FINANCIAL PERFORMANCE OF THE BANKING SECTOR : THE CASE OF KENYAN BANKS AND FINANCIAL INSTITUTIONS (1986 TO 1990).

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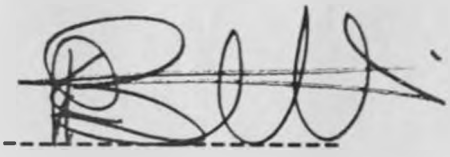
A PROJECT SUBMITED IN PARTIAL FULFILLMENT OF THE DEGREE OF MASTER IN BUSINESS AND ADMINISTRATION, FACULTY OF COMMERCE, UNIVERSITY OF NAIROBI.

JUNE, 1992.

DECLARATION

The project is my original work and has not been submitted for a degree in any other University.

Signed 

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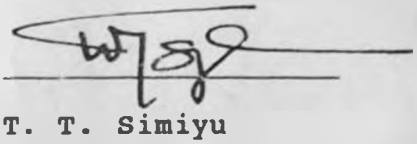
This project has been submitted for examination with my approval as the University Supervisor.

Signed 

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DEDICATED TO MY FAMILY AND PARENTS

TABLE OF CONTENTS

APPENDICES, LIST OF TABLES AND FIGURES:

ACKNOWLEDGEMENTS

I am indebted not only to people who gave me the inspiration to take up this M.B.A. course but also to those who gave me the guidance and assistance on what I have reported here.

Special thanks go to my supervisor Mr.N.T.T Simiyu Lecturer Department of Accounting, for his advice and guidance through out the project work. I also wish to thank all the members of staff of the Faculty of Commerce for their support.

I would also like to thank the University of Nairobi for the scholarship that enabled me pursue the course.

My sincere thanks go to my wife Jane Chepkosgei, Children Jematia, Kiprop, Kipkeitany and Kipruyot whose sacrifice, understanding and dedication toward my course has been enormous.

Lastly, I wish to express grateful appreciation to Elizabeth Chelangat for producing most of this typescript.

Needless to say, I alone assume complete responsibility for any errors.

ABSTRACT

This study sought to do
cument the financial performance of the banking sector for the period 1986 to 1990 and to develop a model to predict bank failure using financial ratios derived from annual published financial statements.

Ratios cannot be evaluated in isolation and they carry some meaning only if related to some standard, hence the need for development of industrial or sector benchmarks. Return on assets (ROA) and return on equity (ROE) for the banking sector is 2% and 24.9% respectively, these can be considered as the sector's performance benchmark or norm and can be used for comparative analysis with other sectors or industries. These norms were developed from a sample of 30 banks who have been in operation for at least 6 years prior to the period of interest (1986-1990).

The Kenya Banking authorities specify statutory ratios that must be complied with by the sector in an attempt to ensure that prudent management practices are employed but banks continue to fail. Bank failure is no doubt very costly to investors, depositors, and society at large and the benefits of being able to predict it before it occurs cannot be over emphasised.

To develop a discriminant function a sample of 6 failed and 27 non-failed (unmatched) banks were used. A set of 6 failed and 6 non-failed (matched) was also considered in an attempt to control for

difference in characteristic of size and age, but the results in the two sets (matched and unmatched) confirmed that financial ratios can perfectly discriminate between failed and non-failed banks.

The discriminant functions developed showed that profitability and liquidity ratios were the best in predicting failure. Each of the fourteen (14) ratios that were considered contributed to the discrimination function but the best ten (10) were net profit/total equity, net profit/total assets, quick ratio, current ratio, net profit/paid up or assigned capital, equity/total deposits, equity/total assets, equity/total loans, current ratio and asset growth rate. The other four ratios had insignificant contribution and were in fact excluded in the matched sample function. These were; total loan/total deposit, deposit growth rate, deposits/total liabilities and net loans/total assets.

BACKGROUND

Banking services are demanded and supplied at a price (e.g. interest rate). It involves the function of buying and selling money in the form of deposit collection from depositors and availing credit to investors or borrowers. A bank must select investment opportunities that suit the borrowers interests and provide incentives to various sources of funds who have surplus funds.[1]

Generally savers and investors will use the financial performance standing of the available institutions as one of the criteria in deciding where to place their funds or where to borrow from.

The Kenyan banking system is very diverse in terms of institutions' sizes and structure. There are 28 commercial banks, 59 financial institutions (non-bank or NBFITS), 10 building societies and 5 representative offices of foreign banks.[2] They range from single office institutions with assets less than Ksh. 20 million, to wide branch network banks with assets above Ksh. 17 billion. This complexity in structure and size must be reflected in their performance levels.

The degree of success and profitability of an institution depends on her managers' ability to achieve satisfactory financial

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[1] Weldon T.J. Taylor and Shaw Jnr.: cited by salami K.A. "Marketing financial Services in Kenya: An overview" Finance, June, 1989. pp. 8-13.

[2] Directory of Commercial Banks, Financial Institutions, Building Societies and Representative offices of foreign banks operating in Kenya. June 1991: Central Bank of Kenya, Bank Supervision Dept.

performance that provides essential public confidence.

This study attempts to outline the financial performance of the Kenyan banking sector by analyzing and generating industrial norms and comparing them to the legal requirements that are imposed on the sector. A performance rating system which is based on more objective sector bench marks can easily be accepted by institutions than those that are arbitrarily assigned in a relatively more subjective manner.

Financial statements is one of the basis for predicting financial performance of a firm and it provides a way of reducing uncertainty faced by creditors and investors.[3]

The Banking Act Cap.488 was revised in 1985 and 1989 mainly because of the banking sector crisis that were experienced in mid 1980s.[4] It seems it is the trend to have revision of banking regulations only after a crisis, as the evidence from the USA indicates.

> **"As our past history has demonstrated, it is very difficult to get significant legislation pertaining to financial institutions through Congress in the absence of a financial crisis."[5]**

The Act gives the Minister of Finance full control of licensing banks both new and branch expansion by existing banks (section 5 & 6 of the Act). While this may act against liberalization or free market, it is essential because it allows the Government to ensure

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[3] Otieno Odhiambo Luther; "Ratios-Strengths and Weaknesses": The Accountant (ICPAK) July/Sept. 1987 pp. 15.

[4] "Problems in the domestic banking scene": Executive; Feb. 1985. pp. 27 - 28.

[5] Horvitz M. Paul: "Stimulating bank competition through Regulatory Action": Journal of Finance, March 1965. pp. 1.

soundness and integrity of the sector. However, bankers would like to see a less legalistic and informal approach to supervision.

"While they accept that Congress wants to make sure that there is no repetition of the recent savings and loan disaster, they believe lawmakers have restricted the commercial banks so severely that they cannot now compete effectively with unregulated financial service firms."[6]

Kenya has a Financial Restructuring Program which has the support of the World Bank with the ultimate objective of liberalizing the sector through introduction of a more competitive financial market.

"Currently the World Bank is involved (through technical assistance or credit projects) in bank restructuring exercise in a number of developing countries including Ghana, Hungary, Kenya, Nigeria, Pakistan, Turkey, Uruguay and Yugoslavia."[7]

Any changes in a country's monetary policy will be reflected in the banking sector's performance, but this effect will have some lag[8]. The Central Bank of Kenya has a department which is charged with the responsibility of monitoring the performance of the entire banking sector, with an objective of ensuring that the sector is sound and runs with adequate integrity to maintain the essential public confidence. **Part VII of The Banking Act** stipulates the powers and responsibilities of the Central Bank, while **Part IV section 17 to 20** specifies the legal financial requirements that

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[6] **Banking World (magazine): "Banks Mourn about over-regulation." April 1992, pp.19.**

[7] **Andrew Sheng: "The Art of Bank Restructuring Issues and Techniques." Economic Development Institute of The World Bank EDI Working Papers 1991, pp. 1.**

[8] **Severn K. Alan & Rangarajan C. "The Response of Banks to changes in Aggregate Reserves".** Journal of Finance **, Dec.,1965.pp. 651.**

ust be met by all institutions licensed under this Act. These equirements are prescribed by the Central Bank in the form of inancial ratios covering Liquidity, Capital, Deposits and Assets. he ratios are uniformly applied on all institutions irrespective f their size, age, and structure. It is expected that such tatutory requirements will direct the institutions to make use of rudent management practices, hence better performance levels that uarantees safety and soundness which is the basis of public onfidence. **This study will also attempt to establish the elationship between the legal requirements and the financial erformance of the sector.** However, a common question in the market s addressed on the need of this central banks' supervisory powers lus their related legal requirements[9]. George G. Kaufman has strongly questioned the need for Federal Reserve System on supervision and control of the sector and he argued that it should nly exist for monetary policy aspects.[10]

In 1978 the U.S.A. bank supervisory authorities jointly introduced a uniform system for rating banks. This system helped in providing quick summary on financial position of individual banks or the overall banking system. For such systems to be effective they should be based on the common characteristics of weak institutions so as to act as effective early warning systems.

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[9]Carson Dean: "Is the Federal Reserve System Really Necessary?": "Reply": Journal of Finance, Sept. 1965. pp. 486 - 489.

[10] Kaufman G. George " Is The Federal Reserve System really necessary ?": "Comment". Journal of Finance , Sept. 1965 pp. 485.

)ut of the banking sector crisis of 1980s and the subsequent ımendment of The Banking Act Cap.488 (then) in 1985 the Government ɜstablished the Deposit Protection Fund, whose responsibilities are specified in Part VIII of The Banking Act, 1989. This fund is to act as a deposit guarantee or insurance scheme for depositors.

The experience of Organisation for Economic Co-operation and Development (OECD) countries suggest that the existence of such schemes act as a powerful instrument for preserving the integrity of the financial system by limiting the likelihood of mass deposit withdrawals and giving the governments more options on how to contain banking sector crisis."

This study will attempt to develop a discriminant model that can be used to categorise banking institutions into non-failed and failed or potential failure candidates.

" Pecchioli R.M. Prudential Supervision in Banking : Trends in Banking Structure and regulation in OECD countries: OECD, 1987. pp. 19 - 20.

CHAPTER 1

INTRODUCTION TO BANKING SECTOR IN KENYA

1.1 OVERVIEW OF BANKING

The Banking sector in Kenya performs several functions which contribute to the functioning of the financial system. Some of their functions include the following:[12]

1. They participate in supply of money through creation of credit in the form of loans.
2. Custodians of public money through deposit collection.
3. Supply of liquidity.
4. Provide flexibility and mobility of money through their maintenance of interchangeability of currency and bank deposits.
5. Provide mechanism of payment in an efficient manner.
6. Provide means of accumulating and investing savings.
7. Provide direct bill-paying or act as agents for collection of bills, and
8. provide business advise to customers.

From the above functions it is clear that this sector plays a very significant role in boosting national output, employment and income. It is therefore one of the fundamental sectors to the country's economic development.

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[12] Salami K.A. "The Role of Liquidity Management; Commercial banks must provide essential public confidence". Finance, September, 1989.pp.12-13.

Kenyan banking sector has been growing at a high rate.[13] The table below shows the growth rate of the sector between 1975 and 1991:

Year	1975	1982	1991
Commercial Banks	14	20	28
Growth rate		43%	40%
NBFITs	10	34	69
Growth rate		240%	103%
TOTAL INSTITUTIONS	24	54	97
Growth rate		125%	78%

Source: Extracted from Central Bank of Kenya Directory of banks and financial institutions and building societies.

This growth rate especially in the 1980s may suggest the financial performance in this sector must be or has been high to warrant the attractiveness for growth.

1.2 BANKING, PERFORMANCE, BENCHMARKING AND FAILURE DEFINED

(a) Banking sector defined:

According to the U.S.A Internal Revenue Code 1954:

A bank is defined as: Any bank or trust company ----- a substantial portion of the business of which consists of receiving deposits and making loans and discounts -----. Such terms also mean domestic building and loan associations."[14]

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[13] Salami K.A " Marketing Financial Services in Kenya An overview". Finance, June, 1989. pp. 8-13

[14] U.S.A Internal Revenue Code of 1954: Cited by Beazer F. William; "The Law Lock-ins, and Bank Portfolio Choice." Jcurnal of Finance,Dec. 1965, pp. 665.

In this study banking institutions (all referred to as banks) are organisations licensed under The Banking Act of 1989, which take deposits from the public and lend the same as loans at some interest. They are essentially profit making organizations who attempt to raise funds at the lowest cost possible and invest or lend at the highest interest rates. In their activities they act as physical intermediaries between savers or depositors and borrowers (investors). In the two major aspects of their operations (i.e deposit collection and lending) assessment of risk by both parties must be considered and this will be reflected in the interest paid or earned by each.

(b) Financial Performance defined:

Performance is the ability to sustain income, stability and growth. It is a measurement of relative investment results,[15] it can be relative to one of the following: assets, capital, number of employees, and other size measures.

Walter has identified three factors (i) to (iii) below, which have made measurement of financial performance complex[16]:

(i) The concern with tax structure which penalizes income and makes investment firms to put emphasis on capital gains rather than their normal operations.

(ii) Continued erosion of purchasing power which forces one to

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[15] **Walter p. Stern: "Performance-Transitory or Real?" Financial Analysis Journal; January-February, 1968 pp. 113**

[16] **Ibid pp. 110-111.**

invest in capital appreciation rather than traditional income objectives.

(iii) Most companies are tied to their business cycle and cannot grow faster than the industry that they are in or their economies.

(iv) Detailed financial information is not available to the general public and reliance on annual reports and accounts, and market price performance may not be sufficient.

(v) Most markets in less developed countries including Kenya are not efficient rendering market based measures misleading.[17]

(c) Benchmarking or Industrial Norms Defined:

Adopting from Pryor S. Lawrence[18], benchmarking can be defined as measuring your performance against that of best-in-class companies, determining how the best in class achieved those performance levels, and using the information as the basis for your own company's targets, strategies and implementation. It is the act of searching for industry's best practices that lead to superior performance. A bench mark is therefore a standard by which an industry or group or class uses to judge the best.

Bench marks are used to understand what level of performance is

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[17] Muragu Kinandu: "Market Efficiency: An Information Approach", The Accountant (ICPAK), Oct/Dec; 1991.pp.18-22.

[18] Pryor S. Lawrence: "Benchmarking: A self-improvement Strategy,": The Journal of Business Strategy: Nov./Dec. 1989. pp. 28 - 32.

really possible, and understand why the gap exists between a firm's current performance and the optimum performance.

"Benchmarking is the key to becoming the best of the best."[19] This means through benchmarking banking sector executives may be able to improve their performance, hence add value to their firms. It is through benchmarking that one is able to compare services and costs of different institutions within the banking sector.

(d) Bank Failure defined:

"A problem bank is one that in the eyes of the Federal banking agencies has violated a law or regulation or engaged in a "unsafe or unsound" banking practice to such an extend that the present or future solvency of the bank is in question."[20]

A failed bank is one which is insolvent, they are largely identified by bank examination procedures or when their creditors take action against them.[21]

For purposes of this study a failed bank is one which has been declared **"a problem bank"** by the Kenya Government banking authorities. A popular example is the set of fourteen (14) institutions that were taken over by the Government in December 1989.[22] Otherwise any bank not declared so is assumed to be a non-

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[19] **Bemowski Karen: "The Benchmarking Bandwargon." Quality Progress, January, 1991 pp. 19 - 24.**

[20] **Joseph F. Sinkey Jr. "A Multivariate Statistical Analysis of the characteristics of problem banks." The Journal of Finance, March, 1975, pp. 21.**

[21] **Paul A. Meyer and Howard W. Piefer: "Prediction of Banks Failures": The Journal of Finance, Sept. 1970 pp. 853.**

[22] **Daily Nation: "Banks to be reconstructed", January, 1990 pp.11**

failed or non-problem bank.

1.3 THE NEED OF THE STUDY

Investment performance measurement in USA became a significant issue to investors from 1960s. Before then investments were monitored without any numerical measures.[23] This significance arose from more competition in the financial market between money and pension fund managers.

" performance measurement has become a significant part of the investment process in the past 25 Years."[24]

May be this significance in Kenyan banking sector has not been realised or it may be emerging now with the current harsh competition in the local financial market plus the recent move to liberalize the industry and develop a more active capital market. Measurement of financial performance largely depends on availability of data. One of the problems surrounding financial performance is lack of a single statistic that can act as a complete measure. It is generally accepted now that no single statistic exists for measuring performance.[25]

The other big problem is lack of a single statistic measure based on past data which can be used to distinguish managers who can do well from the poor ones. Altman argues that the target of 1980s has been towards development of such distinguishing measures. This

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[23] **Altman I.E: Handbook of Financial Markets and Institutions; John Wiley & Sons. Sixth Edition (1987) pp.27-3.**

[24] **Ibid pp. 27.3**

[25] **Ibid pp. 27.4**

may be the ultimate ideal objective of such performance studies in the future.

Flotation of shares by banking sector firms has been significant in the last six years as it increased from 4 to 7 institutions, registering an increase of 75% . Investors through brokers or directly would be interested on knowing the performance of these firms and the only source that is readily available is the annual published reports and accounts plus stock market prices. The performance of such institutions is not apparent from such public information as there is need for further analysis for one to derive any meaningful performance measure from them. It is therefore necessary for users to re-express the financial statements through calculation of ratios and observing trends. It would also be of investor's concern to know the effect of being quoted on the stock exchange on a firm's performance, this would come out more clearly by comparing performance before and after being quoted.

"Indeed, within the context of asset and liability management, a bank's ability to raise needed funds in the market place depends critically upon the standing of the bank in the market ..... which is a direct function of the market perception of its; capital strength, profit performance and outlook".[26]

The need of this study is justified by the great emphasis placed on earnings or profit performance as opposed to other measures such as asset volume growth rate.

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[26] **Pacchioli Op. cit. pp. 117.**

Banking sector management have shifted their focus to profitability because of recent developments in their sector which include:[27]

1. The need for additional capital adequacy funds meaning profit should be boosted as a major source, (the Kenyan Banking Act of 1989 section 7 & 18).
2. Increasing need of provisioning by the Government banking authorities, (section 20 (2)).
3. The need for funds to gather for expansion and modernisation of customer services through advanced technology which calls for capital intensive projects for institutions to achieve readily acceptable outlook and efficiency.
4. High volatility of interest and exchange rates coupled with harsh competition especially with the current liberalization means that the sector members are facing a higher risk exposure.

Banking sector holds a significant portion of Kenya's GDP, in 1989 it had 20% GDP, by holding assets of about Shs 33 billion compared to the country's GDP of Shs. 170 billion (at current price then).[28] This means the performance of banking sector is of great concern in determining the country's economic performance or growth in national wealth.

Also because the banking sector interacts with all other sectors of the economy its performance may be a reflection of the entire economy's performance and will definitely be of concern to national

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[27] **Pacchioli Ibid pp. 117.**

[28] **Central Bank of Kenya Economic Report: for the financial year ended 30th, June 1990. pp. 36 & 54.**

economic planners.

1.4 STATEMENT OF THE PROBLEM

The Kenyan banking sector institutions as mentioned earlier are complex in structure and size. All parties interested with their performance may be facing problems out of their diverse complexities. This problem may be more significant to bank supervisors whose role is to ensure that the entire sector is sound and adequately serves the financial needs of the public. Despite these complexities The Banking Act specifies financial ratios which are to act as basis of good performance. These ratios are applied uniformly across the sector without any discrimination in relation to an individual institution's major characteristics such as size in terms of assets, capital, branch network, age, deposits etc.

However, there seem not to be any evidence in this sector to confirm that such ratios are the best indicators of sound financial performance.

Ratios have meaning only if related to some standard.[29] This justifies the need for some financial performance standards or bench marks of the banking sector in Kenya for their related ratios to carry some meaning.

In summary the study attempts to answer the following questions among others:

1. What could be considered as the industrial norms or standard

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[29] Craig G. Johnson: "Ratio Analysis and The Prediction of Firm Failure". The Journal of Finance, Dec. 1970, pp. 1166.

ratios of the Kenyan banking sector?

2. Which ratios are most important in detecting financial performance level of financial sector institutions and therefore can be used to predict potential failure banks?

3. What weight should be attached to each ratio that is selected? and

4. How should the weights be objectively established?

1.5 OBJECTIVES OF THE STUDY

1. This study attempts to develop banking sector's financial performance norms by using accounting based measures.

2. To establish whether financial ratios can be used to discriminate between non-failed and failed or problem banking institutions. The findings will then be compared with those ratios which are being enforced by the banking authorities in terms of their strength in prediction of bank failure.

"Section 17: Specifies the required ratio between capital and deposits.
Section 18: Specifies the required ratio between capital and assets.
Section 19: Empowers the Central Bank to specify the minimum liquid assets and lists those items that are considered to be liquid."[30]

1.6 IMPORTANCE OF THE STUDY.

Financial performance analysis is done for the benefit of financial decision makers which include; investors, lenders, managers, labour unions, government, etc.

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[30] **The Banking Act. of 1989. Part IV**

This study may benefit the following parties:
Investors, depositors, financial authorities (NSE, CMA, the Government, the Central Bank, etc.), the banking sector executives, financial consultants, and academicians.

Financial performance measure is important to most parties as it assists them to predict the future course of a firm in terms of its likely earnings, stock prices, growth, and cash flow. Due to the varied number of interested parties with different interest it is difficult to come out with a uniform measure that equally satisfies all. There is need for methods that are flexible and general to accommodate different user needs.

The common purposes of performance analysis may include any of the following forms:-

(1) Comparing an actual performance with an expectation or objectives,

(2) analyzing sources of good and bad performance,

(3) comparing performance of a single firm in different periods,

(4) comparison of performance of a firm with established industry bench marks.

If it can be established that financial ratios can predict or explain bank failure cases that were experienced in 1980s then banking authorities may consider using such techniques to determine how their supervisory resources can be allocated more efficiently. The next section of literature review discusses various methods of measuring financial performance and gives advantages and

disadvantages of each. It also gives some background information of bank failure.

CHAPTER 2

LITERATURE REVIEW

This Chapter is divided into two parts, Part I discusses various methods of measuring financial performance while part II covers some empirical evidence of bank failure.

PART I

METHODS OF MEASURING FINANCIAL PERFORMANCE

The two major methods of evaluating financial performance can be in two basis:

(i) accounting data based and

(ii) market based.

This study considers both methods in this chapter and an outline of both is given with their advantages and disadvantages.

2.1 ACCOUNTING DATA BASED METHODS (Traditional Techniques)

These are methods which utilize accounting data, they include annual profits, earnings per share, return on capital employed or return on shareholder's equity, total return rate on assets and earnings growth rate. Most of the accounting measures are based on ratio analysis and it is important at this stage to look at various characteristics of ratios identifying some of their strengths and weaknesses.

2.1.1 Characteristics of ratios

Ratios are quantified concepts that allow an entity to be evaluated against its peers (likes) and its own historical performance.[31] Evaluation of financial performance of banks largely employ skills of financial analysts who have the art of interpreting financial statements, and ratio analysis is a major tool in this task.

Ratios can be classified into two, **time** and **snapshot.**[32] Time ratios measures period-to-period changes of a single item (e.g. earnings), while snapshot measure a relationship between two items in a single period (e.g. earnings to assets both in 1988). However, what is important in ratio analysis is the **level** and **trend.** For example apart from establishing earnings as being 20% of asset (level) one would want to know whether that ratio has been on a rising or falling (trend) over time.

Ratios can also be classified into **normative** and **descriptive.**[33] Normative are those which permit **value judgement** (e.g return on assets, net charge-offs to loans, and equity formation rate). Descriptive do not permit immediate value judgement, but will tell more about the kind of entity one is analyzing (e.g net interest margin, and break-even yield).

To arrive at comparative performance analysis for the Kenyan

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[31] **Lysons J.J, Intrator L.J. and Probber M.R. Bank Analysis from External Sources, Cates, Lyons Co. INC NYC (1980) pp.5**

[32] **Ibid pp.5**

[33] **Ibid pp.6**

banking sector one must come out with the "mean" ratios of institutions in the same peer group (i.e those same in size, operations, locations and/or network). Ratios are also **'interact'** because one ratio can be explained by one or more other ratios.

> **"The point is that it is essential to relate ratios together in order to make valid interpretations"[34]**

This means the fewer the ratios used in an analysis, the greater the risk of misinterpretation. This problem can be compounded by the judgemental conclusions drawn by analysts.

2.1.2 Arguments for Accounting Economic Based Measures

1. Accounting numbers will reflect any actions that are taken by managers. This means whenever managers take any actions that do not work towards improving shareholders wealth then the same will be reflected in accounting earnings figure and on any other earnings based figures or ratios.

> **"The capital market response to an earnings announcement is correlated with the magnitude of the 'unexpected' component of the earnings number"[35]**

This means the share prices of a quoted bank will fall to reflect any unexpected fall in earnings and vise versa.

2. Accounting ratios can be used to predict effects of some firm's position in future. Altman (1968)[36] used accounting ratios to discriminate between bankrupt and non-bankrupt firms where he

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[34] **Ibid pp.8**

[35] **Brown (1968) and Beaver (1979): Cited by Mwarania K.M : "Executive Compensation Shareholder Wealth and Managerial Performance". The Accountant (ICPAK) October-December 1986 pp.5-7**

[36] **Altman (1968): cited by: Mwarania K.M., op cit, pp.6.**

established that the firms could have been predicted correctly two years before bankruptcy. Similarly Wansley's studies of 1983[37] showed that price earning ratio and other accounting ratios could be used to discriminate between firms that were takeover targets and that were not, he concluded that a correct prediction could have been made a year before the takeovers. Beaver used 30 different financial ratios and he concluded that investors use the information content of ratios in predicting corporate sickness or failure and he suggested that ratios can be used to predict failure five (5) years prior to failure[38]. These studies show that investors and other financial decision makers can base their actions/decisions on ratio analysis.

3. Kaplan[39] has argued that accounting measures act as a better assessment tool on managerial performance or actions than market based measures. This is because market based measures are more prone to external factors that are outside managers control (e.g stock price, government actions, labour shortage, general business conditions).

"Accounting measures may provide less 'noisy' indicators of the profitability of the actions taken by executives"[40].

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[37] Wansley (1983) cited by Mwarania K.M., op.cit, pp.6

[38] Beaver (1966) cited by : Otieno Odhiambo Luther; op. cit. pp. 18.

[39] Kaplan S. Robert: Advanced Management Accounting. Prentice-Hall of India, (1988), pp.569

[40] Mwarania K.M "Executive Compensation Shareholder Wealth and Managerial Performance". The Accountant (ICPAK). October-December, 1986 pp.5-7

4. Accounting figures are based on standard generally accepted rules which can be used by auditors to verify their accuracy. Thus they are better measures because they are checked by both independent parties (auditors) and any users who are familiar with such rules.

5. Accounting measure are simple to compute and the information required is always readily available. For example Banks and financial institutions are legally required to publish their annual balance sheet once a year in any public daily news papers[41]. This means some accounting information for the sector is readily available to any interested party through the press.

2.1.3. Disadvantages of Accounting Based Measures

Financial statements data have inherent limitations, and it follows then that ratios inherit some limitations from them. Miller[42] argued that earlier studies were theoretically and practically wrong because they emphasised individual ratios as opposed to combination of highly reflective ratios or multivariate ratios that were studied by Altman.[43]

1. Accounting numbers are based on 'ad-hoc' rules specified by the accounting profession. Lack of consistency of these rules within and between firms is a problem in arriving at true

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[41] The Banking Act of 1989 Part V Section 22.

[42] Miller (1966) Cited by : Otieno Odhiambo Luther; op. cited pp. 18

[43] Altman (1971) pp. 58 : Ibid. pp. 18

comparative analysis. For example institutions being compared may have drawn their accounts using different accounting policies like KCB who used historical cost with modification for revaluation of freehold and lease properties in 1987 which other banks may not have.[44]

2. When accounting numbers reflect an increased performance it is not automatic that shareholders wealth also increases correspondingly. Rappaport (1981) identified this feature in USA between 1974 and 1979 when EPS grew by 15% while in the same period return to ordinary shares was below inflation rate or negative.[45] This means in some situations there may be some inconsistency between accounting measures and shareholders wealth. This feature would be more significant in periods of high inflation.

> **"The 'fictional' accounting gain is simply an artifact of the impact of inflation on profits computed from the historical-cost accounting system."[46]**

3. Management can increase accounting earnings by using actions that do not benefit the stockholder or even decrease the firm's value,[47] e.g sell-of assets whose market value is well in excess of book value or changing accounting policies like depreciation methods.

4. Window dressing of accounts is another disadvantage. This

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[44] **Kenya Commercial Bank Limited: Annual Report and Account 1987.**

[45] **Mwarania K.M op cit pp. 6**

[46] **Ibid pp.6**

[47] **Kaplan S.Robert: op cit.pp. 569.**

is serious in banking industry as it is easily employed to derive some desired balance sheet appearance. It is mainly used to conceal poor or deteriorating financial positions.[48] [49]

2.2 MARKET BASED MEASURES

Out of the above negative arguments on accounting based measures other non-accounting based methods have been developed and the most important one is the market based. Shareholders are interested with what they can fetch incase they sell the share now or in future. This means market values would be of more relevance to them than accounting-based or book values.

2.2.1 Advantages of Market-based Measures:

1. Managers cannot easily manipulate share price values as compared to accounting numbers which can easily be manipulated through change of accounting policies.
2. Share prices are derived from market forces (demand and supply) by investors, or brokers who act on any information related to the firm. This process makes it a more objective measure than the accounting measures which are based on arbitrary accounting principles applied by managers.
3. Measuring shareholders wealth using market based information

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[48] Eldoret Residential Seminar by Pannel Bellhouse Mwangi "Banks and Financial Institutions" The Accountant (ICPAK) July/September 1987, pp. 21-22 & 27.

[49] Largay and Stickey (1980) pp. 51 : Cited by Otieno Odhiambo Luther Op. cit. pp. 16.

is simple. Change in share holders wealth = Change in share price over a period plus dividends over the period, (i.e. after making adjustment for inflation).[50]

4. Market share price is seen to be a better estimate of future cash flows than book values.

2.2.2 Disadvantages of Market Measures

1. A share price may not really reflect the real value of the firm because it considers only that information which is available to the public and may not include any inside information.

> **"The people within the firm do not want to tell the world about all those transactions, partly because it would be costly and partly because it would give out information the firm might regard as proprietary"[51]**

This means the conditions of inadequate disclosure of information forces users of financial statements to manipulate what is reported to get out the best estimates of a firm's value.

2. It may be unfair to use share prices to evaluate financial performance of managers because share prices incorporate external market factors which are beyond the managers control[52]. If used it may cause some unfavourable transfer of wealth between shareholders and managers.

3. Kenya capital market may not be well developed and even some

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[50] **Mwarania K.M. op. cit. pp.7**

[51] **Fisher Black op. cit. pp. 21.**

[52] **Kaplan S. Robert, op. cit. pp. 570.**

publicly available information is not adequately processed.[53] [54] This is because for share prices to reflect a true shareholders wealth there must be a mature and an efficient capital market. From the above arguments against market based measures one can conclude that Kenyan banking sector share prices may have little or no relation to the true value of banks.

2.3 SELECTION OF AN APPROPRIATE METHOD

Where an efficient capital market exists then the market determines the prices of securities of various firms and security prices have been shown to be useful forecasts of firm performance reflecting future performance in a relatively unbiased way.[55] In countries like Kenya where capital markets are not well developed as quoted earlier we are forced to rely on available financial data which takes us to traditional form of analysis.

The basic difference of the two methods is that market prices reflect a **point in time** value while accounting data based values are associated with a **period** as they measure change in value over a period. This may explain why published accounts must have previous year's figures to facilitate evaluation of change in value over time. Beaver in his later studies concluded that there was no perfect association between ratio forecasts and market movements he suggested that investors look at both ratio and non-ratio

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[53] **Muragu Kinandu op. cit. pp. 20-21.**

[54] **Mwarania K. M. op. cit. pp. 7.**

[55] **Beaver (1987) :Cited by Otieno Odhiambo op. cit. pp. 15.**

information.[56]

From the above analysis of the two major methods it can be concluded that none may be considered the best. It is recommended that both are used because a single method may not be best for all firms. Consideration should be given to the purpose of measurement e.g if it is for evaluation of management then it is more sensible to use that which has less influence from external factors.

[56]Beaver (1968) : Cited by Ibid. pp. 18.

PART II

EMPIRICAL EVIDENCE OF BANK FAILURE

2.4 EARLY STUDIES

Most bank failures are of recent times and not much has been documented[57], other than public media covers (i.e. newspapers, magazines and journals) in Kenya no other literature on this subject was found. However, other studies on the same include Sprague (Nov. 1927), Spar (March, 1932) and Garlock (1941), those of 1960s are Cotter (1966) and Cox (1966)[58]. Most of the earlier studies (before world war II) were few and did not ascertain the specific characteristics which differentiated failed from non-failure banks. Hoace Secrist (1938) suggested that simple balance sheet analysis cannot discriminate banks into the two groups and he recommended that better differentiation can be achieved through multivariate analysis.

2.4.1 Bank Failures in America

Bank failures have been recorded through out American history as shown on the table overleaf.

These failures prompted the American government to take extensive legislative amendments in an attempt to prevent such similar occurrences. For example banks were barred from paying interest on

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[57] **Andrew Sheng "The Art of Bank Restricting": EDI working papers World Banks 1991 page 1.**

[58] **Paul A. Mayer and Howard W. Piefer: Op. Cited. pp. 854.**

demand (current account) deposits and other excessively risky activities such as stock under-writing. In 1933 federal deposit insurance corporation (FDIC) was established and this institution provides insurance cover to depositors which in turn enhanced the public confidence on the banking sector.

Table 2.4.1 Bank failure in America:

Period	Number of banks which failed or suspended operations	Total banks in existence
1. Panic of 1893	approx. 500	9,500 (5% failed)
2. 1913 Monetary Crisis	105	not given
3. 1914-1915	over 150	"
4. 1916-1917	over 150	"
5. 1920s	an average of 588 each year[59]	"
6. 1930s to 1933	9,100	"

Source:extracted from Chayim Herezig-Marxs: Bank failures[60]

2.4.2 Bank Failures in Kenya

Similar failures were experienced in Kenya in 1980s where about fourteen banks and financial institutions failed (collapsed).

"..... taken to avert a repeat of the 1984/5 chain collapse of banks and financial houses-----"[61]

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[59] **NOTE: Data on bank supervision prior to 1934 are not wholly comparable with data from later years because some suspended banks subsequently reopened.**

[60] **Thomas M. Havvilesky and John T. Boorman: Current perspectives in Banking: Operations, Managements and Regulations,AHM Publishing Corp. second edition, (1980). pp. 488-489**

[61] **Daily Nation : "Banks to be reconstructed 2 World Bank experts appointed for the purpose"; Tuesday 2nd January,1990 pp.11**

Similarly, the Kenya government like the U.S. introduced some amendments in their banking act in 1985 and 1989 as a result of these crisis. In the 1985 amendment an insurance scheme under Deposit Protection Fund Board (DPF) was established (part VIII section 36-42 of the Banking Act refers) to protect the interests of depositors. This board has started playing some significant role in taking over or managing problem institutions or lending funds to them e.g formation of Consolidated Bank of Kenya in 1989 as a means of enhancing the public confidence in the banking sector.

2.4.3 Implications of Bank Failure

When banks fail, investors, depositors and general public (society) face some losses or costs. Prediction of failure due to whatever cause will help in reducing the length of time losses and costs, are incurred, and minimizes the amount of misallocated resources.[62] This means it pays for economies to minimize the chances of bank failure arising in order to eliminate waste or misallocation of scarce economic resources. This can only be realised if the causes of bank failure are known and is possible to identify potential failure candidates (institutions) early enough so as to allow for some safety or reconstruction schemes to be developed and implemented successfully.

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[62] Paul A. Meyer and Howard W. Piefer. op. cited. pp. 853

2.4.4 Findings of Empirical Studies

Empirical findings have shown that factors such as asset composition, loan characteristics, capital adequacy, sources and uses of revenue, efficiency, and profitability act as good discriminators between failed and non-failed banks. Sinkey (1970) in his study hypothesised that quality of management and honesty of employees are the major internal factors which explain banking problems as opposed to external factors. Mayer and Piefer also agreed that external factors are relatively unimportant because local economic conditions had not been significant causes of problems in U.S banks.

Although it may be difficult to measure these two major factors, managerial ability can easily be identified through performance measures. However,it is expected that over a period of time these factors can be reflected in a banks financial statements. This means by examining financial ratios one may capture the results of management decisions and will indirectly be evaluating managerial performance.

Altman (1968) carried out his survey in USA, Japan, Brazil, Australia and Canada and in all the five countries he found marked differences between financial ratios of failed and non-failed groups of firms [63]

If differences between good and poor management can be reflected in financial ratios over time then analysis of such data allow

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[63]**Foster George: Financial Statement Analysis; Pentice-Hall International. Second Edition (1986) pp. 551.**

prediction of bank failure in advance.

Previous studies in America have shown that most bank deterioration to problem status (or collapse) is not an overnight change but is a gradual (over-time) development. Such findings can be seen as the basis of developing financial based predictors of potential failure candidates.

Factors such as size, number of offices or branch network, local market or sector conditions may have a direct impact on an institution's financial performance and may not allow direct comparability of different banks. To control for such anomalies a set of carefully matched institutions may be used in development of discriminant functions. Piefer (1970) matched banks under the following conditions:-

(a) the same city,

(b) approximately same size (or peer groups), this can be based on assets, deposits, branch network or any other measure of size.

(c) same age,

(d) same regulatory requirements, and

(e) used data which covered the same period.

Such similarity allowed Piefer to ignore exogenous variables such as local economic conditions because they were considered to apply uniformly, and therefore insignificant to be included in the analysis.

2.4.5.Early Warning System of Potential Failure Banks

Sinkey (1975)[64] developed a model which was used to predict potential problem banks that required more attention from bank examiners. He developed the model by comparing 113 problem with 163 non-problem banks and determine the ratios which had the minimum misclassification by carrying out two tests:

(1) test of equality of group means and

(2) test of dispersion matrix equality between groups.

He found that net capital ratio was the most important discriminator between problem and non-problem banks. The model was in form of a quadratic equation:

$1.8195\ (NRC) - 0.0711387\ (NCR)^2 - 4.4503 <= 0$

where:

NCR = (K + R - C) / A

K = total capital accounts

R = valuation reserves

C = loans that are unduly risk

C = L + D + S where:

L = "loss " classified loans

D = "doubtful" classified loans

S = "substandard" classified loans

If the value of the LHS of this quadratic equation is equal to or less than zero then the bank was classified as a problem bank and required closer monitoring.

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[64] Harvilesky T.M. & Boorman J.T. op. cit. pp. 509-525

Sinkey's second study was on information content of balance sheet and income expense data where he confirmed existence of information content. From this study he concluded that an early warning system would be effective only if the following problems are resolved:-

(1) The information is extracted in a timely and efficient manner. This calls for on-spot examination immediately after data have been analyzed.

(2) Supervisory and examination personnel are convinced that information is useful.

Sinkey improved his single ratio prediction model by developing a discriminant function based on multivariate discriminant analysis (MDA) technique where seven variables (ratios) were used.

The seven variables used were:-

(1) LRI = interest and fees on loans as a percentage of total operating income, (this measures the level of income concentration).

(2). OEOI = total operating expense as a percentage of total operating income, (this measures operating efficiency of management).

3. USA = US government securities as a percentage of total assets, (this measure liquidity and asset composition).

4. SLA = state and local securities as a percentage of total assets, (this measures asset composition).

5. LA = total loans as a percentage of total assets, (this measures loan volume as a composition of assets)

6. NFA = Net Federal Funds, (sales minus purchases) as a

percentage of total assets, (this measures federal funds activity and aggressiveness of liability management).

7. KRA = capital and reserves for bad debt losses on loans as a percentage of total assets.(this measures capital adequacy).

