

**Capital Requirements and Bank
Behaviour in Kenya: Empirical Evidence**

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Abstract

This study analyses the impact of risk-based capital requirements on bank risk and capital levels. In the past, regulators placed much attention on increase in bank capital without much consideration of the corresponding level of risk in bank portfolios. Theoretical and empirical research suggests that increasing regulatory capital standards may cause banks to increase rather than decrease portfolio risk. Furthermore, higher bank capital levels do not, by themselves, guarantee that banks are adequately capitalized. Therefore, from a public policy perspective, what is important is the amount of capital a bank holds relative to its level of risk. A major step towards this is the Basle Accord of 1988, which requires that capital requirements be sensitive to the risk in a bank's portfolio of assets and off-balance sheet activities.

Building on research done in other countries, this study utilizes simultaneous equations approach to model the regulatory impact of minimum capital requirements on bank risk behaviour and capital levels. The study uses data series for the first three years when risk-based capital requirements were enforced in Kenya. The study estimates using the three stage least square method, which is a full information estimation procedure.

The results show that risk-based capital requirements have been effective in increasing capital for the capitalized bank while the effect has been minimal for the under-capitalized banks. The study, through the HHI and CR4 indices, confirms the widely held view that Kenya's banking sector has an oligopolistic market structure or to be one of loose monopolistic competition. This means that for more competition to be achieved in the banking sector, more banks have to enter into the business. However, the banks entry into the business must be accompanied by a change in the regulatory framework that will enhance competition and efficiency in the sector. The study concurs with the view that there is need to lower the minimum capital requirements in order to make the financial market more competitive. In other words, prudential capital requirements should not be set so high to the extent that they enhance risky behaviour in banks. They should be set low or fair enough to ensure asset quality, non-risky tendencies and a competitive banking environment.

This Discussion Paper is produced under the Umbrella Project for *Improving the Enabling Environment for Businesses in Kenya*. The aim of the Project is to improve the policy, legal, and regulatory environment for businesses. The Project has three components. The **Simplifying the Regulatory Environment for Business (SREB)** component involves research on constraints to operation of business by the private sector in Kenya. The **Private Sector Advocacy** component assists the private sector in advocating for reforms that create a favourable environment for business and investment. The **Capacity Building** component aims to build capacity in line ministries and regulatory agencies to respond to reform proposals made by the private sector and other stakeholders. KIPPRA implements the first and third components while the Kenya Private Sector Alliance implements the advocacy component. The Project is funded by the British Department for International Development (DfID).

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1. Introduction

In recent years, regulators have increased their focus on the role of capital requirements for banking institutions in enhancing the stability of the financial system. A major step in this direction was the 1988 agreement among G-10¹ countries on minimal risk-based capital requirements for banks, referred to as the Basle Accord of 1988. The purpose of the risk-based standards was to make bank capital requirements sensitive to the risk in a bank's portfolio of assets and off-balance sheet activities.

Kenya enacted the capital requirements of the Basle Accord in 1999. Before then, the regulators issued explicit minimum capital standards for banks and other financial institutions. These standards required that banks hold capital at least equal in amount to a fixed percentage of their assets. While these standards have been given credit for increasing bank capital ratios, the 1980s and 1990s witnessed an increase in both the number and cost of bank failures in Kenya. The failures may be attributed to under-capitalization and poor lending practices (Kagira and Kirkpatrick, 2001; Brownbridge, 1998).

Kenya's regulators took up capital requirements in line with the international Basle Accord in an attempt to standardize the system of computing the risk-based capital. A major weakness with the previous minimum standards was that they failed to take into account the risk in a bank's portfolio of assets, and that high-risk assets required the same amount of capital as low-risk assets. This is mostly related to a market and institutional failure to rate borrowers in their risk category and, in general, to provide a market to mitigate risk.

¹ These countries are Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States. Switzerland became the eleventh member but the group is still referred to as the G-10.

The increasing reliance by regulators on capital requirements raises several questions. How do banks respond to capital requirements? Do they increase their capital or do they reduce their higher risk assets? Does increase in capital requirements induce banks to reduce or to increase the level of risk in their portfolio? While a lot of attention is given to increase in capital, issues of the corresponding level of risk in bank portfolio because of increase in capital requirements are rarely addressed. To date, some theoretical and empirical research suggests that increasing regulatory capital standards may cause banks to increase rather than decrease their portfolio risk. Furthermore, higher bank capital levels do not, by themselves, guarantee that banks are adequately capitalized. Therefore, from a public policy perspective, what is important is the amount of capital a bank holds relative to its level of risk (Jacques and Nigro, 1994)

While economic theory is split over how capital requirements contribute to bank failure, studies on the issue have not been concrete. The information and explanations for bank failure in Kenya remains inadequate. This study aims to provide more information on this issue and discuss policy implications. The study aims to provide empirical evidence on the impact of capital regulation on bank capital and portfolio risk especially with the adoption of risk-based capital standards in Kenya. The study investigates how regulation of bank activity in Kenya affects the behaviour of banks in their choice of portfolio, and how regulatory constraints (capital adequacy, reserve requirements and deposit insurance) affect bank risk behaviour. It is expected that findings of this study will be used to develop new capital regulations that will increase the soundness of the banking system in Kenya.

1.1 Rationale for Capital Requirements

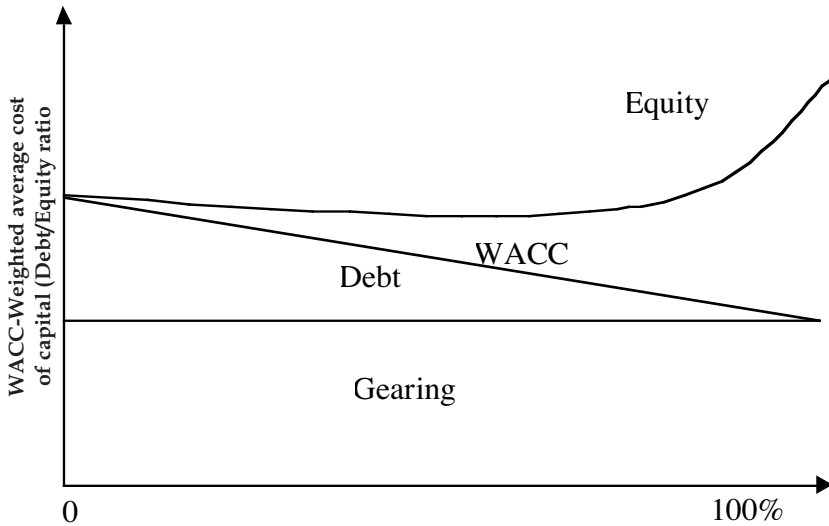
Bank regulators place great emphasis on regulation of bank capital, as it is believed that capital plays a crucial role in depository institutions. One objective of capital regulation has been to reduce the number of bank failures. Equity capital provides a cushion to absorb losses that would otherwise cause a bank to fail. Regulators consider prevention of bank failure an important goal at least in part because of concern that one bank's failure may adversely affect the stability of other financial institutions. Another consideration is the need to reduce the losses to depositors and the deposit insurer when a bank fails. Both equity and debt subordinated to depositors provide a cushion to reduce the losses to depositors and the deposit insurer in the event of failure. Capital also supports growth and long term fixed investment for banks and reduces moral hazards.

Theoretically, models based on the option pricing² support the stabilising effects of capital requirements. In this framework, an unregulated bank will take excessive portfolio and leverage risks in order to maximise its shareholder value at the expense of the deposit insurance (Benston *et al*, 1986; Keeley and Furlong, 1989 and 1990). Capital requirements can reduce these moral hazard incentives by making bank shareholders absorb a larger part of the losses, therefore reducing the value of the deposit insurance. With more capital and less risk-taking, the effect is clearly a decrease in the bank's default probability, and therefore higher stability in the financial sector.

Figure 1 shows the trend in capital movement. The weighted average cost of capital (WACC) is given by the weighted sum of the equity and debt lines. When gearing is zero, WACC is equal equity and when

² Options are contracts that do not obligate the holder to transact at the contract price. The holder exercises such a right if it is in his favour/interest.

Figure 1: Gearing



gearing is 100 percent, WACC is equal to debt. Gearing is defined as debt/equity ratio. Capital requirements demand that this gearing ratio may be reduced, implying a higher proportion of equity used to finance the bank. This is more costly than debt since it bears more risk³. As a bank's gearing ratio falls, its WACC rises.

Economic theory argues that when capital is relatively expensive, the forced reduction in leverage diminishes the bank's expected returns. As a consequence, the bank's owners may choose a higher point on the efficiency frontier, with higher returns and higher risks. The intended objective of capital requirements might therefore not be met and the results could be perverse. Introduction of risk-based capital standards is an attempt to eliminate the possible perverse effects of capital requirements (Rime, 2000).

³ For simplicity purposes we assume that the cost of debt is independent of the bank's gearing. This is reasonable for a bank whose deposits are covered by insurance or probably by government guarantee.

1.2 Capital Adjustments

According to Wall and Peterson (1996), banks can generally respond in one of two ways in terms of increasing capital. A bank may increase its capital ratio without reducing the probability that it will fail. This response may be referred to as “cosmetic” change in the capital ratio. A second response would be to increase measured capital ratio in a way that reduces the probability of failure. This response may be referred to as an “effective” change in the capital ratio.

One way for a bank to make cosmetic improvements in its capital ratios would be to reduce its total assets in order to improve its capital to assets ratio while increasing portfolio risk by increasing the proportion of risky assets. The other way of making cosmetic changes is to exploit differences between capital as measured for regulatory purposes and the banks’ true economic capital. Regulatory accounting generally records assets at historical costs rather than at their current market value. Therefore, regulatory measures of capital may differ substantially from the economic capital available to support the long-term viability of a bank. A bank may exploit these differences to increase its capital as measured by regulatory accounting criteria. Therefore, a seemingly low-cost way for a bank to maintain or increase its regulatory capital ratio is to avoid recognizing losses on depreciated assets, and accelerate recognition of gains on assets that have appreciated. Banks can also utilize gains or losses from securities to adjust their capital ratios. However, this may not be a feasible option given the adoption of International Accounting Standards (IAS) and the provision of section 20(1) of the Banking Act (Laws of Kenya, Cap 488).

A second general response to capital regulations would be to increase measured capital ratios in a way that also reduces the probability of failure and the expected losses to depositors and the deposit insurer

should the bank fail. Examples of this type of response include reducing risk exposure and increasing the capital base without taking offsetting measures that increase risks.

Concerning effective changes in capital, a bank may reduce the volume of loan asset to increase the capital ratio. For example, immediately after the Basle Accord of 1988 was put in place in the United States there, a slowdown in credit growth was observed in the market. Banks might have responded to the new capital requirements by reducing the volume of credit extended or by increasing their interest margins to build up their capital. However, it is difficult to fully confirm that capital constraints contributed to the credit slowdown. The evidence is mixed and capital requirement shocks appear to have played only a partial role in the decline in lending.