Out of application of such ratio analysis the American banking authorities have developed an early warning system which computes three statistics that compares each predicted problem bank to all insured commercial banks in the whole country, region, and state.[65]

2.4.6 Advantages of an Early Warning System:

1. Prevention of bank failure :

An early identification of problem banks allows banking authorities to focus on them and prevent further deterioration. This may mean fewer bank failures and minimize losses to deposit protection fund, depositors and society in general.

2. Banking authorities will be able to allocate their examination resources more efficiently as the system can be used to determine the order, depth/intensity and frequency of each bank's examination.

3. The system will give more value to balance sheet and profit loss information and other statutory returns collected by banking authorities as they will be more useful in providing data for the warning system.

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[65] **Ibid pp. 522**

4. It makes identification of problem banks more objective therefore strengthen the acceptance of banking authorities evaluation in the industry.·

5. The model also acts as a means of evaluating the supervisory authority member's ability to rate banks correctly.

6. It allows individual institutions' management to carry out self-appraisal evaluation which may lead to more prudent management skills being employed in the industry.

2.4.7 Causes of Bank Failure ✓ Our own Causes

Aristo'bulo de Juan[66] identified the following as major causes of bank failure: mismanagement, lack of/or poor supervision, and political pressure.

(a) Mismanagement

This can be classified into four types: technical, cosmetic, desperate and fraud.

(i) **Technical mismanagement** - arises out of application of inadequate policies and practices which can take the form of over extension, poor lending, lack of internal controls, and poor planning in management functions.

(ii) **Cosmetic management** - this involves buying time to remain in control by hiding past and current losses . This can take the form of rolling over loans, capitalization of interest

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[66] Aristo'bulo de Juan "Does Bank Insolvency Matter? and What to do about It?" EDI Working Pagers World Bank, 1991 pp.1-33.

Ref

(when it is clear that it will not be realized at all) and fictitious or unrealistic collateralization.

(iii) **Desperate management** - arises when bank managers see a danger of having losses (capital loss) or not being able to meet a target dividend pay out rate and seeks for ways of making up for such deterioration. Common practices used are speculation, paying above market rates for deposits and charging high interest rates.

(iv) **Fraud management** - arises when management decides to divert part of the bank's liquid funds when dangers of iliquidity approach. Common methods employed are lending to companies and buying or selling companies that are owned, or connected with the bank.

(b) Poor or lack of supervision

The purpose of supervision is three fold: regulatory, verification and enforcement. A supervisory unit is effective if the regulatory system gets proper disclosure of information, and have an effective and efficient means of verifying the true position as reported. Also the unit should have an effective and prompt means of enforcing any remedial action that is deemed necessary otherwise any identified problems may grow and the supervisory mechanism will be discredited.

"Many developing countries show some major gaps in bank regulation."[67]

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[67] **Ibid pp.5**

De Juan has identified six bank supervisory weaknesses which less developed countries face:

(a) Capital adequacy requirements are too low to absorb losses and some elements that are considered as capital are not proper e.g frequent property revaluation reserves.

(b) Capital requirement is expressed as a percentage of deposits or assets without considering the risks involved.

(c) Accounting systems are poor especially on loan classification which is based on formal requirements of security cover as opposed to the actual riskiness of the borrowers.

(d) Limitation of exposure or loans to related parties are relaxed.

(e) Regulatory institutions are within the central bank or ministry of finance with limited powers, insufficient quality staff with low remuneration. Most of their on-site work place more emphasis on administrative regulations as opposed to financial health of banks.

(f) External auditors who are meant to supplement regulatory system is a failure because they merely adhere to domestic accounting principles which are not explicit on principle risk areas such as provision for loan losses and interest accruals.

(c) Political pressure

Governments influence the running of banks through the following ways:

(a) Banks may be required to invest on specific sectors or government securities.

(b) Most state-owned banks have their management appointed under

political considerations making it difficult to have competent and independent professionals in the board.

(c) Pressure on non-recovery or tolerance for non-repayment is common.

(d) Inadequate legal procedure for recovering loans which are lengthy and complicated and some take over five years.

2.4.8 Common Features of Potential Failure Banks

De Juan identified the following as common features of distressed or problem banks[68]:

- o Negative net worth out of past or present losses.
- o Non-disclosure of losses out of poor accounting rules and practices, inadequate supervision, and unreliable external auditors.
- o Extravagant spending making operational costs rise out of proportion with the size of the business.
- o They provide high deposit rates to attract funds as they need liquidity at any cost. This compounds the loss making position as cost of funds will be too high.
- o Lending at high interest rates to mainly speculators and high risk operators who may be unable to repay.
- o Deterioration of loan portfolio as they keep lending more to their major big borrowers because of fear that if they fall the bank will equally follow suit.
- o Use of hiding and creative accounting.

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[68] Ibid pp. 2-4

CHAPTER 3

PERFORMANCE ANALYSIS TOOLS

3.1 MAJOR RATIOS TO BE USED IN THE ANALYSIS

3.1.1 EARNINGS AND PROFITABILITY RATIOS

Earnings is the most important factor to analyze because it is essential for:-

a) Absorbtion of loan losses

b) To finance internal growth and act as an indicator of share holders wealth growth through earnings formation rate (EFR).

c) Earnings growth rate is compared to asset growth. If asset growth is high while earnings growth is low then assets of lower profitability may have been acquired (reducing earnings growth) or asset expansion at the expense of profitability has been undertaken.

To evaluate earnings return on total assets (ROA), net earnings divided by total assets is examined. This is a level ratio, other level indicators include return on stockholders' equity or networth.

3.1.2 CONDITIONAL ANALYSIS RATIOS

Lyons, Intrator and Probber[69] argue that it is important to do further analysis on **capital adequacy, asset quality, liquidity** and

[69] **Loys J.J.,Intrator L.J. & Probber M.R. op. cit. pp. 67 - 92.**

off-balance sheet risk, to be able to come out with better performance evaluation of any banking sector. The justification of extending analysis to these aspects is because earnings effect is finally reflected in these items. At the same time poor earnings may be realised out of the poor firm's conditions that may be reflected in these 4 areas.

a) Capital Adequacy

Capital adequacy and formation can be evaluated through four ratios:- (i) equity formation rate (EFR), (ii) capital as a percentage of total assets, (iii) capital to total loans and (iv) capital to total deposits. The Basle Committee report of mid-1980s[70] plus the Central Bank of Kenya's Circular no. 1/86 of 1991 [71] requires banks to maintain a minimum capital at 8% of total assets.

EFR= Retained Earnings/Shareholder' equity. It shows the extent to which equity growth can support loan or asset growth.

b) Liquidity Position.

Section 19 of the Banking Act of 1989[72] requires banks and financial institutions to maintain a liquidity level of 20% and 24%

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[70] **Frame work for measuring risk based capital: A report from Basle Committee on Banking Regulations and Supervisory Practices.**

[71] **Central Bank circular No. 1/86 of 1991 issued to all banks and financial institutions on capital adequacy requirements.**

[72] **The Banking Act. of 1989. Section (19)**

of their total deposit liabilities respectively. Where liquid assets includes cash in hand, net balances with the Central Bank, current accounts with other banks and financial institutions plus uncleared effects, and Kenya Government Bills[73].

Liquidity is a relative term, it is considered to include only those assets that can be converted into cash in the shortest time possible with a minimum loss. In this banking sector any asset that can be liquified into cash within a period that is less or equal to 90 days is considered to be liquid.

> **"Liquidity management is the focal point of commercial bank's management".[74]**

Liquidity acts as defense from unexpected losses that may arise out of deposit run-off crisis or when external fund interest rates rocket forcing the bank to get other funds, e.g acquiring additional liabilities under adverse market conditions like Trade Bank and Panafrican Bank[75].

The following ratios are to be employed in evaluating liquidity position:-

(i) Quick assets to deposits= $\frac{\text{Cash + Marketable Securities}}{\text{Total Deposits}}$

This measures the ability to liquidate current assets to meet deposit run-offs.

(ii) Loans to deposits = Total loan/Total Deposits. This measures

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[73] **Salami K.A. " The Role of Liquidity Management ". Finance, September , 1989. pp. 12-13.**

[74] **Ibid pp. 12.**

[75] **Daily Nation (Kenya), 8th Feb., 1992.**

the extent to which deposits are locked up in loans or the extent to which deposit money is utilized.

(iii) Current ratio = Current Assets/Current liabilities. It measures the ability of liquidating current assets to meet current liabilities as they fall due.

Liquid assets that are maintained to meet the minimum legal requirements are of extremely limited use as assets. Bankers generally consider legally required reserve balances as part of the most illiquid segment of their asset portfolio. They see it as useful over long periods just as a cushion against penalty rates of interest.[76] This means banking sector is being forced to sacrifice profitability at the expense of meeting legal requirements.

(C) Asset Quality

Most of the ratios that are meant to measure this condition are not available on published accounts unless one gets access to more detailed accounting data. Ratios such as:(i) percentage of non-performing loans and (ii) non-current loans to total loans, and (iii) loan loss reserves to total loans, are better measures if relevant data were accessible. In published accounts net loans (after deducting provisions) to total assets shows what portion of assets is in loans. The trend of this ratio should be compared to deposit liability growth rate.

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[76] **Carson Deane: Op. cit. pp. 486.**

3.2 MARKET RELATED MEASURES

Use of price earning ratio where a company's market price and most recent earnings is used to arrive at estimated value, this is a popular method[77]. In this method earnings is multiplied by a standard price earnings ratio to get an estimated firm value. Trend analysis of such values may give an indication of the financial performance of each institution if the relevant data were available. The basic problem is that most of these institutions are not quoted in the stock exchange , while some of those quoted might not have had a reasonable period in the stock market to allow stability. Among the non-bank institutions only Credit Finance Corporation, Diamond Trust, Kenya Finance Corporation and National Industrial Credit are listed and all have had more than five years in the stock market. For banks it is only Barclays which has operated in the stock market for almost five years the other have had 3 and 2 years KCB and Standard respectively. Other closely related methods that could be used include dividend yield basis. As mentioned earlier in section 2.2.2 above inefficiency of Kenya Capital Market may disqualify the use of most market based methods. In view of the above analysis of market based measures in Kenyan banking sector this study will employ only accounting based performance measures.

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[77] Mellet J.H. and Edward R.J. :Accountancy for Banking Students : The Chartered Institute of Bankers, 3rd Edition 1988. pp. 251-280.

CHAPTER FOUR

RESEARCH DESIGN

This chapter specifies the research design that was employed to achieve the two main objectives stated in **Chapter One.**

4.1 THE POPULATION AND PERIOD OF STUDY

All banks and financial institutions registered and licensed under the Banking Act.

The period of study is between 1986 and 1990.

Choice of period of study is five years and this is taken to be reasonable because average ratios shift over time[78], and due to availability of necessary data.

4.2 THE SAMPLING CRITERIA

4.2.1 THE SAMPLE CRITERIA FOR SECTOR PERFORMANCE BENCHMARKS

This section gives the criteria for selecting a sample of institutions that were used to derive sector performance norms or benchmarks.

For the purposes of this study an institution must meet the following criteria to be considered relevant for the study:

1. Should have been in operation before or from 1980.
2. It's annual reports and accounts must be accessible as the study is based on financial performance measures that are accounting based.

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[78] Edward I. Altman: "financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy". The Journal of Finance, Sept. 1968. pp. 590.

3. The firm must be in operation at present.

The objective of using this criteria is to ensure any outlier that may arise from new or exiting firms is eliminated. It is assumed that the five year operation period is adequate for a firm to get to its maturity state for purposes of measuring its average financial performance.

Based on this criteria 41 institutions were eligible as the population of study but information for only 30 was available and all these were considered in the analysis.

4.2.2 SAMPLE CRITERIA FOR DETERMINATION OF DISCRIMINANT FUNCTION

This section describes the criteria used to derive a sample of institutions that were used to establish that the ability ratios can discriminate between failed and non-failed banks.

The initial intention was to consider all 14 banks that failed and were taken over by the Government in 1989 but data for only 6 institutions was available and all (6) were considered in the discriminant analysis.

To derive a reasonable sample size a control group of 27 non-failed banks were considered. Again these were the only ones whose financial statements covered the period of interest (1987 and 1988) and were available.

Kiragu[79] and Piefer (see section 2.4.4) used matched samples to

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[79] **Kiragu I.M.; "Prediction of corporate failure using price adjusted accounting data.": A unpublished M.B.A. Project of the University of Nairobi; July 1991, pp. 25.**
Kiragu used 10 failed and 10 non-failed firms in an attempt to control for variability of company characteristics.

improve comparability of results.

To test for the effect of unmatched sample size, mentioned above another set of 6 failed and 6 non-failed matched banks that were similar in size and age were analysed over the same period.

4.3 DATA COLLECTION (applies to all samples and objectives)

The study is based on secondary data. This is a set of characteristics mainly ratios that are derived from annual reports and accounts of the population of interest.

The accounts details were obtained from individual institutions, Nairobi Stock Exchange, daily news papers, journals and magazines for the period 1986 to 1990.

Sixteen (16) financial ratios were used in the analysis, all are listed below:

Net profit Before Tax/Total Assets
Net profit Before Tax/Paid up or Assigned Share capital
Net profit/Total Shareholders' Equity
Asset growth rate
Stockholder's equity/Total Assets
Stockholder's Equity/Total Loans
Capital & Reserves/Total Deposit
Quick Assets/total Deposits
Quick ratio
Current ratio
Total Loans/Total deposits
Net Loans/Total Assets
Total customer deposits/Total liabilities
Deposit growth rate
Capital growth rate
Net profit growth rate

These ratios can be classified into:

1. Profitability or Earnings,
2. Capital adequacy,
3. Liquidity, and

4. Asset quality and Financing.

Their classification is shown on **appendix A.**

Selection of ratios is based on the following criteria:

1. Data availability that permitted the calculation of ratios across institutions and years

2. The established set groups of ratios by other scholars (e.g. profitability, liquidity, capital, financing and etc.),which have been shown to have considerable merit in the measurement of financial performance of corporate entities.[80]

Altman (1968) selected his ratios based on: indicators of corporate problems in past studies, popularity in literature by past studies, and relevance to his study. He also categorised ratios in the same four (4) common groups as above.

4.4 DATA ANALYSIS

4.4.1 Sector Financial Performance Analysis

Based on the asset size of 1989 the institution were classified into 2 peer groups, this classification is based on the Central Bank Of Kenya Bank Supervision Department institutions directory.[81] This classification is an attempt to control for size differences across the sector.

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[80] Ismael G. Damboleno & Sarkis J. Khoury: "Ratio Stability and Corporate Failure".The Journal of Finance, Sept. 1990, pp.1017-1026

[81] Central Bank of Kenya Banks and Financial Institutions Directory. Op. cit.

"Controlling for the effect of size differences is the most frequently cited motivation for analyzing data in ratio form."[82]

"A frequent argument is that financial ratios by their very nature, have the effect of deflating statistics by size and therefore a good deal of size effect is eliminated by grouping or analyzing institutions by size"[83].

For purpose of this analysis the institutions (banks) were divided into four sub-sector groups based on asset size and nature of institution (i.e whether it is a commercial bank on a financial institution) see table below.

Table 4.4.1 VOLUME OF DATA CONSIDERED FOR SECTOR PERFORMANCE

SUB-SECTOR	PEER GROUP	VOLUME OF ASSETS	NUMBER OF INSTITUTIONS CONSIDERED	NUMBER OF EXPECTED ACCOUNTS	ACCOUNTS ACTUAL USED
1. BANKS	1 & 2	over 1 billion	9	45	39
2. BANKS	3 & 4	200-999.9 million	9	45	44
3. BANKING SUB-SECTOR	1 - 4	200-over 1 billion	18	90	83
4. NBFITS	1 & 2	over 1 billion	3	15	13
5. NBFITS	3 & 4	200-999.9 million	9	45	43
6. NBFITS SUB-SECTOR	1 - 4	200-over 1 billion	12	60	66
7. TOTAL INSTITUTIONS CONSIDERED			30	150	139

30 out of 41 institutions which qualified the sampling criteria were considered for sector performance analysis.

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[82] George Foster : Financial Analysis. Prentice-Hall Inter. Second Edition pp.96

[83] Edward I. Altman (1968): Op. Cit. pp.593.

ne sector performance norms or bench marks were developed by using inancial ratio analysis which is a form of cross-sectional echnique,it is also a form of data reduction[84]. Foster identified our uses of cross-section performance measures as : validation nalysis, management performance evaluation, prediction of inancial distress and public policy decisions in different ndustries or sectors[85]. To derive peer group ratios aggregation of ross-sectional analysis is carried out, equal weighted means and compound averages were used.

4.4.2 Graphical Analysis

This is used to improve the presentation of the analysis results for ease of interpretation especially on the sub-sectors' and peer groups' performance comparisons. While actual ratio level is important its trend over time adds more information value to the analysis and graphical representation will reflect it better.

4.4.3 Discriminant Model

The other statistical tool used in the study is Multivariate Discriminant Analysis (MDA) Technique.

SPSS/PC+ package was used with fourteen financial ratios as outlined on the data code structure form overleaf.

Two-group MDA is used as the institutions' performance rating is in two distinct categories, **failed** (group 1) and **non-failed** (group 2).

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[84] **Ibid. pp. 96.**

[85] **Ibid. pp. 176.**

The discriminant function or model developed classifies the institutions into one of the two groups.

This technique is appropriate because it is designed to combine some weighting on a set of discriminating variables and force the institutions into some statistically distinct sets.

4.4.4 Test Statistic

Some test statistic was carried out on the following:

1. The significance or discriminating ability of the variables on a univariate basis using U-statistic test.
2. The contribution of each variable in a multivariate basis.
3. The overall discriminating power of the model by using eigenvalue, canonical correlation, Wilks' Lambda, values and the rate of misclassification (confusion matrix) of the equation.

The objective targets on the hypothesis that: all the institutions in terms of their financial performance come from the same population, hence no difference between the two groups.

CHAPTER FIVE

A THEORETICAL BACKGROUND OF MDA

The purpose of this chapter is to give the reader a brief theoretical description of multivariate discriminant analysis (MDA) and its application as a means of justifying its use in this study. Weston and Bringham have suggested that MDA technique was developed to improve the use of ratios in credit analysis. Altman enhanced its use in his studies, when he demonstrated how ratio analysis can be used to discriminate or predict bankruptcy[86].

5.1 Objectives of MDA

" The mathematical objective of MDA is to weight and linearly combine the discriminating variables in some fashion so that the groups are forced to be as statistically distinct as possible. In other words, we want to be able to "discriminate" between the groups in the sense of being able to tear them apart"[87]

The basic objectives of MDA can be summarised as follows:

1. It aims at determining whether a selected set of independent variables significantly differentiates among two or more groups of objects under investigation.
2. To determine the discriminatory powers of each variable.
3. To develop ways of classifying new objects whose independent variables are known but whose group membership is unknown.

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[86] Weston & Bringham :Financial Management pp. 185

[87] William R. Klecka: Discriminant Analysis, University of Cincinnati: pp. 435

5.2 The steps and Nature of MDA

The basic steps of MDA are:-

1. Establishing mutually exclusive priori groups
2. Collecting data for each of the groups
3. Deriving linear combinations of the characteristics that best discriminate between the groups, i.e. development of a function which minimizes the probability of misclassification.

Mathematically the discriminant function takes the following form:-

Z1 = V1X1 + V2X2 + V3X3 + ----- + VnXn

Where:

Z1= Score on discrimination function i

V1= the weighting coefficients

X1= the values of the independent discriminating variables

We seek for Vi's (weighting coefficients) that maximize the following function:

$$Max\ M = \frac{(Z_1 - Z_2)^2}{\sum\sum (Z_{ij} - Z_i)^2}$$

Max M = between -group variations / within - group variation.

Where:

$Z_1 - Z_2$ represents the separation of the two groups 1 and 2

$(Z_{ij} - Z_i)$ Measures the variation of Z score within an individual group

Z the Z value of the institution in the nth group

Zi the means of the Z score values in the groups.

MDA seeks to minimize within group variation and maximize between group variation.

5.3 Classification matrix

The results of classification when compared to priori groups determines the perfectness or effectiveness of the model. The results of classification are shown in the form of classification matrix.

	Predicted Group membership	
	Failed	Non-failed
Actual Group Membership		
Failed	C_1	I_1
Non-failed	I_2	C_2

Where C and I represents correct and incorrect classification respectively. If the model is a perfect predictor, then:

$$I_1 = I_2 = 0$$

i.e. if no institution is classified incorrectly.

5.4 Assumptions of MDA

The basic assumptions of the technique as described by Eisenbeis and Avery [88] are:-

1. the groups being investigated are discrete and identifiable,
2. each observation in each group can be described by member of variables or characteristics,
3. these variables are assumed to have a multivariate normal distribution in each population.

5.5 Potential Problems of MDA

The following can be seen as potential weaknesses in an application of MDA[89]:

1. The independent variables used in a study may not be accurate either because of being wrongly measured or not the right ones.
2. Some of the independent variables may be highly correlated. This is a problem because if two variables are perfectly correlated then their effect will be the same as that of a single one which has been used twice in the same function.
3. MDA requires a sample size which is at least two or three times the number of variables used.

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[88] Joseph F. Sinkey Jr. "A Multivariate Statistical Analysis of the characteristic of problem Banks"; The Journal of Finance; March 1975 pp. 25.

[89] Boyd Jr; H.W.; Ralph, W., and Stasch, S.F.: Marketing Research Text and Cases; Richard D. Irwin, Inc. Homewood, Illinois, 1985 p. 603

4. The true relationship between the dependent variables and the independent variable may not be linear.
5. It may be difficult to interpret the results in a meaningful way if the data on independent variables are determined subjectively.

CHAPTER SIX

DATA ANALYSIS AND FINDING

This chapter outlines how the analysis was carried and the findings of the study for both development of sector bench marks and development of a discriminant model.

6.1 SECTOR'S PERFORMANCE AND BENCHMARKS

Analysis of sector performance data is based on financial ratios which have been discussed in detail in chapter 3. These ratios are derived from annual published accounts of banks and NBFITS. The ratios are analysed in seven sets as described in chapter 4, section 4.4.1 Table 4.1 (i.e banks per 1 & 2, banks per 3 & 4, all banks, NBFITS peer 1 & 2, NBFITS peer 3 & 4, all NBFITS and the whole sector).

In this section the analysis of ratios is divided into four parts; profitability, capital adequacy, liquidity and asset quality and financing. Sector and sub-sector benchmarks are tabulated according to the seven sets on tables 6.1.1. to 6.1.7 **appendix A.** The last column on each table represents the standard ratio which is derived as a compound average as opposed to simple arithmetic average. The former is preferred because it gives weighting to each period.[90]

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[90] **Edward I Altman : Handbook of Financial Markets and Institutions op.cit 27.8**

Compound average is calculated in the following way:-

If return in the last 4 years is 10%, -2%, -9% and 1% the sum average would give 0% (i.e $\frac{10-2-9+1}{4}$) while compound average is given by solving for R in the following function;

$$(1+R)^4 = (1+0.10)\ (1-0.02)\ (1-0.09\ (1+0.01)$$

$$R = -2.3\%$$

This format is used to arrive at both sector and sub-sector standard ratios (or norms) for each of the sixteen (16) financial ratios considered. For all ratios some graphical analysis is carried out where the trend of each ratio in the seven tables (6.1.1. to 6.1.7) is plotted on a line graph as shown on figures 1 to 16 **appendix B**. For ease of comparative analysis the compound average of each ratio is included on the graphs as a sixth observation on x-axis.

6.1.1 Profitability

Generally NBFITS of peer group 1 and 2 maintained the highest level of profitability in the sector, this is reflected in all profitability ratios shown on figures 1, 2 and 3. NBFITS of peer group 3 & 4 registered a lower return than NBFITS of peer 1 & 2 through out the five year period.

Commercial banks of peer group 3 & 4 had a higher return on assets (ROA) than those of peer 1 & 2 in 1988 to 1990 and the opposite in 1986 and 1987.

The average pretax return on assets (ROA) and return on equity (ROE) in the banking sector are 2% and 24.6% respectively. These

can be taken as the sector's standard or benchmarks and can be used for comparison with those of other sectors or industries in the economy.

The sector has generally shown a declining trend in terms of profitability on assets over the five year period, this may be explained by the rapid growth rate and competition in the sector as discussed in chapter 1 section 1.1.

All the three ratios represented on figures 1, 2 and 3 reflect this declining trend. 1989 and 1990 showed a drastic decline which coincides with the major banking crisis period of 1989. Figure 4 shows the major decline in profitability growth rate in the sector was mainly contributed by NBFITS which may explain the association of the declining profitability with the banking crisis as it mainly involved NBFITS (12 out of the 14 failed institutions were NBFITS[91]). Otherwise the sector had an average profitability growth rate of about zero (0%) as shown in figure 4.

6.1.2 Capital Adequacy

Shareholder's equity to total loans (SE/TL) measures the extent to which capital is able to support the existing and further growth of assets. This is because it serves as a cushion for any unanticipated losses. In average commercial banks of peer group 3 & 4 had the highest ratio of SE/TL as shown in figure 7. However, the sector generally maintained a close range of 0.1 to 0.2 with a

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[91] **Daily Nation, January 1990 op. cit. p. 11**

compound average of 0.15. Shareholder's equity to deposits measures the extend to which a bank's capital provide cushion to depositors. All the sub-sectors maintained a uniform trend as shown on figure 8 with a standard of 0.109 over the period.

Generaly on all capital adequacy ratios considered, (i.e. equity/total loans, equity/customer deposits and equity/total assets), commercial banks of peer 3 & 4 maintained the highest level through out the five year period. However, the sector has maintained a uniform trend trough the period in all the three ratios (figure 6,7 & 8).

The Banking Act 1989 (section 17 & 18) empowers the Central Bank to specify the ratio of equity/deposits and equity/risk assets and currently the minimum required level is 7.5% and 8% respectively. From the above analysis and looking at figures 6 & 8 it is clear that the sector is generally meeting these minimum requirements.

6.1.3 Liquidity

This measures the ability of the institutions to settle their liabilities as they fall due. Figures 9, 10 and 11 reflect a general rise of liquidity level in 1986 and 1987 and a decline in 1988 to 1990. This trend may be explained by the position of the economy in those years with 1987 having had a coffee boom which could have boosted the liquidity position of the sector.

In general commercial banks of peer group 3 & 4 had the highest liquidity levels although NBFITS are legally required to maintain a higher level (24%) than banks (20%). Although the accounting

ratios considered here are not derived in the same format as the statutory form, they still give some insight of the sector's liquidity standards[92].

From the graphical analysis figures 10 & 11 it is explicit that the sector generaly maintains a uniform liquidity level. Current ratio and quick ratio for the sector were at 1.026 and 0.343 respectively in the five years period.

6.1.4 Asset Quality

By the nature of the sector's business the largest part of their assets are in loans. In the five years period the sector in average had 56.7% of total assets in loans (figure 13).

Total loans to total deposit shows the extent to which loans are funded by customer deposits. It also acts as an indicator of an institution's liquidity by showing the extend to which customer funds are tied in loans. The sector registered loans to deposits ratio of 71.9% meaning that about 72% of total sector loans are funded by customer deposits. To assess the quality of assets one needs more information than what is reported in published accounts e.g level of loan loss provisions, classification of loans in terms of their performance, level of concentration on particular sectors of the economy, etc.

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[92] **Note: It is important to note that the liquidity ratios considered in this study are strictly different from the statutory form because the latter requires further adjustments for inter-bank deposits and borrowings. Quick assets/deposits may be a better approximation because statutory ratios take liquid assets as a ratio of total customer deposits.**

From the graphical analysis most asset and financing ratios are uniform in the entire sector as there are no major variations on their trends. Customer deposits to total liabilities (figure 14) show the extent to which operations are funded with customer deposits. The sector's average funding by depositors is 85.6% in the period.

Assets growth rate (figure 15) is directly related to deposit growth rate (figure 16), both show similar trend movements over the period . This is expected because most of the loan assets (80%) in the sector are funded with public deposits (figure 12).

6.2 RESULTS OF DISCRIMINATION

The analysis was carried out on two sets of sample data, **unmatched** (33 banks) and **matched** (12 banks), but all the matched were part of the unmatched set. The first page of **appendix C** is a set of ratios calculated from 1987 and 1988 financial statements of both failed and non-failed banks, this is the input that was used in the **SPSS/PC+ package.**

6.2.1 REPORTS USED FOR ANALYSIS

A lot of information was generated from the sample data sets as it is the nature of most standardized statistical packages. A full set of statistic test printout is attached as **appendix C** for the **unmatched (33 banks)** and **appendix D** for the **matched (12 banks)** this is for the benefit of other scholars or readers who may want to carry out further detailed analysis.

In this study the following printout information was used.

- Pooled within group correlation matrix,
- Wilks' Lamda (u-statistic) and univariate F-ratio,
- Standardized canonical discriminant function coefficients,
- Pooled within - groups correlations with function,
- Unstandardized canonical discriminant function coefficients
- Group centroid,
- Histogram for group,
- All-groups stacked histogram
- Classification Results or Confusion Matrix

6.2.2 SYMBOLS USED IN DATA ANALYSIS

In the analysis variables were defined as follows:

V1: Net profit Before Tax/Total Assets

V2: Net profit Before Tax/Paid up or Assigned Share capital

V3: Net profit/Total Shareholders' Equity

V4: Asset growth rate

V5: Stockholder's equity/Total Assets

V6: Stockholder's Equity/Total Loans

V7: Capital & Reserves/Total Deposit

V8: Quick Assets/Total Deposits

V9: Quick ratio

V10: Current ratio

V11: Total Loans/Total deposits

V12: Net Loans/Total Assets

V13: Total customer deposits/Total liabilities

V14: Deposit growth rate

Banks were labelled with serial numbers 1,2,3,4,.....33

Group 1.....failed banks

Group 2.....non-failed banks

The same symbols were used in both 1987 and 1988 analysis on both sample sets {i.e 33 (unmatched) and 12 (matched) banks}.

6.2.3 ANALYZING BETWEEN GROUP MEANS

The objectives of this analysis is to establish whether there is a between group mean differences in financial ratios amongst failed and non-failed banks.

A test for the equality of means between the two groups was carried out with the following hypothesis for each ratio:

Null Hypothesis (HO): the means of financial ratios of the two groups are equal.

Alternative Hypothesis (HI): the means of financial ratios of the two groups are not equal.

This test was done at 95% confidence level (or 0.05 significance level) for both 1987 and 1988.

Table 6.2.1 overleaf is a summary of the statistical decisions for both years.

Results for 1987 (two years prior to failure) were slightly different from those of 1988 (one year prior to failure).

In 1987 seven (7) out of fourteen (14) ratios (50%) were significantly different and nine(9) 64% for 1988.

All profitability ratios were significantly different in both years that is, net profit /total assets, net profit /total equity and net profit /paid up or assigned capital.

Table 6.2.1

Statistical decisions on hypothesis test on equality of group means

Sample T (6 failed and 27 non-failed banks)

	1987 DATA			1988 DATA		
Variables	Wilks' Lamda	Significance t-value	Statistical Decision Ho:	Wilks' lamda	Significance t-value	Statistical Decision
v1	0.55459	0	reject	0.59924	0	reject
v2	0.61646	0.0001	reject	0.60823	0.0001	reject
v3	0.51387	0	reject	0.28674	0	reject
v4	0.9323	0.1436	do not reject	0.91426	0.0982	do not reject
v5	0.936358	0.1574	do not reject	0.71823	0.0015	reject
v6	0.72935	0.0019	reject	0.78138	0.0016	reject
v7	0.92257	0.1169	do not reject	0.69276	0.0008	reject
v8	0.62659	0.0002	reject	0.5654	0	reject
v9	0.58746	0.0001	reject	0.85539	0.029	reject
v10	0.72692	0.0018	reject	0.52275	0	reject
v11	0.99726	0.7722	do not reject	0.95053	0.2126	do not reject
v12	0.98959	0.5721	do not reject	0.99999	0.9884	do not reject
v13	0.99217	0.6243	do not reject	0.99645	0.7419	do not reject
v14	0.98852	0.5529	do not reject	0.9895	0.5704	do not reject

All capital adequacy ratios that were considered (i.e equity /total assets, equity/total loans and equity /deposits) were significantly different in 1988 while only equity/total loans was different in 1987.

All asset quality and funding ratios were not significantly different in both years.

Because 50% and 46% of the ratios were not significantly different in the two years respectively, this means there is a group mean differences among the two groups of failed and non-failed banks. It further shows that simple means comparison of ratios may not perfectly discriminate between the two groups. This justifies the need for a multivariate discriminant model.

6.2.4 CORRELATION MATRIX

Using pooled within-groups correlation matrix the correlation the following variables had significant association between each other in the two years.

1987 data

v1 and v2 = 0.89542

v1 and v9 = 0.92974

v5 and v7 = 0.93808

1988 data

v1 and v2 = 0.93367

v4 and v14 = 0.96176

v5 and v6 = 0.86064

v6 and v7 = 0.80500

Most of these associations are expected because of logical relationship of the accounting figures e.g. Asset growth rate (v4) and deposit growth rate (V14) are likely to be directly proportional, as availability of more deposits will finance additional loans (assets).

6.2.5 DEVELOPMENT OF THE DISCRIMINANT FUNCTIONS

Discriminant analysis results for both 1987 and 1988 were used to develop two models in both cases as many variables (ratios) as possible were incorporated. Fourteen (14) variables were computed from available data and all were used in the function.

The default technique of **DIRECT METHOD** was used in creation of the discriminant functions because it allows functions to be created directly from the entire set of independent variables concurrently[93]. This means in both years full models (incorporating all possible variables) were developed.

In MDA two groups allows development of one function as the number of discriminant functions is equal to the number of groups minus one (2-1=1) or the number of independent variables (14) whichever is smaller.

Because the data was actual ratios the unstandardized coefficient function is appropriate for both 1987 and 1988 functions[94].

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[93] **William R. Klecka: op. cit. pp. 446.**

[94] **Marija J. Norusis: SPSSX Advanced Statistics Guide; McGraw-Hill Book Co. 1985 PP. 90**

1987 Discriminant function using unstandardized coefficients

Z = 73.60165V1 - 1.406476V2 + 1.463638V3 - 3.573084V4
- 1.351446V5 - 6.742068V6 + 1.532697V7 + 6.459150V8
+ 3.934118 V9 - 1.186595V10 - 1.642895V11
+ 10.08912V12 - 0.9188973V13 + 2.716910V14
- 6.341269 . (1)

1988 Discriminant Function Using Unstandardized Coefficients

Z = 8.143715V1 - 0.3110483V2 + 4.403804V3 + 5.944754V4
+2.156819V5 + 1.025290V6 - 12.39153V7 + 7.238063V11
+7.431537V12 - 3.040989V13 - 5.049905V14
- o.6073515. (2)

Where:

Zi is the score on discrimination function i

V's are the unstandardized values of the n discriminating variables used in the analysis

6.2.6 INDICATORS OF EFFECTIVENESS OF THE FUNCTION

Various methods were used to determine the effectiveness of the functions:-

Table 6.2.2

Canonical Discriminant Functions

Function	Eigenvalue	Canonical correlation	Wilks' Lamda	Chi-square	DF	Significance
1987	5.7499	0.9230	0.1481	45.829	14	0.000
1988	75.5672	0.9398	0.1167	51.551	14	0.000

(a) **Eigenvalue**

Eigenvalue = between - groups sum of squares
within - groups sum of squares

The larger the eigenvalues are, the better the effectiveness of the function. In both functions eigenvalues are high which is associated with "good" functions. Eigenvalue for 1987 was 5.7499 and 7.55672 for 1988 which indicates that the distinctiveness of the two groups became more pronounced as the failure period approached. This is expected because the difference between the two groups must have increased as the failed group deteriorated.

(b) **Canonical correlation**

This measures the function's ability to discriminate as it shows the proportion of variance in the discriminant function that is explained by the groups. In both cases 92.3% and 93.98% of the between-group total variance in 1987 and 1988 respectively is attributed to differences among groups. The improved discriminatory power of 1988 function is further reflected by the higher explanatory power which increased by 1.68% (93.98-92.3)

(c) **Wilks' Lambda**

This measures the proportion of total variance in the discriminant scores that is not explained by difference among groups (or that which is not explained by the model).

In 1987 and 1988 functions Wilks' Lambda values were 0.1481 and 0.1167 respectively.

A smaller value of Wilks' Lambda is associated with functions that have much variability between groups and little variability within groups. This means in the two functions most variability was explained by the differences among the two groups. Decline from 0.1481 to 0.1167 shows that the variability between the two groups

increased as the failure period of the failed banks approached.

(d) **Confusion Matrix**

This tests the classification results of the function which appear on table 6.2.3 below.

Table 6.2.3. Classification table

	Actual group	Number of cases	Predicted Membership group 1	2
1987:	Group 1	6	6	0
	Group 2	27	0	27
1988	Group 1	6	6	0
	Group 2	27	0	27

6.2.7 VALIDATION OF THE MODEL

As the sample size was small no data was set a side (held out) for this test, this means the same observations that were used to build the model were used to test it. A hit rate (i.e. correct classification rate) of 100% in both years was achieved as shown in table 6.2.4 below.

Table 6.2.4 Classification of results in % terms

Model	Actual group	Predicted group 1	2	Total	Hit-rate
1987	1	100	0	100	100%
	2	0	100	100	
1988	1	100	0	100	100%
	2	0	100	100	

The above table is a version of the confusion matrix table 6.2.3. As the same data was used to develop the model this test may not

be efficient, however,it gives useful insights of the ability of the present variables to discriminate among the groups.

6.2.8 HISTOGRAM PLOTS AND GROUP CENTROIDS

A plot of discriminant scores for the two groups in both years was carried out to show the distribution of the two groups and their overlaps if any.

Figures overleaf show that the two groups are clearly distinct. This is expected because the model attained a 100% correct classification.

Each function has group centroids which are also shown on the histograms. This is tabulated below:

Table 6.2.5 Group Centroids:

Function	Group	Centroid values	Number of banks on overlap area	Between group centroids Interval
	Group 1	Group 2		
1987	-4.93017	1.09559	0	6.02576
1988	-5.65584	1.25685	0	6.91269

From the centroids it is clear that the variance between the two groups increasingly became more distinct as the failure period approached i.e it increased from an interval of 6.02576 to 6.91269.

6.2.9 CONTRIBUTION OF EACH VARIABLE TO THE FUNCTION

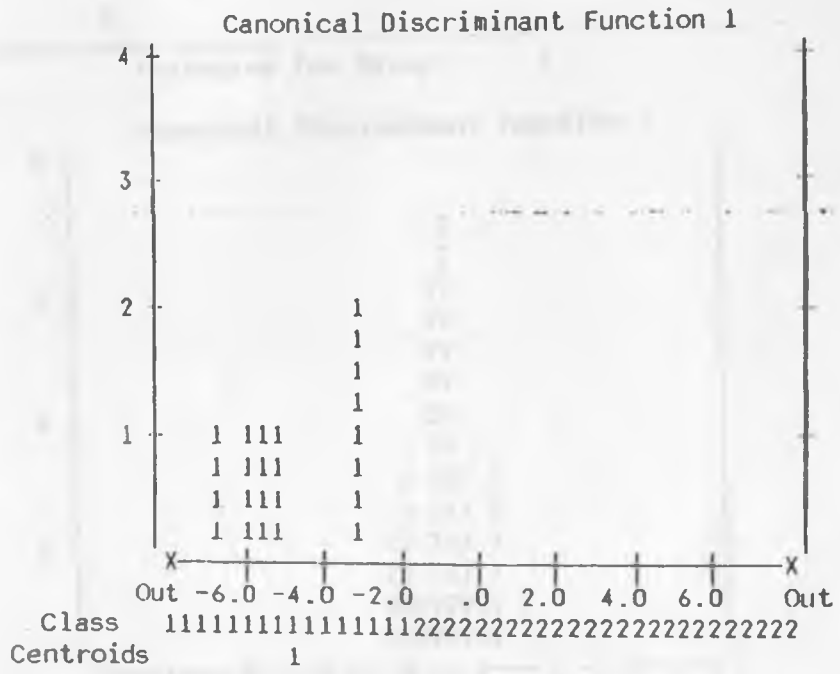
This examines the correlations between the values of the functions and the values of the variables.

Using the pooled within groups correlation within the function, the two years comparative results are on table 6.2.6 (page 72).

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

Histogram for Group 1



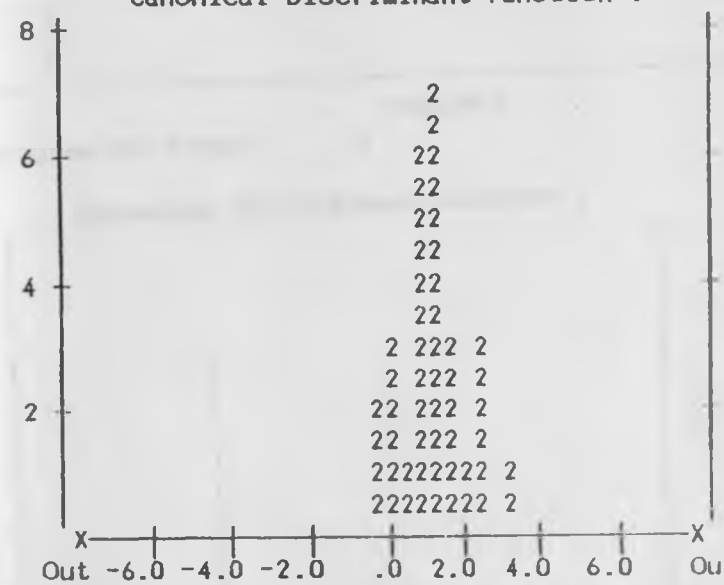
HISTOGRAMS OF 33 UNMATCHED BANKS IN 1987

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

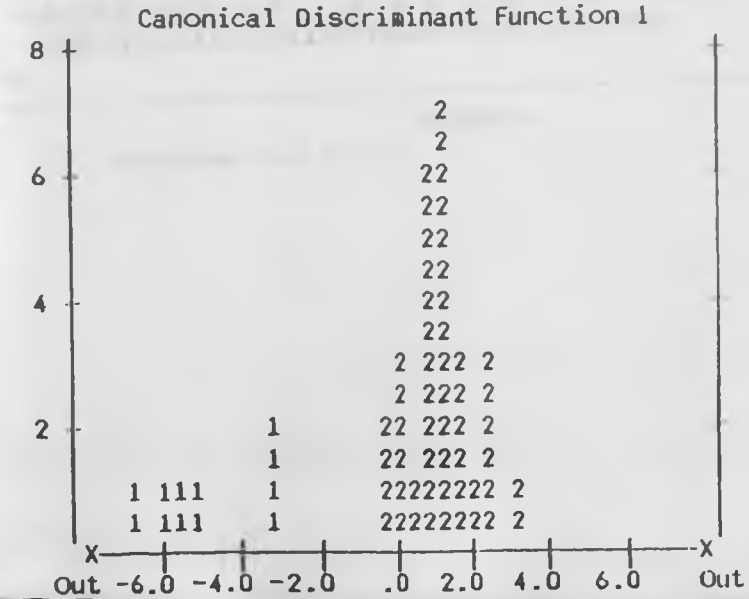
Histogram for Group 2

Canonical Discriminant Function 1



All-groups stacked Histogram

Canonical Discriminant Function 1

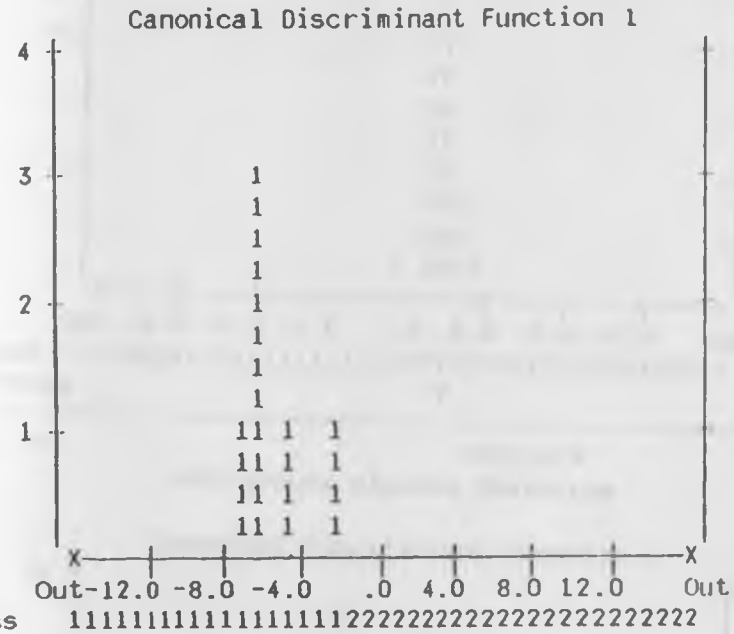


HISTOGRAMS OF 33 UNMATCHED BANKS IN 1988

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

Histogram for Group 1



Histogram for Group 2

HISTOGRAMS OF 33 UNMATCHED BANKS IN 1988

Page 71

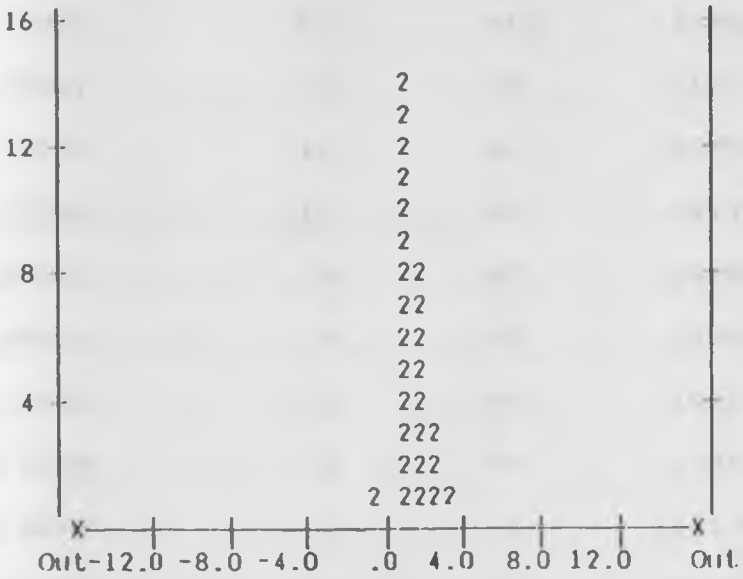
Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

Page 73 SPSS/PC+ 6/16/92

Histogram for Group 2

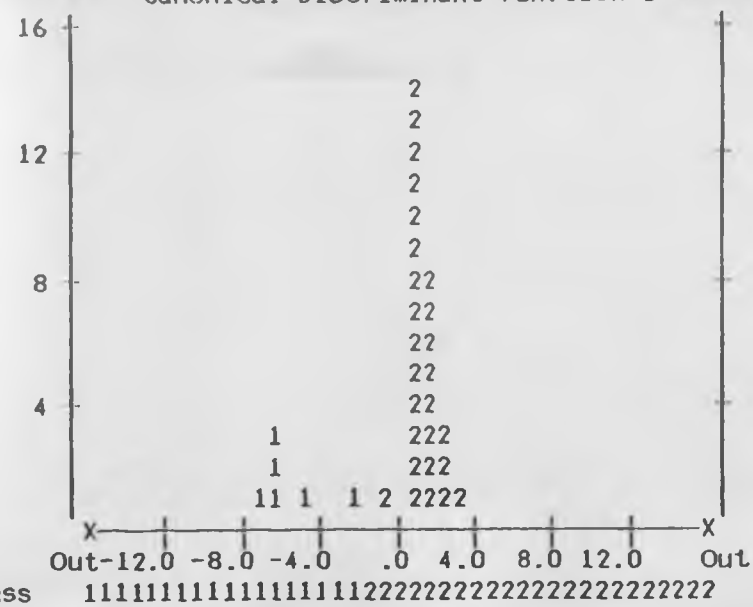
Canonical Discriminant Function 1



Page 74 SPSS/PC+ 6/16/92

All-groups stacked Histogram

Canonical Discriminant Function 1



In both years net profit/equity (V3) had the highest correlation with the discriminant functions. Variables V11, V12, V13 and V14 had the least contributions, each had less than 0.10. For both years percentage contribution of each variable is shown on the third column of table 6.2.6 below.

Table 6.2.6 Variables ordered by size of correlation within the functions.

1987 Data			1988 Data		
Variable	Correlation	Contribution %	Variable	Correlation	Contr. %
v3	.40562	15	v3	.57335	20
v1	.37373	13	v10	.34734	12
v9	.34947	13	v8	.31872	11
v2	.32894	12	v1	.29729	10
v8	.32194	12	v2	.29175	10
v10	.25561	9	v7	.24209	8
v6	.25404	9	v5	.22769	8
v7	.12081	4	v6	.19229	7
v4	.11238	4	v9	.14947	5
v5	.10852	4	v4	.11133	4
v14	.04494	2	v11	.08309	3
v12	.04277	2	v14	.03745	1
v13	.03706	1	v13	.02170	1
v11	.02188	1	v12	.00096	0
		100%			100%

6.3 RESULTS OF MDA ON MATCHED GROUPS

As mentioned in section 2.4.4 chapter two, Pifer (1970) matched banks under certain conditions to allow for better comparability. In this study, to establish the impact of such factors like size, number of branches, age, asset base a set of 12 banks were analyzed separately using the same MDA technique. All the 12 were part of the main sample of 33 banks that were analyzed in section 6.2 above.

Appendix D, gives a full set of printouts of their results. Most of the results gave similar findings as for the 33 banks, however some of the key findings are briefly outlined below.

6.3.1 ANALYZING BETWEEN GROUP MEANS

Using the same hypothesis as in section 6.2.3, table 6.3.1 overleaf gives a summary of the statistical decisions for both years. Results for 1987 were slightly different from those of 1988. In 1987 five (5) out of 14 ratios 36% were significantly different and four(4) 29% for 1988. Because of the lower rejection level in this sample compared to that of 33 banks set (which had 50% and 64% rejection score) this confirms that use of simple mean ratio analysis to discriminate failed and non-failed banks in a matched group may not perfectly discriminate between the groups, hence the need for a multivariate discriminant model.

Table 6.3.1

Statistical decisions on hypothesis test on equality of group means

Sample II (6 failed and 6 non-failed banks)

	1987 DATA			1988 DATA		
Variables	Wilks' Lamda	Significance t-value	Statistical Decision Ho:	Wilks' lamda	Significance t-value	Statistical Decision
v1	0.67228	0.0517	do not reject	0.7227	0.0786	do not reject
v2	0.73057	0.0838	do not reject	0.74025	0.0905	do not reject
v3	0.6407	0.0394	reject	0.36931	0.002	reject
v4	0.97321	0.6112	do not reject	0.82691	0.1786	do not reject
v5	0.71061	0.0712	do not reject	0.74148	0.0914	do not reject
v6	0.63687	0.0381	reject	0.86036	0.2315	do not reject
v7	0.67806	0.0543	do not reject	0.7851	0.129	do not reject
v8	0.55323	0.0175	reject	0.27764	0.0005	reject
v9	0.48386	0.0085	do not reject	0.29139	0.0006	do not reject
v10	0.56426	0.0195	do not reject	0.34193	0.0014	do not reject
v11	0.87338	0.2563	do not reject	0.95828	0.5243	do not reject
v12	0.9373	0.4325	do not reject	0.99974	0.9605	do not reject
v13	0.91948	0.3714	do not reject	0.88099	0.2721	do not reject
v14	0.96764	0.5758	do not reject	0.90856	0.3394	do not reject

6.3.2 Discriminant functions using unstandardized coefficients

(a) 1987 function Using Unstandardized Coefficients

$$Z = -18.14934V1 - 4.44328V2 + 6.286802V3 + 1.58079V4 + 147.1852V5 - 56.82473V6 + 34.91032V3 - 21.42624V9 - 3.976191V11 - 4.233541 \quad (3)$$

Variables V7, V10, V12, V13, and V14 are not included in this function because they failed the tolerance test whose minimum level was set to 0.001. This is because, if low tolerance variables are included, large rounding errors may occur when computing the discriminant coefficients which then leads to faulty estimates of Z scores and inaccurte classification of banks[95].

(b) 1988 function Using Unstandardized Coefficients

$$Z = 21.68095V1 - 0.5681196V2 + 3.875173V3 + 0.1234297V4 - 1.175271V5 + 3.813397V6 - 26.58028V7 + 53.88912v8 - 53.83032v9 + 2.419649 \quad (4)$$

Variables v10,v11,v12,and v14 are not included in this function because of the reasons given for equation (3) above.
Among these excluded variables are v11,v12,v13 and v14 which were found to have the lowest contribution to the functions (in section 6.2.9 for both equations (1) and (2).

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[95] William R. Klecka: Op. Cit. pp. 452-453

(c) WILKS' LAMDA

Wilks' Lamda in the matched sample for 1987 and 1988 were 0.0584 and 0.0942 respectively. This shows there was a higher variability between the groups in the matched sample than the unmatched whose values were higher 0.1481 and 0.1167 respectively.

(d) Confusion Matrix and Hit-rate

Like the unmatched sample, the matched data reflected 100% hit-rate see **appendix D.**

(e) Group centroids and Histograms

Table 6.3.2 group centroids compared

Function	Group	Centroid values	Number of banks on	Between group centroids
	Group1	Group2	overlap area	Internal
1987	-3.366546	3.66546	0	7.33092
1988	-2.83007	2.83007	0	5.66014

From the centroids table above and histogram plots overleaf the variance between the two groups decreased by 1.67078 (from 7.33092 to 5.66014) as opposed to the increase recorded on the unmatched sample where it increase by 0.88693 (6.02576 to 6.91269).

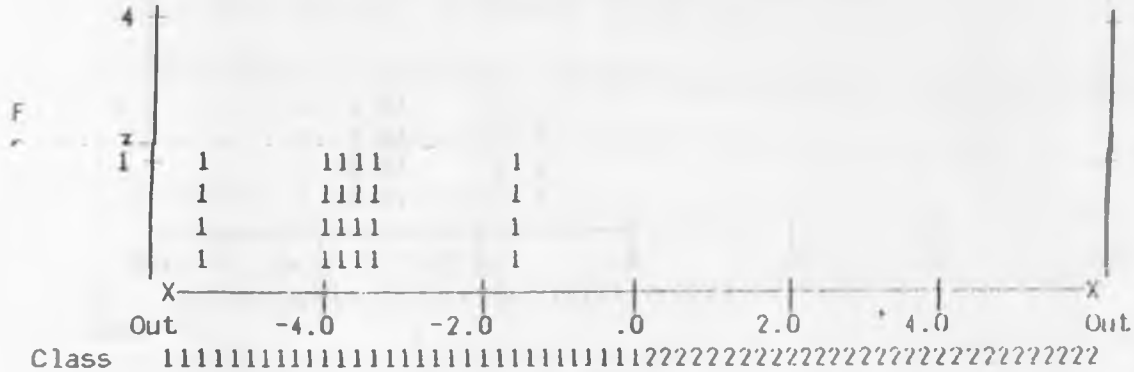
HISTOGRAMS OF 12 MATCHED BANKS IN 1987

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

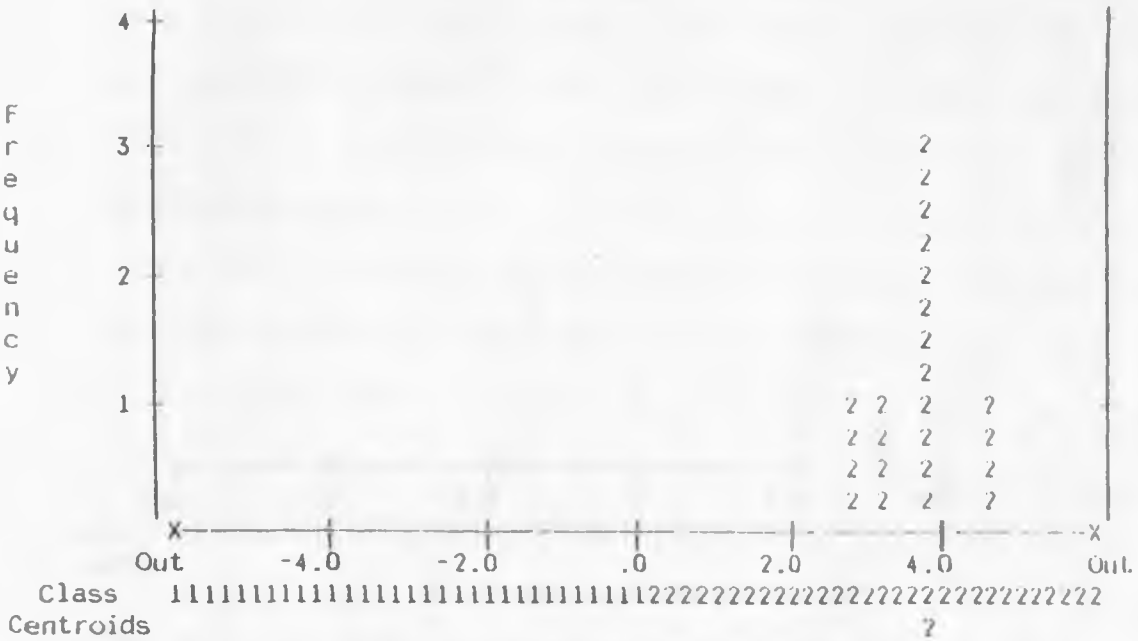
Histogram for Group 1

Canonical Discriminant Function 1



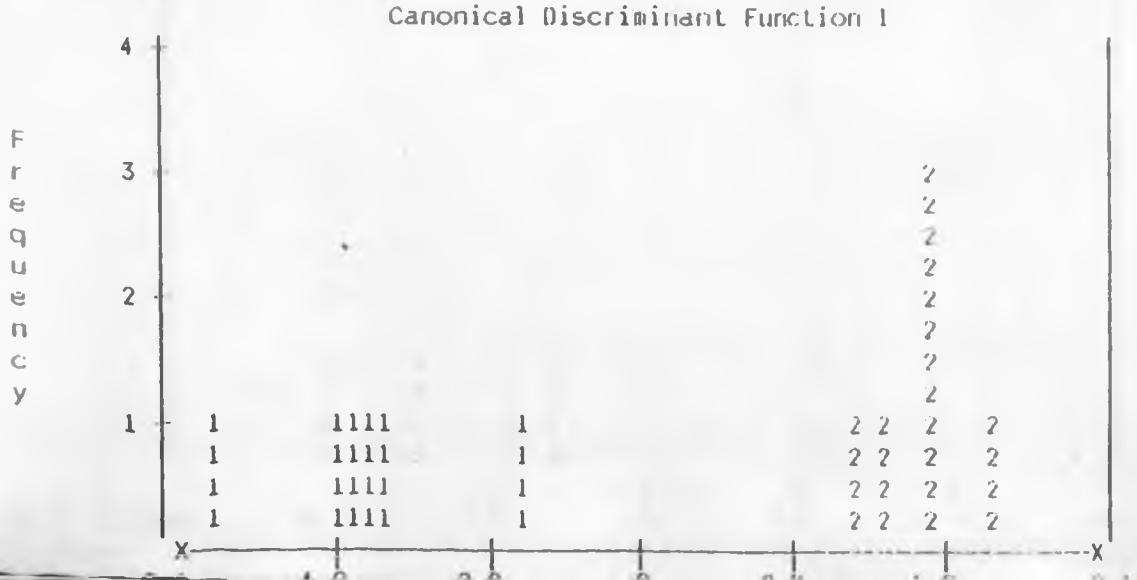
Histogram for Group 2

Canonical Discriminant Function 1



All-groups stacked Histogram

Canonical Discriminant Function 1



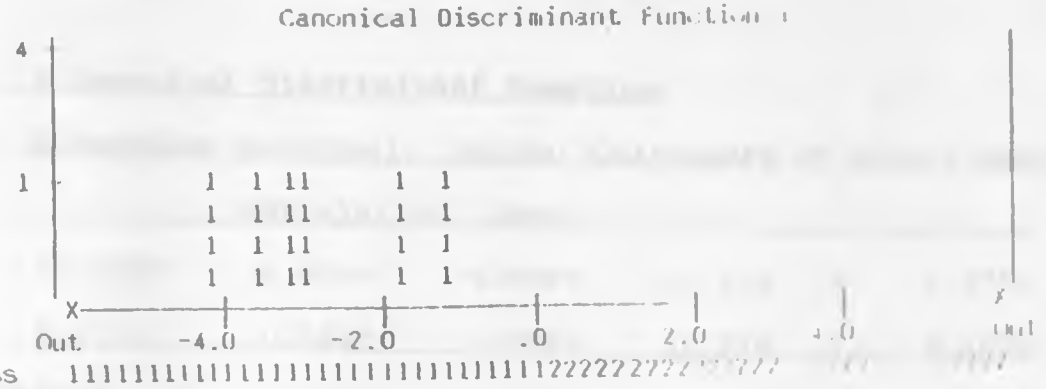
HISTOGRAMS OF 12 MATCHED BANKS IN 1988

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

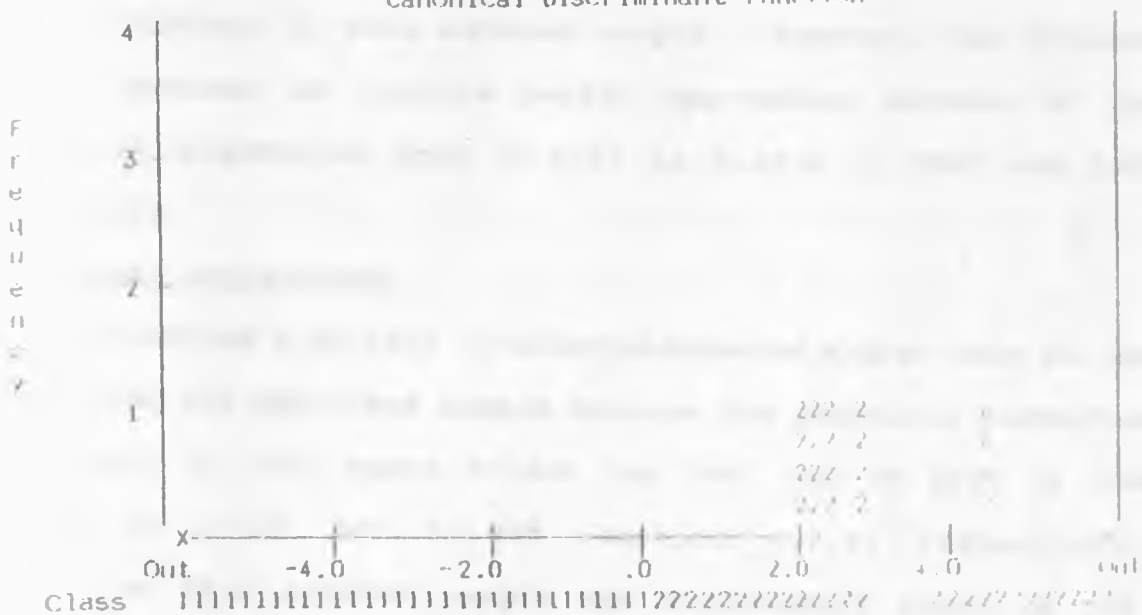
Histogram for Group 1

Canonical Discriminant Function 1



Histogram for Group 2

Canonical Discriminant Function



All-groups stacked Histogram

Canonical Discriminant Function

6.3.3 INDICATORS OF EFFECTIVENESS OF THE FUNCTION

Table 6.3.3 Canonical Discriminant Function

Function	Eigenvalue	Canonical correlation	Wilks' Lamda	Chi-square	DF	Significance
1987	16.1227	0.9704	0.0584	15.622	9	0.0752
1988	9.6112	0.9517	0.0942	12.990	9	0.1630

(a)Eigenvalues

Eigenvalues for the two years were higher than those from 33 banks sample, showing that the difference between the two groups was more distinct in this matched sample. However, the variance did not increase as failure period approached because of the decrease of eigenvalue from 16.1227 to 9.6112 in 1987 and 1988 respectively.

(b)Canonical correlation

The function's ability to discriminate was higher than the one derived from the unmatched sample because the canonical correction was higher in both years 97.04% for 1987 and 95.175% in 1988 compared to 92.3% and 93.98% (section 6.2.6) respectively. However, in this matched sample the explanatory power of 1987 function was higher than that of 1988 (i.e 97.04% > 95.17%) this was opposite for the unmatched sample which increased from 92.35% to 93.98%

6.4 SUMMARY OF THE ANALYSIS AND FINDINGS

A matched sample[96] set gave a better discriminant function than unmatched sample as the former had higher canonical correlation, higher eigenvalues and lower Wilks' Lambda values.

The function of the unmatched sample is statistically appropriate because it incorporates all the fourteen (14) variables.

From these analyses it is apparent that the fourteen variables or ratios used in the study discriminates among the two groups of failed and non-failed banks.

The discriminating equations are two depending on the report being considered (i.e whether it is one or two years prior to failure). For two years prior to failure equation (1) and one year is equation (2) both are on page 68.

Generally the explanatory power of discriminant functions increased because as the failed banks deteriorated the difference between failed and non-failed banks must have increased.

[96] **Note: A sample size of 12 banks is too small for statistical purposes.**

CHAPTER 7

SUMMARY, CONCLUSION, LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

7.1 SUMMARY AND CONCLUSION

This study was set to undertake two objectives first to document the financial performance of the banking sector in Kenya by developing financial ratio standards or benchmarks. Secondly it was set to investigate the ability of financial ratios to predict bank failure.

The sector has generally reflected a decline in performance level in the period of study 1986 to 1990, this may be attributed to the rapid growth of the sector.

The sector has an average before tax return on assets (ROA) of 2% and 24.9% on equity (ROE). These financial performance measures can be taken as the financial benchmarks of the sector and can be compared to those of other sectors. As far as capital adequacy is concerned, going by the statutory requirements the sector met the stipulated minimum limits of 7.5% for equity/deposits and 8% for equity/assets because the sectors compound average in the period was 10.9% and 7.9% respectively. This suggests that the sector is highly levered as total assets is funded 92% by liabilities, mainly customer deposits.

Capital growth rate in the sector was high in 1987 and 1988, this may be explained by the increased public issues made by the sector in the same period .

Although the statutory liquidity levels were not accessible from the available data, the sector has an average current ratio and quick ratio of 1.026 and 0.344 respectively. This indicates that the sector is able to meet her liabilities as they fall due.

In developing the discriminant function fourteen (14) financial ratios were considered. The following is the ranking of the ratios according to their discriminatory powers depending on the period or the number of years prior to failure:-

Two years prior to failure (1987)		**One year prior to failure (1988)**	
	%		%
Netprofit/total equity	15	Netprofit/total equity	20
Netprofit/total assets	13	Current ratio	12
Quick ratio	13	Quick assets/total deposits	11
Netprofit/paid up capital	12	Netprofit/total assets	10
Quick assets/total deposits	12	Netprofit/paidup capital	10
Current ratio	9	Equity/total deposits	8
Equity/total loans	9	Equity/total assets	8
Equity/total deposits	4	Equity/total loans	7
Asset growth rate	4	Quick ratio	5
Equity/total assets	4	Asset growth rate	4
Deposit growth rate	2	Total loans/total deposits	3
Net loans/total assets	2	Deposit growth rate	1
Deposits/total liabilities	1	Deposits/total liabilities	1
Total loans/deposits	1	Net loans/total assets	0
	100		100

These rankings show that the first ten ratios have significant contribution of at least 4% while in both periods (one and two years) prior to failure the following four ratios had insignificant (less than 4%) contribution; total loan/total deposits, net loan/total assets, total customer deposit/total liabilities and deposit growth rate. Similar reports were recorded on the matched sample set as the same 4 ratios were excluded from the discriminant functions in both periods.

Two of the statutory ratios that are being enforced by the Central Bank; equity/assets and equity/deposits are among those with moderate contribution 4% and 8% in both periods respectively. However, quick assets/total deposits as an indicator of statutory liquidity requirement had a more significant contribution to the discrimination function of 12% and 11% in both 1987 and 1988 respectively.

Net profit/total equity is the most significant discriminatory ratio contributing 15% and 20% in 1987 and 1988 respectively. This suggests that the banking authorities should consider including profitability ratios as a basis of detecting potential problem institutions.

The findings of the study provides evidence in the following areas:

1. The average financial performance of the Kenyan banking sector is 2% and 24.9% in terms of return on assets (ROA) and return on equity ROE) respectively. These ratios can be taken as the sector's financial performance norms or benchmarks.
2. The statutory requirements on capital adequacy which are being enforced by the Central Bank through the Banking Act of 1989 (section 17 and 18) are within the sector's benchmark levels hence most institutions are meeting them.
3. Out of the findings of analysis between group mean differences it is clear that simple financial ratio mean comparisons (Univirate analysis) may not adequately discriminate between failed and non-failed banks. By employing multivariate analysis of a combination

of ratios a perfect classification model is derived both one year and two years prior to failure, this confirms the superiority of the technique.

4. Financial ratios can be employed to discriminate banks into failed and non-failed groups. The most significant discriminators are profitability and liquidity ratios, these are net profit to total equity, net profit/total assets and quick assets/total deposits.

These findings conform to those of Altman[97] and Kimura[98] who concluded that profitability ratios are the most critical factors in a firms ability to avoid failure.

5. As financial ratios were able to discriminate failed and non-failed banks perfectly (100%), the Kenyan banking authorities can develop an early warning system to detect future problems banks.

6. This study suggest that bank managers should ensure that their banks achieve high returns on their assets and share holders' equity and maintain adequate liquidity to avoid dangers of being insolvent or failing.

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[97]**Altman E.I "Financial ratios, Discriminant Analysis and the Prediction of corporate Bankruptcy," Journal of Finance, Sept. 1968 pp 600.**

[98]**Kimura J.H "The predictive accuracy of accounting and non-accounting information under inflationary conditions" Phd Dissertation (unpublished), University of California, Los-Angeles, pp. 82.**

7.2 LIMITATIONS OF THE STUDY

The results of this study should be interpreted in light of the following limitations:

1. The financial performance benchmarks (norms) and the discriminant variables were derived from historical financial data without adjusting for any inflation tendencies.

2. The time frame used for benchmarks 1986 to 1990 (5 years) and also the discriminant function 1987 to 1989 (3 years) was short.

3. The sample size used especially for failed banks is small, this was mainly because of unavailability of data for some banks. This may mean given a bigger sample size the discriminant function might change.

4. Validation results from the confusion matrix are biased upwards due to use of the same observations that were used to develop the model.

5. Most banks disclose only the minimum statutory requirements and this meant that it was not possible to calculate some ratios from the available statements. Therefore the study was constrained by the limitations of such public information.

6. The financial ratios were generated from financial statements which have been prepared under different accounting policies and similarly the study is constrained by the limitations of such financial statement preparations.

7. The study considered only financial performance ratios as the only signals of bank failure, other internal and external factors could contribute to failure but non was included as a variable.

8. Financial ratios cannot **"trace the cause"** of failure but only attempt to measure the extent to which a firm's financial policies and problems have resulted in poor performance or failure[99].

7.3 SUGGESTIONS FOR FURTHER RESEARCH

1. Undertake the same study but using current cost accounting or price adjusted data. This will enable the behaviour of historical data to be compared to those of inflation adjusted data in terms of performance norms and discrimination model.
2. Other sector or industrial norms can be developed so that they can be compared to those of the banking sector.
3. Stepwise discriminant analysis method could be used to reduce the number of financial ratios in a more objective manner.
4. Other factors could be introduced into the development of the model such as branch network, type of control (foreign or local), quality of management, and some exogenous factors.
5. A study to establish the factors that contribute to successful or poor financial performance of individual banking entities can be carried out.

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[99] Edward I. Altman "A reply"; Journal of Finance, Dec. 1970, pp. 1169.

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APPENDIX A:

Performance Ratio Tables for Banks and NBFITS: 1986 TO 1990.

APPENDIX A: TABLE 6.1.1

RATIO ANALISYS FOR COMMERCIAL BANKS IN PEER GROUP 1 & 2:

EARNINGS AND PROFITABILITY RATIOS:	1986	1987	1988	1989	1990	ARITHMETIC AVERAGE FOR 5 YEARS	COMPOUND AVERAGE FOR 5 YEARS
Net Profit Before Tax/Total Assets.	0.024	0.027	0.027	0.013	0.028	0.024	0.024
Net Profit Before Tax/Paid up or Assigned Capital	0.996	0.796	0.807	0.343	0.689	0.726	0.712
Net Profit Before Tax/Total Shareholders' Equity	0.385	0.352	0.337	0.153	0.298	0.305	0.303
Net profit growth rate		0.050	-0.236	-0.453	5.712	1.268	0.310
CAPITAL ADEQUACY RATIOS:							
Capital growth rate		0.166	0.203	0.271	0.131	0.193	0.151
Shareholders' Equity/Total Assets	0.073	0.073	0.077	0.091	0.079	0.079	0.079
Shareholders' Equity/Total Loans	0.131	0.134	0.144	0.151	0.144	0.141	0.141
Shareholders' Equity/Total Customers' Deposits	0.094	0.101	0.106	0.113	0.102	0.103	0.105
LIQUIDITY RATIOS:							
Quick assets/Total deposits	0.385	0.451	0.368	0.328	0.359	0.378	0.378
Quick ratio	0.340	0.349	0.291	0.294	0.308	0.316	0.316
Current ratio	1.021	1.012	1.023	1.039	0.920	1.003	1.003
ASSET QUALITY & FINANCING RATIOS:							
Total loans/Total deposits	0.745	0.756	0.765	0.770	0.647	0.737	0.736
Net loans/Total assets	0.591	0.547	0.553	0.622	0.507	0.564	0.563
Total customer deposits/Total Liabilities	0.860	0.807	0.798	0.893	0.767	0.825	0.824
Deposit growth rate		0.064	0.117	0.021	0.151	0.088	0.087
Asset growth rate		0.134	0.111	0.018	0.165	0.107	0.105

NOTE: All growth rate figures for 1986 are not included because 1985 accounts were not available for most firms.

APPENDIX A: TABLE 6.1.2

RATIO ANALISYS FOR COMMERCIAL BANKS IN PEER GROUP 3 & 4:

EARNINGS AND PROFITABILITY RATIOS:	1986	1987	1988	1989	1990	ARITHMETIC AVERAGE FOR 5 YEARS	COMPOUND AVERAGE FOR 5 YEARS
Net Profit Before Tax/Total Assets.	0.023	0.023	0.023	0.026	0.036	0.026	0.026
Net Profit Before Tax/Paid up or Assigned Capital	0.654	0.464	0.352	0.336	0.742	0.510	0.501
Net Profit Before Tax/Total Shareholders' Equity	0.312	0.263	0.222	0.248	0.300	0.269	0.269
Net profit growth rate		0.359	0.296	0.253	0.479	0.347	0.344
CAPITAL ADEQUACY RATIOS:							
Capital growth rate		0.283	0.172	0.148	0.170	0.193	0.151
Shareholders' Equity/Total Assets	0.081	0.092	0.097	0.102	0.116	0.098	0.098
Shareholders' Equity/Total Loans	0.158	0.198	0.201	0.189	0.223	0.194	0.194
Shareholders' Equity/Total Customers' Deposits	0.111	0.125	0.157	0.141	0.162	0.139	0.146
LIQUIDITY RATIOS:							
Quick assets/Total deposits	0.482	0.574	0.513	0.484	0.489	0.509	0.508
Quick ratio	0.371	0.501	0.420	0.416	0.416	0.425	0.424
Current ratio	1.030	1.091	1.008	1.086	1.092	1.061	1.061
ASSET QUALITY & FINANCING RATIOS:							
Total loans/Total deposits	0.694	0.647	0.691	0.751	0.748	0.706	0.706
Net loans/Total assets	0.521	0.483	0.443	0.544	0.535	0.505	0.504
Total customer deposits/Total Liabilities	0.819	0.831	0.677	0.830	0.826	0.797	0.796
Deposit growth rate		0.121	-0.051	0.275	0.106	0.113	0.107
Asset growth rate		0.123	0.023	0.185	0.084	0.104	0.102

NOTE: All growth rate figures for 1986 are not included because 1985 accounts were not available for most firms.

APPENDIX A: TABLE 6.1.3

RATIO ANALISYS FOR NBFITS IN PEER GROUP 1 & 2:

EARNINGS AND PROFITABILITY RATIOS:	1986	1987	1988	1989	1990	ARITHMETIC AVERAGE FOR 5 YEARS	COMPOUND AVERAGE FOR 5 YEARS
Net Profit Before Tax/Total Assets.	0.042	0.039	0.033	0.035	0.032	0.036	0.036
Net Profit Before Tax/Paid up or Assigned Capital	1.998	1.063	1.152	2.047	1.433	1.539	1.505
Net Profit Before Tax/Total Shareholders' Equity	0.529	0.454	0.308	0.371	0.308	0.394	0.391
Net profit growth rate		0.303	0.091	0.291	0.126	0.203	0.199
CAPITAL ADEQUACY RATIOS:							
Capital growth rate		0.113	0.814	0.128	0.340	0.349	0.250
Shareholders' Equity/Total Assets	0.084	0.086	0.113	0.098	0.103	0.097	0.097
Shareholders' Equity/Total Loans	0.173	0.126	0.168	0.147	0.161	0.155	0.155
Shareholders' Equity/Total Customers' Deposits	0.104	0.103	0.138	0.119	0.124	0.118	0.121
LIQUIDITY RATIOS:							
Quick assets/Total deposits	0.519	0.329	0.296	0.317	0.270	0.346	0.343
Quick ratio	0.488	0.306	0.275	0.287	0.254	0.322	0.319
Current ratio	1.057	1.056	1.050	1.047	1.057	1.053	1.053
ASSET QUALITY & FINANCING RATIOS:							
Total loans/Total deposits	0.636	0.811	0.834	0.823	0.754	0.772	0.770
Net loans/Total assets	0.517	0.685	0.685	0.674	0.627	0.638	0.636
Total customer deposits/Total Liabilities	0.880	0.927	0.928	0.900	0.932	0.913	0.913
Deposit growth rate		0.216	0.256	0.216	0.379	0.267	0.265
Asset growth rate		0.191	0.295	0.175	0.329	0.248	0.246

NOTE: All growth rate figures for 1986 are not included because 1985 accounts were not available for most firms.

APPENDIX A: TABLE 6.1.4

RATIO ANALISYS FOR NBFITS IN PEER GROUP 3 & 4:

EARNINGS AND PROFITABILITY RATIOS:	1986	1987	1988	1989	1990	ARITHMETIC AVERAGE FOR 5 YEARS	COMPOUND AVERAGE FOR 5 YEARS
Net Profit Before Tax/Total Assets.	0.015	0.013	0.009	0.008	-0.005	0.008	0.008
Net Profit Before Tax/Paid up or Assigned Capital	0.919	0.417	0.186	0.142	-0.002	0.332	0.297
Net Profit Before Tax/Total Shareholders' Equity	0.582	0.252	0.138	0.099	-0.201	0.174	0.146
Net profit growth rate		-0.442	-0.399	0.462	-4.359	-1.185	ERR
CAPITAL ADEQUACY RATIOS:							
Capital growth rate		0.999	0.813	0.018	0.075	0.476	0.317
Shareholders' Equity/Total Assets	0.041	0.055	0.079	0.067	0.065	0.062	0.061
Shareholders' Equity/Total Loans	0.090	0.096	0.172	0.127	0.128	0.123	0.122
Shareholders' Equity/Total Customers' Deposits	0.046	0.063	0.104	0.084	0.083	0.076	0.083
LIQUIDITY RATIOS:							
Quick assets/Total deposits	0.357	0.315	0.704	0.411	0.363	0.430	0.424
Quick ratio	0.339	0.300	0.357	0.295	0.291	0.316	0.316
Current ratio	1.000	1.008	1.015	1.007	1.012	1.008	1.008
ASSET QUALITY & FINANCING RATIOS:							
Total loans/Total deposits	0.634	0.717	0.705	0.703	0.734	0.699	0.698
Net loans/Total assets	0.572	0.635	0.548	0.577	0.607	0.588	0.588
Total customer deposits/Total Liabilities	0.944	0.949	0.852	0.867	0.878	0.898	0.898
Deposit growth rate		0.065	0.074	0.228	0.143	0.127	0.126
Asset growth rate		0.083	0.114	0.133	0.124	0.113	0.113

NOTE: All growth rate figures for 1986 are not included because 1985 accounts were not available for most firms.