The imposition of risk-based capital standards could lead banks to reallocate their portfolios from loans to securities because risk-based capital standards focus on credit risk, imposing full capital charges on most types of lending to private firms and individuals but smaller charges (in some cases no charge) for many types of securities.

Banks can also effectively increase their regulatory capital by increasing their retained earnings or issuing new securities. It is costly for banks to issue equity to increase their capital because equity holders are generally less protected from bank insolvencies than other creditors. Therefore, banks typically demand a higher rate of return than depositors or holders of bonds.

2. Capital Adequacy Regulations in Kenya

The first legislation enacted to regulate the minimum paid-up capital of banks in Kenya was the Banking Ordinance of 1956. According to this legislation, the Registrar of Banks was allowed to grant banking licenses to companies that had paid-up capital of more than Ksh 2 million. This legislation also created a reserve fund. Banks incorporated in the colony and outside the colony were required to maintain a reserve fund and transfer to the fund every year not less than 25% of their net profits until the amount of the reserve fund was equal to the paid up capital.

The second legislation that affected bank capital was the amendment of the 1968 Banking Act in 1980 to raise minimum capital from Ksh 2 million to Ksh 5 million for banks incorporated in Kenya and from Ksh 10 million to Ksh 50 million for banks incorporated outside Kenya. The 1968 Banking Act was further amended in 1982 to raise the minimum capital required to open a bank to Ksh 10 million for a locally incorporated bank and Ksh 100 million for banks incorporated outside Kenya. In 1985, the Act was further amended to raise the minimum capital required to start a bank to Ksh 15 million for a locally incorporated bank and Ksh 150 million for a bank incorporated outside Kenya. This amendment ensured that those wishing to do banking business had adequate capital of their own. Banks were given up to 16 May 1987 to increase their paid-up or assigned capital.

In order to ensure that adequate capitalisation was maintained at all times, and also adjusted automatically proportionate to the increase in deposits, gearing ratio (paid-up capital and unimpaired reserves to total deposit liabilities) was raised from 5 to 7.5 percent. Banks were given up to 16 May 1988 to build-up their capital and reserves. In addition to this provision, the Central Bank of Kenya, in consultation with the

Minister for Finance, was empowered to prescribe minimum ratios that banks should maintain between paid-up capital and unimpaired reserves on one hand and their assets on the other.

The other important provision to strengthen the capital base of banks was re-introduction of a statutory reserve fund. The reserve fund was to be built-up from net profits. As long as the reserve fund was less than paid-up capital, banks were required to transfer 12.5 percent of their net profits each year to the reserve fund. After the level of the statutory reserves was equal to the paid-up capital, institutions were required to transfer not less than 10 percent of their net profit to the reserve fund every year. This requirement was necessitated by the fact that a number of banks were declaring dividends or issuing bonus shares even where real profits had not been made. Furthermore, a number of banks were also declaring dividends without making adequate provisions for bad and doubtful debts. This situation was dangerous because without adequate provisions for bad debts, one large or a few loan defaults could precipitate a financial crisis for the involved institutions. Profits or losses would not be declared before adequate provision for bad and doubtful debts was made.

In 1992, the minimum capital/asset ratio was raised from 5.5 percent to 7.5 percent. Again, in 1994, the 1989 Banking Act was amended and the minimum capital requirement for locally incorporated banks was raised from Ksh 15 million to Ksh 75 million and Ksh 200 million for a bank incorporated outside Kenya. This was further raised to Ksh 200 million in 1997 for both locally and foreign incorporated banks (Table 1). Minimum capital was maintained at Ksh 200 million until the introduction of risk-based capital standards.

Table 1: Minimum capital requirements for commercial banks in Kenya (Ksh millions)

Banking legislation	Bank in Kenya	Banks outside Kenya
Banking Ordinance 1910	No regulation	No regulation
Banking Ordinance 1956	2	2
Banking Act 1968	2	2
Banking Act 1968 amendment in 1980	5	50
Banking Act 1968 amendment in 1982	10	100
Banking Act 1968 amendment in 1985	15	150
Banking Act 1989	15	150
Banking Act 1989 amendment in 1994	75	200
Banking Act 1989 amendment in 1997	200	200
1999	200	200

Source: Central Bank of Kenya (1986): "Its evolution, responsibilities and organization" Central Bank of Kenya (1998): Annual report

2.1 Risk-based Capital Standards⁴

Prior to the implementation of risk-based standards, Kenyan banks were subject to a requirement that they hold a minimum fixed percentage of their assets in the form of capital, regardless of the level of risk in their portfolio.

The primary purpose of risk-based standards was to require banks to hold capital in accordance with the perceived credit risk in their portfolio. As such, these risk-based standards link capital to risk by assigning risk weights to broad categories of assets. Currently, risk-based standards contain four risk weight categories: 0%, 20%, 50% and 100% (Appendix 2). Low credit risk assets such as cash and Kenyan government securities are considered to have no default risk and were

⁴ See appendix Annex 1 on development of international risk based capital standards (Basle Accord I and II)

assigned to the zero risk category. At the other extreme, higher credit risk assets such as commercial loans are assigned to the 100% risk weight category. Having assigned individual assets to the appropriate risk weight category, the bank computes its total risk adjusted assets by summing its risk-weighted assets (the shilling volume of each asset multiplied by the corresponding risk weight). As a final step, capital must be held as a percentage of the total risk weighted assets.

The implementation of the Basle Accord of 1988 has been done in phases in Kenya since 1990. In the year 2000, capital requirement amendments were incorporated in the Banking Act. All banks were therefore required to compute capital and declare their adjusted risk weight capital ratios. Minimum capital requirements were then adjusted.⁵

The core capital, monitored on a continuous basis by the Central Bank of Kenya, would apply to all institutions and may be reviewed from time to time. Other things being equal, the greater the credit risk in a bank's portfolio, the greater the total risk weighted assets, and the greater the level of capital that the bank must hold against its portfolio. The minimum core capital required is shown in Table 2 and must be achieved by the compliance dates indicated.

⁵ The minimum capital requirement was adjusted to incorporate risk and the minimum ratios defined as follows:

- A core capital of not less than 8% of total risk adjusted assets plus risk adjusted off balance sheet items
- A core capital of not less than 8% of its total deposit liabilities. Section 17 (1) of the Banking Act states that *"The core capital of an institution shall at all times be not less than eight percent of its total deposit liabilities"*
- A total capital of not less than 12% of its total risk adjusted assets plus risk adjusted balance sheet items. Section 18 of the Banking Act provides that *"The Central Bank may prescribe the minimum ratios which shall be maintained by institutions as between their core capital and total capital on one hand and their assets (including their total loans and advances) and off balance sheet items on the other hand for that purpose, may also determine the method of classifying and evaluating assets"*

Table: 2: Minimum core capital

Compliance date	Banks and mortgage finance companies (Ksh millions)	Financial institution (Ksh millions)
31-12-1999	200	150.0
31-12-2000	250	187.5
31-12-2001	300	225.0
31-12-2002	350	262.5
31-12-2003	400	300.0
31-12-2004	450	337.5
31-12-2005	500	375.0

Source: Second schedule to the Banking Act of 1999

Section 7⁶ (1) of the Banking Act 2000 states that “A license shall not be granted to an institution unless the institutions meet the minimum capital requirements specified in the second schedule”. Therefore, all institutions must meet the requirements of minimum core capital⁷ in order to operate in Kenya.

⁶ Section 7 & 17 of the Banking Act provided for capital requirements before risk-based standards were introduced. Section 18, came with the introduction of risk-based standards, which was enacted in the Banking Act 2000.

⁷ “**Core capital**” (Tier 1) as defined in section 2(1) of the Banking Act includes permanent shareholders equity (issued and fully paid-up ordinary shares and perpetual non-cumulative preference shares) plus disclosed reserves (additional share premium plus retained earnings plus 50% of profits after tax plus minority interest in consolidated subsidiaries) less intangible assets (goodwill and equity funded through revaluation reserves). With respect to profits after tax for the current year to date, 50% of the profits will be allowed as part of core capital. The institutions must have made adequate provisions for bad and doubtful debts, depreciation and other expenses. In arriving at the applicable figure, any proposed or interim dividends have to be taken into account. “**Supplementary capital** (Tier 2) includes 25% of asset revaluation reserves which has received prior Central Bank’s approval, subordinated debt, hybrid (debt equity) capital instruments, general loan loss provisions, or any other capital instrument approved by Central Bank. Supplementary capital must not exceed core capital. “**Total capital**” means core capital plus supplementary capital.

2.2 Measurement of Capital Adequacy

Kenyan bank regulators have identified levels of capital characterising well-capitalised and under-capitalised banks. Banks in any of the two under-capitalised categories (Table 3) face severe penalties and regulatory intervention. Banks just meeting minimum standards are considered adequately capitalised. Banks classified as well-capitalised qualify for less regulatory scrutiny. A depository institution's Capital Adequacy, Asset Quality, Earnings, Liquidity (CAEL)⁸ rating reflects the examiner's evaluation of other characteristics and also affects regulatory actions.

Banks in the two under-capitalised (marginal and unsatisfactory) categories must restrict growth, prepare plans to restore capital and receive approval from regulators before expanding operations, making acquisitions, or opening new branches. Significantly, under-capitalised banks face more strict limitations, including prohibitions on increases in compensation to senior executives. If managers cannot correct deficiencies, regulators are required to place banks in receivership (Deposit Protection Fund control) within 90 days. These policies reflect that severely under-capitalised institutions have little incentive to control risk, and therefore expose the deposit insurance system to substantial moral hazard.

Capital adequacy is measured in terms of:

- Minimum core capital set by the regulators
- Gearing ratio, that is Core Capital/Total Deposit Liabilities (minimum 8%)

⁸ This rating system has been adopted from the internationally recognised system called (CAMEL) an acronym that stands for Capital Adequacy, Asset Quality, Management, Earnings and Liquidity. It is however not possible to rate management (M) offsite as it is difficult to obtain quantifying related data, hence (CAEL).

- Core Capital /TRWA (minimum 8%) where TRWA = Total Risk Weighted Assets
- Total Capital/TRWA (minimum 12%) (Appendix 1 for the risk weights)

Any institution whose core capital is below the statutory minimum specified in the second schedule shall be rated "Unsatisfactory" (Table 3) even if the capital ratios specified below are higher than the prescribed minimum.

Basis for the spread bands:

- The starting basis is that an institution which just meets the minimum ratio of 12% be rated fair

Table 3: Rating criteria for total capital (Kenya's ratings)

Rate	Number of Banks		Bands
	2001	2002	
Strong	33	33	More than 19.5 %
Satisfactory	5	4	15.6% - 19.4%
Fair	4	5	12.0% - 15.5%
Marginal	1	3	8.4% - 11.9%
Unsatisfactory	8	6	Less than 8.3%

Source: Bank Supervision Department of the Central Bank of Kenya, Annual Report 2002 (Financial Analysis Division Operational Manual)

- Secondly, since the average non-performing advances to total advances ratio in the sector is about 30%, the percentage used in determining the size of the bands is derived as $(30/100)(12\%) = 3.6\%$ (12% being the statutory total capital/risk weighted assets ratio).

- Taking 12% as the starting point, then 3.6 percentage points be added on to 12% to get next upper band and subtracted to get to the next lower band. The assumption is that an institution will require more capital to cushion itself against losses arising from non-performing advances.

2.3 Other Issues on Capital

In addition to capital requirements, there are other issues that have a direct effect on capital and may at times be detrimental in achieving the minimum capital standards set by the Central Bank regulators.

2.3.1 Prohibited business

Section 10(1) of the Banking Act provides for prohibited businesses⁹. Previously, this provision was at 100% of core capital (Bank Supervision Annual Report, 1996). A reduction to 25% meant that banks had to adjust their capital accordingly if they were to lend the same amount as before or more. For example, a bank lending Ksh 100 million with a capital base of Ksh 100 million was required to have a capital base of Ksh 400 million to lend the same amount under the new requirements.

⁹ An institution shall not in Kenya grant to any person or permit to be outstanding any advance, credit facility or give any financial guarantee or incur any other liability on behalf of any person, so that the total value of the advances, credit facilities, financial guarantees and other liabilities in respect of that person at any time exceed twenty five percent of its core capital; provided that the Central Bank may with the written approval of the Minister, authorise a mortgage finance company to permit the total value of the advances, credit facilities, financial guarantees or other liabilities in respect of any such person at any time to exceed 25 per centum of its core capital by such per centum as the Central Bank may in each particular case prescribe". This was amended in accordance to the Basle standards.

2.3.2 Provisions for bad and doubtful debts

A specific provision for loan impairment was established to provide for estimate of credit losses as soon as the recovery of an exposure is identified as doubtful. A general provision for loan impairment is established to cover losses that are judged to be present in the lending portfolio at balance sheet date but which have not been specifically identified as such. This provision is based on the directors' assessment of the latent risk of default known to be present in the portfolio of the bank's advances. All banks are required to provide for specific and general provisions in their computation of balance sheet and profit and loss account.

The level of provisions for loan losses affects the capital ratio of a bank. Periodic additions to loan loss reserves, by means of loan loss provisioning, are charged against current earnings. If a bank sets up loan loss provision, its net income declines and, as a result, retained earnings also decrease. The level of retained earnings affects the capital ratio of a bank directly.

With the increasing level of non-performing loans, the realization of meeting the minimum capital requirements is hampered as banks attend to the large provisions for loans year after year (Table 4).

Table 4: Trends in loans, non-performing loans (NPLs) and provisions (Ksh billions)

	2001	2000	1999	1998	1997	1996	1995	1994
Total loans	272	294	284	268	227	208	181	114
Non-performing loans (NPLs)	109	112	97	83	69	37.9	31.8	25.4
Provisions for NPLs	64	67	54	41	23	17.4	15.9	0
NPLs/Total loans (%)	40	38	34	31	30	18	18	22.3
Provisions/NPLs (%)	59	60	56	49	34	46	50	0

Source: Bank Supervision Division, Central Bank of Kenya annual report 2000

The percentage for provisions/NPLs increased from 34 percent in 1997 to 60 percent in 2000 and stood at 59 percent in 2001. This is expected to worsen unless the economy improves.

2.3.3 Market structure

Kenya's banking sector is characterized by an oligopolistic market structure where 8 out of 49 banking institutions control 69 percent of total assets of the banking sector (Market Intelligence, 2000). Constructing the Hirschman-Herfindall index (HHI) and concentration ratio (CR4) reveals an almost similar market structure for the banking industry. The CR4 shows a market structure of loose oligopoly or monopolistic competition while the HHI shows a market structure of effective competition or monopolistic competition (Table 5).

The same eight (8) banks hold 70 percent of all deposits (Central Bank of Kenya, 2000). This leaves the other banks to compete for the remaining 30 percent deposits or alternatively extricate a proportion of the 70 percent deposits held by the dominant banks, therefore leaving smaller banks to undertake risky ventures to make ends meet. Further, small banks are now being encouraged to merge to meet the minimal capital requirements, exacerbating the oligopolistic market structure that is already there¹⁰.

The banking market structure (Table 5) is tending from loose oligopoly to tight oligopoly using the CR4. The same trend is depicted using the HHI, which shows a movement towards oligopoly. The banking environment is not competitive and the high minimum capital requirement could be hindering the entry of new banks into business.

¹⁰ Examples of banks that have merged include Bullion Bank Ltd and Southern Credit Bank Ltd, Universal and Paramount Bank Ltd, Guilders and Guardian Bank Ltd, Giro and Commerce Bank Ltd, and Habib A. G Zurich and Habib Africa Bank Ltd. The larger banks that have merged include ABN AMRO and Citibank NA.

On one hand, the minimum requirements act as regulatory measures insulating the banking industry while on the other hand they are an hindrance to the development and well being of the banking industry.

Table 5: Structure of Kenya's banks (based on assets and deposits)

Summary statistics

	2002	2001	2000	1999	1998	1997	1996
HHI (assets)	876	856	835	873	963	901	927
HHI (deposits)	926	879	839	902.5	940.1	921.9	947
CR4 (assets) (%)	51.93	51.84	50.32	51.87	54.61	52.85	53.51
CR4 (deposits) (%)	53.95	52.64	50.53	53.25	54.23	53.77	53.93
CR4	Interpretation of the market						
CR4 = 0	Perfect competition						
0 < CR4 < 40	Effective competition or monopolistic competition						
40 <= CR4 < 60	Loose oligopoly or monopolistic competition						
60 <= CR4	Tight oligopoly or dominant firm with a competitive fringe						
90 <= CR4	Effective monopoly (near monopoly) or dominant firm with a comparative fringe						
HHI	Interpretation of market structure						
HHI < 1000	Effective competition or monopolistic competition						
1000 < HHI < 1800	Monopolistic competition or oligopoly						
1800 < HHI	Oligopoly, dominant firm with a competitive fringe, or monopoly						

3. Literature Review

Bank regulators in many countries place great emphasis on the regulation of bank capital. Typically, the mere addition of capital to a bank's balance sheet is assumed to reduce risk. The move to more stringent capital standards (risk or non-risk-based) in banking has led to considerable controversy and scepticism. The impact of such a regulation on the probability of failure of banks is not yet unambiguously resolved. Some argue that higher capital requirements will cause banks simply to invest in more risky assets, and therefore offset, or even more than offset, the desired effect of higher capital. When forced to maintain a higher capital-asset ratio, banks remain with less funds to intermediate. Therefore, they may try to compensate the reduction of their earnings resulting from the constraint by investing in more profitable assets that generally imply higher level of risk.

There are a number of studies that have examined the relationship between capital levels and portfolio risks. Kahane (1977), Koehn and Santomero (1980), and Kim and Santomero (1988), have shown that an increase of capital-asset ratio causes a reshuffling of bank's portfolio from less risky to more risky assets. Moreover, they demonstrate that an increase of the capital constraint may lead to a lower as well as to a higher probability of bank failure, depending on the amount of relative risk aversion shown by the bank. They use the mean-variance framework to show that regulatory capital standards may have the unintended effect of causing utility maximising banks to engage in increasingly risky behaviour.

In contrast, Keeley and Furlong (1989) argue that the mean-variance approach is inappropriate and the results therefore do not hold because it ignores the effect of deposit insurance put option. The authors use a value-maximising model where a bank with publicly traded stock maximises the value of its stock. They show that the bank never increases

portfolio risk as a result of increased capital standards when it pays a flat rate deposit insurance premium. The reason is that the marginal value of the deposit insurance option with respect to asset risk declines as leverage declines. Therefore, increase in capital standards reduces a bank's incentive to take risk. But Gennotee and Pyle (1991) find that even if the impact of deposit insurance is accounted for, increased stringency in capital standards may lead banks to incur greater portfolio risk if banks are not restricted to zero net present value investment.

With regard to risk-based capital regulation, Kim and Santomero (1988) and Kendall and Levonian (1992b) have examined how the design of risk-based capital standards influences bank risk taking. They find that a risk-based rule designed to minimise the probability of bank failure will lead banks to choose high-risk assets. Research work done by Haubrich and Wachtel (1993) suggests that implementation of Basle risk-based capital standards caused significant changes in the composition of bank portfolios, but does not address the impact of these changes on overall portfolio risk.

Empirical studies done on the impact of capital-based regulation to portfolio risk taking behaviour of banks have applied mathematical models using differential and augmented equations. For example, Calem and Rob (1996) set up a model-banking firm and calibrated it using the real parameter values to analyse the impact of bank risk taking of increased capital standards, capital-based premia differentials, and risk-based capital requirements. They find that risk taking tended to increase with capitalisation. Therefore, an increase in capital standards is found to have little impact on risk-taking behaviour among undercapitalised banks, unlike the capitalised banks. Nevertheless, the model suggested that some of the regulatory initiatives could have some unintended consequences.

Another complimentary study using the same models is by Milne and Whalley (2001) in UK banks. In the study, they analyse the impact of bank capital regulation on risk taking incentives of banks. In a dynamic mathematical model with endogenous capital, they show optimal position when a bank is faced with capital regulation to increase its capital. Using the same analysis, they also investigate the relationship between buffer of free capital and incentives for risk. They find that incentives for risk-taking depended upon buffer of free capital, not total level of capital. Further, there is no long-run effect on bank risk-taking behaviour when regulatory capital requirements are imposed.

An attempt has been made by Jacques and Nigro (1994) on US banks and Rime (2000) on Swiss banks to use simultaneous equations in assessing the impact of capital requirements on bank risk taking behaviour. Both studies estimate the simultaneous equations, which recognise the endogeneity problem of both bank capital ratios and risk levels. The equation estimated by Rime (2000) is of the form:

$$\begin{aligned} \text{CAP}_{j,t} &= \alpha_0 + \alpha_1 \text{REG} + \alpha_2 \text{ROA}_{j,t} + \alpha_3 \text{SIZE}_{j,t} + \alpha_4 \text{RISK}_{j,t-1} - \alpha_5 \text{CAP}_{j,t} \\ \text{RISK}_{j,t} &= \beta_0 + \beta_1 \text{REG} + \beta_2 \text{LLOSS}_{j,t} + \beta_3 \text{SIZE}_{j,t} + \beta_4 \text{CAP}_{j,t} - \beta_5 \text{RISK}_{j,t-1} \end{aligned}$$

Where REG represents regulatory pressure, ROA is return on assets, SIZE is the size of the bank in terms of asset concentration, LLOSS is the loan losses, CAP is defined as ratio of capital to total assets while RISK is the risk-weighted adjusted assets to total assets. Nigro (1994) used similar equations but with additional variables to incorporate risk. Nigro finds that risk-based capital standards brought about significant increases in capital and decreases in portfolio risk of well-capitalised banks, while Rime (2000) finds a positive relationship between changes in risk and changes in the ratio of capital to total assets. This implies that higher capital requirements led to higher risk-taking by banks.