APPENDIX A: TABLE 6.1.5

RATIO ANALISYS FOR A SAMPLE OF COMMERCIAL BANKS PEER GROUP 1 TO 4:

EARNINGS AND PROFITABILITY RATIOS:	1986	1987	1988	1989	1990	ARITHMETIC AVERAGE FOR 5 YEARS	COMPOUND AVERAGE FOR 5 YEARS
Net Profit Before Tax/Total Assets.	0.023	0.025	0.025	0.019	0.032	0.025	0.025
Net Profit Before Tax/Paid up or Assigned Capital	0.825	0.630	0.579	0.340	0.716	0.618	0.609
Net Profit Before Tax/Total Shareholders' Equity	0.349	0.308	0.280	0.200	0.299	0.287	0.286
Net profit growth rate		0.204	0.030	-0.100	3.096	0.807	0.462
CAPITAL ADEQUACY RATIOS:							
Capital growth rate		0.225	0.188	0.210	0.150	0.193	0.151
Shareholders' Equity/Total Assets	0.077	0.082	0.087	0.097	0.098	0.088	0.088
Shareholders' Equity/Total Loans	0.144	0.166	0.173	0.170	0.183	0.167	0.167
Shareholders' Equity/Total Customers' Deposits	0.102	0.113	0.131	0.127	0.132	0.121	0.126
LIQUIDITY RATIOS:							
Quick assets/Total deposits	0.434	0.513	0.440	0.406	0.424	0.443	0.443
Quick ratio	0.356	0.425	0.356	0.355	0.362	0.371	0.370
Current ratio	1.025	1.051	1.016	1.063	1.006	1.032	1.032
ASSET QUALITY & FINANCING RATIOS:							
Total loans/Total deposits	0.720	0.702	0.728	0.761	0.697	0.721	0.721
Net loans/Total assets	0.556	0.515	0.498	0.583	0.521	0.534	0.534
Total customer deposits/Total Liabilities	0.840	0.819	0.737	0.861	0.796	0.811	0.810
Deposit growth rate		0.092	0.033	0.148	0.128	0.100	0.100
Asset growth rate		0.128	0.067	0.101	0.124	0.105	0.105

NOTE: All growth rate figures for 1986 are not included because 1985 accounts were not available for most firms.

APPENDIX A: TABLE 6.1.6

RATIO ANALISYS FOR A SAMPLE OF NBFITS PEER GROUP 1 TO 4:

EARNINGS AND PROFITABILITY RATIOS:	1986	1987	1988	1989	1990	ARITHMETIC AVERAGE FOR 5 YEARS	COMPOUND AVERAGE FOR 5 YEARS
Net Profit Before Tax/Total Assets.	0.022	0.020	0.015	0.015	0.004	0.015	0.015
Net Profit Before Tax/Paid up or Assigned Capital	1.189	0.579	0.428	0.619	0.357	0.634	0.610
Net Profit Before Tax/Total Shareholders' Equity	0.568	0.303	0.180	0.167	-0.073	0.229	0.211
Net profit growth rate		-0.256	-0.277	0.419	-3.238	-0.838	-0.838
CAPITAL ADEQUACY RATIOS:							
Capital growth rate		0.778	0.813	0.046	0.141	0.444	0.400
Shareholders' Equity/Total Assets	0.052	0.062	0.088	0.075	0.074	0.070	0.070
Shareholders' Equity/Total Loans	0.111	0.104	0.171	0.132	0.137	0.131	0.130
Shareholders' Equity/Total Customers' Deposits	0.060	0.073	0.112	0.093	0.093	0.086	0.093
LIQUIDITY RATIOS:							
Quick assets/Total deposits	0.397	0.318	0.602	0.388	0.340	0.409	0.406
Quick ratio	0.376	0.302	0.336	0.293	0.282	0.318	0.317
Current ratio	1.014	1.020	1.024	1.017	1.023	1.020	1.020
ASSET QUALITY & FINANCING RATIOS:							
Total loans/Total deposits	0.635	0.741	0.737	0.733	0.739	0.717	0.716
Net loans/Total assets	0.559	0.647	0.583	0.601	0.612	0.600	0.600
Total customer deposits/Total Liabilities	0.928	0.943	0.871	0.875	0.892	0.902	0.902
Deposit growth rate		0.103	0.119	0.225	0.202	0.162	0.161
Asset growth rate		0.110	0.159	0.144	0.175	0.147	0.147

NOTE: All growth rate figures for 1986 are not included because 1985 accounts were not available for most firms.

APPENDIX A: TABLE 6.1.7

RATIO ANALISYS FOR THE SECTOR (A SAMPLE OF ALL BANKS & NBFITS IN PEER 1-4):

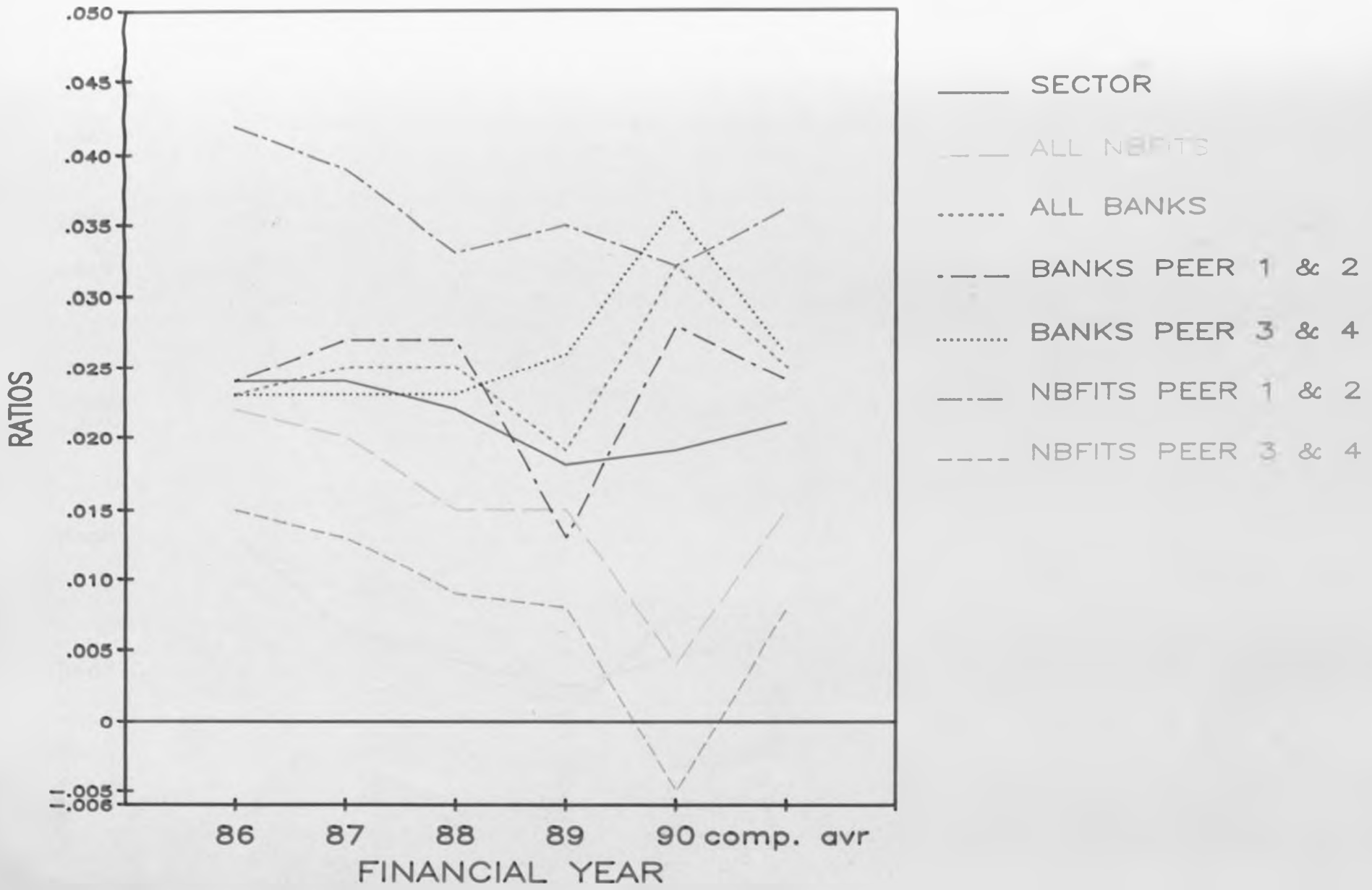
EARNINGS AND PROFITABILITY RATIOS:	1986	1987	1988	1989	1990	ARITHMETIC AVERAGE FOR 5 YEARS	COMPOUND AVERAGE FOR 5 YEARS
Net Profit Before Tax/Total Assets.	0.023	0.022	0.020	0.017	0.018	0.020	0.020
Net Profit Before Tax/Paid up or Assigned Capital	1.007	0.604	0.503	0.479	0.536	0.626	0.610
Net Profit Before Tax/Total Shareholders' Equity	0.458	0.305	0.230	0.184	0.113	0.258	0.249
Net profit growth rate		-0.026	-0.123	0.160	-0.071	-0.015	-0.188
CAPITAL ADEQUACY RATIOS:							
Capital growth rate		0.501	0.500	0.128	0.146	0.319	0.276
Shareholders' Equity/Total Assets	0.065	0.072	0.087	0.086	0.086	0.079	0.079
Shareholders' Equity/Total Loans	0.127	0.135	0.172	0.151	0.160	0.149	0.149
Shareholders' Equity/Total Customers' Deposits	0.081	0.093	0.122	0.110	0.113	0.104	0.109
LIQUIDITY RATIOS:							
Quick assets/Total deposits	0.416	0.416	0.521	0.397	0.382	0.426	0.424
Quick ratio	0.366	0.363	0.346	0.324	0.322	0.344	0.344
Current ratio	1.020	1.036	1.020	1.040	1.015	1.026	1.026
ASSET QUALITY & FINANCING RATIOS:							
Total loans/Total deposits	0.677	0.721	0.733	0.747	0.718	0.719	0.719
Net loans/Total assets	0.557	0.581	0.540	0.592	0.566	0.567	0.567
Total customer deposits/Total Liabilities	0.884	0.881	0.804	0.868	0.844	0.856	0.856
Deposit growth rate		0.098	0.076	0.187	0.165	0.131	0.130
Asset growth rate		0.119	0.113	0.122	0.150	0.126	0.126

NOTE: All growth rate figures for 1986 are not included because 1985 accounts were not available for most firms.

APPENDIX B:

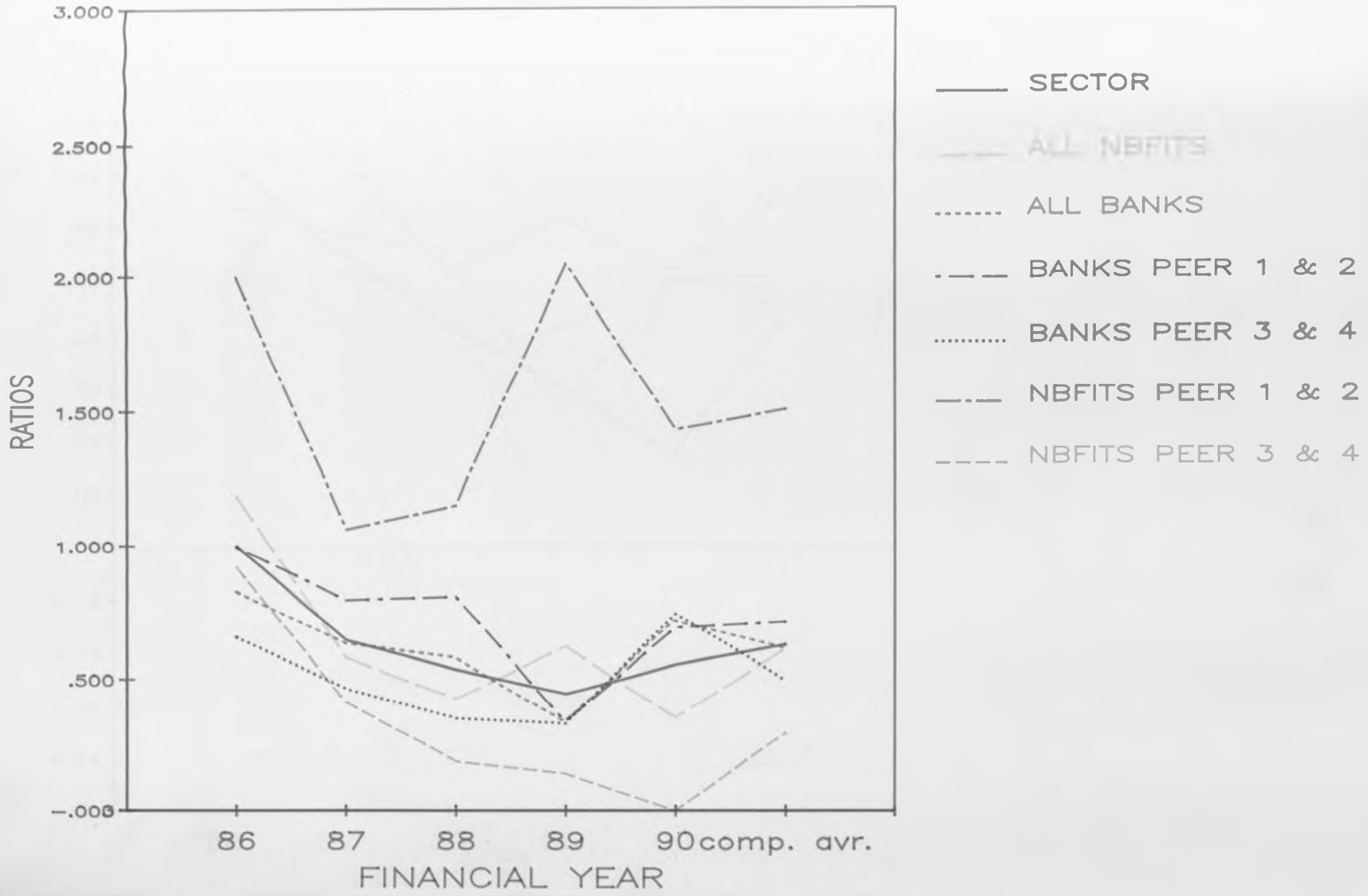
. . **Graphical Analyses Figures 1 to 16 on Performance Ratios for the whole sector and it's sub-sectors 1986 to 1990.**

KENYAN BANKING SECTOR FINANCIAL PERFORMANCE
PROFITABILITY: NET PROFIT BEFORE TAX/TOTAL ASSETS



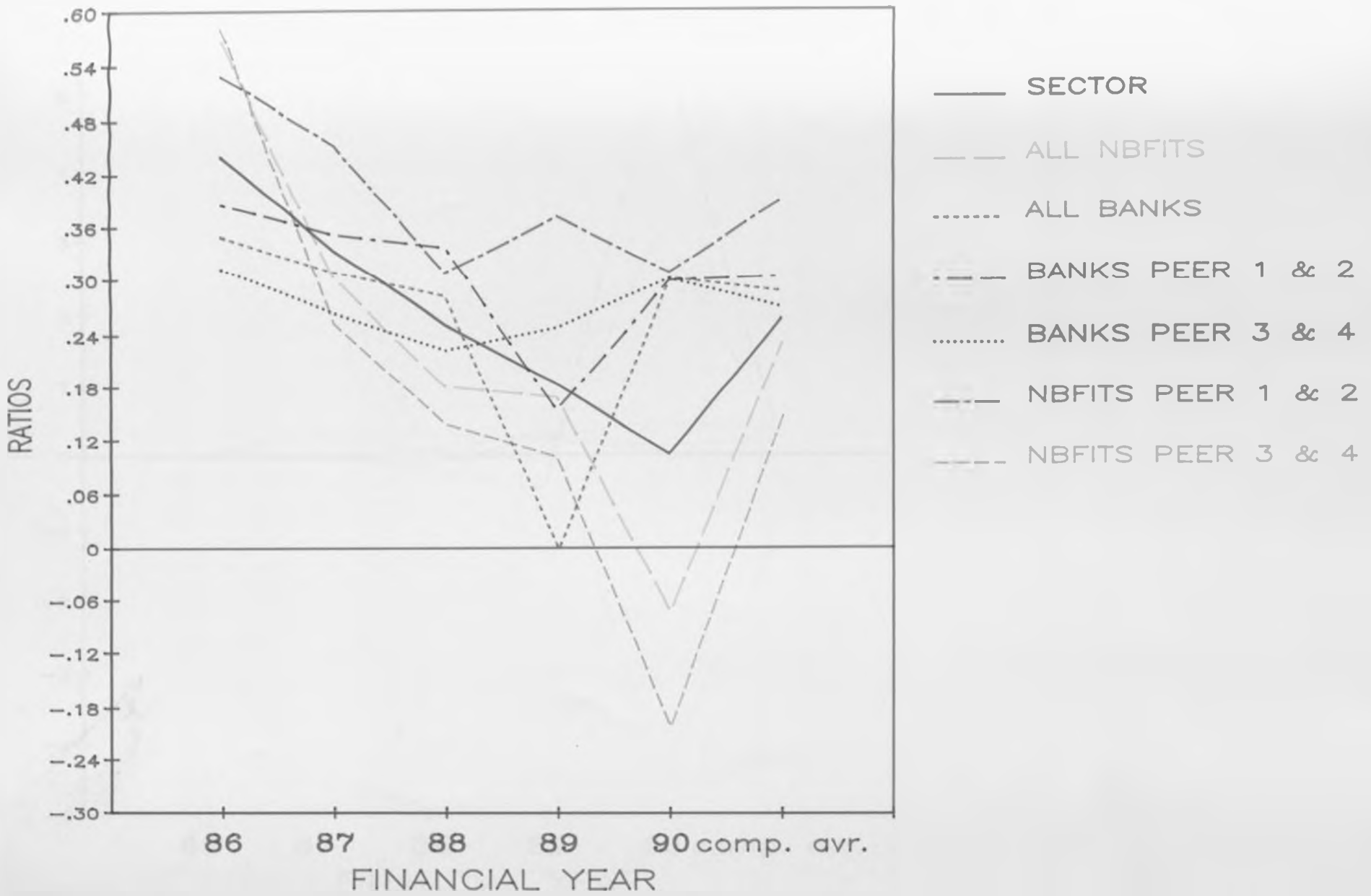
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

PROFITABILITY: NET PROFIT BEFORE TAX/PAID UP CAPITAL

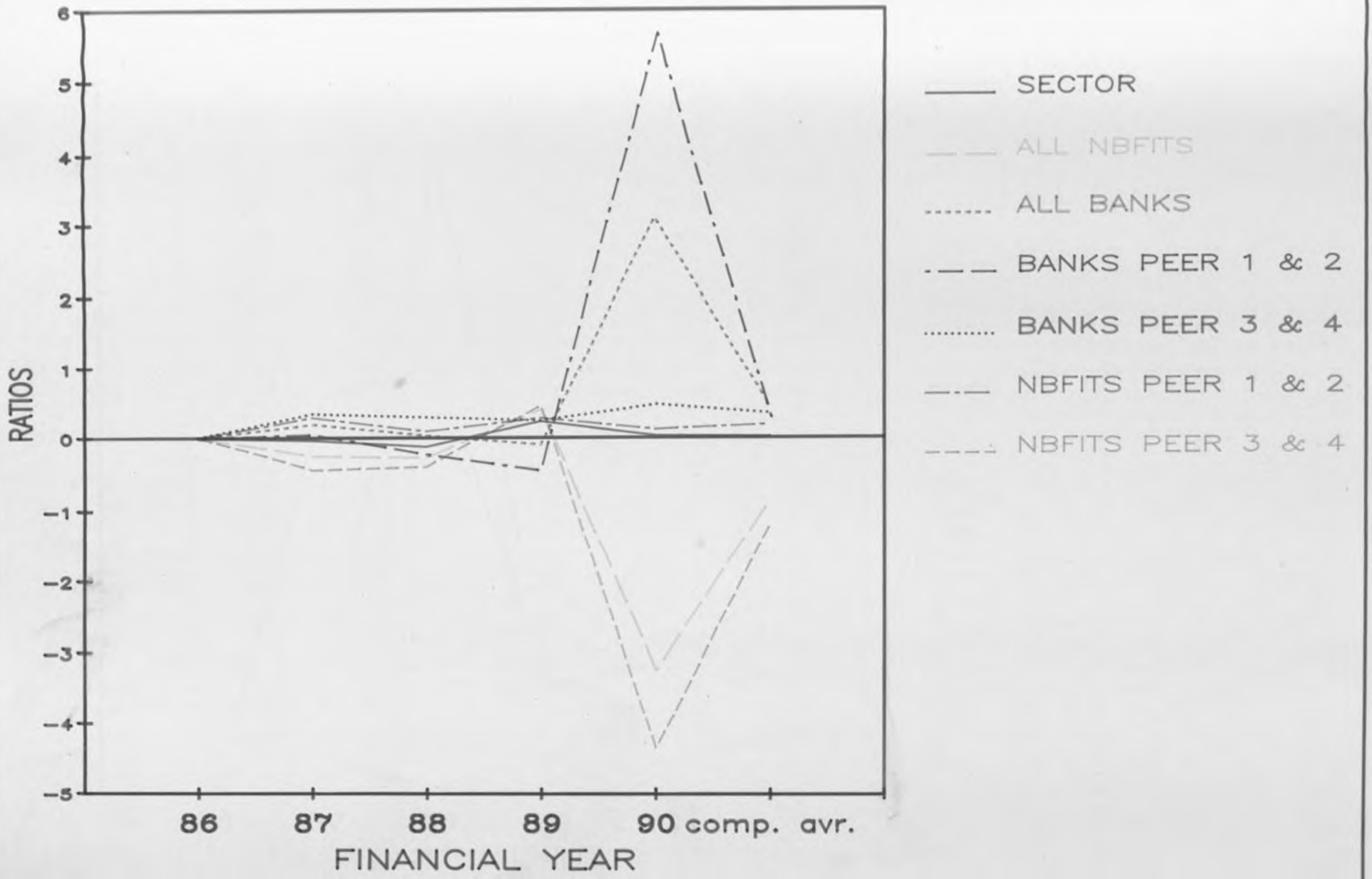


KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

PROFITABILITY: NET PROFIT BEFORE TAX/TOTAL EQUITY

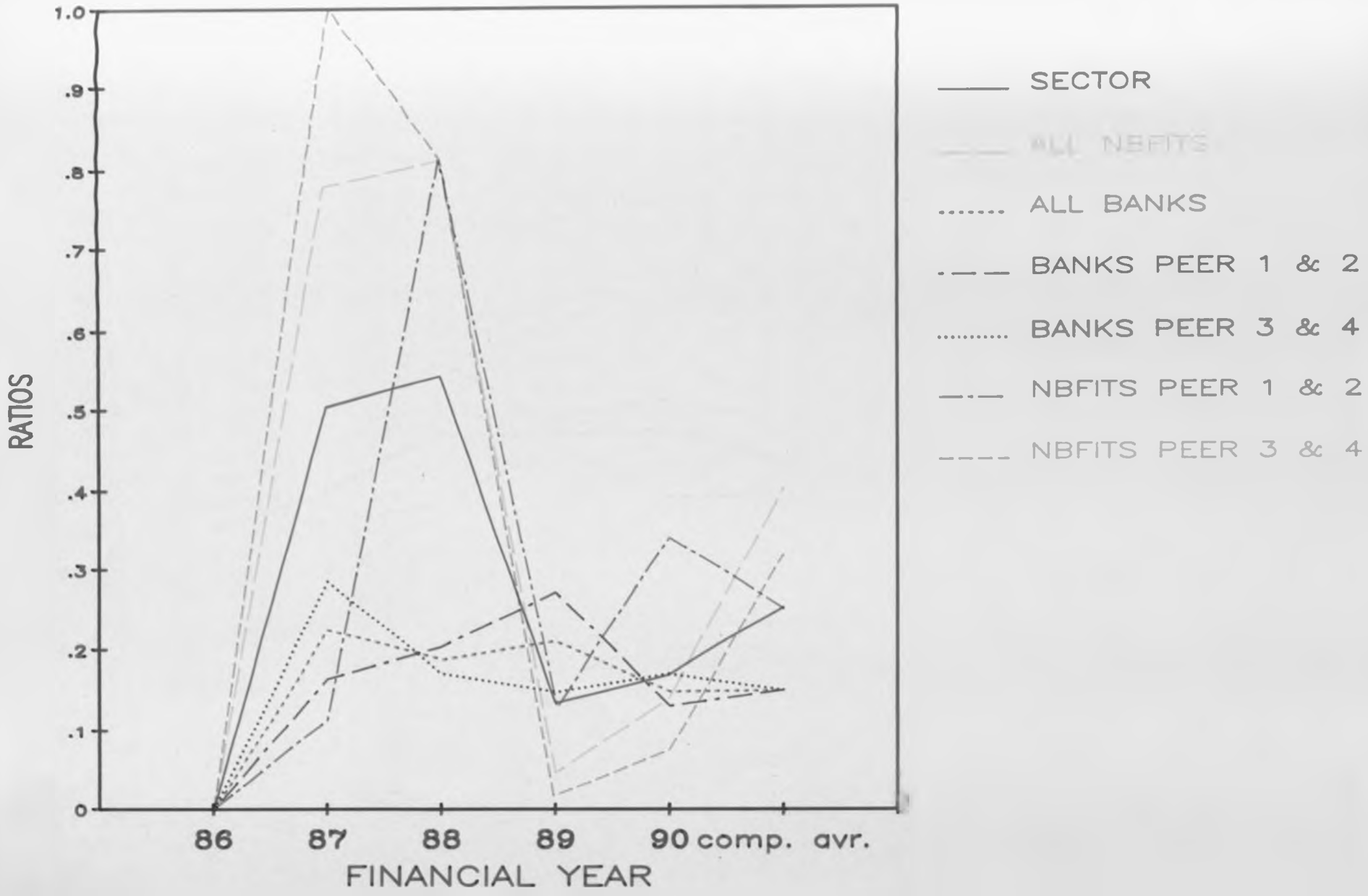


KENYAN BANKING SECTOR FINANCIAL PERFORMANCE
PROFITABILITY: NET PROFIT BEFORE TAX GROWTH RATE



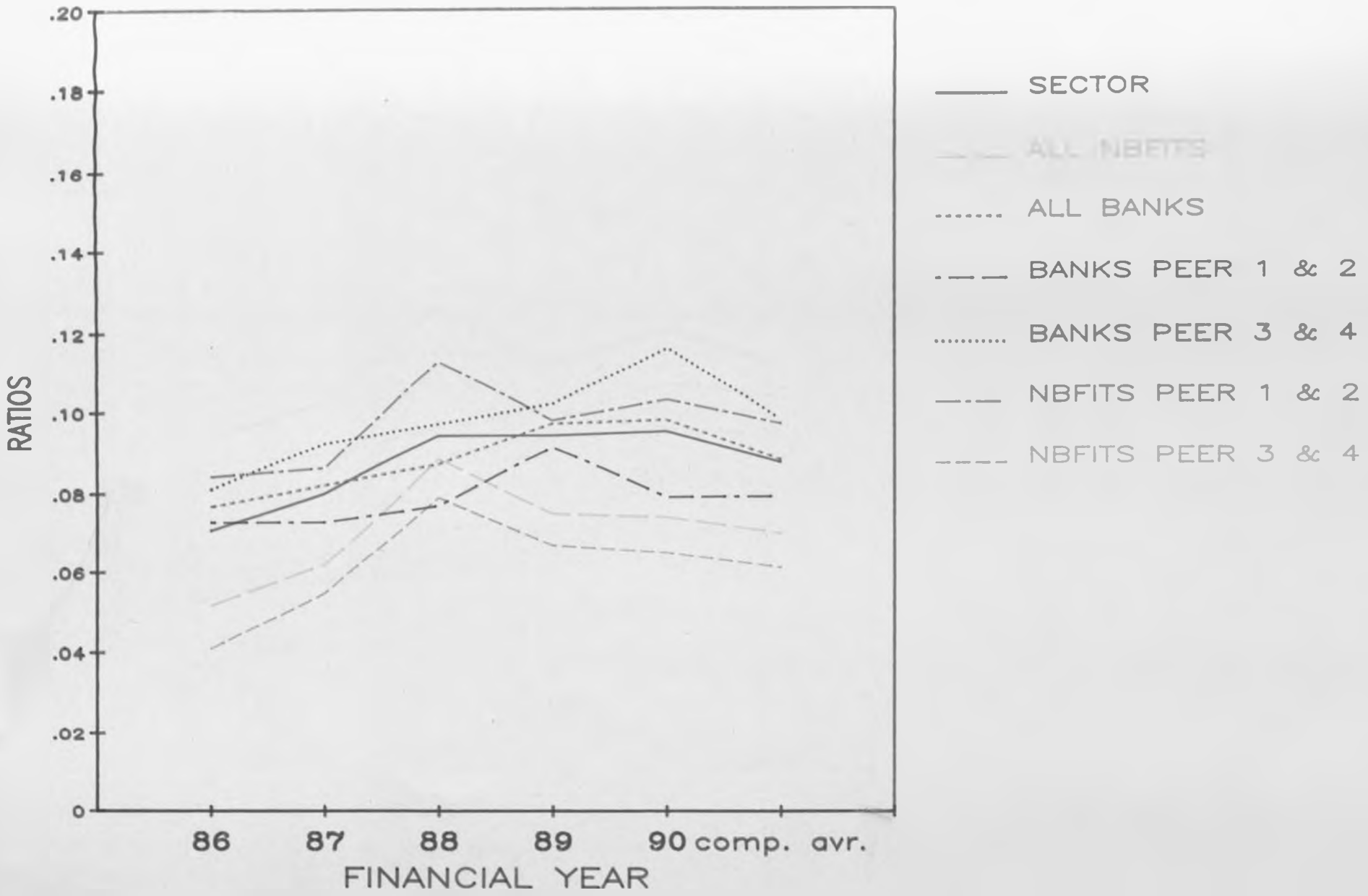
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

CAPITAL ADEQUACY: CAPITAL GROWTH RATE



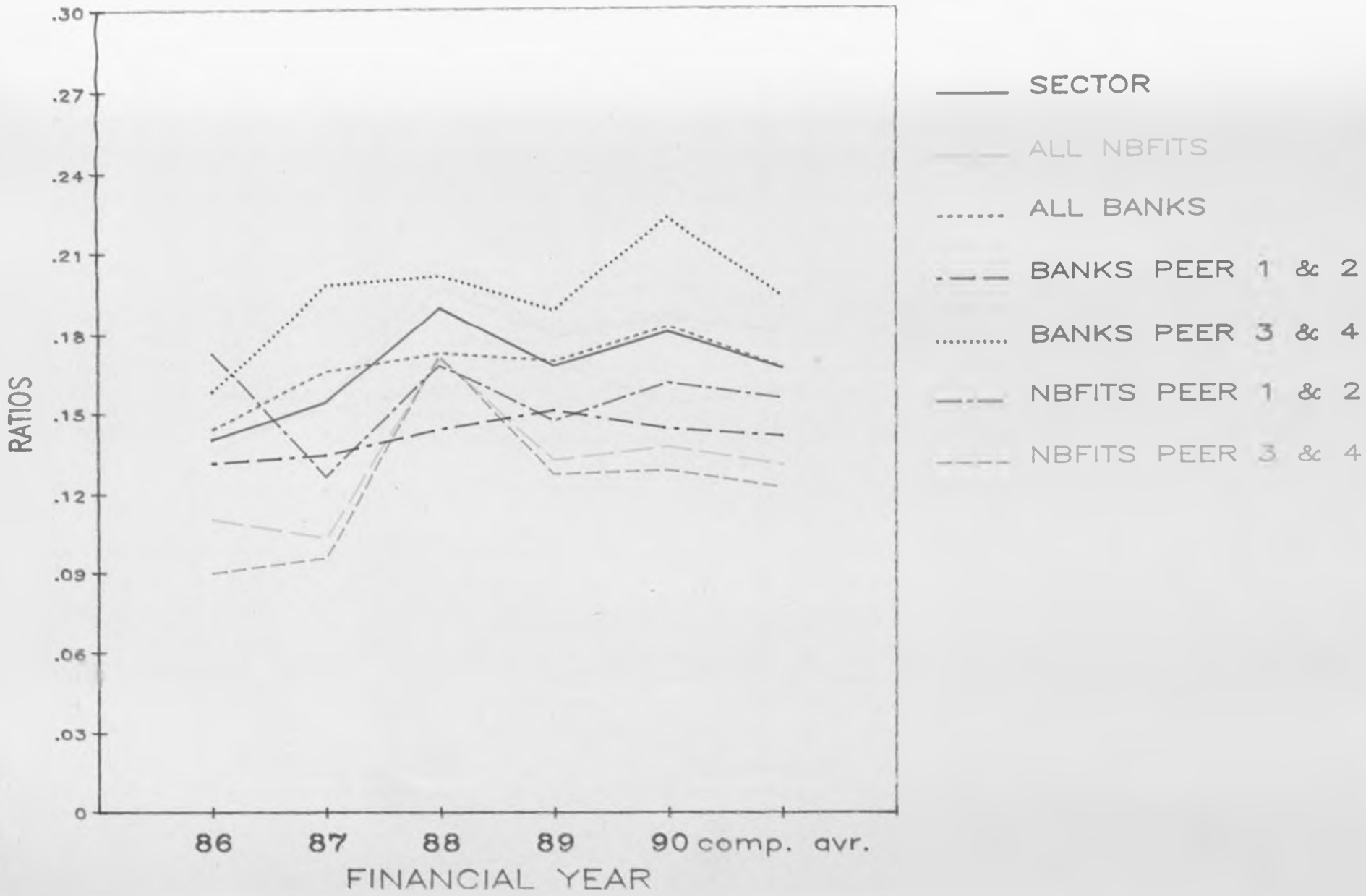
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

CAPITAL ADEQUACY: SHAREHOLDERS' EQUITY/TOTAL ASSETS



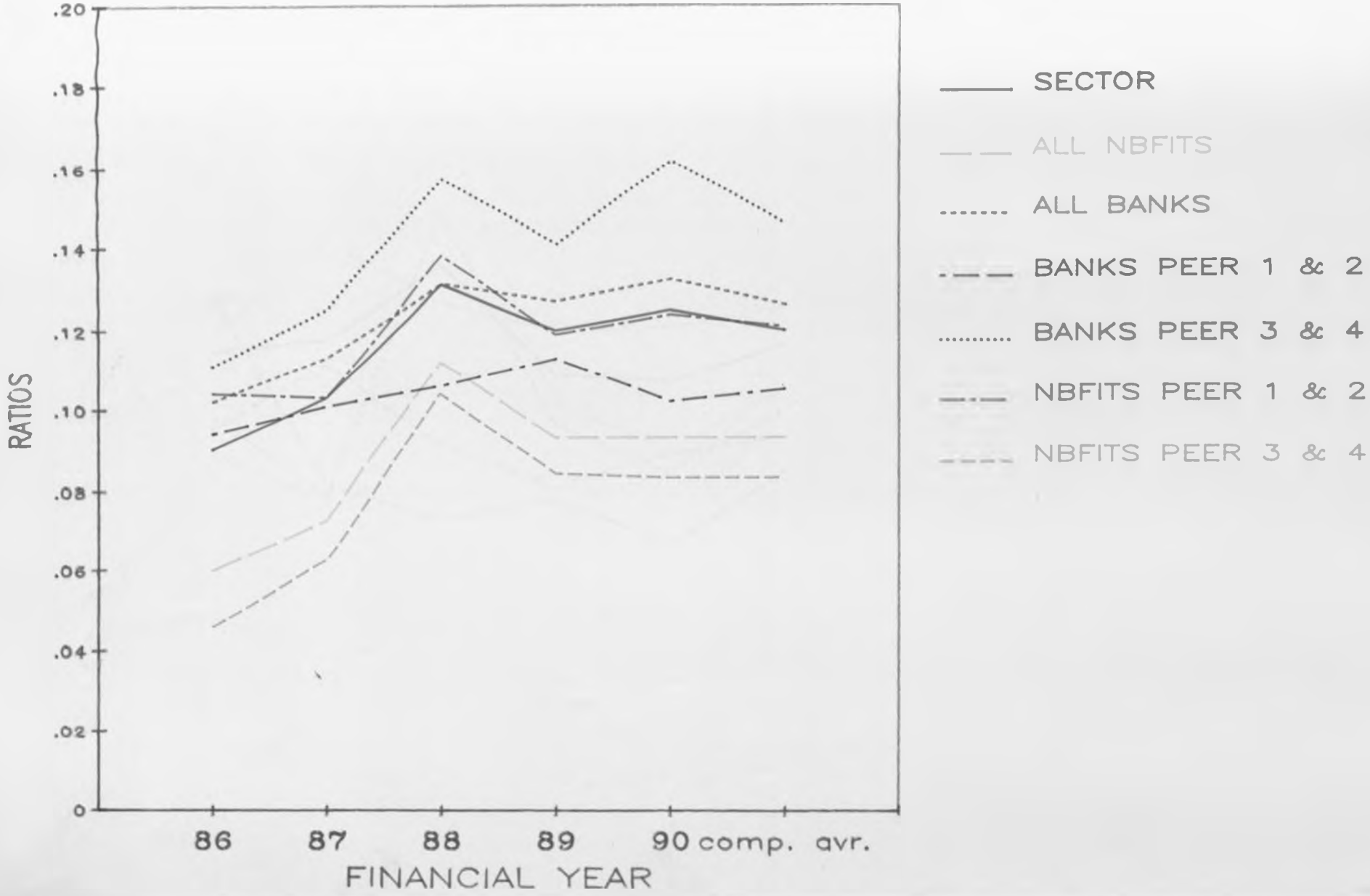
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

CAPITAL ADEQUACY: SHAREHOLDERS' EQUITY/TOTAL LOANS

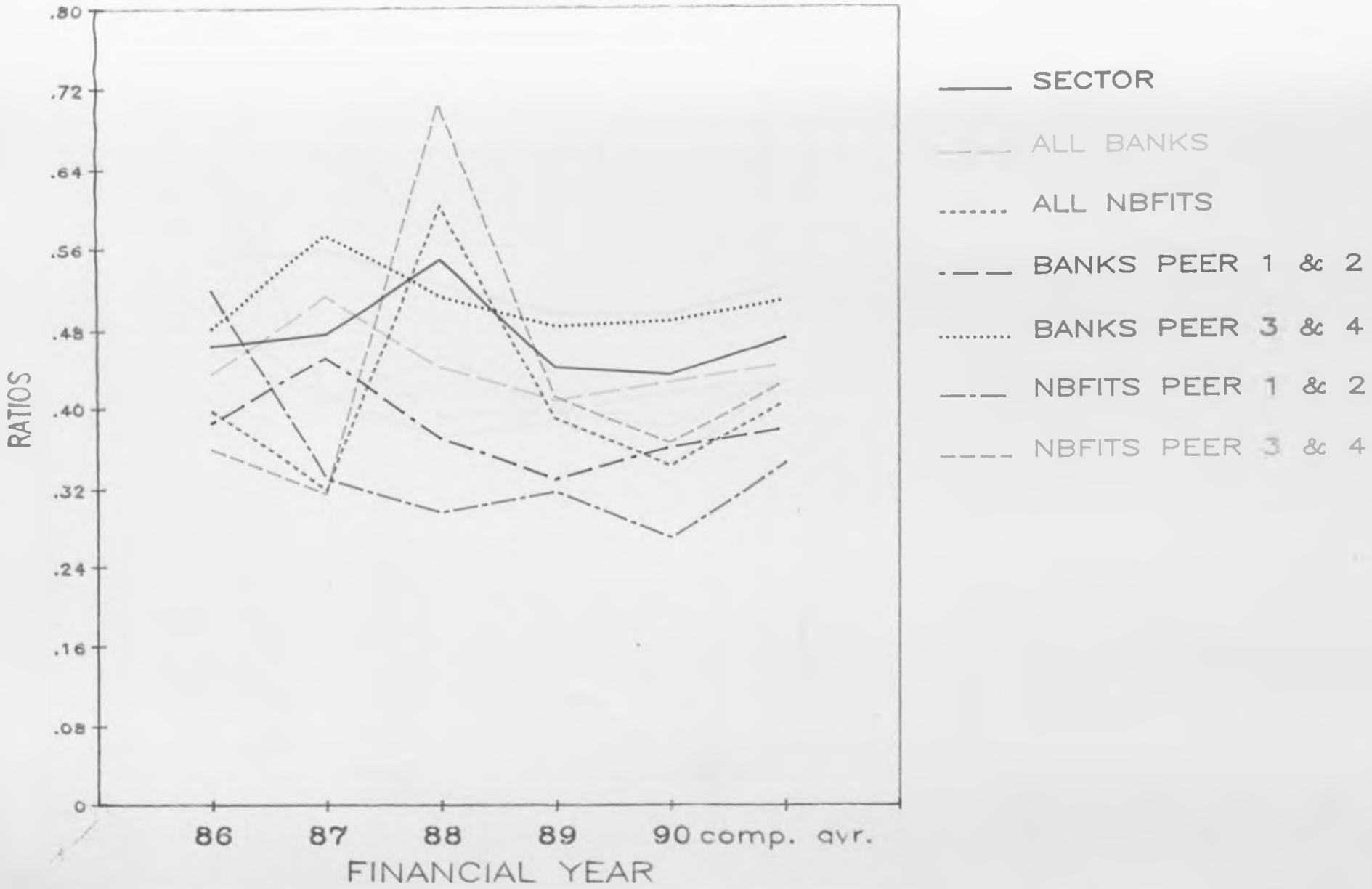


KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

CAPITAL ADEQUACY: SHAREHOLDERS' EQUITY/CUSTOMER DEPOSITS

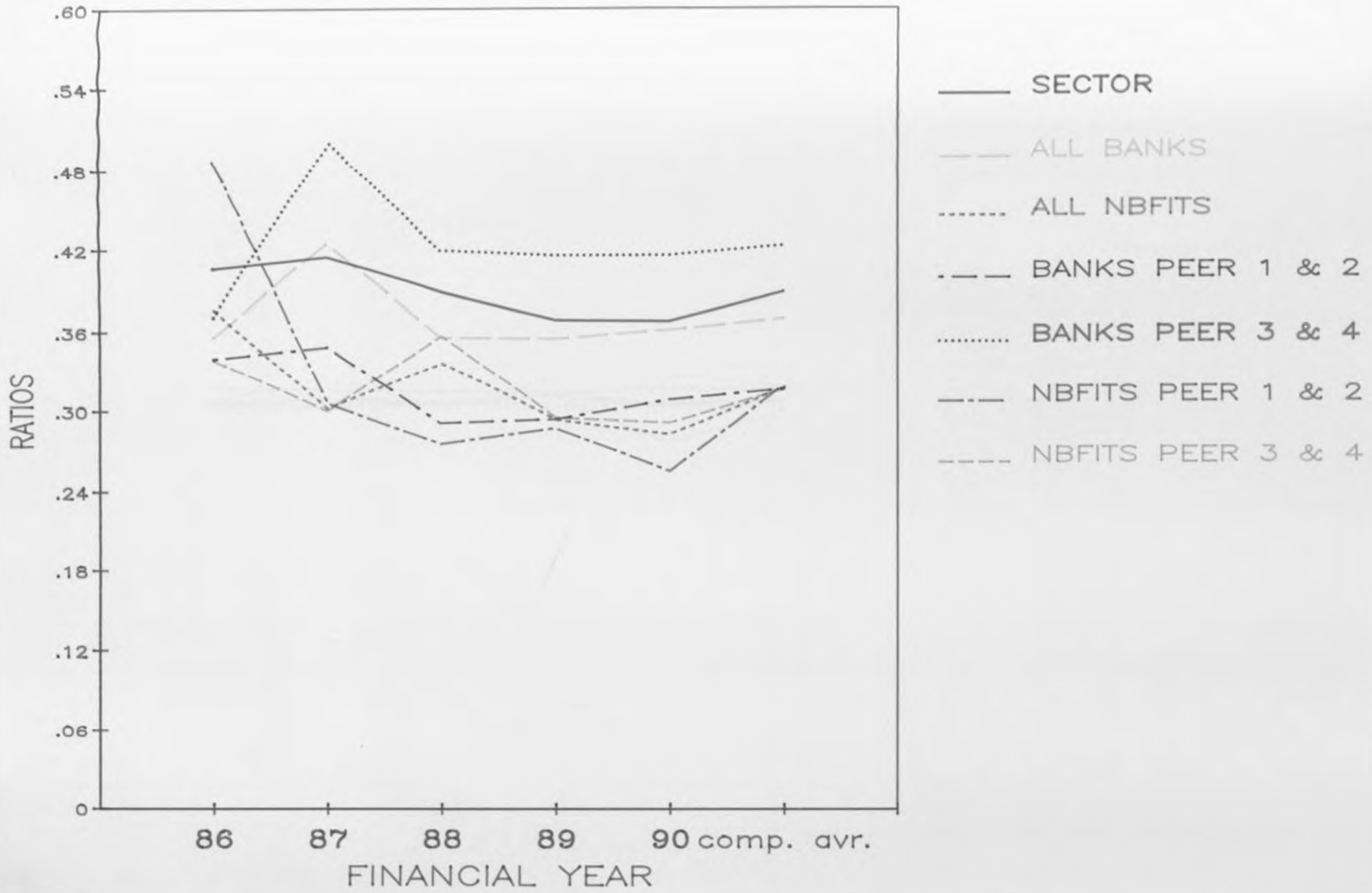


KENYAN BANKING SECTOR FINANCIAL PERFORMANCE
LIQUIDITY: QUICK ASSETS, CUSTOMER DEPOSITS



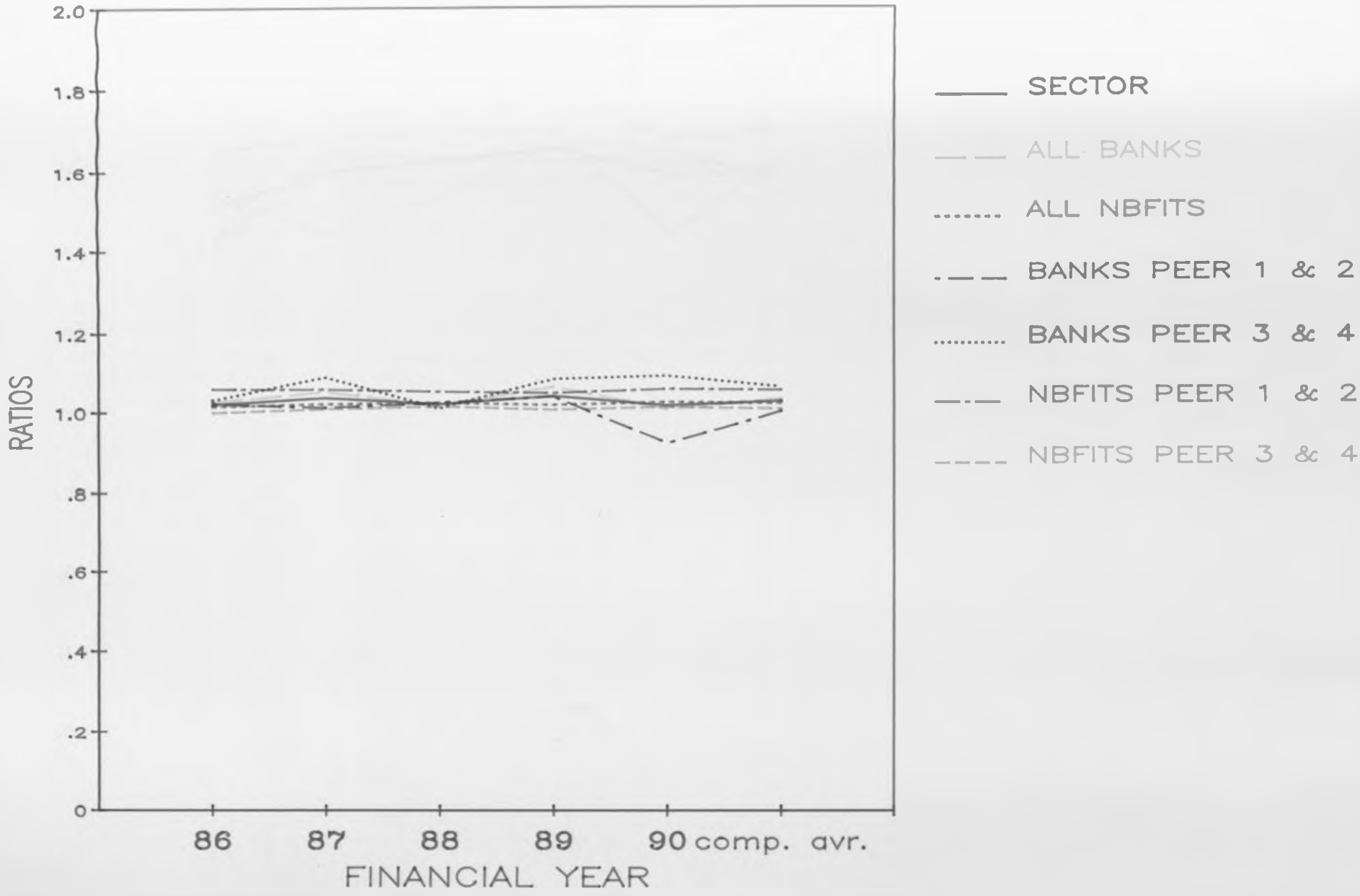
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

LIQUIDITY:QUICK RATIO



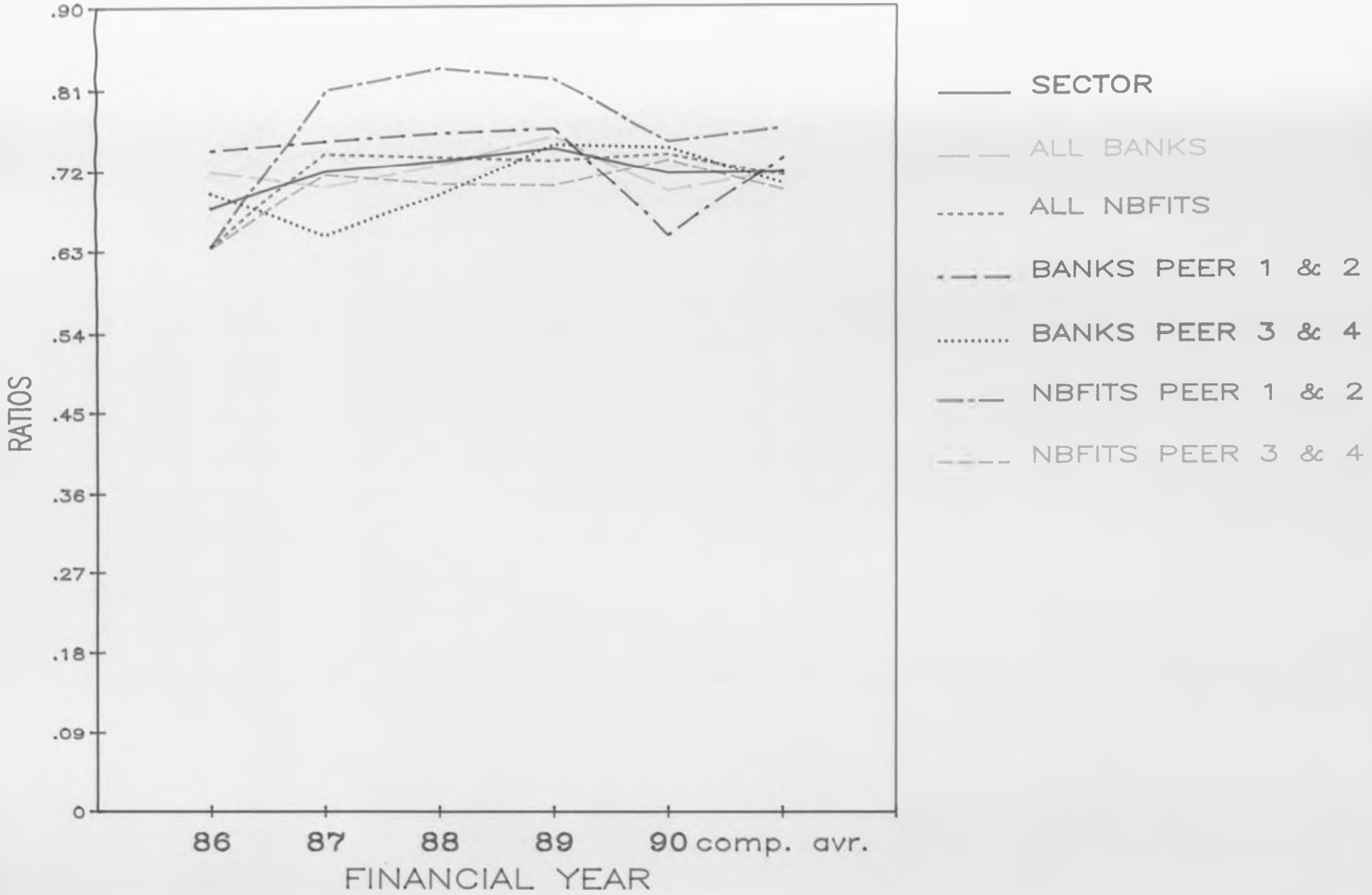
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

LIQUIDITY:CURRENT RATIO



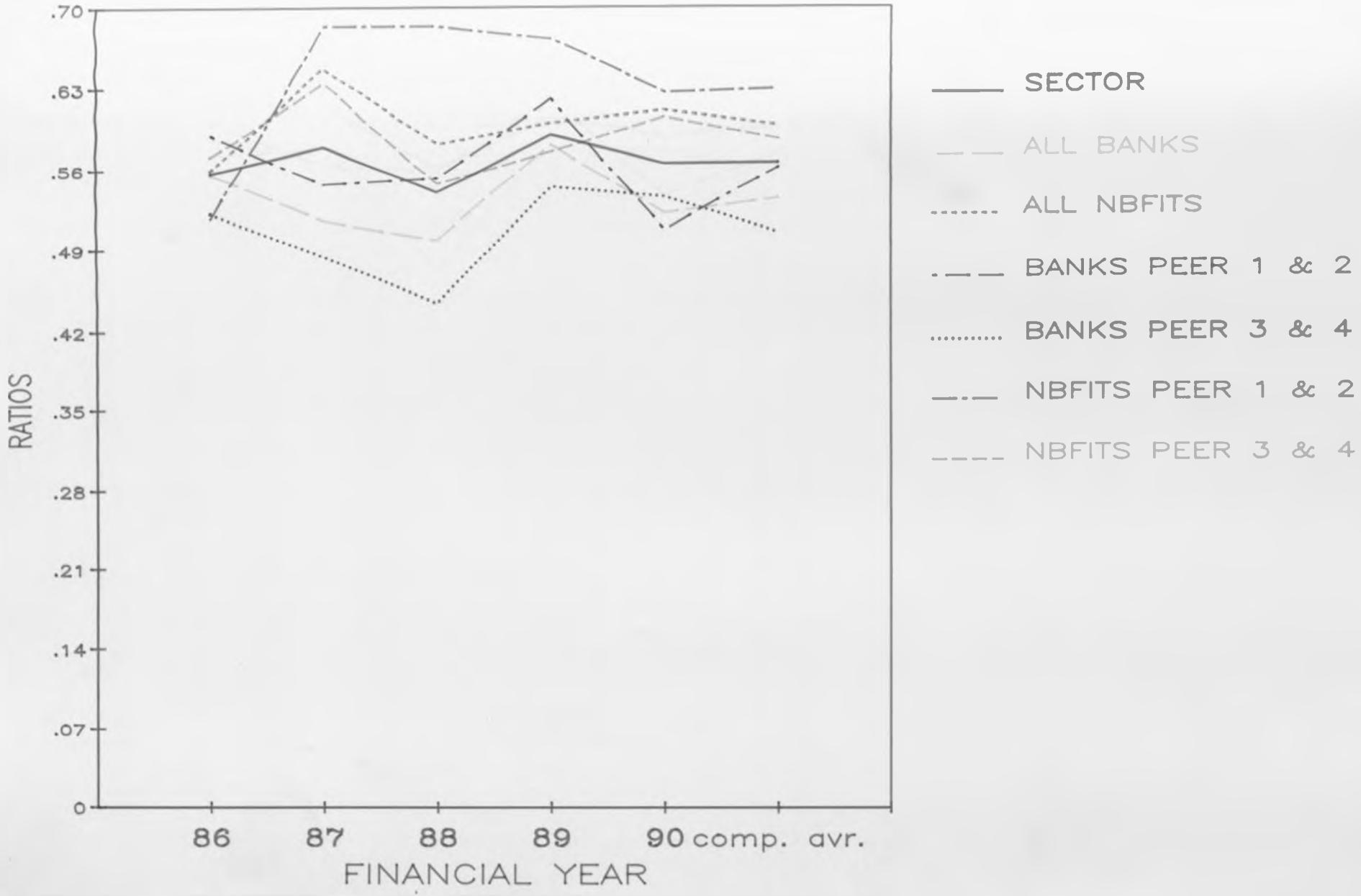
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

ASSET QUALITY: TOTAL LOANS/TOTAL CUSTOMER DEPOSITS



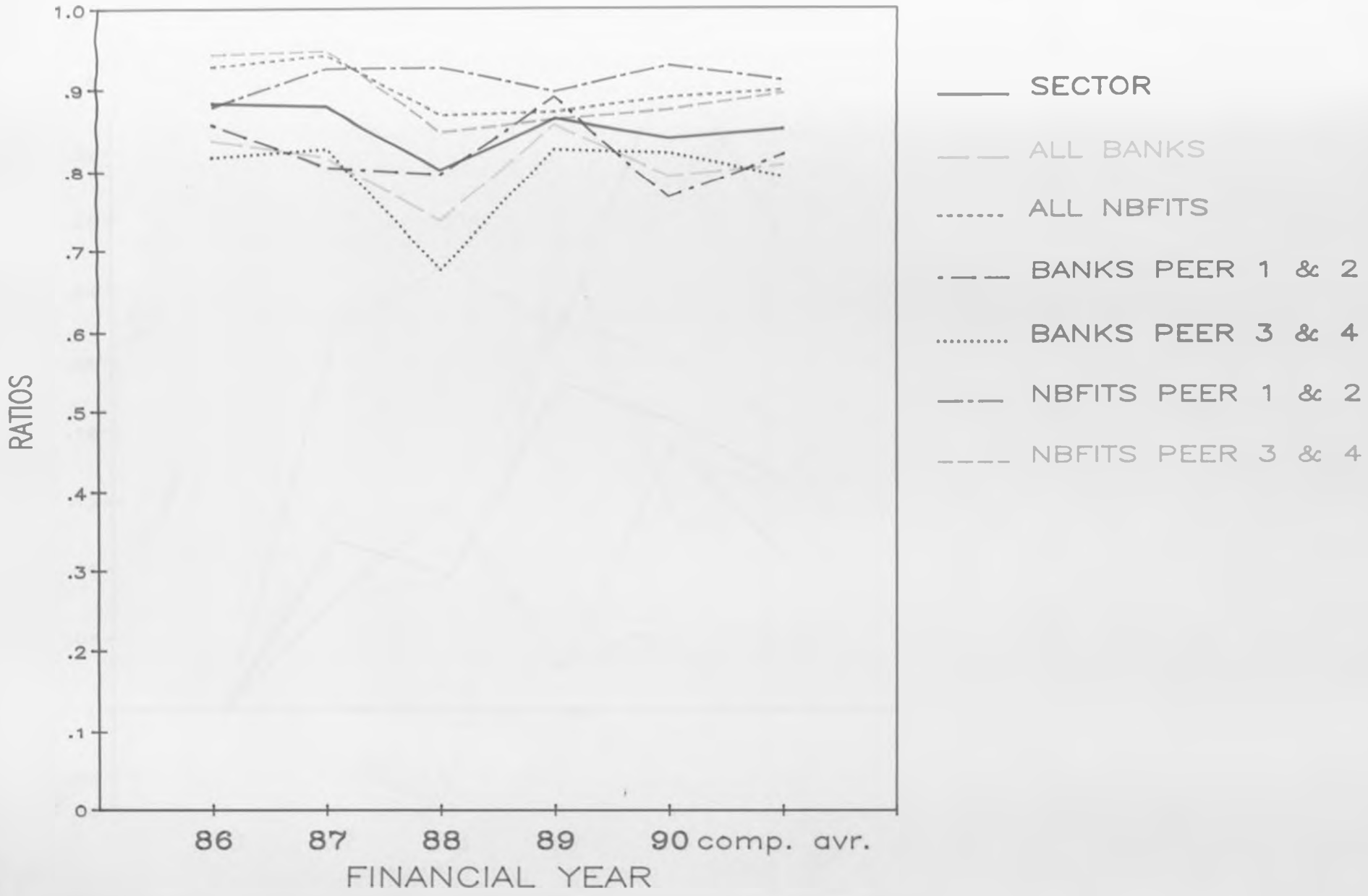
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

ASSET QUALITY: NET LOANS/TOTAL ASSETS



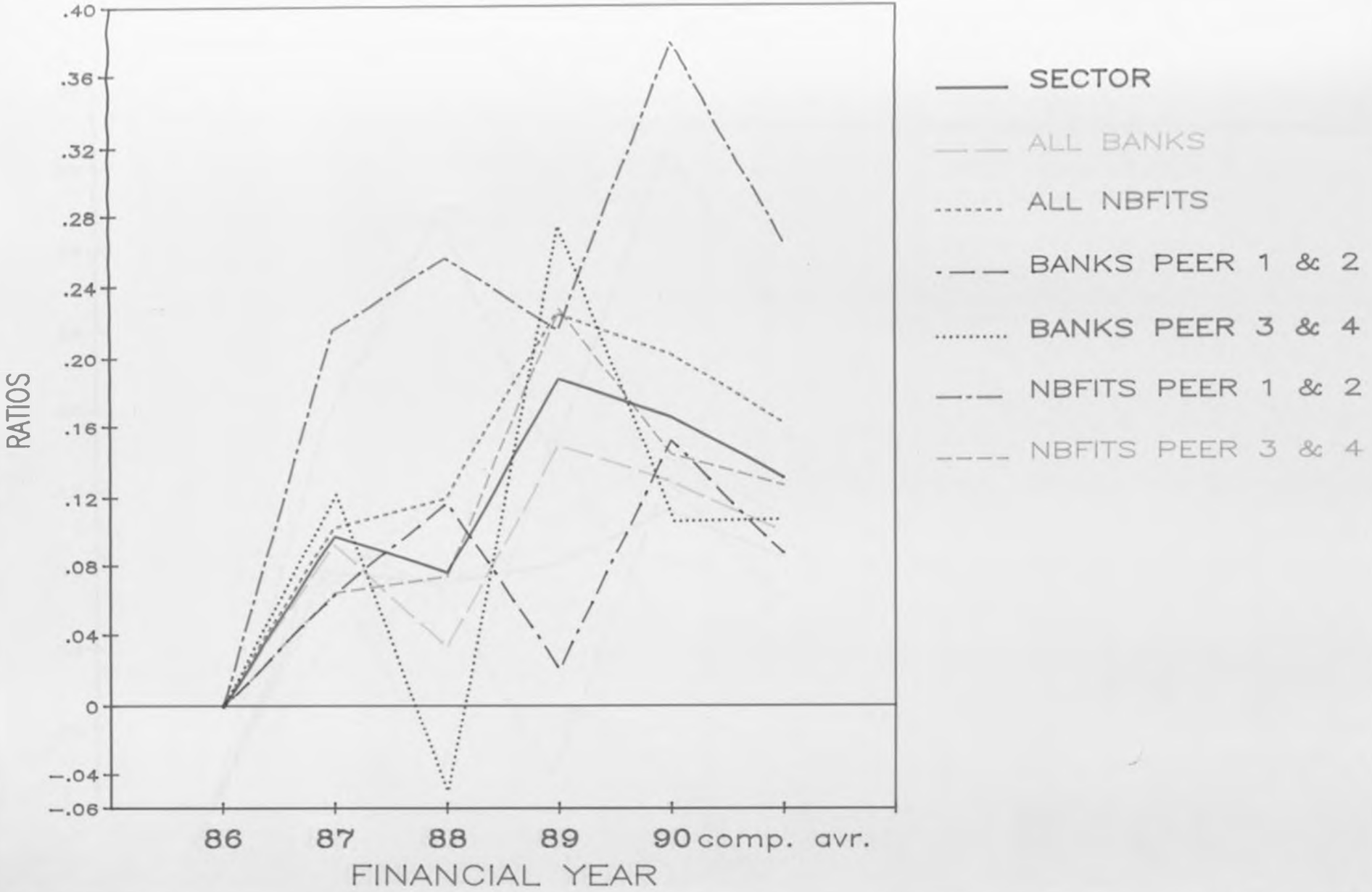
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

FINANCING: CUSTOMER DEPOSITS/TOTAL LIABILITIES



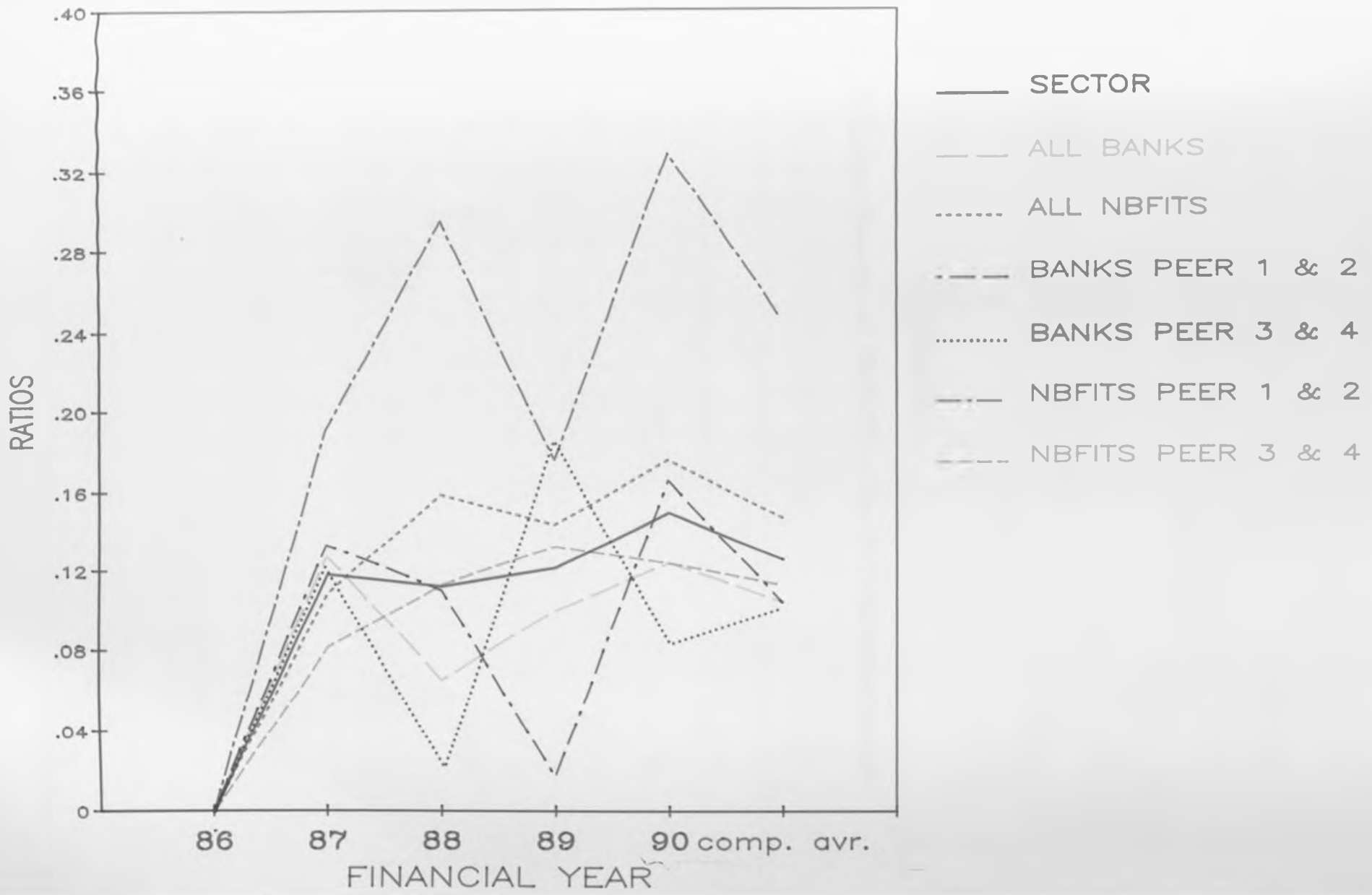
KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

FINANCING: DEPOSIT GROWTH RATE



KENYAN BANKING SECTOR FINANCIAL PERFORMANCE

ASSET QUALITY: ASSET GROWTH RATE



APPENDIX C:

Input data and Output Reports of SPSS/PC+ for 33 Unmatched Sample of Banks.

APPENDIX C: INPUT DATA USED IN SPSS/PC+ FOR 33 MATCHED BANKS

	BANK'S				VARIABLES	RATIOS		CODES							GROUP
1987	ID NO	V001	V002	V003	V004	V005	V006	V007	V008	V009	V010	V011	V012	V013	V014	V015
	1	-0.09	-2.88	-1.81	-0.01	-0.05	-0.09	-0.05	0.12	0.12	0.88	0.53	0.52	0.95	0.13	1
	2	-0.01	-0.06	-0.19	0.25	0.02	0.02	0.02	0.02	0.02	0.99	0.08	0.78	1.00	0.22	1
	3	0.01	0.01	0.04	0.04	0.09	0.13	0.11	0.03	0.03	0.85	0.82	0.64	0.86	-0.11	1
	4	-0.14	-3.27	-0.61	-0.30	-0.22	-0.37	-0.17	0.06	0.06	0.51	0.46	0.59	0.99	-0.15	1
	5	-0.03	-0.25	-0.58	1.18	0.05	0.07	0.06	0.07	-0.05	0.96	0.94	0.75	0.78	1.34	1
	6	0.01	0.01	0.01	0.74	0.03	0.13	0.05	0.20	0.13	1.02	0.38	0.23	0.63	0.53	1
	7	0.02	0.18	0.17	0.20	0.10	0.15	0.12	0.26	0.24	1.04	0.81	0.67	0.92	0.16	2
	8	0.01	0.20	0.17	0.18	0.07	0.15	0.08	0.62	0.60	1.09	0.51	0.45	0.96	0.15	2
	10	0.01	0.01	0.01	0.08	0.06	0.35	0.09	1.11	0.87	1.07	0.25	0.18	0.79	0.52	2
	11	0.01	0.06	0.06	0.38	0.18	0.32	0.22	0.10	0.10	1.19	0.69	0.55	0.98	2.50	2
	12	0.02	0.41	0.32	0.04	0.05	0.13	0.06	0.67	0.63	1.04	0.44	0.39	0.94	0.04	2
	13	0.03	1.84	0.50	0.20	0.07	0.12	0.08	0.49	0.42	1.01	0.68	0.55	0.86	0.12	2
	14	0.02	0.54	0.31	0.16	0.06	0.10	0.08	0.40	0.33	1.00	0.80	0.62	0.83	0.02	2
	15	0.01	0.27	0.12	0.20	0.08	0.17	0.10	0.44	0.42	1.02	0.56	0.49	-0.95	0.23	2
	16	0.03	0.79	0.46	-0.20	0.06	0.11	0.07	0.22	0.20	1.01	0.67	0.56	0.89	-0.16	2
	17	0.00	-0.06	0.06	0.05	0.05	0.10	0.09	0.75	0.45	1.01	0.88	0.49	0.59	-0.25	2
	18	0.00	1.12	0.62	-0.13	0.07	0.14	0.09	0.41	0.36	0.99	0.67	0.54	0.88	-0.11	2
	19	0.06	1.70	0.61	0.26	0.99	0.17	0.20	0.61	0.32	1.08	1.13	0.54	0.52	-0.11	2
	20	0.01	0.21	0.14	0.47	0.08	0.17	0.10	0.47	0.42	1.04	0.59	0.49	0.98	0.69	2
	31	0.01	0.32	0.22	0.09	0.04	0.09	0.07	0.78	0.78	1.59	0.79	0.45	0.59	0.00	2
	22	0.04	1.49	0.39	0.11	0.09	0.19	0.12	0.52	0.42	1.02	0.67	0.49	0.81	0.39	2
	23	0.01	0.15	0.14	0.02	0.06	0.11	0.07	0.48	0.45	1.05	0.62	0.55	0.94	0.03	2
	24	0.03	0.68	0.46	0.17	0.07	0.13	0.08	0.42	0.39	0.98	0.62	0.53	0.92	0.17	2
	25	0.04	0.30	0.26	0.40	0.16	0.41	0.21	0.64	0.56	1.03	0.52	0.38	0.88	0.35	2
	26	0.02	0.18	0.16	-0.18	-0.15	0.32	0.21	0.63	0.52	1.10	0.65	0.47	0.84	-0.24	2
	27	0.02	0.11	0.13	0.20	0.13	0.29	0.21	0.72	0.53	1.07	0.71	0.45	0.73	0.03	2
	28	0.04	0.88	0.48	0.23	0.07	0.11	0.08	0.36	0.35	1.06	0.74	0.66	0.96	0.27	2
	29	0.04	1.25	0.43	0.15	0.98	0.14	1.12	0.30	0.26	1.05	0.88	0.71	0.90	0.17	2
	30	0.03	1.65	0.81	0.11	0.04	0.04	0.04	0.15	0.15	1.04	0.93	0.85	0.94	0.10	2
	32	0.02	0.68	0.38	-0.03	0.06	0.09	0.07	0.34	0.32	1.06	0.71	0.69	0.92	-0.04	2
	33	-0.01	-0.23	0.00	-0.07	0.03	0.04	0.03	0.34	0.32	0.99	0.68	0.63	0.94	0.07	2

APPENDIX C: INPUT DATA USED IN SPSS/PC+ FOR 33 MATCHED BANKS

	BANK'S				VARIABLES	RATIOS		CODES							GROUP
1988	ID.NO	V001	V002	V003	V004	V005	V006	V007	V008	V009	V010	V011	V012	V013	V014	V015
	1	-0.01	1.01	-1.72	-0.44	-0.03	-0.04	-0.06	0.08	0.07	0.88	0.95	0.84	0.85	-0.51	1
	2	-0.54	-6.13	-1.05	-0.39	-0.52	-0.74	-0.34	0.01	0.01	0.62	0.47	0.70	0.99	-0.06	1
	3	-0.01	-0.25	-0.05	0.09	0.14	0.26	0.02	0.08	0.07	0.86	0.77	0.56	0.84	0.01	1
	4	0.39	-5.55	-0.35	-0.38	-1.13	-3.74	-0.53	0.10	0.10	0.47	0.14	0.30	0.99	0.04	1
	5	-0.01	-0.19	-0.80	0.55	0.02	0.03	0.02	0.01	0.01	0.83	0.71	0.69	0.81	0.88	1
	6	-0.07	-1.43	-0.96	-0.31	0.07	0.22	0.11	0.00	0.00	0.60	0.51	0.91	0.73	-0.23	1
	7	0.02	0.22	0.20	0.17	0.09	0.13	0.11	0.24	0.22	0.98	0.80	0.93	0.91	0.18	2
	8	0.01	0.22	0.17	0.09	0.07	0.16	0.08	0.65	0.60	1.06	0.49	0.87	0.93	0.08	2
	9	0.01	0.09	0.07	0.15	0.08	0.12	0.10	0.24	0.21	0.94	0.82	0.90	0.87	0.05	2
	10	0.01	0.27	0.22	0.12	0.65	0.13	0.08	0.44	0.40	1.05	0.59	0.51	0.90	0.32	2
	11	0.01	0.06	0.06	0.07	0.07	0.10	0.08	0.34	0.32	1.06	1.78	0.69	0.94	2.40	2
	12	0.03	0.43	0.34	-0.22	0.09	0.18	0.11	0.56	0.54	1.10	0.58	0.50	0.97	-0.25	2
	13	0.04	2.26	0.42	0.12	0.09	0.14	0.11	0.32	0.27	0.94	0.78	0.61	0.85	0.12	2
	14	0.02	0.54	0.29	0.11	0.07	0.11	0.09	0.31	2.27	1.02	0.85	0.68	0.86	0.15	2
	15	0.01	0.42	0.17	0.10	0.08	0.14	0.10	0.35	0.33	1.01	0.70	0.60	0.93	0.07	2
	16	0.03	0.79	0.51	0.20	0.06	0.11	0.07	0.17	0.15	1.01	0.66	0.55	0.89	0.19	2
	17	0.01	0.11	0.12	0.13	0.05	0.10	0.09	0.38	0.22	1.02	0.90	0.49	0.57	0.10	2
	18	0.04	0.84	0.51	0.12	0.08	0.14	0.10	0.48	0.40	1.07	0.74	0.57	0.84	0.06	2
	19	0.05	1.44	0.50	0.05	0.10	0.17	0.17	0.39	0.26	1.09	1.00	0.59	0.66	0.19	2
	20	0.02	0.39	0.20	0.09	0.10	0.29	0.13	0.63	0.53	1.04	0.46	0.35	0.85	0.02	2
	21	0.01	0.24	0.18	0.07	0.05	0.10	0.10	0.72	0.72	1.71	0.98	0.52	0.56	-0.01	2
	22	0.02	0.88	0.22	-0.02	0.10	0.19	0.13	0.45	0.35	1.01	0.72	0.51	0.79	0.04	2
	23	0.03	0.47	0.37	0.01	0.07	0.15	0.08	0.56	0.53	1.07	0.56	0.49	0.95	0.01	2
	24	0.04	0.69	0.48	0.08	0.09	0.16	0.11	0.45	0.41	1.07	0.56	0.49	0.95	0.01	2
	25	0.04	0.36	0.26	0.06	0.17	0.42	0.22	0.60	0.55	1.04	0.53	0.40	0.91	0.09	2
	26	0.03	0.22	0.18	-0.08	0.18	0.32	0.42	0.51	0.27	1.07	1.31	0.56	0.52	-0.45	2
	27	0.02	0.16	0.17	0.09	0.13	0.31	0.22	0.80	0.55	1.08	0.72	0.43	0.69	0.02	2
	28	0.03	1.00	0.22	0.39	0.13	0.21	0.16	0.32	0.31	1.05	0.79	0.65	0.96	0.30	2
	29	0.04	1.30	0.40	0.19	0.09	0.13	0.11	0.27	0.24	1.04	0.89	0.72	0.90	0.21	2
	30	0.03	0.42	0.30	0.09	0.09	0.10	0.10	0.05	0.05	1.10	1.02	0.88	0.95	0.03	2
	31	0.00	0.00	0.00	0.12	0.07	0.14	0.07	0.27	0.26	0.88	0.54	0.48	0.96	0.08	2
	32	0.01	0.32	0.16	0.07	0.07	0.09	0.08	0.27	0.25	1.06	0.86	0.72	0.90	0.04	2
	33	0.00	0.03	0.03	0.00	0.06	0.05	0.07	0.24	0.22	1.01	0.68	0.71	0.92	0.06	2