Ediz, Michael and Perrauding (1998) use a multivariate panel regression model to evaluate the impact of capital regulation on UK bank behaviour. They specifically hold other influences on capital constant and formulate an equation where changes in capital ratios depend on lagged level of the ratio, plus a range of conditioning variables, which capture the nature of bank's business. They find that capital requirements affect bank behaviour over and above the influence of the banks' own internally generated capital targets. The effect would either be positive or negative depending on the capital level the bank is in when the requirements are imposed. More capitalised banks tend to take more risk takers than the less capitalised ones.

4. Methodology

From the literature above, it appears that there is a relationship between bank capital and portfolio risk. This study adopts the Jacques and Nigro model (1994)¹¹ to analyse the relationship between portfolio risk and bank capital and the impact risk-based capital standards may have had on them. In this model, observed changes in banks' capital and risk levels consist of two components: a discretionary adjustment and a change by factors exogenous to the bank:

$$\Delta CAP_{j,t} = \Delta^d CAP_{j,t} + E_{j,t} \quad (1)$$

$$\Delta RISK_{j,t} = \Delta^d RISK_{j,t} + S_{j,t} \quad (2)$$

Where $\Delta CAP_{j,t}$ and $\Delta RISK_{j,t}$ are the observed changes in capital and risk levels, respectively, for bank j in period t . $\Delta^d CAP_{j,t}$ and $\Delta^d RISK_{j,t}$ represent the discretionary adjustments in capital and risk, and $E_{j,t}$ and $S_{j,t}$ are exogenously determined factors. In any period, banks may not be able to adjust their desired capital and risk levels instantaneously. Therefore, Jacques and Nigro model the discretionary changes in capital and risk using the partial adjustment framework such that:

$$\Delta^d CAP_{j,t} = \alpha(CAP^*_{j,t} - CAP_{j,t-d}) \quad (3)$$

$$\Delta^d RISK_{j,t} = \beta(RISK^*_{j,t} - RISK_{j,t-d}) \quad (4)$$

Where $CAP^*_{j,t}$ and $RISK^*_{j,t}$ are bank j 's target capital and risk levels, respectively. In the partial adjustment framework, the discretionary changes in capital and risk are proportional to the difference between the target level and the level existing in period $t-1$. Substituting equations (3) and (4) into equations (1) and (2), the change in capital and risk can be written as:

$$\Delta CAP_{j,t} = \alpha(CAP^*_{j,t} - CAP_{j,t-1}) + E_{j,t} \quad (5)$$

¹¹ Jacques and Nigro (1994) use the Shrieves and Dahl (1992) model and modify it to incorporate risk-based capital standards.

$$\Delta RISK_{j,t} = \beta(RISK_{j,t}^* - RISK_{j,t-1}) + S_{j,t} \quad (6)$$

Therefore, the observed changes in capital and risk in period t are a function of the target capital and risk levels, the lagged capital and risk levels, and any exogenous factors. The target levels of capital and risk are not observable, but are assumed to depend upon some set of observable variables. These variables include regulatory capital standards or macroeconomic conditions. Specifying variables to explain changes in capital and risk, the model can be written as follows:

$$CAP_{j,t} = \alpha_0 + \alpha_1 SIZE + \alpha_2 BHC_{j,t} + \alpha_3 LEVD_{j,t} + \alpha_4 RISK_{j,t} + \alpha_5 INC_{j,t} + \alpha_6 DEP_{j,t} - \alpha_7 CAP_{j,t-1} + \alpha_8 RPG_{j,t} + \alpha_9 RPL_{j,t} + \varepsilon_{j,t} \quad (7)$$

$$RISK_{j,t} = \beta_0 + \beta_1 SIZE + \beta_2 BHC_{j,t} + \beta_3 LEVD_{j,t} + \beta_4 CAP_{j,t} + \beta_5 DEP_{j,t} - \beta_6 RISK_{j,t-1} - \beta_7 RPG_{j,t} + \beta_8 RPL_{j,t} + T_{j,t} \quad (8)$$

Where $T_{j,t}$ and $\varepsilon_{j,t}$ are disturbance terms.

Definition of Variables

In this study and in reference to Kenyan banks, adjustment in capital and risk are influenced by a number of explanatory variables including: the size of the bank (SIZE), whether the bank is affiliated with a multinational holding company (BHC), the profitability of bank (INC), deposits of the bank (DEP), lagged levels of capital (CAP_{t-1}) and ($RISK_{t-1}$), and degree of regulatory pressure RPG and RPL. These variables are taken from Jaques and Nigro (1994).

The SIZE is measured as the natural log of bank's total assets. This gives us insight as to whether the size of the bank matters in considering the impact of increased capital on portfolio risk. Higher capital requirements may be hypothesised to affect larger banks than smaller banks, as they

like to store up buffer capital. It is expected that risk and capital will increase as assets increase. Apriori expectation is a positive relationship between assets and capital and risk.

BHC is a dummy variable that indicates bank ownership (whether a bank is affiliated with a multibank holding company or not). In the Kenyan banking system, a number of banks are affiliated to multibank holding companies. The banks that are affiliated to multibank holding companies will take the value of one (unity) and zero otherwise. The ownership of a bank has an important implication on the performance of the bank and how the bank adjusts capital when regulatory measures are put in place.

The ratio of income to total assets (INC) in the period t-1 is taken from Jacques and Nigro (1994). This will be used as a proxy for profitability during the period. This is an important variable as there is a proportion of profits that contributes into capital. It is expected that an increase in income will lead to an increase in capital. There is a negative relationship between income and capital reserves.

DEP gives the change in the deposit to asset ratio. This will be used to measure the impact of changes in deposits on capital and risk. It is expected that as deposits increase, banks will invest more in assets leading to increase in capital. As this ratio decreases, capital is expected to increase. A negative relationship is expected.

RPG and RPL

The RPG and RPL are the variables for regulatory pressure. The variables assume that there is no response from banks above the minimum regulatory capital standards. Other authors such as Peltzman (1970), Mingo (1975), Dietrich and James (1983), and McManus and Rosen (1991) use ratios involving a bank's capital level and the regulatory minimum standards as a way of calculating the degree of regulatory

pressure. These methods allow banks above the minimum regulatory standards to respond and have the added benefit of recognising the non-linear relationship between regulatory capital standards and either portfolio risk or changes in capital ratios.

In this study, RPG and RPL signal the degree of regulatory pressure brought about by risk-based capital standards. In order to recognise the non-linear relationship between regulatory standards and the dependent variables, the regulatory pressure variable is defined as the difference between the inverse of bank j 's risk-based capital ratio (RBC_j) and the inverse of the regulatory minimum risk-based ratio of 12 percent.¹² Because banks with risk-based capital ratios above and below the 12% percent threshold may react to the standards differently, this study partitions the regulatory pressure variable into two variables, RPG and RPL. RPL equals $(1/RBC_j - 1/12)$ for all banks whose risk-based capital ratio is less than 12 percent and 0 for all banks with risk-based ratios above the minimum. Banks that did not meet the minimum risk-based capital standard at the end of year 2000 and 2001 are under considerable regulatory pressure to increase their capital ratios. Therefore, RPL should have a positive effect on capital ($\alpha_9 > 0$) or a negative effect on portfolio risk ($\beta_8 < 0$), because banks can meet the minimum risk-based standards by either raising capital or reducing risk-weighted assets.

The second regulatory pressure variable, RPG, equals $(1/RBC_j - 1/12)$ for all banks whose risk-based ratio is greater than or equal to 12 percent, and 0 otherwise. While banks with risk-based capital ratios in excess of

¹² The definition of regulatory pressure recognizes the non-linear relationship between regulatory and portfolio risk or capital. This relationship is shown in this equation: $(1/RBC_j - 1/8)$. Mingo (1975) and Dietrich and James (1983) argue that this equation permits a non-linear response in capital and a non-linear response in risk, as shown by McManus and Rosen (1991). To see this relationship we note that: $(\delta\Delta CAP_i / \delta RBC_j = -\alpha / RBC_j^2; \delta\Delta RISK_i / \alpha RBC_j = -\beta / RBC_j^2)$.

12 percent are not explicitly capital constrained, implementation of risk-based standards may have significantly affected their level of capital or portfolio risk. Since these banks already meet the minimum risk-based standards, they may choose to reduce capital ($\alpha_8 > 0$) or increase their level of portfolio risk ($\beta_7 < 0$). Alternatively, as Hancock and Wilcox (1992), and Baer and McElravey (1993) note, banks may increase their capital position as a buffer against shocks to equity. Because banks must meet the risk-based capital standards on a continuous basis, implementation of risk-based standards may cause these banks to increase their capital ($\alpha_8 < 0$) or reduce risk ($\beta_7 > 0$) as insulation against any uncertainty regarding whether the bank meets the regulatory minimum.

The partitioned definition of regulatory pressure has two advantages over those used in previous research. First, unlike many previous studies, this specification of regulatory pressure allows banks that are not explicitly capital deficient to also respond to introduction of new regulatory standards. Second, partitioning the dataset by whether or not a bank meets the minimum risk-based threshold allows banks that are under-capitalised to respond differently than those banks that are not explicitly under-capitalised. Previous models have tended to assume there is no regulatory response by well-capitalised banks or that their response is the same as that of under-capitalised institutions.

The leverage ratio is also included as a variable to explain adjustment in capital and risk. Baer and McElravey (1993) note that adoption of risk-based capital standards came with changes in the calculation of the leverage ratio. Since Kenyan banks do not depend so much on borrowed funds, this variable may not be important, even though there is an empirical question.

RISK_{j,t} and CAP_{j,t}

The risk and capital variables are included to recognise the possible simultaneous relationship between capital and risk. Empirical estimation of equations (7) and (8) require measures of both bank capital and portfolio risk. There are two definitions of a banks' capital: the ratio of capital to total assets and the ratio of capital to risk-weighted assets. Shrieves and Dahl (1992) used the first definition. The second definition has become more popular since the introduction of risk-weighted capital standards and has been used by Jacques and Nigro (1994), Aggarwal and Jacques (1997) and Ediz, Michael and Perrauding (1998). This study uses the second ratio too.

Measurement and definition of banks' risk is quite problematic and the literature suggests a number of alternatives, all of which are subject to some criticism. Shrieves and Dahl (1992) use the ratio of risk-weighted assets to total assets. This is subsequently used by Jacques and Nigro (1994) and Aggarwal and Jacques (1997). The rationale for using this measure is that portfolio risk is primarily determined by allocation of assets across different risk categories. A clear advantage of risk-weighted assets is that it reflects banks' decisions on risk-taking with appropriate timeliness. The reliance on this indicator, however, supposes that the risk weightings correctly reflect the economic risk of the different asset categories.

Other studies, such as those by Berger (1995), Berger and Udell (1994), and Shrieves and Dahl (1992), use non-performing loans because the measure is less subject to criticism of being a lagging indicator than are other measures. Therefore, non-performing loans as a percentage of total assets (NONP) is used as an alternative measure of portfolio risk. The study uses both methods of risk-weighted assets/total asset and non-performing loans to measure risk.

5. Data and Empirical Estimation

Effective June 1999, banks were required to hold 12 percent of their risk-weighted assets in the form of capital. This study covers the first three years (2000-2002) when risk-based capital standards were in effect (after the Banking Act was amended in 2000), using annual report statements of 51 Kenyan banks. The model is estimated using 3SLS procedure, which recognises the endogeneity of both bank capital ratios and risk levels in a simultaneous equation framework. The 3SLS method makes use of all the information in the model structure to estimate the variables in the equations. As such, the method may asymptotically be more efficient than the limited-information single equation methods (Ghosh, 1991).

The hypotheses being tested are:

1. High capital requirements lead to high-risk portfolio.
2. Capital risk-based asset ratio is positively related to risk of portfolio.

Estimation results of equation 7 and 8, without RPG and RPL, give the determinants of capital in Kenya. The results are presented in Table 6 and 7.

Table 6: 3SLS estimation (CAP is the dependent variable)

Variable	Coefficient	Asymptotic t-ratio
LSIZE	0.98177(05)	0.2126
BHC	0.51749(02)	0.2847
LEVD	-0.96886(01)	-5.911
C_RWART	0.31045	2.677
INC	-0.28126	-1.872
DEP	-0.42966	-9.097
L_CAP	-0.72075	-11.41
CONSTANT	0.46966	10.47

Table 6 gives the determinants of capital. Size of the bank and multi-holding bank company do not significantly determine the level of capital a bank holds. The level of capital is determined by level of income

Table 7: 3SLS estimation (RISK is the dependent variable)

Variable	Coefficient	Asymptotic t-ratio
LSIZE	0.12598(02)	1.833
BHC	-0.66705(01)	-2.471
LEVD	-0.16611(02)	-0.6897
C_CAP	-0.11764	-1.9205
DEP	-0.12210	-1.992
L_RWART	-0.34004	-6.013
CONSTANT	0.30706	4.727

generated from banking activities, deposit base, changes in risk levels, and previous levels of capital amount borrowed from other banks. The coefficients are significant as indicated by the asymptotic t-ratio.

The determinants of risk levels are size, multi-holding bank company, deposit base and changes in risk. The amount that a bank borrows from other banks does not significantly determine risk. This may be explained by the fact that very few banks in Kenya depend on borrowed funds. The few that borrow use the funds to increase capital, as this is significant in the first equation (Table 6). Correlation matrices were also done (see appendix for results). The results show absence of serial correlation.

To measure regulatory impact, RPG and RPL are included in the equations. The results are presented in Table 8 and 9 while a summary of the statistics is presented in Table 10.

Table 8: 3SLS equation 1 (CAP is the dependent variable)

Variable	Measure of risk (nonp/tassets)		Rwa/tassets	
	Coefficients	Asymptotic T/ratio	Coefficients	Asymptotic T/ratio
Size	0.73800(03)	1.455	0.82841(03)	1.674
Multinational bank holding	-0.19495(01)	-1.124	-0.10635(01)	-0.6251
Leverage	-0.89334(01)	-5.736	-0.89797(01)	-5.911
Change in risk	0.20039	3.212	0.14289	1.601
Income	-0.32518	-2.332	-0.33885	-2.360
Deposits	-0.44791	-9.841	-0.42060	-9.669
Capital _{t-1}	-0.77649	-11.28	-0.80724	-11.93
Regulatory pressure G	-1.2201	-2.745	-1.2838	-2.968
Regulatory pressure L	-0.17890	-0.8719	0.16159	0.9430
Constant	0.45806	9.940	0.42799	9.788

Table 9: 3SLS equation 2 (RISK is the dependent variable)

Variable	Measure of risk (nonp/tassets)		Rwa/tassets	
	Coefficients	Asymptotic T/ratio	Coefficients	Asymptotic T/ratio
Size	-0.10152(02)	-1.089	0.17968(03)	0.2380
Multinational bank holding	-0.40446(01)	-1.236	-0.60293(01)	-2.251
Leverage	0.11923(01)	0.3926	-0.4348(01)	-1.660
Change in capital	0.14805	0.9491	-0.40932	-2.868
Deposit	-0.20505	-0.2387	-0.31368	-3.990
Risk _{t-1}	-0.46461	-8.008	-0.49818	-7.166
Regulatory pressure G	2.9436	3.384	2.6900	3.567
Regulatory pressure L	1.5585	4.928	0.13344	0.5101
Constant	0.19243	1.955	0.66301	5.771

The results of estimating equations (7) and (8), using the various measures of portfolio risk, are presented in Tables 8 and 9. Considering equation 7, the results in Table 8 indicate that size of a bank does not significantly affect changes in capital when the measure of risk used is non-performing loans. However, size matters when the *Rwart* is used as a measure of risk. Multinational holding does not significantly affect changes in capital, implying ownership does not affect changes in capital. Leverage significantly affects changes in capital with a negative coefficient. Increase in capital leads to a reduction in leverage. Increase in capital also leads to increase in changes in risk levels. Income, deposits and previous years' capital have a significant negative impact on capital. This implies that increase in capital has a negative effect on income of the banks, deposits and previous years' capital. This is expected, as increasing capital leads to depletion of bank's profits, deposit/asset ratio and previous years' capital. The *RPG* is significant for the capital equation while the *RPL* is insignificant. Using the two measures of risk yield similar results except for the case of size.

Regarding the risk equation 8, the measure of risk *Rwart* gives better results than the measure of risk using non-performing loans. Most of the findings when non-performing loans are used as a measure of risk are insignificant. Size does not significantly affect changes in risk. Multinational bank holding significantly affects changes in risk, implying that banks that are internationally held engage in risk business as compared to banks that are not held internationally. Deposit and previous years' risk affect changes in risk levels. *RPG* also affects changes in risk positively and significantly and *RPL* is not significant.

In general, and as a combination of the two equations, both size and multi-bank holding are insignificant, implying other factors other than these ones influence the way banks react to changes in prudential regulations in Kenya. The parameter estimates on the lagged levels of capital and risk in table 8 and 9 range between 0.77 and 0.46, therefore

implying a fairly quick adjustment of both risk and capital to a bank's desired levels. This is contrary to a study carried out in the United States by Jaques and Nigro (1994), which found a slow adjustment in their banks. This parameter estimates ranged between 0.248 and 0.305.

The income-asset ratio variable yielded a negative coefficient. This is expected as an increase in capital involves a shift of some of income (profits) to reserves. DEP has a negative coefficient suggesting that banks with more stable deposit bases tended to hold less capital.

Leverage is found to be significant in both equations from table 8 and 9. This was not expected as banks in Kenya have very small proportions of their funds borrowed. Of primary importance in this study is what impact risk-based capital standards has had on changes in bank capital and portfolio risk.

First, banks that were not explicitly constrained by risk-based capital (42 banks out of 51, table 3) responded to implementation of the standards by increasing their capital asset ratios and reducing their portfolio risk. This is evident from tables 8 and 9, where the parameter estimate for regulatory pressure (RPG) is significant in both tables and equals -1.2838 and 2.69, respectively, using Rwart as a measure of risk. These findings suggest that risk-based capital was effective in raising capital and is consistent with the theory that well-capitalized banks increased capital to provide a buffer against shocks to equity. Capital increased by 6 basis points. At the same time, banks that have met the minimum standards have reduced their portfolio risks in Kenya by 13 basis points¹³. This is contrary to studies done previously by Koehn

¹³ This may be illustrated by the equation formula applied using the median bank: $RPG = (1/RBC - 1/12)$ From table 10 we have the median in 2002 as 28.95%. $RPG = (1/28.95 - 1/12)$ which gives -0.048. This is multiplied by the coefficient (-1.2838 * -0.048) 0.06 implying increase in the capital ratio by 6 basis points when risk-based capital requirements were implemented. In the case of risk equation the positive coefficient of 2.69 * -0.048 gives the -0.13, a decrease in the risk by 13 basis points.

Table 10: Summary statistics for sample banks

Variable	Banks with RBC ratio less than 12%	Banks with RBC ratio more than 12%
Number of banks	9	42
Median RBC		
2002 (%)	12.0	29.0
2001 (%)	6.7	28.5
2000 9%)	8.0	28.7
Median income		
-asset ratio		
2002 (%)	3.6	7.9
2001 (%)	10.1	8.3
2000 (%)	14.5	15.3
Equity and Assets		
Median equity-asset		
ratio (K/TA)		
2002 (%)	6.8	16.0
2001 (%)	5.9	16.3
2000 (%)	7.9	17.1
% change equity		
capital	2001	199
total		
assets (TA)		
2002	-18.7	6.1
2001	-34.0	5.2
2000	-11.4	5.9
All banks total		
loans (% change)		
2002	-8.1	
2001	3.4	
2000	5.6	

and Santomero (1980), who argue that increase in capital requirement leads to increase in portfolio risk.

However, capital requirements do not have a significant impact on banks that do not meet the minimum requirements. There were nine (9) of such banks in Kenya in 2002. The parameter estimate of RPL is insignificant in both equations of capital and risk. The signs of the coefficients may give us indications on which direction this would affect these banks. A negative coefficient in Table 8 suggests that there would be decrease in capital and a positive coefficient in the risk equation implies an increase in the risk. This is further elaborated in Table 10. Whereas the percentage change in total assets shows a declining trend from -11.4 to -34, implying decrease in risks in years 2000 and 2001,

year 2002 shows a slight increase in risk. The increase in capital may be explained by a decrease in total assets and portfolio risk. This is complemented by the general declining trend of total loans given out during the period 2000-2002 (Table 4 and Table 10). Therefore, we can say that there has been more effective increase of capital, instead of cosmetic adjustment.