ID NO. 1 TO 12 ARE DATA FOR 12 MATCHED BANKS USED IN APPENDIX D

OUTPUT OF 33 UNMATCHED BANKS 1987 RESULTS

```
DISCRIMINANT GROUPS=V015(1,2)/VARIABLES=V001 TO V014/STATISTICS=ALL.

Since ANALYSIS= was omitted for the first analysis all variables
on the VARIABLES= list will be entered at level 1.

This Discriminant Analysis requires      7552 (      7.4K) BYTES of workspace.
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- - - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - - -

On groups defined by V015 Grouping Variable

33 (unweighted) cases were processed.
0 of these were excluded from the analysis.
33 (unweighted) cases will be used in the analysis.

Number of Cases by Group

V015	Number of Cases Unweighted	Weighted	Label
1	6	6.0	
2	27	27.0	
Total	33	33.0	

Group Means

V015	V001	V002	V003	V004
1	-.04167	-1.05833	-.52333	.30333
2	.02222	.57852	.29519	.12111
Total	.01061	.28091	.14636	.15424

V015	V005	V006	V007	V008
1	-.01333	-.01833	.00333	.08333
2	.10074	.15963	.14185	.47741
Total	.08000	.12727	.11667	.40576

V015	V009	V010	V011	V012
1	.06833	.86833	.65500	.58500
2	.40889	1.06630	.68037	.54741
Total	.34697	1.03030	.67576	.55424

V015	V013	V014
1	.86833	.32667
2	.79185	.18630
Total	.80576	.21182

Group Standard Deviations

V015	V001	V002	V003	V004
1	.06080	1.57118	.68980	.55536
2	.01577	.58168	.20545	.16437
Total	.03749	1.03521	.45981	.27429

V015	V005	V006	V007	V008
1	.11112	.19083	.09993	.06713
2	.18414	.09545	.20309	.21985
Total	.17741	.13398	.19498	.25259

V015	V009	V010	V011	V012
1	.04622	.18713	.22749	.19927
2	.17542	.11385	.18496	.13315
Total	.20767	.14838	.18969	.14431

V015	V013	V014
1	.14386	.55428
2	.36864	.51120
Total	.33844	.51318

Pooled Within-Groups Covariance Matrix with 31 degrees of freedom

	V001	V002	V003	V004
V001	.8048387E-03			
V002	.2097760E-01	.6819427		
V003	.6595341E-02	.2203658	.1121486	
V004	.2982796E-02	.8399391E-01	.1017778E-01	.7240645E-01
V005	.1655556E-02	.4576655E-01	.8820311E-02	.1134659E-01
V006	.1949642E-02	.3122802E-01	.3589845E-02	.1463154E-01
V007	.1726523E-02	.4307873E-01	.8271207E-02	.8712186E-02
V008	-.3068100E-03	-.2914313E-01	-.1490872E-01	.1664875E-02
V009	-.5758065E-03	-.3232025E-01	-.1401864E-01	-.2623656E-03
V010	.1200179E-02	.2626995E-01	.3737157E-03	.1287885E-01

	V001	V002	V003	V004
V011	.1807348E-02	.7309241E-01	.2019833E-01	.6099642E-02
V012	.8082437E-04	.2809504E-01	.1031171E-01	-.2252330E-02
V013	-.3428315E-03	-.8429331E-02	.4135723E-02	-.1381685E-01
V014	.7802867E-03	.1699952E-01	-.2176930E-01	.8775090E-01

	V005	V006	V007	V008
V005	.3042963E-01			
V006	.3665830E-02	.1351547E-01		
V007	.3113644E-01	.5947909E-02	.3620454E-01	
V008	-.6854241E-02	.7881959E-02	-.4143130E-02	.4126619E-01
V009	-.6068100E-02	.5009857E-02	-.4951971E-02	.3054373E-01
V010	.2101314E-02	.5325149E-02	.2284468E-02	.5499164E-02
V011	.8248148E-02	-.2024074E-02	.9676822E-02	-.1280884E-01
V012	.4753286E-02	-.7634707E-02	.3478375E-02	-.2254456E-01
V013	.1417085E-02	-.4489188E-02	.8432497E-03	-.1214958E-01
V014	.1646476E-01	.2547730E-01	.1205329E-01	-.2206428E-01

	V009	V010	V011	V012
V009	.2615323E-01			
V010	.6312007E-02	.1651977E-01		
V011	-.1466900E-01	.3328614E-02	.3704020E-01	
V012	-.1726219E-01	-.2413202E-02	.1692826E-01	.2127318E-01

	V009	V010	V011	V012
V013	-.7769713E-02	-.3784886E-02	-.4893070E-03	.1115741E-01
V014	-.1604014E-01	.1758053E-01	-.6295579E-02	-.4450299E-02

	V013	V014
V013	.1173126	
V014	.5372640E-02	.2687278

Pooled Within-Groups Correlation Matrix

	V001	V002	V003	V004	V005	V006	V007

V001	1.00000						
V002	.89542	1.00000					
V003	.69420	.79684	1.00000				
V004	.39073	.37799	.11295	1.00000			
V005	.33453	.31771	.15099	.24173	1.00000		
V006	.59113	.32528	.09221	.46772	.18076	1.00000	
V007	.31984	.27416	.12980	.17016	.93808	.26889	1.00000
V008	-.05324	-.17373	-.21915	.03046	-.19343	.33375	-.10719
V009	-.12550	-.24201	-.25885	-.00603	-.21510	.26647	-.16093
V010	.32915	.24750	.00868	.37238	.09372	.35638	.09341
V011	.33102	.45990	.31339	.11778	.24568	-.09046	.26425
V012	.01953	.23326	.21111	-.05739	.18682	-.45026	.12534

	V001	V002	V003	V004	V005	V006	V007
V013	-.03528	-.02980	.03606	-.14992	.02372	-.11274	.01294
V014	.05306	.03971	-.12540	.62908	.18208	.42275	.12220

	V008	V009	V010	V011	V012	V013	V014
V008	1.00000						
V009	.92974	1.00000					
V010	.21062	.30367	1.00000				
V011	-.32762	-.47130	.13456	1.00000			
V012	-.76090	-.73184	-.12873	.60306	1.00000		
V013	-.17462	-.14027	-.08598	-.00742	.22334	1.00000	
V014	-.20953	-.19133	.26386	-.06310	-.05886	.03026	1.00000

Correlations which cannot be computed are printed as '.'

Wilks' Lambda (U-statistic) and univariate F-ratio
with 1 and 31 degrees of freedom

Variable	Wilks' Lambda	F	Significance
V001	.55459	24.90	.0000
V002	.61646	19.29	.0001
V003	.51387	29.33	.0000
V004	.93230	2.251	.1436
V005	.93658	2.099	.1574
V006	.72935	11.50	.0019
V007	.92257	2.602	.1169
V008	.62659	18.47	.0002
V009	.58746	21.77	.0001
V010	.72692	11.65	.0018
V011	.99726	.8531E-01	.7722
V012	.98959	.3261	.5721
V013	.99217	.2448	.6243
V014	.98852	.3599	.5529

Covariance Matrix for Group 1,

	V001	V002	V003	V004
V001	.3696667E-02			
V002	.9232333E-01	2.468617		
V003	.2745333E-01	.8089667	.4758267	
V004	.1756667E-01	.5258733	.8549333E-01	.3084267
V005	.6293333E-02	.1548667	.3078667E-01	.3467333E-01
V006	.1112333E-01	.2696567	.5862667E-01	.6477333E-01
V007	.5746667E-02	.1432733	.3419333E-01	.3076667E-01
V008	.3266667E-03	-.5266667E-02	-.6666667E-02	.1270667E-01
V009	.1433333E-03	.2745667E-01	.1390667E-01	.3084667E-02

V010	.9296667E-02	.2215233	.2439333E-01	.7178667E-01
V011	.5490000E-02	.1862900	.3124000E-01	.4444000E-01
V012	-.9500000E-03	.2397000E-01	-.3900000E-02	-.4460000E-02
V013	-.5103333E-02	-.1244167	-.3970667E-01	-.5693333E-01
V014	.1055333E-01	.3673067	.1276667E-01	.2963933

	V005	V006	V007	V008
V005	.1234667E-01			
V006	.2078667E-01	.3641667E-01		
V007	.1099333E-01	.1863333E-01	.9986667E-02	
V008	.1333333E-04	.2273333E-02	.6666667E-05	.4506667E-02
V009	-.8466667E-03	-.1566667E-03	-.8733333E-03	.2926667E-02
V010	.1763333E-01	.3154333E-01	.1476667E-01	.3706667E-02
V011	.1458000E-01	.1839000E-01	.1276000E-01	-.1078000E-01
V012	.1720000E-02	-.3910000E-02	.9000000E-03	-.1228000E-01
V013	-.8106667E-02	-.1759667E-01	-.8053333E-02	-.6873333E-02
V014	.2600667E-01	.4650667E-01	.2233333E-01	.8833333E-02

	V009	V010	V011	V012
V009	.2136667E-02			
V010	.1216667E-02	.3501667E-01		
V011	-.8070000E-02	.1349000E-01	.5175000E-01	
V012	-.7970000E-02	-.3710000E-02	.3783000E-01	.3971000E-01
V013	-.3183333E-02	-.1414333E-01	.4830000E-02	.1811000E-01
V014	.1933333E-02	.5745333E-01	.5258000E-01	.1212000E-01

	V013	V014
V013	.2069667E-01	
V014	-.4448667E-01	.3072267

Covariance Matrix for Group 2,

	V001	V002	V003	V004
V001	.2487179E-03			
V002	.7257265E-02	.3383516		
V003	.2584188E-02	.1071734	.4221054E-01	
V004	.1782051E-03	-.9829060E-03	-.4305983E-02	.2701795E-01
V005	.7636752E-03	.2478575E-01	.4596011E-02	.6860684E-02
V006	.1854701E-03	-.1462365E-01	-.6994160E-02	.4988889E-02
V007	.9534188E-03	.2381054E-01	.3286182E-02	.4470940E-02
V008	-.4286325E-03	-.3373476E-01	-.1649373E-01	-.4585470E-03
V009	-.6012821E-03	-.3402479E-01	-.1404017E-01	-.9064103E-03
V010	-.3568376E-03	-.1127877E-01	-.4245442E-02	.1550427E-02
V011	.1099145E-02	.5132365E-01	.1807493E-01	-.1273504E-02
V012	.2790598E-03	.2888832E-01	.1304473E-01	-.1827778E-02
V013	.5726496E-03	.1387593E-01	.1256695E-01	-.5525214E-02
V014	-.1099145E-02	-.5036724E-01	-.2841083E-01	.4762735E-01

	V005	V006	V007	V008
V005	.3390712E-01			
V006	.3733618E-03	.9111396E-02		
V007	.3501011E-01	.3508405E-02	.4124644E-01	
V008	-.8174929E-02	.8960541E-02	-.4941168E-02	.4833533E-01
V009	-.7072222E-02	.6003419E-02	-.5736325E-02	.3585470E-01
V010	-.8856125E-03	.2831909E-03	-.1159544E-03	.5843875E-02
V011	.7030484E-02	-.5949858E-02	.9083903E-02	-.1319900E-01
V012	.5336610E-02	-.8350997E-02	.3974217E-02	-.2451852E-01
V013	.3248575E-02	-.1968519E-02	.2554131E-02	-.1316425E-01
V014	.1462977E-01	.2143319E-01	.1007635E-01	-.2800613E-01

	V009	V010	V011	V012
V009	.3077179E-01			
V010	.7291880E-02	.1296268E-01		
V011	-.1593803E-01	.1374501E-02	.3421140E-01	
V012	-.1904915E-01	-.2163818E-02	.1290869E-01	.1772764E-01
V013	-.8651709E-02	-.1792877E-02	-.1512251E-02	.9820370E-02
V014	-.1949658E-01	.9912678E-02	-.1761781E-01	-.7636895E-02

	V013	V014
V013	.1358926	
V014	.1496097E-01	.2613242

tal Covariance Matrix with 32 degrees of freedom

	V001	V002	V003	V004
V001	.1405871E-02			
V002	.3636506E-01	1.071659		
V003	.1441165E-01	.4190159	.2114239	
V004	.1103598E-02	.3561165E-01	-.1302159E-01	.7523769E-01
V005	.2721875E-02	.7298125E-01	.2286875E-01	.7803125E-02
V006	.3632955E-02	.7494006E-01	.2582415E-01	.9199432E-02
V007	.3030208E-02	.7651563E-01	.2540625E-01	.4567708E-02
V008	.3565152E-02	.7072273E-01	.3504034E-01	-.9403314E-02
V009	.2780019E-02	.5420597E-01	.2918239E-01	-.9774242E-02
V010	.3102936E-02	.7515909E-01	.2521989E-01	.6942424E-02
V011	.1999527E-02	.7717898E-01	.2275284E-01	.5199811E-02
V012	-.2901515E-03	.1777727E-01	.5269034E-02	-.1131061E-02
V013	-.1081723E-02	-.2737102E-01	-.5597159E-02	-.1124706E-01
V014	-.6198864E-03	-.1877983E-01	-.3871506E-01	.8893267E-01

	V005	V006	V007	V008
V005	.3147500E-01			
V006	.6665625E-02	.1795170E-01		
V007	.3258750E-01	.9543750E-02	.3801667E-01	
V008	.2562500E-03	.1839432E-01	.4360417E-02	.6380019E-01
V009	.8125000E-04	.1415085E-01	.2439583E-02	.5017737E-01
V010	.5500000E-02	.1056335E-01	.6419792E-02	.1729508E-01
V011	.8434375E-02	-.1268182E-02	.9913542E-02	-.1087481E-01
V012	.3946875E-02	-.8422443E-02	.2570833E-02	-.2411269E-01
V013	.3437500E-04	-.6436932E-02	-.8083333E-03	-.1639356E-01
V014	.1349375E-01	.2084886E-01	.8693750E-02	-.2986080E-01

	V009	V010	V011	V012
V009	.4312803E-01			
V010	.1645720E-01	.2201553E-01		
V011	-.1288513E-01	.3995076E-02	.3598144E-01	
V012	-.1868674E-01	-.3479451E-02	.1625294E-01	.2082519E-01
V013	-.1152263E-01	-.5989299E-02	-.7716856E-03	.1124981E-01
V014	-.2287244E-01	.1276818E-01	-.6645170E-02	-.3501705E-02

	V013	V014
V013	.1145439	
V014	.6851705E-02	.2633528

- - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - -

n groups defined by V015 Grouping Variable

nalysis number 1

imost methods All variables passing the tolerance test are entered

Minimum Tolerance Level..... .00100

anonical Discriminant Functions

Maximum number of functions..... 1
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

rior probability for each group is .50000

Lassification Function Coefficients
Fisher's Linear Discriminant Functions)

D15 =	1	2
D01	-554.1655	-110.6593
D02	-4.386007	-12.86110
D03	22.29599	31.11553
D04	5.207307	-16.32326
D05	60.01575	51.87226
D06	101.4828	60.85664
D07	-54.09863	-44.86296
D08	85.14192	124.0632
D09	-104.4801	-80.77404
D10	102.8306	95.68050
D11	-11.75535	-21.65505
D12	76.97855	137.7732
D13	7.272598	1.735539
D14	-12.78293	3.588534
Constant)	-72.45379	-99.11166

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.1481	45.829	14	.0000
1*	5.7499	100.00	100.00	.9230	:				

* marks the 1 canonical discriminant functions remaining in the analysis.

tandardized Canonical Discriminant Function Coefficients

	FUNC 1
D01	2.08806
D02	-1.16147
D03	.49015
D04	-.96146
D05	-.23575
D06	-.78381
D07	.29163
D08	1.31212
D09	.63622
D10	-.15251
D11	-.31619
D12	1.47153
D13	-.31473
D14	1.40842

Structure Matrix:

Pooled-within-groups correlations between discriminating variables
and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1
V003	.40562
V001	.37373
V009	.34947
V002	.32894
V008	.32194
V010	.25561
V006	.25404
V007	.12081
V004	-.11238
V005	.10852
V014	-.04494
V012	-.04277
V013	-.03706
V011	.02188

Unstandardized Canonical Discriminant Function Coefficients

	FUNC 1
V001	73.60165
V002	-1.406476
V003	1.463638
V004	-3.573084
V005	-1.351446
V006	-6.742068
V007	1.532697
V008	6.459150
V009	3.934118
V010	-1.186595
V011	-1.642895
V012	10.08912
V013	-.9188973
V014	2.716910
(Constant)	-6.341269

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	-4.93017
2	1.09559

Test of equality of group covariance matrices using Box's M

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Group Label	Rank	Log Determinant
1	< 6	(too few cases to be non-singular)
2	14	-64.070169
Pooled Within-Groups Covariance Matrix	14	-58.880778

ENOUGH NON-SINGULAR GROUP COVARIANCE MATRICES FOR DSC--At least two are required for a test to be performed.

Case Number	Mis Val	Sel	Actual Group	Highest Probability Group	P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
1			1	1	.0522	1.0000	2	.0000	-6.8717
2			1	1	.0572	.9988	2	.0012	-3.0283
3			1	1	.0601	.9989	2	.0011	-3.0500
4			1	1	.6117	1.0000	2	.0000	-5.4379
5			1	1	.7459	1.0000	2	.0000	-5.2543
6			1	1	.3131	1.0000	2	.0000	-5.9389
7			2	2	.2155	1.0000	1	.0000	-.1429
8			2	2	.9518	1.0000	1	.0000	1.0352
9			2	2	.8876	1.0000	1	.0000	1.2369
10			2	2	.0335	1.0000	1	.0000	3.2215
11			2	2	.8538	1.0000	1	.0000	.9113
12			2	2	.3367	1.0000	1	.0000	2.0563
13			2	2	.3202	1.0000	1	.0000	.1015
14			2	2	.5120	1.0000	1	.0000	.4399
15			2	2	.9323	1.0000	1	.0000	1.1805
16			2	2	.1734	1.0000	1	.0000	-.2659
17			2	2	.7231	1.0000	1	.0000	.7412
18			2	2	.2002	1.0000	1	.0000	2.3765
19			2	2	.7465	1.0000	1	.0000	1.4188
20			2	2	.2773	1.0000	1	.0000	.0092
21			2	2	.2240	1.0000	1	.0000	2.3117

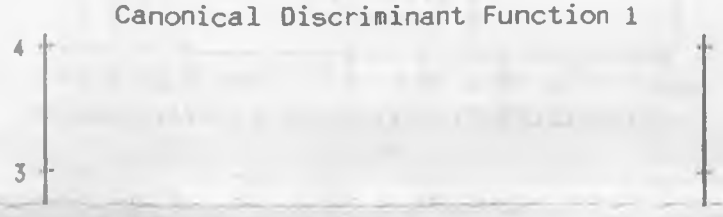
Case Number	Mis Val	Sel	Actual Group	Highest Probability Group	P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
22			2	2	.7417	1.0000	1	.0000	1.4252
23			2	2	.9038	1.0000	1	.0000	.9748
24			2	2	.9509	1.0000	1	.0000	1.1572
25			2	2	.6999	1.0000	1	.0000	.7102
26			2	2	.9312	1.0000	1	.0000	1.1819
27			2	2	.8395	1.0000	1	.0000	.8931
28			2	2	.2398	1.0000	1	.0000	2.2712
29			2	2	.7204	1.0000	1	.0000	1.4535
30			2	2	.8113	1.0000	1	.0000	.8569
31			2	2	.9455	1.0000	1	.0000	1.1639
32			2	2	.9455	1.0000	1	.0000	1.1639
33			2	2	.1621	.9999	1	.0001	-.3026

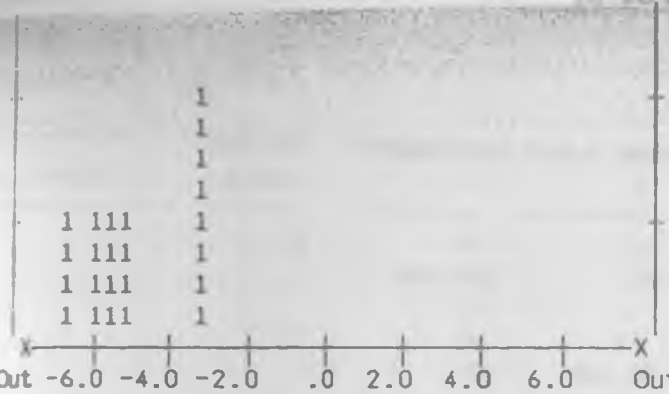
Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

Histogram for Group 1

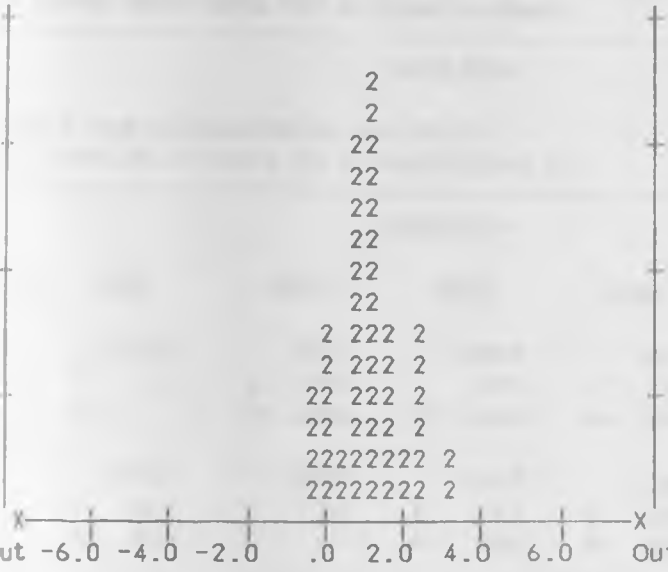
Canonical Discriminant Function 1





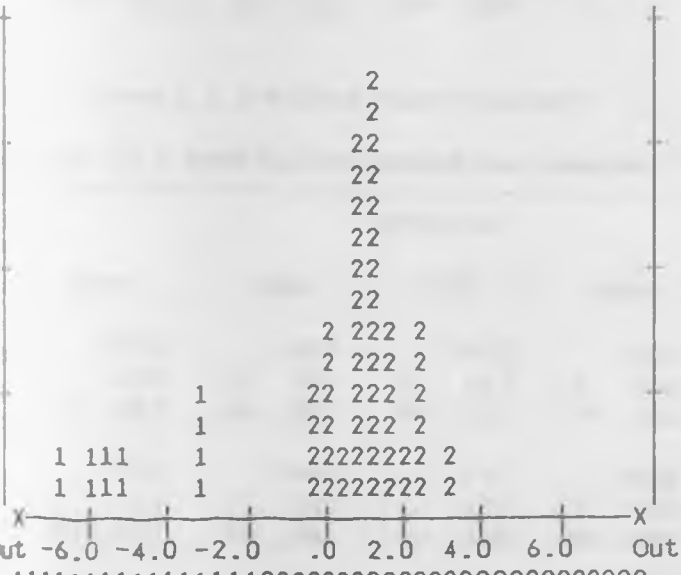
Histogram for Group 2

Canonical Discriminant Function 1



All-groups stacked Histogram

Canonical Discriminant Function 1



Classification Results -

Actual Group	No. of Cases	Predicted Group Membership 1	2
Group 1	6	6 100.0%	0 .0%
Group 2	27	0 .0%	27 100.0%

ercent of "grouped" cases correctly classified: 100.00%

ssification Processing Summary
33 Cases were processed.
0 Cases were excluded for missing or out-of-range group codes.
0 Cases had at least one missing discriminating variable.
33 Cases were used for printed output.

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ge 32 SPSS/PC+ 6/16/92

s procedure was completed at 18:33:11
ELATIONS VARIABLES=V001 TO V014/OPTIONS 2,5.

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e 33 SPSS/PC+ 6/16/92

relations:

	V001	V002	V003	V004	V005	V006
V001	1.0000 (0) P= .	.9369 (33) P= .000	.8359 (33) P= .000	.1073 (33) P= .276	.4092 (33) P= .009	.7232 (33) P= .000
V002	.9369 (33) P= .000	1.0000 (0) P= .	.8803 (33) P= .000	.1254 (33) P= .243	.3974 (33) P= .011	.5403 (33) P= .001
V003	.8359 (33) P= .000	.8803 (33) P= .000	1.0000 (0) P= .	-.1032 (33) P= .284	.2803 (33) P= .057	.4192 (33) P= .008
V004	.1073 (33) P= .276	.1254 (33) P= .243	-.1032 (33) P= .284	1.0000 (0) P= .	.1603 (33) P= .186	.2503 (33) P= .080

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

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e 34 SPSS/PC+ 6/16/92

relations:

	V001	V002	V003	V004	V005	V006
V005	.4092 (33) P= .009	.3974 (33) P= .011	.2803 (33) P= .057	.1603 (33) P= .186	1.0000 (0) P= .	.2804 (33) P= .057
V006	.7232 (33) P= .000	.5403 (33) P= .001	.4192 (33) P= .008	.2503 (33) P= .080	.2804 (33) P= .057	1.0000 (0) P= .
V007	.4145 (33) P= .008	.3791 (33) P= .015	.2834 (33) P= .055	.0854 (33) P= .318	.9421 (33) P= .000	.3653 (33) P= .018

V008	.3764	.2705	.3017	-.1357	.0057	.5435
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .015	P= .064	P= .044	P= .226	P= .487	P= .001

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V001	V002	V003	V004	V005	V006
V009	.3570	.2521	.3056	-.1716	.0022	.5086
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .021	P= .078	P= .042	P= .170	P= .495	P= .001
V010	.5577	.4893	.3697	.1706	.2089	.5314
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .002	P= .017	P= .171	P= .122	P= .001
V011	.2811	.3930	.2609	.0999	.2506	-.0499
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .056	P= .012	P= .071	P= .290	P= .080	P= .391
V012	-.0536	.1190	.0794	-.0286	.1542	-.4356
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .383	P= .255	P= .330	P= .437	P= .196	P= .006

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V001	V002	V003	V004	V005	V006
V013	-.0852	-.0781	-.0360	-.1212	.0006	-.1420
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .319	P= .333	P= .421	P= .251	P= .499	P= .215
V014	-.0322	-.0354	-.1641	.6318	.1482	.3032
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .429	P= .423	P= .181	P= .000	P= .205	P= .043

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V007	V008	V009	V010	V011	V012
V001	.4145	.3764	.3570	.5577	.2811	-.0536
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .008	P= .015	P= .021	P= .000	P= .056	P= .383
V002	.3791	.2705	.2521	.4893	.3930	.1190
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .015	P= .064	P= .078	P= .002	P= .012	P= .255
V003	.2834	.3017	.3056	.3697	.2609	.0794
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .055	P= .044	P= .042	P= .017	P= .071	P= .330

	.0854	-.1357	-.1716	.1706	.0999	-.0286
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .318	P= .226	P= .170	P= .171	P= .290	P= .437

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

elations:	V007	V008	V009	V010	V011	V012
	.9421	.0057	.0022	.2089	.2506	.1542
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .487	P= .495	P= .122	P= .080	P= .196
	.3653	.5435	.5086	.5314	-.0499	-.4356
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .018	P= .001	P= .001	P= .001	P= .391	P= .006
	1.0000	.0885	.0602	.2219	.2680	.0914
	(0)	(33)	(33)	(33)	(33)	(33)
	P= .	P= .312	P= .370	P= .107	P= .066	P= .307
	.0885	1.0000	.9566	.4615	-.2270	-.6615
	(33)	(0)	(33)	(33)	(33)	(33)
	P= .312	P= .	P= .000	P= .003	P= .102	P= .000

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

elations:	V007	V008	V009	V010	V011	V012
	.0602	.9566	1.0000	.5341	-.3271	-.6235
	(33)	(33)	(0)	(33)	(33)	(33)
	P= .370	P= .000	P= .	P= .001	P= .032	P= .000
	.2219	.4615	.5341	1.0000	.1419	-.1625
	(33)	(33)	(33)	(0)	(33)	(33)
	P= .107	P= .003	P= .001	P= .	P= .215	P= .183
	.2680	-.2270	-.3271	.1419	1.0000	.5937
	(33)	(33)	(33)	(33)	(0)	(33)
	P= .066	P= .102	P= .032	P= .215	P= .	P= .000
	.0914	-.6615	-.6235	-.1625	.5937	1.0000
	(33)	(33)	(33)	(33)	(33)	(0)
	P= .307	P= .000	P= .000	P= .183	P= .000	P= .

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

orrelations:	V007	V008	V009	V010	V011	V012
V013	-.0122	-.1918	-.1639	-.1193	-.0120	.2303
	(33)	(33)	(33)	(33)	(33)	(33)

P= .473 P= .143 P= .181 P= .254 P= .474 P= .099

.0869 -.2304 -.2146 .1677 -.0683 -.0473
(33) (33) (33) (33) (33) (33)
P= .315 P= .099 P= .115 P= .175 P= .353 P= .397

cient / (Cases) / 1-tailed Significance)

s printed if a coefficient cannot be computed

SPSS/PC+ 6/16/92

ions: V013 V014

-.0852 -.0322
(33) (33)
P= .319 P= .429

-.0781 -.0354
(33) (33)
P= .333 P= .423

-.0360 -.1641
(33) (33)
P= .421 P= .181

-.1212 .6318
(33) (33)
P= .251 P= .000

ient / (Cases) / 1-tailed Significance)

is printed if a coefficient cannot be computed

SPSS/PC+ 6/16/92

ations: V013 V014

.0006 .1482
(33) (33)
P= .499 P= .205

-.1420 .3032
(33) (33)
P= .215 P= .043

-.0122 .0869
(33) (33)
P= .473 P= .315

-.1918 -.2304
(33) (33)
P= .143 P= .099

fficient / (Cases) / 1-tailed Significance)

is printed if a coefficient cannot be computed

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43 SPSS/PC+ 6/16/92

elations: V013 V014

-.1439 -.2144

	(33)	(33)
	P= .181	P= .115
V010	-.1193	.1677
	(33)	(33)
	P= .254	P= .175
V011	-.0120	-.0683
	(33)	(33)
	P= .474	P= .353
V012	.2303	-.0473
	(33)	(33)
	P= .099	P= .397

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations: V013 V014

V013	1.0000	.0394
	(0)	(33)
	P= .	P= .414
V014	.0394	1.0000
	(33)	(0)
	P= .414	P= .

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

This procedure was completed at 18:36:54
SET LISTING OFF.

OUTPUT OF 33 UNMATCHED BANKS 1988 RESULTS

DSCRIMINANT GROUPS=V015(1,2)/VARIABLES=V001 TO V014/STATISTICS=ALL.

Since ANALYSIS= was omitted for the first analysis all variables
on the VARIABLES= list will be entered at level 1.

This Discriminant Analysis requires 7552 (7.4K) BYTES of workspace.

- - - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - - -

On groups defined by V015 Grouping Variable

33 (unweighted) cases were processed.
0 of these were excluded from the analysis.
33 (unweighted) cases will be used in the analysis.

of Cases by Group

	Number of Cases		
	Unweighted	Weighted	Label
1	6	6.0	
2	27	27.0	
Total	33	33.0	

Means

	V001	V002	V003	V004
1	-.17167	-2.09000	-.82167	-.14667
2	.02259	.52481	.25000	.15815
Total	-.01273	.04939	.05515	.10273

	V005	V006	V007	V008
1	-.24167	-.66833	-.09667	.04667
2	.11037	.16370	.12185	.40778
Total	.04636	.01242	.08212	.34212

	V009	V010	V011	V012
1	.04333	.71000	.59167	.57167
2	.42333	1.05852	.73000	.57259
Total	.35424	.99515	.70485	.57242

	V013	V014
1	.86833	.02167
2	.84926	.14444
Total	.85273	.12212

Standard Deviations

	V001	V002	V003	V004
1	.23327	3.01113	.58253	.39185
2	.01375	.51047	.14804	.39690
Total	.12019	1.63625	.49700	.40772

	V005	V006	V007	V008
1	.49451	1.54749	.28090	.04457
2	.11233	.08153	.07179	.17790
Total	.25976	.69698	.15441	.21455

	V009	V010	V011	V012
1	.04179	.16947	.28273	.21451
2	.40117	.13999	.23192	.11983
Total	.39139	.19760	.24316	.13732

	V013	V014
1	.10323	.46688
2	.13126	.47572
Total	.12538	.46931

Pooled Within-Groups Covariance Matrix with 31 degrees of freedom

	V001	V002	V003	V004
V001	.00755445			

	.1144278	1.680951		
V003	-.1263441E-03	-.2355161E-01	.7311237E-01	
V004	.6443967E-02	.5831099E-01	.1139785E-02	.1568884
V005	.1498250E-01	.1987017	-.9603763E-02	.1176619E-01
V006	.3749217E-01	.5310812	-.4458978E-01	.3049845E-01
V007	.9364636E-02	.1153277	.1333333E-03	.4087933E-02
V008	.1652330E-03	-.1111326E-01	.8602151E-03	-.1058208E-01
V009	-.2354839E-03	-.1094624E-01	.3591398E-02	-.9593548E-02
V010	.4658184E-02	.6279654E-01	-.2732258E-02	.3555675E-02

	V001	V002	V003	V004
V011	.8565054E-02	.1379355	-.7063978E-02	.9302151E-02
V012	.1575329E-02	.4909881E-01	-.1222204E-01	.1209343E-01
V013	-.3363381E-02	-.3871302E-01	.2173656E-02	.5957945E-02
V014	.7840502E-03	-.1359928E-01	.6652151E-02	.1806835

	V005	V006	V007	V008
V005	.5002515E-01			
V006	.1204929	.3918230		
V007	.2261661E-01	.6579618E-01	.1704970E-01	
V008	.6125448E-03	.1398566E-02	.3196057E-02	.2686452E-01
V009	-.2738710E-02	-.5053763E-02	-.1839785E-02	.1589247E-01
V010	.9919833E-02	.3084349E-01	.5879809E-02	.9600358E-02
V011	.1788118E-01	.5796398E-01	.1617312E-01	-.4411828E-02
V012	.5199701E-02	.2299755E-01	.6592593E-03	-.1424552E-01
V013	-.6651912E-02	-.2063901E-01	-.8413859E-02	-.7115412E-02
V014	.1499104E-02	-.8456810E-02	-.7153405E-02	-.1328387E-01

	V009	V010	V011	V012
V009	.1352624			
V010	.7565591E-02	.2106906E-01		
V011	-.1126882E-02	.1464194E-01	.5800269E-01	
V012	-.4795699E-02	.3290442E-02	.1560591E-01	.1946458E-01

	V009	V010	V011	V012
V013	-.1135484E-02	-.8252569E-02	-.1734462E-01	.2992533E-02
V014	-.6584946E-02	-.1462007E-02	-.2584409E-02	.1109265E-01

	V013	V014
V013	.1616995E-01	
V014	.1196147E-01	.2249661

Pooled Within-Groups Correlation Matrix

	V001	V002	V003	V004	V005	V006	V007	
V001	1.00000							
V002	.93367	1.00000						
V003	-.00494	-.06718	1.00000					
V004	.17211	.11355	.01064	1.00000				
V005	.70865	.68522	-.15880	.13281	1.00000			
V006	.63363	.65439	-.26345	.12301	.86064	1.00000		
V007	.75870	.68124	.00378	.07904	.77442	.80500	1.00000	
V008	.01066	-.05230	.01941	-.16300	.01671	.01363	.14934	
V009	-.00677	-.02296	.03611	-.06586	-.03329	-.02195	-.03831	
V010	.33950	.33368	-.06962	.06184	.30555	.33947	.31023	
V011	.37622	.44175	-.10848	.09751	.33195	.38449	.51429	
V012	.11945	.27144	-.32399	.21884	.16663	.26334	.03619	

	V001	V002	V003	V004	V005	V006	V007
V013	-.27981	-.23481	.04322	.11929	-.23388	-.25929	-.50474

.01749	-.02211	.05187	.96176	.01413	-.02848	-.11550

V008	V009	V010	V011	V012	V013	V014
1.00000						
.26364	1.00000					
.40353	.14172	1.00000				
-.11176	-.01272	.41884	1.00000			
-.62297	-.09346	.16248	.46445	1.00000		
-.34139	-.02428	-.44711	-.56635	.16868	1.00000	
-.17087	-.03775	-.02124	-.02262	.16763	.19832	1.00000

ations which cannot be computed are printed as '.'

' Lambda (U-statistic) and univariate F-ratio
1 and 31 degrees of freedom

ble	Wilks' Lambda	F	Significance
	.59924	20.73	.0001
	.60823	19.97	.0001
	.28674	77.11	.0000
	.91426	2.907	.0982
	.71823	12.16	.0015
	.78138	8.674	.0061
	.69276	13.75	.0008
	.56540	23.83	.0000
	.85539	5.241	.0290
	.52275	28.30	.0000
	.95035	1.620	.2126
	.99999	.2162E-03	.9884
	.99645	.1105	.7419
	.98950	.3289	.5704

riance Matrix for Group 1

V001	V002	V003	V004
.5441667E-01			
.6832800	9.066880		
-.9983333E-02	-.4249200	.3393367	
.4548667E-01	.5064800	.8586667E-01	.1535467
.9327667E-01	1.251880	-.5770333E-01	.8692667E-01
.2303833	3.297320	-.2776567	.2221933
.5624667E-01	.7124000	.6266667E-03	.5228667E-01
.3933333E-03	.5560000E-02	.6993333E-02	-.4666667E-02
-.2533333E-03	-.4320000E-02	.7246667E-02	-.4553333E-02
.2910000E-01	.4304800	-.2236000E-01	.3302000E-01
.4820333E-01	.7328400	-.7113667E-01	.3357333E-01
.9823333E-02	.2607600	-.7457667E-01	.1419333E-01
-.2048333E-01	-.2447200	.8416667E-02	-.1547333E-01
.1028333E-01	.1232000E-01	.1098633	.1615733

V005	V006	V007	V008
.2445367			
.7391033	2.394737		
.1345667	.3849133	.7890667E-01	
-.8306667E-02	-.3527333E-01	-.3266667E-02	.1986667E-02
-.9493333E-02	-.3838667E-01	-.3973333E-02	.1853333E-02
.6572000E-01	.1951600	.3426000E-01	.3800000E-03
.1169033	.3593767	.5909333E-01	-.4533333E-03
.1334333E-01	.1710767	.1283333E-01	.8333333E-03

	.2430033E-01	-.1167767	-.2543333E-01	.1813333E-02
	.7123333E-02	-.3903333E-02	.5293333E-02	-.6773333E-02

	V009	V010	V011	V012
V009	.1746667E-02			
V010	-.2600000E-03	.2872000E-01		
V011	-.1526667E-02	.4604000E-01	.7993667E-01	
V012	-.1346667E-02	.2744000E-01	.4681667E-01	.4601667E-01
V013	.1906667E-02	-.7860000E-02	-.1539667E-01	.6233333E-03
V014	-.5686667E-02	.8300000E-02	-.1376333E-01	.3766667E-03

	V013	V014
V013	.1065667E-01	
V014	-.2576667E-02	.2179767

Covariance Matrix for Group 2,

	V001	V002	V003	V004
V001	.1891738E-03			
V002	.5033191E-02	.2605798		
V003	.1769231E-02	.5363462E-01	.2191538E-01	
V004	-.1064245E-02	-.2787536E-01	-.1515385E-01	.1575311
V005	-.7407407E-04	-.3832621E-02	-.3538462E-03	-.2687749E-02
V006	.3977208E-03	-.8877493E-03	.2307692E-03	-.6365954E-02
V007	.3488604E-03	.5061254E-03	.3846154E-04	-.5181054E-02
V008	.1213675E-03	-.1431966E-01	-.3192308E-03	-.1171966E-01
V009	-.2320513E-03	-.1222051E-01	.2888462E-02	-.1056282E-01
V010	-.4216524E-04	-.7911823E-02	.1042308E-02	-.2110541E-02
V011	.9423077E-03	.2353077E-01	.5257692E-02	.4634615E-02
V012	-.1082621E-04	.8394729E-02	-.2307692E-03	.1168960E-01
V013	-.7108262E-04	.9037037E-03	.9730769E-03	.1007934E-01
V014	-.1042735E-02	-.1858376E-01	-.1319615E-01	.1843585

	V005	V006	V007	V008
V005	.1261909E-01			
V006	.1529345E-02	.6647293E-02		
V007	.1087749E-02	.4427493E-02	.5154131E-02	
V008	.2327778E-02	.8450855E-02	.4438889E-02	.3164872E-01
V009	-.1439744E-02	.1356410E-02	-.1429487E-02	.1859231E-01
V010	-.8109687E-03	-.7558405E-03	.4220798E-03	.1137350E-01
V011	-.1161538E-02	.1820626E-16	.7919231E-02	-.5173077E-02
V012	-.2135613E-02	-.5652279E-02	-.1681909E-02	-.1682479E-01
V013	.3387464E-03	-.2150997E-02	-.5140883E-02	-.8832479E-02
V014	.4175214E-03	-.9332479E-02	-.9547009E-02	-.1453590E-01

	V009	V010	V011	V012
V009	.1609385			
V010	.9070513E-02	.1959772E-01		
V011	-.1050000E-02	.8603846E-02	.5378462E-01	
V012	-.5458974E-02	-.1353704E-02	.9603846E-02	.1435840E-01
V013	-.1720513E-02	-.8328063E-02	-.1771923E-01	.3448148E-02
V014	-.6757692E-02	-.3339316E-02	-.4346154E-03	.1315342E-01

	V013	V014
V013	.1723020E-01	
V014	.1475726E-01	.2263103

Total Covariance Matrix with 32 degrees of freedom

	V001	V002	V003	V004

	.1444545E-01			
	.1887764	2.677318		
	.3181449E-01	.4070688	.2470133	
	.1532642E-01	.1787611	.5121676E-01	.1662392
	.2500540E-01	.3337071	.4857244E-01	.2786023E-01
	.6111619E-01	.8482453	.9359337E-01	.6845256E-01
	.1558409E-01	.1993795	.3605436E-01	.1417841E-01
	.1092159E-01	.1340888	.6020123E-01	.6634659E-02
	.1109631E-01	.1418277	.6595246E-01	.8475568E-02
	.1489886E-01	.2006376	.5465076E-01	.1974176E-01
	.1241989E-01	.1891155	.1589924E-01	.1548011E-01