Jaques and Nigro (1994) find the parameter estimate of RPL insignificant when they use the risk-weighted assets measure but significant when they use non-performing loans. This is contrary to the findings of this study. RPL is only found to be significant in the risk equation and when non-performing loans are used as a measure of risk. This may be considered as an anomaly because most of the other variables are insignificant. Another study by Rime Bertrand (2000) on Swiss banks finds that regulatory pressures for under-capitalised banks have a positive and significant impact on capital but no significant impact on risk. While in these two cases, the under-capitalised banks increase their capital by greater basis points than the capitalized banks, in Kenya it is the other way round. Capitalized banks increase capital by larger percentage points than the under-capitalised banks. Most banks that fall under the category of under-capitalization are the ones that eventually collapse.

6. Conclusion

The results of this study affirm that regulatory constraints affect bank behaviour particularly for the capitalized banks. Capital requirements cause banks to increase their capital. The results suggest that risk-based capital standards bring about significant increases in capital and decreases in portfolio risk of well-capitalized banks. Risk-based capital for constrained banks show increases in the equity-asset ratio, but these increases appear to be primarily the result of decreasing portfolio risk resulting from reduction in total assets. Table 10 shows the trend in percentage changes in asset for the capitalised and under-capitalised banks.

While this may be deemed as good for the banking sector, it poses serious questions and considerations to be looked into. First, the movement of assets shows a declining trend. This may result from movement of investment in assets, which attract high-risk weights to investments, which attract low risk weights according to Basle Accord capital requirements. That is, movement from corporate loan investment to government Treasury bills investment. This is in line with previous experience in the US where implementation of risk-based capital standards immediately resulted in massive shift of assets from high-risk assets to low risk assets (Ediz, Michael, and Perrauding, 1998). This poses a policy concern as banks will be squeezing the already thin credit market and could eventually lead to a credit crunch.

Secondly, change in assets may actually be as a result of “cosmetic” adjustment brought about by financial innovation (Jones, 2000). This would have the image of a bank that is adequately capitalized but in the actual sense it is under-capitalized. It poses a danger to the entire banking system and chances of systemic failure if a large number of banks are involved. The shortcoming here comes particularly from

the set ways given by the Basle Accord in computing the risk-based capital standards. There have been suggestions of moving from the buckets approach to letting banks set the risk measures in their banks.

Finally, while the overall level of portfolio risk in constrained banks decreased, implementation of risk-based standards appear to have had some effects on the portfolio risk of these banks. Non-performing loans, which are a measure of risk, seem to be large on the constrained banks than on non-constrained banks. This implies that these banks should actually be the ones increasing their capital commensurate to their risk levels. They also ought to be investigated and penalised. High capital requirements do not by themselves ensure that banks are adequately capitalized. What matters is the asset quality that a particular bank holds. Therefore, prudential capital requirements should not be set so high, such that they enhance risky behaviour in banks. Rather, they should be set low or at a fair enough level to ensure asset quality and non-risky tendencies.

The Minister of Finance in the 2003/4 budget reduced the minimum capital requirements to Ksh 250 million down from 450 million. This way, more banks may be able to meet the requirement. Further, the market structure depicted by the banking sector is one of oligopoly or monopolistic competition. With reasonable minimum capital requirement, more banks can enter into the business, therefore offering a competitive financial system. Since the banks that had initially met the requirements had effective increase in capital (Table 10), it is a fair assumption that reduction in minimum capital requirements would lead to effective increase in capital and a more competitive banking system.

Concerning computation of risk weights, these three methods are suggested as a way forward and as an alternative to the buckets approach. These are:

1. Internal ratings-based approach (IRBA): Banks would assign a rating to each borrower based on their rating models and estimate the probability of default (PD) for each of the rating they define. Regulators would then define a function to convert this vector of PDs into the minimum required capital
2. Full models approach (FMA). This extends to credit risk and possibly other risks. Banks would need to develop a system to estimate, either independently or jointly, the probability density functions for losses in all of the bank's business stemming from each of the risk categories. The regulator would then set the capital requirements so that a given soundness objective, for example a minimum solvency standard, is met.
3. "Pre – commitment" approach (PCA): This approach may initially be designed as an alternative to the internal models approach for market risks (Kupiec and O'Brien, 1997). Under the PCA, a bank would pre-commit to a maximum loss exposure over a period of time and the capital charge would be defined as a function of that loss exposure. Should the bank incur a larger loss, it would be subject to a penalty, which could take the form of monetary fines, punitive capital charges or other restrictions on future trading activities.

This study provides directions on further areas of research. Availability of more data will in future provide opportunity to run the regressions and get better estimates and trends of impact of capital requirements on capital and risk. It is necessary to also look at the impact of capital requirements on both capital to asset ratio and risk-weighted asset ratio and see how banks are behaving. These two ratios are positively related in the US and UK. It is worth investigating the relationship so as to know whether the ratios are moving in the same direction or not. If they are not, then there is a problem in regulation.

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APPENDICES

Appendix 1: International risk-based capital standards

Basle Accord I

In the early 1980s, concerns about international banks' (G10 countries) financial health mounted and complaints of unfair competition increased. The Basle Committee on Banking Supervision started considering proposals to set capital standards for these banks. An agreement was reached in July 1988, which was phased in most of the banks in the G10 by January 1993. This was known as the Basle Accord 1. It comprised of two pillars: Pillar 1 providing for capital requirement and pillar II providing for supervision. The Accord laid down 25 core principles that banks would adopt for effective banking supervision (Appendix 3). Core principle number six deals specifically with capital requirements (Appendix 4).

The 1988 Accord explicitly considered only credit risk. It required international banks from the G10 countries to hold a minimum total capital equal to 8% of risk-adjusted assets, with at least half of this met by tier 1 capital (equity capital and disclosed reserves). Tier 2 capital could include, among other instruments, hybrid debt capital instruments. Risk-adjusted assets were defined as the sum of the risk adjusted assets on and off balance sheet. On-balance sheet assets were assigned to one of four risk buckets (0%, 20%, 50% and 100%) and then weighted by the bucket's weight. Off-balance sheet contingent contracts, such as letters of credit, loan commitments and derivative instruments, which are traded over the counter needed to be first converted to a credit equivalent and then multiplied by the appropriated risk weights.

In 1996, the Accord was reviewed and changes made to account for financial innovation and market risks. The amendment required that banks set aside capital to cover risk losses from movements in market prices¹⁴. It also introduced a tier 3 capital to cover market risks, and allowed bank to count subordinated debt (with an original maturity of at least two years) in this tier.

The main novelty of this amendment relates to the fact that it allows banks to use, as an alternative to the standard approach, their internal models to determine the required capital charges for market risk. The use of internal models allows the bank to estimate value-at-risk (VaR) in its trading account, that is the maximum loss that the portfolio is likely to experience over a given holding period with a certain probability. The market risk capital requirement is then set based on the VaR estimate.

Achievement of Basle Accord 1

The Committee believes the 1988 Accord and subsequent additions and amendments have helped to strengthen the soundness and stability of the international banking system and have enhanced competitive equality among internationally active banks. The Accord was followed by substantial increases,

¹⁴ The market risks considered in the amendment are (a) those pertaining to interest rate-related instruments and equities in the trading book and (b) foreign exchange risk and commodities throughout the bank.

primarily during the transitional period between 1988-1992, in the capital ratios of nearly all internationally active banks. This trend has generally continued particularly since pressure from the market on banks to maintain strong capital ratios has increased. The widespread adoption of the Accord in many countries has contributed to achievement of the objective of competitive equality.

Limitations of Basle Accord 1

One possible and undesirable impact on bank behaviour of risk-weighted capital requirements is that excessive differentials in the weights applied to different categories of assets might induce banks to substitute away from highly risk-weighted assets. For example, in the early 1990s after US had adopted the Basle requirements, banks shifted sharply from corporate lending to investing in government securities, and many researchers have attributed this shift to the post-Basle Accord system of capital requirements.

Secondly, the broad classification of risk weights from 0-100% leads to excessive capital allocation with regard to some customers because the credit risk profiles are not analysed with a view to obtaining the accurate risk level for each category of exposure (Central Bank of Kenya, 2001).

Thirdly, the Accord does not provide proper incentives for risk mitigation techniques. For example, there is only minimal capital relief for collateral, and in some cases, the Accord's structure discourages the use of credit risk mitigation techniques.

Basle Accord II

The Basle Accord II introduces a third pillar, which is market discipline. Market discipline encourages high disclosure standards and enhances the role of market participants in encouraging banks to hold adequate capital. While the 1988 Accord provided essentially only one option for measuring credit risks, the new Accord offers a spectrum of approaches from simple to advanced methodologies for the measurement of both credit risk and other risk for determining capital levels. It provides a flexible structure in which banks, subject to supervisory review, will adopt approaches that best fit their level of sophistication and their risk profile. The framework also deliberately builds in rewards for stronger and more accurate risk measurement, more risk sensitive approach to credit risk mitigation and securitisation. This is still at the proposal stage and is due for implementation by year 2005.

Appendix 2: Regulation on capital adequacy (CBK/RG/01)

Prudential Regulations

PART I: PRELIMINARY

1. **Short Title:** Capital Adequacy Regulation
2. **Authorisation:** This regulation is issued in accordance with Section 18 of the Banking Act which authorises Central Bank of Kenya to prescribe the minimum ratios which shall be maintained by institutions as between their core capital and total capital on the one hand and their risk-weighted assets and off-balance sheet items on the other and for that purpose, may also determine the method of classifying and evaluating assets.
3. **Application:** All institutions, including banks, non-bank financial institutions and mortgage finance companies licensed to conduct banking, mortgage finance or financial institutions business in Kenya under the Banking Act.
4. **Definitions:** Terms used within this regulation are as defined in the Banking Act and as further defined below, or as reasonably implied by contextual usage:
 - 4.1 **“Core Capital” (Tier 1):** Is as defined in section 2(1) of the Banking Act, namely permanent shareholders equity (issued and fully paid-up ordinary shares and perpetual non-cumulative preference shares) plus disclosed reserves (additional share premium plus retained earnings plus 50% of profits after tax plus minority interest in consolidated subsidiaries) less intangible assets (goodwill and equity funded through revaluation reserves).

With respect to profits after tax for the current year to date, 50% of the profits will be allowed as part of core capital. The institution must have made adequate provisions for bad and doubtful debts, depreciation and other expenses. In arriving at the applicable figure, any proposed or interim dividends have to be taken into account.

“Supplementary Capital”(Tier 2): Includes 25% of asset revaluation reserves which has received prior Central Bank’s approval, subordinated debt, hybrid (debt equity) capital instruments, general loan loss provisions, or any other capital instrument approved by Central Bank. Supplementary capital must not exceed core capital.

- 4.3 **“Subordinated debt”:** Includes unsecured subordinated debt instrument (debt equity or loan capital) having an original maturity of at least five years. It also includes limited life redeemable preference shares. During the last 5 years to maturity, a cumulative discount (amortization) factor of 20% per annum will be applied to reflect the diminishing value of these instruments as a continuing source of strength. Since subordinated debt is not normally available to participate in losses, the amount included for capital adequacy calculations is limited to 50% of core capital.
- 4.4 **“Total Assets”:** The total net assets reported should agree to equivalent figures in CBK BS(M).

4.5 **“Total Capital”**: Means core capital plus supplementary capital.

PARTII: STATEMENT OF POLICY

1. **Purpose:** This regulation is intended to ensure that each institution maintains a level of capital which (i) is adequate to protect its depositors and creditors; (ii) is commensurate with the risk associated with activities and profile of the institution; and (iii) promotes public confidence in the institution.
2. **Responsibility:** The board of directors of each institution shall be responsible for establishing and maintaining at all times an adequate level of capital. The capital standards herein are the minimum acceptable for institutions, which are fundamentally sound, well managed, and which have no material financial or operational weaknesses. Higher capital ratios may be required for individual institutions based on circumstances listed under Part III, Section 2 below.

PART III: SPECIFIC REQUIREMENTS

1. Minimum Capital Requirements

1.1 Minimum Ratios

Unless higher minimum ratio has been set by Central Bank of Kenya for an individual institution based on criteria set under Part III, section 2 below, every institution shall, at all times, maintain:

- (a) a core capital of not less than eight per cent of total risk-adjusted assets plus risk-adjusted off balance sheet items;
- (b) a core capital of not less than eight per cent of its total deposit liabilities;
- (c) a total capital of not less than twelve per cent of its total risk-adjusted assets plus risk-adjusted off-balance sheet items. The above ratios are subject to review and may be changed from time to time.

1.2 Minimum Core Capital

Minimum core capital of the amounts stated below must be achieved by the compliance dates indicated:

Compliance date	Banks and mortgage finance companies (Ksh millions)	Financial institutions (Ksh millions)
<i>31st Dec. 1999</i>	200	150.0
<i>31st Dec. 2000</i>	250	187.5
<i>31st Dec. 2001</i>	300	225.0
<i>31st Dec. 2002</i>	350	262.5
<i>31st Dec. 2003</i>	400	300.0
<i>31st Dec. 2004</i>	450	337.5
<i>31st Dec. 2005</i>	500	375.0

The minimum core capital will be monitored on a continuous basis by the Central Bank, will apply to all institutions and may be reviewed from time to time.

2. **Criteria for Higher Minimum Capital Ratios**

The Central Bank may require higher minimum capital ratios for an individual institution based on, but not limited to, any one or more of the following criteria:

- (a) institution has, or is expected to have, losses resulting in a capital deficiency;
- (b) institution has significant exposure to risk, whether credit, concentrations of credit, market, interest rate, liquidity, operational, or from other non-traditional activities;
- (c) institution has a high, or particularly severe, volume of poor quality assets;
- (d) institution is growing rapidly, either internally or through acquisitions;
- (e) institution may be adversely affected by the activities or condition of its holding company, associates or subsidiaries; or
- (f) institution has deficiencies in ownership or management (i.e. shareholding structure; composition or qualifications of directors or senior officers; risk management policies and procedures).

3. **Risk Weights**

Risk-based approach to capital adequacy measurement applies to both on and off balance sheet items. The focus of this framework is credit risk, namely the potential risk of counter party default. Apart from the credit risk, there are other significant risks, which institutions should guard against. In particular, interest rate risk, concentration risk and even underlying collateral risk. Institutions must assess and provide for these risks in the evaluation of their respective capital adequacy.

3.1. **On-Balance Sheet Items**

This framework uses three weights only, i. e. 0%, 20%, and 100%. Credit exposures are risk-weighted and classified into the three categories according to their relative risk.

(a) **Zero Weight**

The on-balance sheet assets which have been assigned a 0% weight include: cash (both domestic and foreign), balances with the Central Bank of Kenya, claims on the Kenya Government by way of investments in Treasury bills, Treasury bonds and promissory notes.

(b) **20% Weight**

The 20 % weight has been assigned to deposits and balances due from commercial banks, financial institutions, mortgage finance and building societies in Kenya and abroad, loans and advances guaranteed by the Government of Kenya and interest receivable on placements.

(c) **100% Weight**

The on-balance sheet items assigned the 100% weight are all other claims on the public and private sector which are not covered under the other categories, including deposits in institutions under statutory management, premises and other fixed assets, loans and advances, bills discounted and all other assets of the institution.

3.2 Off-Balance Sheet Items

The credit conversion factors listed below shall apply for various categories of off-balance-sheet items and shall be multiplied by the weights applicable to the corresponding on-balance sheet asset category. The Central Bank will, in its discretion, allocate particular instruments into the categories below according to the characteristics of the instrument within the Kenyan context.

(a) **Zero Weight**

Short-term commitments with an original maturity of up to one year and cancellable unconditionally at any time, e.g. bills for collection and any other contingent liability fully secured by cash.

(b) **20% Weight**

Short-term self-liquidating trade related contingencies arising from the movement of goods, e.g. documentary credit collateralised by underlying shipments.

(c) **50% Weight**

Certain transactions related to contingent items and other commitments with an original maturity exceeding one year, e.g. performance bonds.

(d) **100% Weight**

Direct credit substitutes, sale and repurchase agreements, asset sales with recourse where the credit risk remains with the institution, forward asset purchases, forward deposits and partly paid shares and securities, e.g:

- letter of credit serving as financial guarantee for loans
- acceptances
- forward exchange contracts
- letters of guarantee

4. Plan to Comply with Minimum Capital Standards

Any institution which fails to comply with the minimum ratios set forth in Part III (1) above, or with any higher minimum ratio under Part III (2) set by the Central Bank shall submit to the Central Bank a detailed plan describing the means and timetable by which the institution will achieve and thereafter comply with the required minimum capital ratios. Such plan must be submitted within 60 days of written request from the Central Bank unless a shorter time is specified due to the severity of the capital deficiency.

5. Reports to Central Bank

Each institution shall submit to Central Bank of Kenya the return on Capital to Risk Weighted Assets, Form CBK/PR8, every end of the month to be received by the 15th of the following month. The Central Bank may require such other information as is necessary to evaluate compliance with this regulation and may call for adjustments to capital where necessary.

PART IV: CORRECTIVE MEASURES

1. **Remedial measures:** If an institution fails to comply with this regulation, the Central Bank may pursue any or all corrective actions as provided under Sections 33, 34 and 55 of the Banking Act.
2. **Administrative sanctions:** In addition to the use of corrective actions noted in 1 above, the Central Bank may pursue any or all of the following administrative sanctions against an institution, its board of directors, or its officers:
 - (a) Prohibition from declaring or paying dividends;
 - (b) Prohibition from establishing new branches;
 - (c) Prohibition from engaging in new activities or from expanding existing activities;
 - (d) Suspension of lending, investment, and credit extension operations;
 - (e) Prohibition from acquiring, through purchase or lease, additional fixed assets;
 - (f) Prohibition from accepting further deposits or other liabilities for borrowed money;
 - (g) Prohibition from declaring or paying bonuses, salary incentives severance packages, management fees or other discretionary, compensation to directors or officers.

PART V: EFFECTIVE DATE

1. **Effective date:** The effective date of this regulation shall be 30th June 2000.
2. **Superseding:** This regulation supersedes and replaces Guidelines on Capital Adequacy (CBK/PC/04) earlier issued.

CAPITAL TO RISK-WEIGHTED ASSETES (FORM CBK/PR8)

INSTITUTION:

PERIOD:

1. CAPITAL COMPONENTS	AMOUNT (KSH '000)
<p>1.1 CORE CAPITAL (Tier 1)</p> <p>1.1.1 Paid-up ordinary share capital?Assigned capital</p> <p>1.1.2 Non-repayable share premium</p> <p>1.1.3 General reserves</p> <p>1.1.4 Revenue reserves (retained earnings)</p> <p>1.1.5 Net after tax profits, current year to-date (50% only)</p> <p>1.1.6 Minority interest in subsidiaries</p> <p>1.1.7 Non-cumulative irredeemable preference shares</p> <p>1.1.8 Other reserves</p> <p>1.1.9 Sub-total (1.1.1 to 1.1.8)</p> <p>LESS DEDUCTIONS</p> <p>1.1.11 Investments in unconsolidated subsidiary institutions</p> <p>1.1.12 Goodwill</p> <p>1.1.13 Investments in capital instruments of other institutions</p> <p>1.1.14 Other intangible assets</p> <p>1.1.15 Total deductions (1.1.11 to 1.1.14)</p> <p>1.1.16 CORE CAPITAL (1.1.9 LESS 1.1.15)</p> <p>1.2 SUPPLEMENTARY CAPITAL (Tier 2)</p> <p>1.2.1 Revaluation reserves (25%)</p> <p>1.2.2 Cumulative irredeemable preference shares</p> <p>1.2.3 Convertible notes and similar capital investments</p> <p>1.2.4 Perpetual subordinated debt</p> <p>1.2.5 Limited life redeemable preference shares</p> <p>1.2.6 Term subordinated debt</p> <p>1.2.7 General loan loss provisions</p> <p>1.2.8 Total supplementary capital (1.2.1 to 1.2.7)</p> <p>1.2.9 Supplementary capital/Core capital (%)</p> <p>1.3 TOTAL CAPITAL (1.1.16 + 1.2.8)</p> <p>1.4 Total shareholders' funds (Per CBK BSM)</p> <p>1.5 Difference (1.4 less 1.3)*</p>	
<p><i>* A reconciliation for the difference to be attached on a separate sheet.</i></p>	

2. ON-BALANCE SHEET ASSETS (FORM CBK PR8)

	Amount (Ksh '000)	Weight	Weighted asset vake (Ksh '000)
2.1 Cash (including foreign notes and coins)		0	
2.2 Balances with Central Bank of Kenya		0	
2.3 Kenya Government Treasury bills		0	
2.4 Treasury bonds		0	
2.5 Government promissory notes		0	
2.6 Lending fully secured by cash		0	
2.7 Deposits and balances due from local institutions		0.2	
2.8 Deposits and balances due from foreign institutions		0.2	
2.9 Interest receivable on placements		0.2	
2.10 Advances guaranteed by the Government of Kenya		0.2	
2.11 Other loans and advances (net of provisions)		1.0	
2.12 Other investments		1.0	
2.13 Fixed assets (net of depreciation)		1.0	
2.14 Amounts due from group companies		1.0	
2.15 Other assets		1.0	
2.16 TOTAL (2.1 TO 2.15)			
2.17 Total assets (Per CBK BSM)			
2.18 Difference (2.17 less 2.16)*			
<i>* A reconciliation for the difference to be attached on a separate sheet.</i>			