	.1553693E-02	.4793589E-01	-.1168788E-01	.1175881E-01
	-.3826705E-02	-.4515455E-01	-.1030114E-02	.4879830E-02
	.4418466E-02	.3607633E-01	.2662936E-01	.1807784

	V005	V006	V007	V008
	.6747386E-01			
	.1616622	.4857814		
	.3371108E-01	.9163220E-01	.2384223E-01	
	.2009545E-01	.4744782E-01	.1520161E-01	.4602973E-01
	.1786903E-01	.4360814E-01	.1095634E-01	.3644697E-01
	.2843182E-01	.7436525E-01	.1737936E-01	.2860748E-01
	.2479318E-01	.7380975E-01	.2030502E-01	.3389394E-02
	.5087216E-02	.2239706E-01	.6696970E-03	-.1374905E-01
	-.7474148E-02	-.2242869E-01	-.8790341E-02	-.7949716E-02
	.8082955E-02	.7479072E-02	-.2814015E-02	-.6067140E-02

	V009	V010	V011	V012
	.1531877			
	.2764621E-01	.3904451E-01		
	.6972538E-02	.2158049E-01	.5912576E-01	
	-.4591856E-02	.3237121E-02	.1513788E-01	.1885644E-01
	-.2211932E-02	-.9014489E-02	-.1720739E-01	.2896307E-02
	.7782197E-03	.5148106E-02	.1018939E-03	.1076345E-01

	V013	V014
	.1572045E-01	
	.1122841E-01	.2202485

- - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - -

2 groups defined by V015 Grouping Variable

Analysis number 1
Direct method: All variables passing the tolerance test are entered.
Minimum Tolerance Level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 1
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .50000

Classification Function Coefficients
(Fisher's Linear Discriminant Functions)

V015 =	1	2

-174.9155	-118.6205
3.903829	1.753646
-59.06857	-28.62640
-152.3807	-111.2892
-43.83572	-28.92628
-34.71567	-27.62815
389.7063	304.0474
-68.71576	-18.68121
-1.839743	-2.143005
167.5921	142.3172
44.84652	41.87161
-95.31709	-43.94511
259.7522	238.7307
124.8351	89.92664
-203.1334	-183.7305

---

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Canonical Discriminant Functions

Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
				: 0	.1167	51.551	14	.0000
7.5672	100.00	100.00	.9398	:				

arks the 1 canonical discriminant functions remaining in the analysis.

---

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ardized Canonical Discriminant Function Coefficients

FUNC 1
.76981
-.40328
1.19076
2.35451
.48240
.64179
-1.61802
1.18635
-.01613
-.53072
-.10365
1.03681
-.38670
-2.39520

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ure Matrix:

-within-groups correlations between discriminating variables
and canonical discriminant functions
bles ordered by size of correlation within function)

FUNC 1
.57335
.34734
.31872
.29729
.29175
.24209
.22769
.19229.

[illegible]	.11133
[illegible]	.08309
[illegible]	.03745
[illegible]	-.02170
[illegible]	.00096

Standardized Canonical Discriminant Function Coefficients

	FUNC 1
[illegible]	8.143715
[illegible]	-.3110483
[illegible]	4.403804
[illegible]	5.944354
[illegible]	2.156819
[illegible]	1.025290
[illegible]	-12.39153
[illegible]	7.238063
[illegible]	-.4387026E-01
[illegible]	-3.656298
[illegible]	-.4303537
[illegible]	7.431537
[illegible]	-3.040989
[illegible]	-5.049905
(Constant)	.6073515

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	-5.65584
2	1.25685

Test of equality of group covariance matrices using Box's M

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Group Label	Rank	Log Determinant
1	< 6	(too few cases to be non-singular)
2	14	-66.335697
Pooled Within-Groups Covariance Matrix	14	-52.483049

NOTE 10473
NOT ENOUGH NON-SINGULAR GROUP COVARIANCE MATRICES FOR DSC--At least two are required for a test to be performed.

Case Number	Mis Val	Sel	Actual Group	Highest Group	Probability P(D/G)	Probability P(G/D)	2nd Highest Group	2nd Highest P(G/D)	Discrim Scores
1			1	1	.4534	1.0000	2	.0000	-6.4057
2			1	1	.4594	1.0000	2	.0000	-6.3957
3			1	1	.0009	.7176	2	.2824	-2.3344
4			1	1	.4633	1.0000	2	.0000	-6.3892
5			1	1	.4439	1.0000	2	.0000	-4.8903
6			1	1	.0623	1.0000	2	.0000	-7.5198
7			2	2	.5508	1.0000	1	.0000	.6603
8			2	2	.5988	1.0000	1	.0000	1.7830
9			2	2	.6929	1.0000	1	.0000	.8619

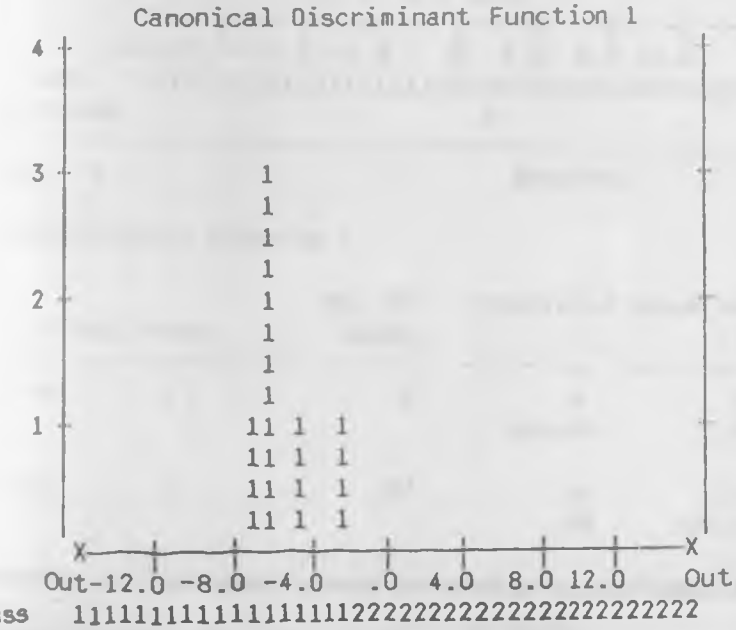
		2	2	.8919	1.0000	1 .0000	1.3928
11		2	2	.7110	1.0000	1 .0000	.8864
12		2	2	.6507	1.0000	1 .0000	1.7096
13		2	2	.7003	1.0000	1 .0000	1.6418
14		2	2	.8771	1.0000	1 .0000	1.4115
15		2	2	.6336	1.0000	1 .0000	.7802
16		2	2	.8627	1.0000	1 .0000	1.0839
17		2	2	.8581	1.0000	1 .0000	1.0781
18		2	2	.0398	1.0000	1 .0000	3.3126
19		2	2	.4912	1.0000	1 .0000	.5685
20		2	2	.8718	1.0000	1 .0000	1.4182
21		2	2	.7987	1.0000	1 .0000	1.5119

Case Number	Mis Val	Sel	Actual Group	Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
22			2	2	.7779	1.0000	1	.0000	.9748
23			2	2	.3031	1.0000	1	.0000	2.2866
24			2	2	.4043	1.0000	1	.0000	2.0909
25			2	2	.4099	1.0000	1	.0000	.4328
26			2	2	.5564	1.0000	1	.0000	.6686
27			2	2	.2613	1.0000	1	.0000	2.3801
28			2	2	.6918	1.0000	1	.0000	.8605
29			2	2	.6609	1.0000	1	.0000	1.6955
30			2	2	.8227	1.0000	1	.0000	1.0328
31			2	2	.0763	1.0000	1	.0000	-.5155
32			2	2	.8528	1.0000	1	.0000	1.0712
33			2	2	.6885	1.0000	1	.0000	.8560

Symbols used in Plots

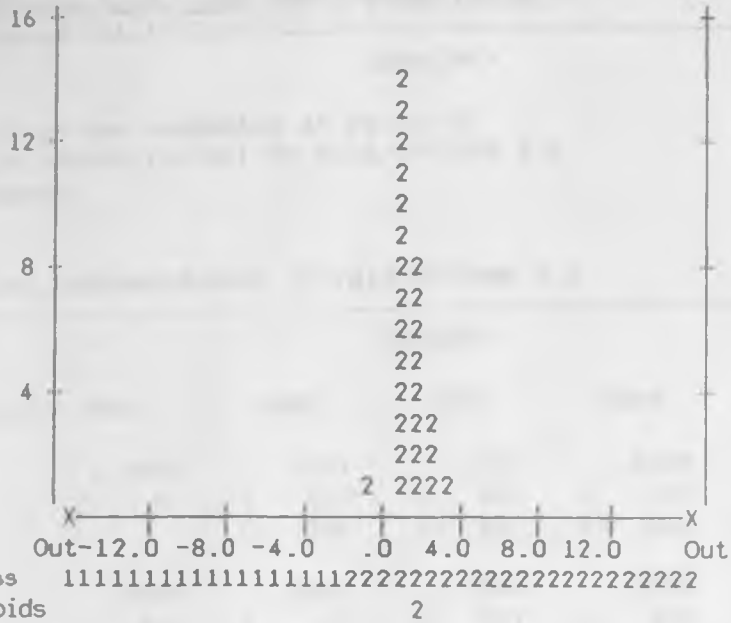
Symbol	Group	Label
1	1	
2	2	

Histogram for Group 1



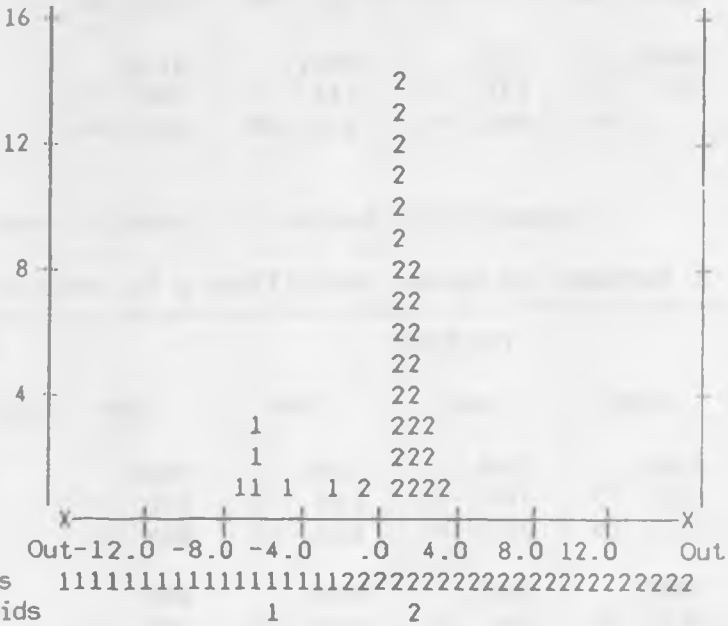
Histogram for Group 2

Canonical Discriminant Function 1



All-groups stacked Histogram

Canonical Discriminant Function 1



Classification Results -

Actual Group	No. of Cases	Predicted Group Membership 1	2
Group 1	6	6 100.0%	0 .0%
Group 2	27	0 .0%	27 100.0%

Percent of "grouped" cases correctly classified: 100.00%

Classification Processing Summary

33 Cases were processed.

0 Cases were excluded for missing or out-of-range group codes

0 Cases had at least one missing discriminating variable.
33 Cases were used for printed output.

This procedure was completed at 18:41:22
CORRELATION VARIABLES=V001 TO V014/OPTIONS 2,5.
--Interrupted--

CORRELATIONS VARIABLES=V001 TO V014/OPTIONS 2,5.

Correlations:	V001	V002	V003	V004	V005	V006
V001	1.0000	.9599	.5326	.3128	.8009	.7296
	(0)	(33)	(33)	(33)	(33)	(33)
	P= .	P= .000	P= .001	P= .038	P= .000	P= .000
V002	.9599	1.0000	.5006	.2680	.7851	.7438
	(33)	(0)	(33)	(33)	(33)	(33)
	P= .000	P= .	P= .002	P= .066	P= .000	P= .000
V003	.5326	.5006	1.0000	.2527	.3762	.2702
	(33)	(33)	(0)	(33)	(33)	(33)
	P= .001	P= .002	P= .	P= .078	P= .015	P= .064
V004	.3128	.2680	.2527	1.0000	.2631	.2409
	(33)	(33)	(33)	(0)	(33)	(33)
	P= .038	P= .066	P= .078	P= .	P= .070	P= .088

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V001	V002	V003	V004	V005	V006
V005	.8009	.7851	.3762	.2631	1.0000	.8929
	(33)	(33)	(33)	(33)	(0)	(33)
	P= .000	P= .000	P= .015	P= .070	P= .	P= .000
V006	.7296	.7438	.2702	.2409	.8929	1.0000
	(33)	(33)	(33)	(33)	(33)	(0)
	P= .000	P= .000	P= .064	P= .088	P= .000	P= .
V007	.8397	.7891	.4698	.2252	.8405	.8514
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .000	P= .003	P= .104	P= .000	P= .000
V008	.4235	.3820	.5646	.0758	.3606	.3173
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .007	P= .014	P= .000	P= .337	P= .020	P= .036

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V001	V002	V003	V004	V005	V006

	.2359	.2215	.3390	.0531	.1758	.1599
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .093	P= .108	P= .027	P= .385	P= .164	P= .187
	.6273	.6206	.5565	.2450	.5539	.5400
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .000	P= .000	P= .085	P= .000	P= .001
V011	.4250	.4753	.1316	.1561	.3925	.4355
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .007	P= .003	P= .233	P= .193	P= .012	P= .006
V012	.0941	.2133	-.1713	.2100	.1426	.2340
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .301	P= .117	P= .170	P= .120	P= .214	P= .095

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

rrelations:	V001	V002	V003	V004	V005	V006
V013	-.2539	-.2201	-.0165	.0955	-.2295	-.2567
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .077	P= .109	P= .464	P= .299	P= .099	P= .075
V014	.0783	.0470	.1142	.9448	.0663	.0229
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .332	P= .398	P= .263	P= .000	P= .357	P= .450

oefficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

rrelations:	V007	V008	V009	V010	V011	V012
V001	.8397	.4235	.2359	.6273	.4250	.0941
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .007	P= .093	P= .000	P= .007	P= .301
V002	.7891	.3820	.2215	.6206	.4753	.2133
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .014	P= .108	P= .000	P= .003	P= .117
V003	.4698	.5646	.3390	.5565	.1316	-.1713
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .003	P= .000	P= .027	P= .000	P= .233	P= .170
V004	.2252	.0758	.0531	.2450	.1561	.2100
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .104	P= .337	P= .385	P= .085	P= .193	P= .120

Coefficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

rrelations: V007 V008 V009 V010 V011 V012

	V007	V008	V009	V010	V011	V012
V005	.8405	.3606	.1758	.5539	.3925	.1426
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .020	P= .164	P= .000	P= .012	P= .214
V006	.8514	.3173	.1599	.5400	.4355	.2340
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .000	P= .036	P= .187	P= .001	P= .006	P= .095
V007	1.0000	.4589	.1813	.5696	.5408	.0316
	(0)	(33)	(33)	(33)	(33)	(33)
	P= .	P= .004	P= .156	P= .000	P= .001	P= .431
V008	.4589	1.0000	.4340	.6748	.0650	-.4667
	(33)	(0)	(33)	(33)	(33)	(33)
	P= .004	P= .	P= .006	P= .000	P= .360	P= .003

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V007	V008	V009	V010	V011	V012
V009	.1813	.4340	1.0000	.3575	.0733	-.0854
	(33)	(33)	(0)	(33)	(33)	(33)
	P= .156	P= .006	P= .	P= .021	P= .343	P= .318
V010	.5696	.6748	.3575	1.0000	.4492	.1193
	(33)	(33)	(33)	(0)	(33)	(33)
	P= .000	P= .000	P= .021	P= .	P= .004	P= .254
V011	.5408	.0650	.0733	.4492	1.0000	.4534
	(33)	(33)	(33)	(33)	(0)	(33)
	P= .001	P= .360	P= .343	P= .004	P= .	P= .004
V012	.0316	-.4667	-.0854	.1193	.4534	1.0000
	(33)	(33)	(33)	(33)	(33)	(0)
	P= .431	P= .003	P= .318	P= .254	P= .004	P= .

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V007	V008	V009	V010	V011	V012
V013	-.4540	-.2955	-.0451	-.3639	-.5644	.1682
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .004	P= .047	P= .402	P= .019	P= .000	P= .175
V014	-.0388	-.0603	.0042	.0555	.0009	.1670
	(33)	(33)	(33)	(33)	(33)	(33)
	P= .415	P= .370	P= .491	P= .379	P= .498	P= .176

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

relations:	V013	V014
V001	-.2539	.0783
	(33)	(33)
	P= .077	P= .332
V002	-.2201	.0470
	(33)	(33)
	P= .109	P= .398
V003	-.0165	.1142
	(33)	(33)
	P= .464	P= .263
V004	.0955	.9448
	(33)	(33)
	P= .299	P= .000

oefficient / (Cases) / 1-tailed Significance)

. " is printed if a coefficient cannot be computed

rrelations: V013 V014

V005	-.2295	.0663
	(33)	(33)
	P= .099	P= .357
V006	-.2567	.0229
	(33)	(33)
	P= .075	P= .450
V007	-.4540	-.0388
	(33)	(33)
	P= .004	P= .415
V008	-.2955	-.0603
	(33)	(33)
	P= .047	P= .370

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

rrelations: V013 V014

V009	-.0451	.0042
	(33)	(33)
	P= .402	P= .491
V010	-.3639	.0555
	(33)	(33)
	P= .019	P= .379
V011	-.5644	.0009
	(33)	(33)
	P= .000	P= .498
V012	.1682	.1670
	(33)	(33)

P= .175 P= .176

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

---

rrelations: V013 V014

V013	1.0000	.1908
	(0)	(33)
	P= .	P= .144
V014	.1908	1.0000
	(33)	(0)
	P= .144	P= .

efficient / (Cases) / 1-tailed Significance)

" is printed if a coefficient cannot be computed

---

is procedure was completed at 18:46:33

APPENDIX D:

Output Reports of SPSS/PC+ for 12 Matched Banks.

OUTPUT OF 12 MATCHED BANKS 1987 RESULTS

DSCRIMINANT GROUPS=V015(1,2)/VARIABLES=V001 TO V014/STATISTICS=ALL.

Since ANALYSIS= was omitted for the first analysis all variables
on the VARIABLES= list will be entered at level 1.

This Discriminant Analysis requires 7552 (7.4K) BYTES of workspace.

- - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - -

On groups defined by V015 Grouping Variable

12 (unweighted) cases were processed.
0 of these were excluded from the analysis.
12 (unweighted) cases will be used in the analysis.

Number of Cases by Group

V015	Number of Cases Unweighted	Weighted	Label
1	6	6.0	
2	6	6.0	
Total	12	12.0	

Group Means

V015	V001	V002	V003	V004
1	-.04167	-1.05833	-.52333	.30333
2	.01333	.17833	.15167	.18167
Total	-.01417	-.44000	-.18583	.24250

V015	V005	V006	V007	V008
1	-.01333	-.01833	.00333	.08333
2	.08667	.19667	.10667	.51333
Total	.03667	.08917	.05500	.29833

V015	V009	V010	V011	V012
1	.06833	.86833	.65500	.58500
2	.45833	1.09000	.50000	.49167
Total	.26333	.97917	.57750	.53833

V015	V013	V014
1	.86833	.32667
2	.93000	.58667
Total	.89917	.45667

Group Standard Deviations

V015	V001	V002	V003	V004
1	.06080	1.57118	.68980	.55536
2	.00516	.13963	.10797	.11907
Total	.05017	1.24421	.58809	.38817

V015	V005	V006	V007	V008
1	.11112	.19083	.09993	.06713
2	.04885	.11057	.05922	.36451
Total	.09708	.18633	.09511	.33596

1	.04622	.18713	.22749	.19927
2	.28882	.05621	.21836	.19600
Total	.28350	.17537	.22748	.19465

V015	V013	V014
1	.14386	.55428
2	.07321	.95158
Total	.11349	.75477

Pooled Within-Groups Covariance Matrix with 10 degrees of freedom

	V001	V002	V003	V004
V001	.1861667E-02			
V002	.4639500E-01	1.244057		
V003	.1391333E-01	.4119850	.2437417	
V004	.8660000E-02	.2591083	.4009500E-01	.1613017
V005	.3123333E-02	.7581000E-01	.1421667E-01	.1993000E-01
V006	.5448333E-02	.1287650	.2438667E-01	.3381000E-01
V007	.2840000E-02	.6932333E-01	.1538000E-01	.1838667E-01
V008	.6666667E-04	-.4580000E-02	-.6176667E-02	-.1116000E-01
V009	-.2683333E-03	-.1064000E-01	-.7171667E-02	-.1302500E-01
V010	.4548333E-02	.1088117	.1068667E-01	.3875333E-01
V011	.2995000E-02	.9315500E-01	.1643000E-01	.2938000E-01
V012	-.3983333E-03	.1481667E-01	.1088333E-02	.4488333E-02
V013	-.2551667E-02	-.5995833E-01	-.1795333E-01	-.2604667E-01
V014	.4303333E-02	.1470700	-.2223333E-01	.1926200

	V005	V006	V007	V008
V005	.7366667E-02			
V006	.1170667E-01	.2432167E-01		
V007	.6930000E-02	.1126000E-01	.6746667E-02	
V008	-.6016667E-02	.7083333E-02	-.6320000E-02	.6868667E-01
V009	-.5626667E-02	.2758333E-02	-.6110000E-02	.5343667E-01
V010	.9866667E-02	.1703167E-01	.8643333E-02	-.3376667E-02
V011	.1088000E-01	.8945000E-02	.1035000E-01	-.3298000E-01
V012	.2333333E-02	-.8521667E-02	.1653333E-02	-.3792333E-01
V013	-.3473333E-02	-.1118833E-01	-.3586667E-02	-.1428667E-01
V014	.3436667E-01	.5859667E-01	.3771000E-01	-.7261667E-01

	V009	V010	V011	V012
V009	.4277667E-01			
V010	-.3861667E-02	.1908833E-01		
V011	-.2582500E-01	.7495000E-02	.4971500E-01	
V012	-.2837333E-01	-.5950000E-03	.2954500E-01	.3906333E-01
V013	-.9221667E-02	-.6171667E-02	.5325000E-02	.1461500E-01
V014	-.7011667E-01	.5198667E-01	.6266000E-01	.9533333E-02

	V013	V014
V013	.1302833E-01	
V014	-.1579333E-01	.6063667

Pooled Within-Groups Correlation Matrix

	V001	V002	V003	V004	V005	V006	V007
V001	1.00000						
V002	.96405	1.00000					
V003	.65315	.74816	1.00000				
V004	.49974	.57842	.20221	1.00000			
V005	.84340	.79190	.33550	.57817	1.00000		
V006	.80968	.74025	.31673	.53980	.87458	1.00000	
V007	.80135	.75668	.37927	.55736	.98300	.87902	1.00000

V011	.31132	.37458	.14926	.32809	.56853	.25724	.56513
V012	-.04671	.06721	.01115	.05654	.13755	-.27647	.10184
V013	-.51812	-.47096	-.31859	-.56818	-.35454	-.62853	-.38256
V014	.12808	.16933	-.05783	.61591	.51420	.48251	.58958

	V008	V009	V010	V011	V012	V013	V014
V008	1.00000						
V009	.98582	1.00000					
V010	-.09325	-.13514	1.00000				
V011	-.56438	-.56001	.24330	1.00000			
V012	-.73213	-.69410	-.02179	.67043	1.00000		
V013	-.47758	-.39063	-.39136	.20923	.64784	1.00000	
V014	-.35582	-.43536	.48321	.36089	.06194	-.17769	1.00000

Correlations which cannot be computed are printed as '.'

Wilks' Lambda (U-statistic) and univariate F-ratio
with 1 and 10 degrees of freedom

Variable	Wilks' Lambda	F	Significance
V001	.67228	4.875	.0517
V002	.73057	3.688	.0838
V003	.64070	5.608	.0394
V004	.97321	.2753	.6112
V005	.71061	4.072	.0712
V006	.63687	5.702	.0381
V007	.67806	4.748	.0543
V008	.55323	8.076	.0175
V009	.48386	10.67	.0085
V010	.56426	7.722	.0195
V011	.87338	1.450	.2563
V012	.93730	.6690	.4325
V013	.91948	.8757	.3714
V014	.96764	.3345	.5758

Covariance Matrix for Group 1,

	V001	V002	V003	V004
V001	.3696667E-02			
V002	.9232333E-01	2.468617		
V003	.2745333E-01	.8089667	.4758267	
V004	.1756667E-01	.5258733	.8549333E-01	.3084267
V005	.6293333E-02	.1548667	.3078667E-01	.3467333E-01
V006	.1112333E-01	.2696567	.5862667E-01	.6477333E-01
V007	.5746667E-02	.1432733	.3419333E-01	.3076667E-01
V008	.3266667E-03	-.5266667E-02	-.6666667E-02	.1270667E-01
V009	-.4433333E-03	-.2345667E-01	-.1390667E-01	.3086667E-02
V010	.9296667E-02	.2215233	.2439333E-01	.7178667E-01
V011	.5490000E-02	.1862900	.3124000E-01	.4444000E-01
V012	-.9500000E-03	.2397000E-01	-.3900000E-02	-.4460000E-02
V013	-.5103333E-02	-.1244167	-.3970667E-01	-.5693333E-01
V014	.1055333E-01	.3673067	.1276667E-01	.2963933

	V005	V006	V007	V008
V005	.1234667E-01			
V006	.2078667E-01	.3641667E-01		
V007	.1099333E-01	.1863333E-01	.9986667E-02	
V008	.1333333E-04	.2273333E-02	.6666667E-05	.4506667E-02
V009	-.8466667E-03	-.1566667E-03	-.8733333E-03	.2926667E-02
V010	.1763333E-01	.3154333E-01	.1476667E-01	.3706667E-02
				-.1078000E-01

V014	.2600667E-01	.4650667E-01	.2233333E-01	.8833333E-02

	V009	V010	V011	V012
V009	.2136667E-02			
V010	.1216667E-02	.3501667E-01		
V011	-.8070000E-02	.1349000E-01	.5175000E-01	
V012	-.7970000E-02	-.3710000E-02	.3783000E-01	.3971000E-01
V013	-.3183333E-02	-.1414333E-01	.4830000E-02	.1811000E-01
V014	.1933333E-02	.5745333E-01	.5258000E-01	.1212000E-01

	V013	V014
V013	.2069667E-01	
V014	-.4448667E-01	.3072267

Covariance Matrix for Group 2.

	V001	V002	V003	V004
V001	.2666667E-04			
V002	.4666667E-03	.1949667E-01		
V003	.3733333E-03	.1500333E-01	.1165667E-01	
V004	-.2466667E-03	-.7656667E-02	-.5303333E-02	.1417667E-01
V005	-.4666667E-04	-.3246667E-02	-.2353333E-02	.5186667E-02
V006	-.2266667E-03	-.1212667E-01	-.9853333E-02	.2846667E-02
V007	-.6666667E-04	-.4626667E-02	-.3433333E-02	.6006667E-02
V008	-.1933333E-03	-.3893333E-02	-.5686667E-02	-.3502667E-01
V009	-.9333333E-04	.2176667E-02	-.4366667E-03	-.2913667E-01
V010	-.2000000E-03	-.3900000E-02	-.3020000E-02	.5720000E-02
V011	.5000000E-03	.2000000E-04	.1620000E-02	.1432000E-01
V012	.1533333E-03	.5663333E-02	.6076667E-02	.1343667E-01
V013	.1059808E-17	.4500000E-02	.3800000E-02	.4840000E-02
V014	-.1946667E-02	-.7316667E-01	-.5723333E-01	.8884667E-01

	V005	V006	V007	V008
V005	.2386667E-02			
V006	.2626667E-02	.1222667E-01		
V007	.2866667E-02	.3886667E-02	.3506667E-02	
V008	-.1204667E-01	.1189333E-01	-.1264667E-01	.1328667
V009	-.1040667E-01	.5673333E-02	-.1134667E-01	.1039467
V010	.2100000E-02	.2520000E-02	.2520000E-02	-.1046000E-01
V011	.7180000E-02	-.5000000E-03	.7940000E-02	-.5518000E-01
V012	.2946667E-02	-.1313333E-01	.2406667E-02	-.6356667E-01
V013	.1160000E-02	-.4780000E-02	.8800000E-03	-.2170000E-01
V014	.4272667E-01	.7068667E-01	.5308667E-01	-.1540667

	V009	V010	V011	V012
V009	.8341667E-01			
V010	-.8940000E-02	.3160000E-02		
V011	-.4358000E-01	.1500000E-02	.4768000E-01	
V012	-.4877667E-01	.2520000E-02	.2126000E-01	.3841667E-01
V013	-.1526000E-01	.1800000E-02	.5820000E-02	.1112000E-01
V014	-.1421667	.4652000E-01	.7274000E-01	.6946667E-02

	V013	V014
V013	.5360000E-02	
V014	.1290000E-01	.9055067

Total Covariance Matrix with 11 degrees of freedom

	V001	V002	V003	V004
V001	.2517424E-02			
	[illegible]	1.548055		

V005	.4559594E-02	.1026455	.3133333E-01	.1480000E-01
V006	.8178030E-02	.1895727	.6174924E-01	.2360227E-01
V007	.4131818E-02	.9787273E-01	.3300455E-01	.1328636E-01
V008	.6510606E-02	.1408636	.7354394E-01	-.2441364E-01
V009	.5606061E-02	.1218636	.6527576E-01	-.2478182E-01

	V001	V002	V003	V004
V010	.7459848E-02	.1736818	.5052197E-01	.2787500E-01
V011	.3977273E-03	.3240909E-01	-.1359773E-01	.3185227E-01
V012	-.1762121E-02	-.1800909E-01	-.1619242E-01	.7177273E-02
V013	-.1394697E-02	-.3370909E-01	-.4968939E-02	-.2572500E-01
V014	.7812121E-02	.2213909	.2765152E-01	.1664818

	V005	V006	V007	V008
V005	.9424242E-02			
V006	.1650606E-01	.3471742E-01		
V007	.9118182E-02	.1629545E-01	.9045455E-02	
V008	.6257576E-02	.3165303E-01	.6372727E-02	.1128697
V009	.5521212E-02	.2537576E-01	.5436364E-02	.9431515E-01
V010	.1501515E-01	.2848106E-01	.1410455E-01	.2292576E-01
V011	.5663636E-02	-.9568182E-03	.5040909E-02	-.4815909E-01
V012	-.4242424E-03	-.1321970E-01	-.1127273E-02	-.4542121E-01
V013	-.1475758E-02	-.6555303E-02	-.1522727E-02	-.5756061E-02
V014	.3833333E-01	.6851515E-01	.4160909E-01	-.3552424E-01

	V009	V010	V011	V012
V009	.8036970E-01			
V010	.2006667E-01	.3075379E-01		
V011	-.3996364E-01	-.2556818E-02	.5174773E-01	
V012	-.3572121E-01	-.6183333E-02	.3080455E-01	.3788788E-01
V013	-.1824242E-02	-.1882576E-02	.2234091E-02	.1171667E-01
V014	-.3608788E-01	.6297879E-01	.4597273E-01	.2048485E-02

	V013	V014
V013	.1288106E-01	
V014	-.9984848E-02	.5696788

- - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - -

On groups defined by V015 Grouping Variable

Analysis number 1
Direct method: All variables passing the tolerance test are entered.
Minimum Tolerance Level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 1
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .50000

The following 5 variables failed the tolerance test..

Variable	Within Groups Variance	Tolerance	Minimum Tolerance
V007	.674667E-02	.0002193	.0001128
V010	.190883E-01	.0089240	.0003644
[illegible]	.390633E-01	.0074236	.0004856

Classification Function Coefficients
(Fisher's Linear Discriminant Functions)

V015 =	1	2
V001	450.5545	317.5032
V002	-29.77372	-62.34701
V003	18.11846	64.20644
V004	16.41907	28.00770
V005	56.92115	1135.923
V006	-35.11843	-451.6955
V008	21.42698	277.3514
V009	12.66207	-144.4118
V011	40.78394	11.63484
(constant)	-19.43568	-50.47140

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.0584	15.622	9	.0752
1*	16.1227	100.00	100.00	.9704	:				

* marks the 1 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1
V001	-.78309
V002	-4.95591
V003	3.10381
V004	.63488
V005	12.63280
V006	-8.86205
V008	9.14935
V009	-4.43149
V011	-.88657

Structure Matrix:

Pooled-within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1
V013	-.34264
V009	.25722
V012	-.25527
V008	.22381
V007	.18827
V006	.18805
V003	.18650
V001	.17388
V005	.15893
V014	-.15438
V002	-.15124
V010	-.13113
V011	-.09483
V004	-.04132

Unstandardized canonical discriminant function coefficients

	FUNC 1
V001	-18.14934
V002	-4.443280
V003	6.286802
V004	1.580790
V005	147.1852
V006	-56.82473
V008	34.91032
V009	-21.42624
V011	-3.976191
(constant)	-4.233541

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	-3.66546
2	3.66546

Test of equality of group covariance matrices using Box's M

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Group Label	Rank	Log Determinant
1	< 6	(too few cases to be non-singular)
2	< 6	(too few cases to be non-singular)
Pooled Within-Groups Covariance Matrix	9	-43.838100

NOTE 10473
NOT ENOUGH NON-SINGULAR GROUP COVARIANCE MATRICES FOR DSC--At least two are required for a test to be performed.

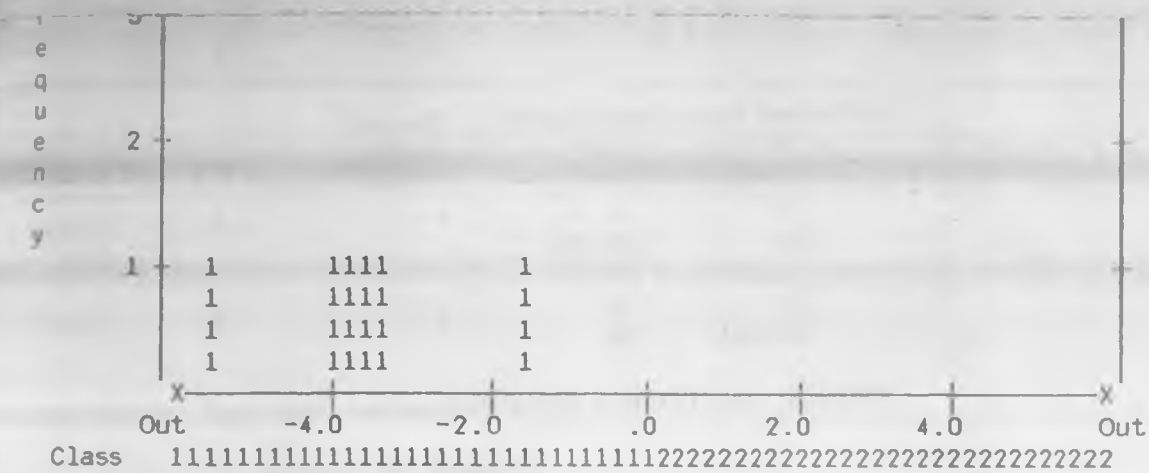
Case Number	Mis Val	Sel	Actual Group	Highest Probability Group	P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
1			1	1	.7893	1.0000	2	.0000	-3.9327
2			1	1	.0430	1.0000	2	.0000	-5.6888
3			1	1	.0457	1.0000	2	.0000	-1.6676
4			1	1	.8552	1.0000	2	.0000	-3.8479
5			1	1	.7471	1.0000	2	.0000	-3.3429
6			1	1	.8786	1.0000	2	.0000	-3.5128
7			2	2	.4423	1.0000	1	.0000	2.8971
8			2	2	.3554	1.0000	1	.0000	4.5897
9			2	2	.9430	1.0000	1	.0000	3.7369
10			2	2	.9025	1.0000	1	.0000	3.7879
11			2	2	.6492	1.0000	1	.0000	3.2105
12			2	2	.9162	1.0000	1	.0000	3.7706

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

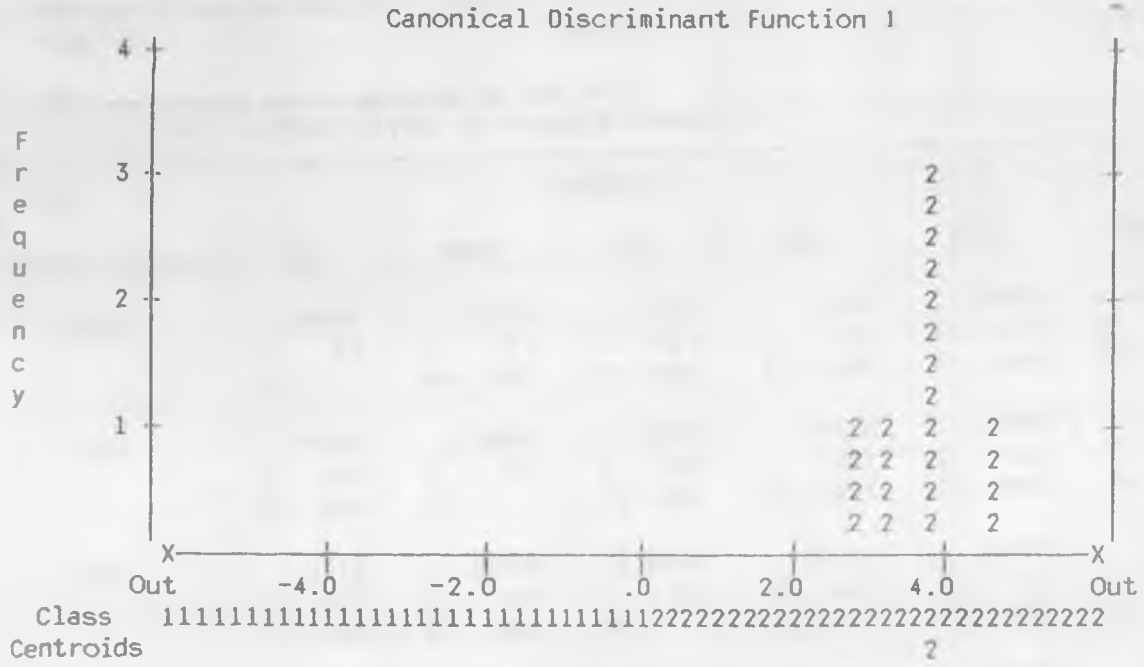
Histogram for Group 1

Canonical Discriminant Function 1



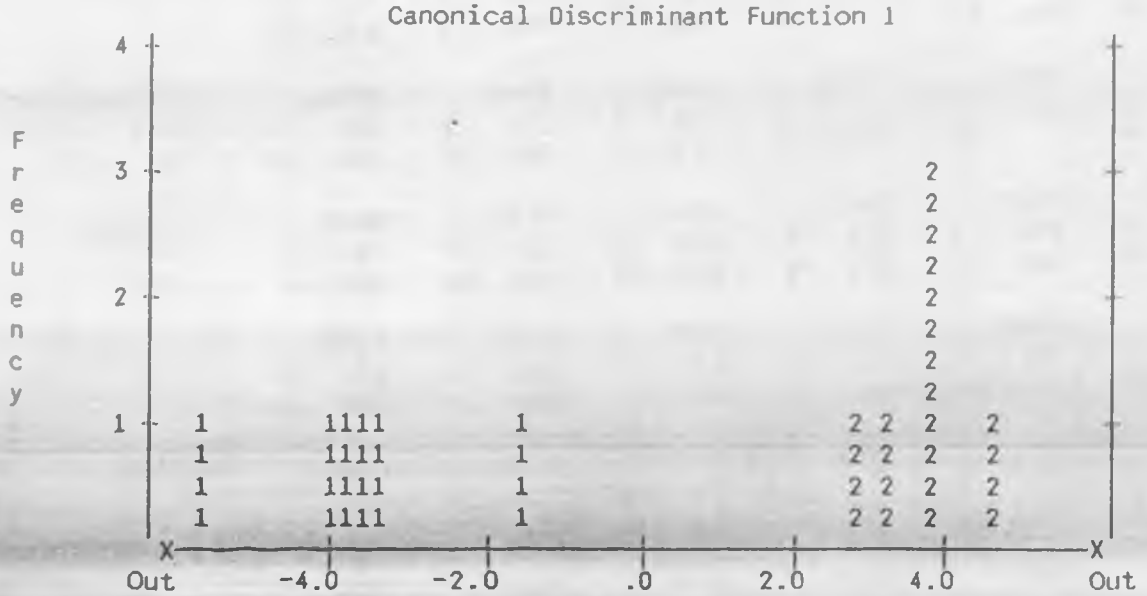
Histogram for Group 2

Canonical Discriminant Function 1



All-groups stacked Histogram

Canonical Discriminant Function 1



Classification Results -

Actual Group	No. of Cases	Predicted Group Membership 1	2
Group 1	6	6 100.0%	0 .0%
Group 2	6	0 .0%	6 100.0%

Percent of "grouped" cases correctly classified: 100.00%

Classification Processing Summary
12 Cases were processed.
0 Cases were excluded for missing or out-of-range group codes.
0 Cases had at least one missing discriminating variable.
12 Cases were used for printed output.

This procedure was completed at 19:29:28
CORRELATIONS VARIABLES=V001 TO V014/OPTIONS=2,5.

Correlations:	V001	V002	V003	V004	V005	V006
V001	1.0000 (0) P= .	.9728 (12) P= .000	.7718 (12) P= .002	.3105 (12) P= .163	.8909 (12) P= .000	.8748 (12) P= .000
V002	.9728 (12) P= .000	1.0000 (0) P= .	.8230 (12) P= .001	.4028 (12) P= .097	.8498 (12) P= .000	.8177 (12) P= .001
V003	.7718 (12) P= .002	.8230 (12) P= .001	1.0000 (0) P= .	.0616 (12) P= .425	.5488 (12) P= .032	.5635 (12) P= .028
V004	.3105 (12) P= .163	.4028 (12) P= .097	.0616 (12) P= .425	1.0000 (0) P= .	.3928 (12) P= .103	.3263 (12) P= .150
V005	.8909 (12) P= .000	.8498 (12) P= .000	.5488 (12) P= .032	.3928 (12) P= .103	1.0000 (0) P= .	.9125 (12) P= .000
V006	.8748 (12) P= .000	.8177 (12) P= .001	.5635 (12) P= .028	.3263 (12) P= .150	.9125 (12) P= .000	1.0000 (0) P= .
V007	.8659 (12) P= .000	.8271 (12) P= .000	.5901 (12) P= .022	.3599 (12) P= .125	.9876 (12) P= .000	.9196 (12) P= .000
V008	.3862 (12) P= .107	.3370 (12) P= .142	.3722 (12) P= .117	-.1872 (12) P= .280	.1919 (12) P= .275	.5057 (12) P= .047
V009	.3941 (12) P= .102	.3455 (12) P= .136	.3915 (12) P= .104	-.2252 (12) P= .241	.2006 (12) P= .266	.4804 (12) P= .057

	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .001	P= .053	P= .093	P= .000	P= .000
V011	.0348	.1145	-.1016	.3607	.2565	-.0226
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .457	P= .362	P= .377	P= .125	P= .211	P= .472
V012	-.1804	-.0744	-.1415	.0950	-.0225	-.3645
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .287	P= .409	P= .331	P= .385	P= .472	P= .122

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V001	V002	V003	V004	V005	V006
V013	-.2449	-.2387	-.0744	-.5839	-.1339	-.3100
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .221	P= .227	P= .409	P= .023	P= .339	P= .163
V014	.2063	.2357	.0623	.5682	.5232	.4872
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .260	P= .230	P= .424	P= .027	P= .040	P= .054

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V007	V008	V009	V010	V011	V012
V001	.8659	.3862	.3941	.8478	.0348	-.1804
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .107	P= .102	P= .000	P= .457	P= .287
V002	.8271	.3370	.3455	.7960	.1145	-.0744
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .142	P= .136	P= .001	P= .362	P= .409
V003	.5901	.3722	.3915	.4899	-.1016	-.1415
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .022	P= .117	P= .104	P= .053	P= .377	P= .331
V004	.3599	-.1872	-.2252	.4095	.3607	.0950
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .125	P= .280	P= .241	P= .093	P= .125	P= .385
V005	.9876	.1919	.2006	.8820	.2565	-.0225
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .275	P= .266	P= .000	P= .211	P= .472
V006	.9196	.5057	.4804	.8716	-.0226	-.3645
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .047	P= .057	P= .000	P= .472	P= .122
V007	1.0000	.1994	.2016	.8457	.2330	-.0609
	(0)	(12)	(12)	(12)	(12)	(12)
	P=	P= .267	P= .265	P= .000	P= .233	P= .425

	(12) P= .267	(0) P= .	(12) P= .000	(12) P= .106	(12) P= .014	(12) P= .006
V009	.2016 (12) P= .265	.9903 (12) P= .000	1.0000 (0) P= .	.4036 (12) P= .097	-.6197 (12) P= .016	-.6473 (12) P= .011
V010	.8457 (12) P= .000	.3891 (12) P= .106	.4036 (12) P= .097	1.0000 (0) P= .	-.0641 (12) P= .422	-.1811 (12) P= .287
V011	.2330 (12) P= .233	-.6302 (12) P= .014	-.6197 (12) P= .016	-.0641 (12) P= .422	1.0000 (0) P= .	.6957 (12) P= .006
V012	-.0609 (12) P= .425	-.6946 (12) P= .006	-.6473 (12) P= .011	-.1811 (12) P= .287	.6957 (12) P= .006	1.0000 (0) P= .

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V007	V008	V009	V010	V011	V012
V013	-.1411 (12) P= .331	-.1510 (12) P= .320	-.0567 (12) P= .431	-.0946 (12) P= .385	.0865 (12) P= .395	.5304 (12) P= .038
V014	.5796 (12) P= .024	-.1401 (12) P= .332	-.1687 (12) P= .300	.4758 (12) P= .059	.2678 (12) P= .200	.0139 (12) P= .483

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V013	V014
V001	-.2449 (12) P= .221	.2063 (12) P= .260
V002	-.2387 (12) P= .227	.2357 (12) P= .230
V003	-.0744 (12) P= .409	.0623 (12) P= .424
V004	-.5839 (12) P= .023	.5682 (12) P= .027
V005	-.1339 (12) P= .339	.5232 (12) P= .040

	(12)	(12)
	P= .163	P= .054
V007	-.1411	.5796
	(12)	(12)
	P= .331	P= .024
V008	-.1510	-.1401
	(12)	(12)
	P= .320	P= .332
V009	-.0567	-.1687
	(12)	(12)
	P= .431	P= .300
V010	-.0946	.4758
	(12)	(12)
	P= .385	P= .059
V011	.0865	.2678
	(12)	(12)
	P= .395	P= .200
V012	.5304	.0139
	(12)	(12)
	P= .038	P= .483

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V013	V014
V013	1.0000	-.1166
	(0)	(12)
	P= .	P= .359
V014	-.1166	1.0000
	(12)	(0)
	P= .359	P= .

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

This procedure was completed at 19:32:04
SET LISTING OFF.

OUTPUT OF 12 MATCHED BANKS 1988 RESULTS

```
DISCRIMINANT GROUPS=V015(1,2)/VARIABLES=V001 TO V014/STATISTICS=ALL.

Since ANALYSIS= was omitted for the first analysis all variables
on the VARIABLES= list will be entered at level 1.

This Discriminant Analysis requires      7552 (      7.4K) BYTES of workspace.
```


-------- D I S C R I M I N A N T A N A L Y S I S --------

On groups defined by V015 Grouping Variable

12 (unweighted) cases were processed.
0 of these were excluded from the analysis.
12 (unweighted) cases will be used in the analysis.

Number of Cases by Group

V015	Number of Cases Unweighted	Weighted	Label
1	6	6.0	
2	6	6.0	
Total	12	12.0	

Group Means

V015	V001	V002	V003	V004
1	-.17167	-2.09000	-.82167	-.14667
2	.01500	.21500	.17667	.39667
Total	-.07833	-.93750	-.32250	.12500

V015	V005	V006	V007	V008
1	-.24167	-.66833	-.09667	.04667
2	.17500	.13667	.09333	.41167
Total	-.03333	-.26583	-.00167	.22917

V015	V009	V010	V011	V012
1	.04333	.71000	.59167	.57167
2	.38167	1.03167	.67667	.57667
Total	.21250	.87083	.63417	.57417

V015	V013	V014
1	.86833	.02167
2	.92000	.46167
Total	.89417	.24167

Group Standard Deviations

V015	V001	V002	V003	V004
1	.23327	3.01113	.58253	.39185
2	.00837	.13338	.10405	.83224
Total	.18512	2.36186	.65649	.68201

V015	V005	V006	V007	V008
1	.49451	1.54749	.28090	.04457
2	.23287	.02875	.01506	.16952
Total	.42796	1.12500	.21404	.22427

	V009	V010	V011	V012
1	.04179	.16947	.28273	.21451
2	.16278	.05947	.14010	.10985
Total	.20990	.20708	.21732	.16251

	V013	V014
1	.10323	.46688
2	.03464	.96758
Total	.07821	.75989

Within-Groups Covariance Matrix with 10 degrees of freedom

V001	V002	V003	V004
.2724333E-01			
.3420750	4.542335		
-.4641667E-02	-.2055600	.1750817	
.2128333E-01	.2153400	.1444667E-01	.4230867
.4638333E-01	.6294450	-.2607167E-01	.2548333E-01
.1152717	1.650340	-.1375750	.1023200
.2817333E-01	.3566100	.6600000E-03	.2312000E-01
.3216667E-03	.9415000E-02	.8150000E-02	-.2344000E-01
.2833333E-04	.4475000E-02	.8316667E-02	-.2166333E-01
.1463500E-01	.2175050	-.9476667E-02	.1909333E-01
.2403167E-01	.3604400	-.3984500E-01	.4183000E-01
.4851667E-02	.1255400	-.4072500E-01	.3296000E-01
-.1015167E-01	-.1210800	.5208333E-02	-.5766667E-02
.3436667E-02	-.3520500E-01	.2402500E-01	.4814600

V005	V006	V007	V008
.1493833			
.3692217	1.197782		
.6658333E-01	.1925333	.3956667E-01	
-.2728333E-02	-.1579333E-01	-.2046667E-02	.1536167E-01
-.3861667E-02	-.1739000E-01	-.2340000E-02	.1469500E-01
.3386500E-01	.9801333E-01	.1699667E-01	.4188333E-02
.5362167E-01	.1781917	.2991333E-01	-.1167333E-01
.1792167E-01	.8474167E-01	.6633333E-02	-.9083333E-02
-.2263167E-01	-.5811833E-01	-.1269667E-01	.2716667E-02
-.7633333E-02	-.1205833E-01	-.1156667E-02	-.2545833E-01

V009	V010	V011	V012
.1412167E-01			
.3838333E-02	.1612833E-01		
-.1162000E-01	.2001333E-01	.4978167E-01	
-.8850000E-02	.1173333E-01	.3098167E-01	.2904167E-01
.2823333E-02	-.3030000E-02	-.8828333E-02	-.3683333E-03
-.2305500E-01	.8648333E-02	.1909167E-01	.2816167E-01

V013	V014
.5928333E-02	
.1291667E-02	.5770967

Within-Groups Correlation Matrix

V001	V002	V003	V004	V005	V006	V007	
1.00000							
.97241	1.00000						
-.06721	-.23050	1.00000					
.19824	.15534	.05308	1.00000				
.72708	.76413	-.16121	.10137	1.00000			
.63812	.70753	-.30042	.14373	.87287	1.00000		
.85811	.84118	.00793	.17869	.86606	.88441	1.00000	
.01572	.03564	.15715	-.29075	-.05695	-.11643	-.08302	
.09144	.01767	.14726	-.28026	-.08408	-.13771	-.09899	

V010	.69818	.80359	-.17834	.23114	.68993	.70518	.67283
V011	.65256	.75798	-.42679	.28823	.62181	.72973	.67401
V012	.17248	.34565	-.57112	.29735	.27209	.45436	.19568
V013	-.79881	-.73785	.16166	-.11514	-.76050	-.68970	-.82901
V014	.02741	-.02174	.07558	.97436	-.02600	-.01450	-.00765

	V008	V009	V010	V011	V012	V013	V014
V008	1.00000						
V009	.99772	1.00000					
V010	.26609	.25433	1.00000				
V011	-.42212	-.43826	.70630	1.00000			
V012	-.43005	-.43701	.54215	.81482	1.00000		
V013	.28468	.30857	-.30987	-.51390	-.02807	1.00000	
V014	-.27039	-.25539	.08964	.11264	.21753	.02208	1.00000

Correlations which cannot be computed are printed as '.'

Wilks' Lambda (U-statistic) and univariate F-ratio
with 1 and 10 degrees of freedom

Variable	Wilks' Lambda	F	Significance
V001	.72270	3.837	.0786
V002	.74025	3.509	.0905
V003	.36931	17.08	.0020
V004	.82691	2.093	.1786
V005	.74148	3.487	.0914
V006	.86036	1.623	.2315
V007	.78510	2.737	.1290
V008	.27764	26.02	.0005
V009	.29139	24.32	.0006
V010	.34193	19.25	.0014
V011	.95828	.4354	.5243
V012	.99974	.2582E-02	.9605
V013	.88099	1.351	.2721
V014	.90856	1.006	.3394

Covariance Matrix for Group 1,

	V001	V002	V003	V004
V001	.5441667E-01			
V002	.6832800	9.066880		
V003	-.9983333E-02	-.4249200	.3393367	
V004	.4548667E-01	.5064800	.8586667E-01	.1535467
V005	.9327667E-01	1.251880	-.5770333E-01	.8692667E-01
V006	.2303833	3.297320	-.2776567	.2221933
V007	.5624667E-01	.7124000	.6266667E-03	.5228667E-01
V008	.3933333E-03	.5560000E-02	.6993333E-02	-.4666667E-02
V009	-.2533333E-03	-.4320000E-02	.7246667E-02	-.4553333E-02
V010	.2910000E-01	.4304800	-.2236000E-01	.3302000E-01
V011	.4820333E-01	.7328400	-.7113667E-01	.3357333E-01
V012	.9823333E-02	.2607600	-.7457667E-01	.1419333E-01
V013	-.2048333E-01	-.2447200	.8416667E-02	-.1547333E-01
V014	.1028333E-01	.1232000E-01	.1098633	.1615733

	V005	V006	V007	V008
V005	.2445367			
V006	.7391033	2.394737		
V007	.1345667	.3849133	.7890667E-01	
V008	-.8306667E-02	-.3527333E-01	-.3266667E-02	.1986667E-02
V009	-.9493333E-02	-.3838667E-01	-.3973333E-02	.1853333E-02
V010	.6572000E-01	.1951600	.3426000E-01	.3800000E-03
V011	.1169033	.3593767	.5909333E-01	-.4533333E-03
V012	.4734333E-01	.1710767	.1293333E-01	-.8333333E-03

V013	-.4300333E-01	-.1167767	-.2543333E-01	.1813333E-02
V014	.7123333E-02	-.3903333E-02	.5293333E-02	-.6773333E-02

	V009	V010	V011	V012
V009	.1746667E-02			
V010	-.2600000E-03	.2872000E-01		
V011	-.1526667E-02	.4604000E-01	.7993667E-01	
V012	-.1346667E-02	.2744000E-01	.4681667E-01	.4601667E-01
V013	.1906667E-02	-.7860000E-02	-.1539667E-01	.6233333E-03
V014	-.5686667E-02	.8300000E-02	-.1376333E-01	.3766667E-03

	V013	V014
V013	.1065667E-01	
V014	-.2576667E-02	.2179767

Covariance Matrix for Group 2,

	V001	V002	V003	V004
V001	.7000000E-04			
V002	.8700000E-03	.1779000E-01		
V003	.7000000E-03	.1380000E-01	.1082667E-01	
V004	-.2920000E-02	-.7580000E-01	-.5697333E-01	.6926267
V005	-.5100000E-03	.7010000E-02	.5560000E-02	-.3596000E-01
V006	.1600000E-03	.3360000E-02	.2506667E-02	-.1755333E-01
V007	.1000000E-03	.8200000E-03	.6933333E-03	-.6046667E-02
V008	.2500000E-03	.1327000E-01	.9306667E-02	-.4221333E-01
V009	.3100000E-03	.1327000E-01	.9386667E-02	-.3877333E-01
V010	.1700000E-03	.4530000E-02	.3406667E-02	.5166667E-02
V011	-.1400000E-03	-.1196000E-01	-.8553333E-02	.5008667E-01
V012	-.1200000E-03	-.9680000E-02	-.6873333E-02	.5172667E-01
V013	.1800000E-03	.2560000E-02	.2000000E-02	.3940000E-02
V014	-.3410000E-02	-.8273000E-01	-.6181333E-01	.8013467

	V005	V006	V007	V008
V005	.5423000E-01			
V006	-.6600000E-03	.8266667E-03		
V007	-.1400000E-02	.1533333E-03	.2266667E-03	
V008	.2850000E-02	.3686667E-02	-.8266667E-03	.2873667E-01
V009	.1770000E-02	.3606667E-02	-.7066667E-03	.2753667E-01
V010	.2010000E-02	.8666667E-03	-.2666667E-03	.7996667E-02
V011	-.9660000E-02	-.2993333E-02	.7333333E-03	-.2289333E-01
V012	-.7500000E-02	-.2493333E-02	.4333333E-03	-.1733333E-01
V013	-.2260000E-02	.5400000E-03	.4000000E-04	.3620000E-02
V014	-.2239000E-01	-.2021333E-01	-.7606667E-02	-.4414333E-01

	V009	V010	V011	V012
V009	.2649667E-01			
V010	.7936667E-02	.3536667E-02		
V011	-.2171333E-01	-.6013333E-02	.1962667E-01	
V012	-.1635333E-01	-.3973333E-02	.1514667E-01	.1206667E-01
V013	.3740000E-02	.1800000E-02	-.2260000E-02	-.1360000E-02
V014	-.4042333E-01	.8996667E-02	.5194667E-01	.5594667E-01

	V013	V014
V013	.1200000E-02	
V014	.5160000E-02	.9362167

Total Covariance Matrix with 11 degrees of freedom

	V001	V002	V003	V004
V001	.3426970E-01			
V002	.4283227	5.578402		
V003	.4660455E-01	.4407159	.4309841	
V004	.4700909E-01	.5373227	.1610682	.4651364

	.6337879E-01	.8341545	.8974545E-01	.8490909E-01
	.1457742	2.006361	.9411136E-01	.2123045
	.3528485E-01	.4436318	.5233182E-01	.4917273E-01
V008	.1887424E-01	.2380114	.1067886	.3277727E-01
V009	.1725000E-01	.2167568	.9967955E-01	.3044091E-01

	V001	V002	V003	V004
V010	.2968030E-01	.3999432	.7896591E-01	.6502273E-01
V011	.2617424E-01	.3811068	-.1307955E-01	.5062273E-01
V012	.4665152E-02	.1172705	-.3566136E-01	.3070455E-01
V013	-.6598485E-02	-.7759318E-01	.1880227E-01	.2413636E-02
V014	.2552424E-01	.2445955	.1416409	.5028909

	V005	V006	V007	V008
V005	.1831515			
V006	.4271333	1.265627		
V007	.8212121E-01	.2167439	.4581515E-01	
V008	.3899697E-01	.6577652E-01	.1705303E-01	.5029924E-01
V009	.3493636E-01	.5847045E-01	.1540455E-01	.4703864E-01
V010	.6733939E-01	.1597235	.3211970E-01	.3582803E-01
V011	.5840606E-01	.1806538	.3159848E-01	-.2150758E-02
V012	.1686061E-01	.7813561E-01	.6289394E-02	-.7759848E-02
V013	-.1470303E-01	-.4149167E-01	-.8865152E-02	.7612879E-02
V014	.4306061E-01	.8563788E-01	.2174848E-01	.2065606E-01

	V009	V010	V011	V012
V009	.4405682E-01			
V010	.3317045E-01	.4288106E-01		
V011	-.2720455E-02	.2565076E-01	.4722652E-01	
V012	-.7584091E-02	.1110530E-01	.2828106E-01	.2640833E-01
V013	.7334091E-02	.1778030E-02	-.6828030E-02	-.2643939E-03
V014	.1964091E-01	.4646212E-01	.2755606E-01	.2620152E-01

	V013	V014
V013	.6117424E-02	
V014	.7374242E-02	.5774333

- - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - -

In groups defined by V015 Grouping Variable

Analysis number 1
Direct method: All variables passing the tolerance test are entered.
Minimum Tolerance Level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 1
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .50000

The following 5 variables failed the tolerance test..

Variable	Within Groups Variance	Tolerance	Minimum Tolerance
V010	.161283E-01	.0000676	.0000067
V011	.497817E-01	.0016587	.0001351
V012	.290417E-01	.0006716	.0000443
V013	.592833E-02	.0011121	.0000931
V014	.537097	.0005706	.0005706

ssification Function Coefficients
isher's Linear Discriminant Functions)

G5 =	1	2
V001	-279.8555	-157.1382
V002	7.843759	4.628121
V003	-38.86148	-16.92744
V004	4.959419	5.658049
V005	12.16882	5.516614
V006	-43.52548	-21.94111
V007	318.3742	167.9260
V008	-117.6044	187.4157
V009	156.5023	-148.1850
(constant)	-30.45231	-16.75675

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.0942	12.990	9	.1630
1*	9.6112	100.00	100.00	.9517	:				

* marks the 1 canonical discriminant functions remaining in the analysis.

tandardized Canonical Discriminant Function Coefficients

	FUNC 1
V001	3.57856
V002	-1.21082
V003	1.62148
V004	.08028
V005	-.45424
V006	4.17350
V007	-5.28718
V008	6.67914
V009	-6.39691

tructure Matrix:

ooled-within-groups correlations between discriminating variables
and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1
V008	.52029
V009	.50301
V010	.47748
V003	.42153
V001	.19981
V002	.19108
V005	.19046
V007	.16876
V004	.14758
V014	.14467
V006	.12995
V011	-.06792
V013	.06533
V012	-.04225

Unstandardized Canonical Discriminant Function Coefficients

	FUNC 1
V001	21.68095
V002	-.5681196
V003	3.875173
V004	.1234297
V005	-1.175271
V006	3.813397
V007	-26.58028
V008	53.88912
V009	-53.83032
(constant)	2.419649

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	-2.83007
2	2.83007

Test of equality of group covariance matrices using Box's M

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Group Label	Rank	Log Determinant
1	< 6	(too few cases to be non-singular)
2	< 6	(too few cases to be non-singular)
Pooled Within-Groups Covariance Matrix	9	-34.675217

NOTE 10473
NOT ENOUGH NON-SINGULAR GROUP COVARIANCE MATRICES FOR DSC--At least two are required for a test to be performed.

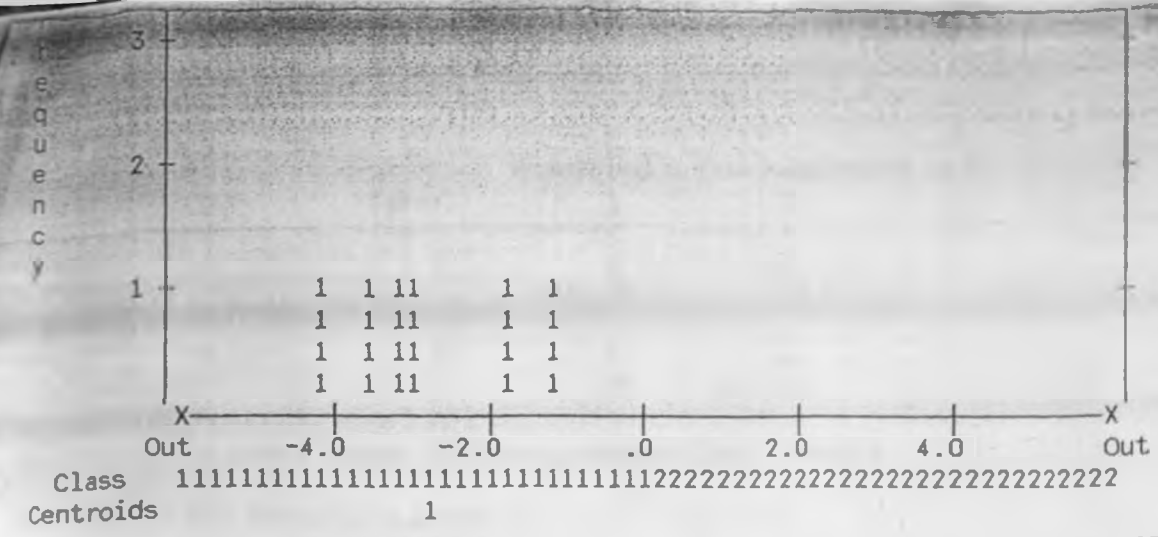
Case Number	Mis Val	Sel	Actual Group	Highest Probability Group	P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discrim Scores
1			1	1	.4404	1.0000	2	.0000	-3.6016
2			1	1	.7907	1.0000	2	.0000	-3.0954
3			1	1	.2955	1.0000	2	.0000	-1.7839
4			1	1	.7668	1.0000	2	.0000	-3.1267
5			1	1	.0952	.9986	2	.0014	-1.1616
6			1	1	.1672	1.0000	2	.0000	-4.2112
7			2	2	.4539	1.0000	1	.0000	2.0812
8			2	2	.1382	1.0000	1	.0000	4.3125
9			2	2	.5350	1.0000	1	.0000	2.2097
10			2	2	.7605	1.0000	1	.0000	3.1349
11			2	2	.6380	1.0000	1	.0000	2.3596
12			2	2	.9582	1.0000	1	.0000	2.8825

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

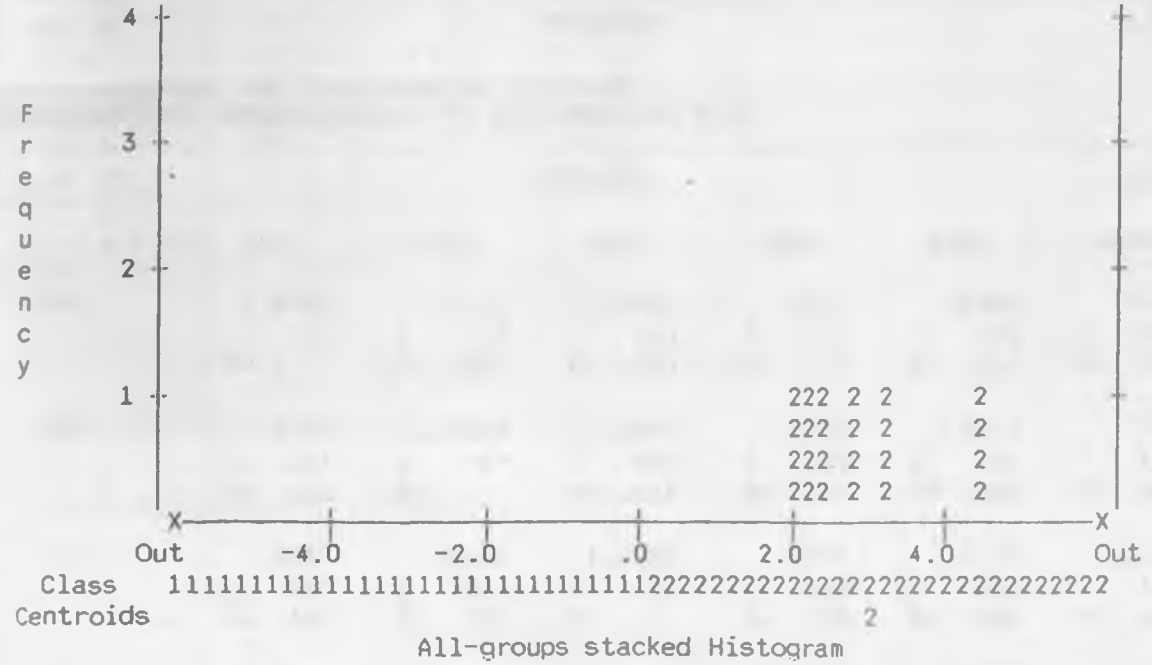
Histogram for Group 1

Canonical Discriminant Function 1



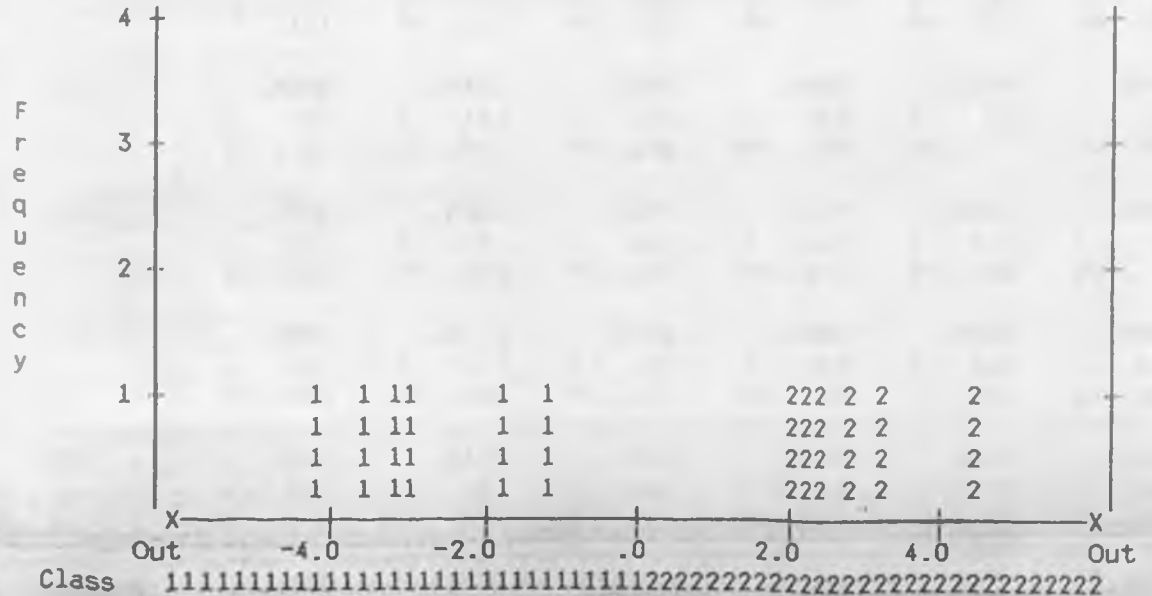
Histogram for Group 2

Canonical Discriminant Function 1



All-groups stacked Histogram

Canonical Discriminant Function 1



Classification Results -

Actual Group	No. of Cases	Predicted Group Membership 1	2
Group 1	6	6 100.0%	0 .0%
Group 2	6	0 .0%	6 100.0%

Percent of "grouped" cases correctly classified: 100.00%

Classification Processing Summary
12 Cases were processed.
0 Cases were excluded for missing or out-of-range group codes.
0 Cases had at least one missing discriminating variable.
12 Cases were used for printed output.

This procedure was completed at 19:35:42
CORRELATIONS VARIABLES=V001 TO V014/OPTIONS 2,5.

Correlations:	V001	V002	V003	V004	V005	V006
V001	1.0000 (0) P= .	.9796 (12) P= .000	.3835 (12) P= .109	.3723 (12) P= .117	.8000 (12) P= .001	.7000 (12) P= .006
V002	.9796 (12) P= .000	1.0000 (0) P= .	.2842 (12) P= .185	.3336 (12) P= .145	.8253 (12) P= .000	.7551 (12) P= .002
V003	.3835 (12) P= .109	.2842 (12) P= .185	1.0000 (0) P= .	.3597 (12) P= .125	.3194 (12) P= .156	.1274 (12) P= .347
V004	.3723 (12) P= .117	.3336 (12) P= .145	.3597 (12) P= .125	1.0000 (0) P= .	.2909 (12) P= .179	.2767 (12) P= .192
V005	.8000 (12) P= .001	.8253 (12) P= .000	.3194 (12) P= .156	.2909 (12) P= .179	1.0000 (0) P= .	.8872 (12) P= .000
V006	.7000 (12) P= .006	.7551 (12) P= .002	.1274 (12) P= .347	.2767 (12) P= .192	.8872 (12) P= .000	1.0000 (0) P= .
V007	.8905 (12) P= .000	.8775 (12) P= .000	.3724 (12) P= .117	.3368 (12) P= .142	.8965 (12) P= .000	.9001 (12) P= .000
V008	.4546 (12) P= .069	.4493 (12) P= .071	.7253 (12) P= .004	.2143 (12) P= .252	.4063 (12) P= .095	.2607 (12) P= .207
V009	.4439 (12) P= .074	.4372 (12) P= .078	.7234 (12) P= .004	.2126 (12) P= .253	.3889 (12) P= .106	.2476 (12) P= .219
V010	.7742	.8177	.5809	.4604	.7500	.6856

	(12)	(12)	(12)	(12)	(12)	(12)
	P= .002	P= .001	P= .024	P= .066	P= .002	P= .007
V011	.6506	.7425	-.0917	.3416	.6280	.7389
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .011	P= .003	P= .388	P= .139	P= .014	P= .003
V012	.1551	.3055	-.3343	.2770	.2424	.4274
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .315	P= .167	P= .144	P= .192	P= .224	P= .083

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V001	V002	V003	V004	V005	V006
V013	-.4557	-.4200	.3662	.0452	-.4393	-.4715
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .068	P= .087	P= .121	P= .444	P= .077	P= .061
V014	.1814	.1363	.2839	.9704	.1324	.1002
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .286	P= .336	P= .186	P= .000	P= .341	P= .378

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:	V007	V008	V009	V010	V011	V012
V001	.8905	.4546	.4439	.7742	.6506	.1551
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .069	P= .074	P= .002	P= .011	P= .315
V002	.8775	.4493	.4372	.8177	.7425	.3055
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .071	P= .078	P= .001	P= .003	P= .167
V003	.3724	.7253	.7234	.5809	-.0917	-.3343
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .117	P= .004	P= .004	P= .024	P= .388	P= .144
V004	.3368	.2143	.2126	.4604	.3416	.2770
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .142	P= .252	P= .253	P= .066	P= .139	P= .192
V005	.8965	.4063	.3889	.7599	.6280	.2424
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .095	P= .106	P= .002	P= .014	P= .224
V006	.9001	.2607	.2476	.6856	.7389	.4274
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .000	P= .207	P= .219	P= .007	P= .003	P= .083
V007	1.0000	.3552	.3429	.7247	.6793	.1808
	(0)	(12)	(12)	(12)	(12)	(12)
	P= .	P= .129	P= .138	P= .004	P= .008	P= .287
V008	.3552	1.0000	.9992	.7715	-.0441	-.2129

	(12)	(0)	(12)	(12)	(12)	(12)
	P= .129	P= .	P= .000	P= .002	P= .446	P= .253
V009	.3429	.9992	1.0000	.7632	-.0596	-.2223
	(12)	(12)	(0)	(12)	(12)	(12)
	P= .138	P= .000	P= .	P= .002	P= .427	P= .244
V010	.7247	.7715	.7632	1.0000	.5700	.3300
	(12)	(12)	(12)	(0)	(12)	(12)
	P= .004	P= .002	P= .002	P= .	P= .026	P= .147
V011	.6793	-.0441	-.0596	.5700	1.0000	.8008
	(12)	(12)	(12)	(12)	(0)	(12)
	P= .008	P= .446	P= .427	P= .026	P= .	P= .001
V012	.1808	-.2129	-.2223	.3300	.8008	1.0000
	(12)	(12)	(12)	(12)	(12)	(0)
	P= .287	P= .253	P= .244	P= .147	P= .001	P= .

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V007	V008	V009	V010	V011	V012
V013	-.5295	.4340	.4467	.1098	-.4017	-.0208
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .038	P= .079	P= .073	P= .367	P= .098	P= .474
V014	.1337	.1212	.1231	.2953	.1669	.2122
	(12)	(12)	(12)	(12)	(12)	(12)
	P= .339	P= .354	P= .352	P= .176	P= .302	P= .254

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations:

	V013	V014
V001	-.4557	.1814
	(12)	(12)
	P= .068	P= .286
V002	-.4200	.1363
	(12)	(12)
	P= .087	P= .336
V003	.3662	.2839
	(12)	(12)
	P= .121	P= .186
V004	.0452	.9704
	(12)	(12)
	P= .444	P= .000
V005	-.4393	.1324
	(12)	(12)
	P= .077	P= .341
V006	-.6715	.1002

	(12)	(12)
	P= .061	P= .378
V007	-.5295	.1337
	(12)	(12)
	P= .038	P= .339
V008	.4340	.1212
	(12)	(12)
	P= .079	P= .354
V009	.4467	.1231
	(12)	(12)
	P= .073	P= .352
V010	.1098	.2953
	(12)	(12)
	P= .367	P= .176
V011	-.4017	.1669
	(12)	(12)
	P= .098	P= .302
V012	-.0208	.2122
	(12)	(12)
	P= .474	P= .254

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

Correlations: V013 V014

V013	1.0000	.1241
	(0)	(12)
	P= .	P= .350
V014	.1241	1.0000
	(12)	(0)
	P= .350	P= .

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

This procedure was completed at 19:38:17
finish.

End of Include file.