3. OFF-BALANCE SHEET ASSETS

	Amount Sh. '000	Weight	Weighted asset vaku (sh. '000)
3.1 Short-term commitments, e.g bills for collections		0	
3.2 Contingent liabilities secured by cash		0	
3.3 Short-term self liquidating trade related contingencies		0.2	
3.4 Transaction related e.g. performance bond		0.5	
3.5 Direct credit substitutes, e.g. sale and repurchase agreements, acceptance, letters of guarantees and forward exchange contracts.		1.0	
3.6 TOTAL (3.1 TO 3.5)		0	
3.7 Total off-balance sheet items as per CBK/BSM			
3.8 Difference (3.6 less 3.7)*			

4. CAPITAL RATIO CALCULATIONS

4.1 Core capital as per 1.1.16 above		
4.2 Total capital as per 1.3 above)		
4.3 Total weighted asset value of on-balance sheet items as per 2.16 above		
4.4 Total weighted asset value of off-balance sheet items as per 3.6 above		
4.5 Overall weighted assets (4.3 + 4.4)		
4.6 Total deposits		
4.7 Core capital to risk assets ratio (4.1/4.5)%		
4.8 Minimum core capital to risk assets requirement		8%
4.9 Excess (deficiency) (4.7 less 4.8)		
5.0 Core capital to deposits requirement		
5.1 Minimum core capital to deposits requirement		8%
5.2 Excess (deficiency) (5.0 less 5.1)		
5.3 Total capital to risk assets ratio (4.2/4.5)%		
5.4 Minimum total capital to risk assets requirement		12%
5.5 Excess (deficiency) (5.3 less 5.4)		

* Reconciliation for the difference to be attached on a separate sheet

Name: Signature:

COMPLETION INSTRUCTIONS

CAPITAL TO RISK-WEIGHTED ASSETS (FORM CBK/PR8)

A: CORE CAPITAL

1.1.1 Paid-up ordinary share capital/Assigned Capital: This is the nominal value of the ordinary shares issued and fully paid, or capital assigned to Kenyan branch(es).

1.1.2 Non-repayable share premium

This is the difference between the nominal price and purchase price of shares, which is not refundable.

1.1.3 General reserves

All reserves which are not for any specific purpose but should not include reserves arising from any statutory requirements.

1.1.4 Revenue reserves (retained earnings)

These are retained earnings from the profits of the prior years not yet appropriated.

1.1.5 Net after tax profits

In this line enter 50% after tax profits for the current year to date. The institution must have made adequate provisions for bad and doubtful debts, depreciation and other expenses. In arriving at the applicable figure, any proposed or interim dividends have to be taken into account.

If losses, enter full amount.

1.1.6 Minority interest in subsidiaries

Minority interest means the claim of the minority shareholders in a subsidiary in the group accounts.

1.1.7 Non-cumulative irredeemable preference shares

These are shares that have a standing claim on the company every year, but the claim is not carried forward in event of not being paid and they are not redeemable.

1.1.8 Other reserves

Enter in this line all other reserves, which have not been included above.

1.1.9 Sub-total

Enter in this line the sub-total of all the items from 1.1.1 to 1.1.8.

B: DEDUCTIONS FROM CORE CAPITAL

1.1.11 Investments in unconsolidated subsidiary institutions

Investments in unconsolidated subsidiary institutions means those investments that have not been taken care of in the group accounts.

1.1.12 Goodwill

This is the difference between the value of the business as a whole and the aggregate of the fair values of its separable net assets at the time of acquisition or sale.

1.1.13 Investments in capital instruments of other institutions

Capital instruments of other institutions are long-term holdings in other banking institutions, e.g. equity shares.

1.1.14 Other intangible assets

These are assets without physical existence, e.g. patents, copyrights, formulae, trademarks, franchise, etc.

1.1.15 Total deductions

Enter in this line the sub-total of all the items from 1.1.11 to 1.1.14.

1.1.16 Core Capital

Core capital is the deduction of line 1.1.15 from line 1.1.9.

C: SUPPLEMENTARY CAPITAL

1.2.1 Revaluation reserves

This is the increase in book value of fixed assets based on independent and professional appraisal as to the market value of such assets. Only 25% of revaluation reserves should be included after obtaining Central Bank of Kenya's approval.

1.2.2 Cumulative irredeemable preference shares

These are shares with standing claim on the company and the claim is carried forward in event of it not paid in the current year but they are irredeemable.

1.2.3 Convertible notes and similar capital investments

Convertible notes are instruments that evidence a company promise to pay a loan on maturity, which can be converted into shares any time before maturity date. Other similar investments are convertible debentures, bonds, loans, etc.

1.2.4 Perpetual subordinated debt

This is a debt equity or loan capital, which is not redeemable.

1.2.5 Limited life redeemable preference shares

These are preference shares with limited life of at least five years and are redeemable.

1.2.6 Term subordinated debt

Refers to loan capital or debt equity with original maturity period of five years and above.

1.2.7 General loan loss provisions

These will only apply where general provisions have been appropriated from retained earnings (revenue reserves).

1.2.8 Total supplementary capital

Enter in this line the sub-total of the items in line 1.2.1 to 1.2.7.

1.2.9 Supplementary capital vs core capital (%)

In this line enter the percentage of the supplementary capital to core capital. Total supplementary capital should not exceed core capital.

1.3 Total capital

Total capital is the sum of core capital and supplementary capital. i.e. Total of lines 1.1.16 and 1.2.8.

1.4 Total shareholders' funds

The figure reported in this line should agree with the total shareholders funds as reported in the BS(M).

1.5 Difference

Any difference between total capital and shareholders' funds should be reported in this line and a reconciliation of the same be attached.

D: ON-BALANCE SHEET ASSETS

2.1 Cash (including foreign notes and coins)

Enter in this line cash at hand (both domestic and foreign).

2.2 Balances with Central Bank of Kenya

This is cash held with Central Bank of Kenya as per the institutions' general ledger.

2.3 Kenya Government Treasury bills

These are Treasury bills issued by Government of Kenya and should be reported at face value.

2.4 Treasury bonds

Treasury bonds refer to bonds issued by Government of Kenya. They should be shown at face value.

2.5 Government promissory notes

These are promissory notes issued by the Government held by the institution.

2.6 Lending fully secured by cash

Enter here all other debts that are fully secured by cash and supported by signed lien documents.

2.7 Deposits and balances due from local Institutions

These are deposits and balances held with local banks, financial institutions, mortgage finance companies and building societies including overnight balances.

2.8 Deposits and balances due from foreign institutions

These are balances held with correspondent and other banks and financial institutions abroad.

2.9 Interest receivable on placements

This is interest earned but not yet received from placements.

2.10 Advances guaranteed by the Government of Kenya

This refers to all loans and advances guaranteed by the Government of Kenya.

2.11 Other loans and advances

These refer to loans and advances that are not guaranteed by the Government of Kenya and are not fully secured by cash. These should be reported net of provisions and interest in suspense. Provisions must be computed in accordance with provisioning regulation CBK/RG/10.

2.12 Other investments

These are investments in other companies other than institutions.

2.13 Fixed assets

These are assets acquired for use in the operation of the business and not intended for resale to customers. They should be shown net of accumulated depreciation.

2.14 Amount due from group companies

This is the claim of the reporting institution from other group companies.

2.15 Other assets

These are other assets, which have not been dealt with above.

2.16 Total assets (per CBK BSM)

Enter in this line total on-balance sheet asset, i.e. total of line 2.1 to 2.15.

2.17 Total assets (per CBK BSM)

Total asset figure as reported in the CBKBS(M) should be indicated in this line.

2.18 Difference

This is the difference between total on-balance sheet assets and total assets as reported in the CBK BS(M). The difference should be explained in the form of reconciliation.

E: OFF-BALANCE SHEET ITEMS

3.1 Short term commitments

These are short-term commitments with original maturity of up to one year and cancellable unconditionally. They include items like bills for collections.

3.2 Contingent liabilities secured by cash

These are off-balance sheet items secured by cash and are supported by signed lien documents.

3.3 Short-term self-liquidating trade-related contingencies arising from the movement of goods

They include documentary letters of credit, standby facilities, credit lines and unused overdrafts.

3.4 Transaction related items

These are transaction related items and commitments. They include performance bonds, bid bonds, warranties and standby letters of credit related to particular transactions.

3.5 Direct credit substitutes

These are direct credit substitutes, e.g. sale and repurchase agreements, acceptances, letters of guarantees, forward exchange contracts, etc.

3.6 Total off-balance sheet assets and risk weighted asset value

Enter in this line the total off-balance sheet assets and the value of weighted assets.

3.7 Total deposits

This refers to deposit liabilities plus interest accrued repayable on demand after fixed period or after notice.

GENERAL

All reported items should agree with or capable of being derived from the figures reported under CBK BS(M) of the same period. The return should be submitted by the 15th of the following month.

Appendix 3: Assessment Ratings

- 1 Compliant
 2a Largely compliant and efforts to achieve compliance are underway
 2b Largely compliant and efforts to achieve compliance are not underway
 3a Materially non-compliant and efforts to achieve compliance are underway
 3b Materially non-compliant and efforts to achieve compliance are not underway
 4a Non-compliant and efforts to achieve compliance are underway
 4b Non-compliant and efforts to achieve compliance are not underway

Summarised description of core principles	Assessment
1 Framework for supervisory authority	1 2 3 4 N/A
1(1) Clear rules and objectives for the supervisory agency should be spelt out in relevant laws and supporting legislation.	1
1(2) Supervisor should possess operational independence and adequate resources to eliminate external operational interference and ensure financing that does not undermine autonomy.	2a
1(3) Existence of a suitable legal framework that identifies the authority responsible for granting/ withdrawing licenses, and setting prudential rules.	1
1(4) Enforcement powers should be in place to address compliance with laws as well as safety and soundness concerns. The supervisor should have unfettered access to bank's files and be legally empowered to take prompt remedial action.	1
1(5) Legal protection for supervisors should be in place, to safeguard the supervisory agency and its staff against lawsuits for actions taken while discharging their duties in good faith.	1
1(6) Arrangements should be in place for confidential sharing of information between supervisory agencies, both domestic and foreign.	1
2 The use of the word "bank" and any of its derivatives should be limited to licensed and supervised institutions to ensure the public is not misled.	1

<p>3 Licensing authority should have the right to set criteria and reject applications for banking establishments that do not meet the standards set on such aspects as ownership structure, directorship, management, financial condition, etc.</p>	<p>1</p>
<p>4 Authority to review and reject proposals to transfer significant ownership or controlling interests in existing banks to other parties should be in place. Laws or regulations should contain clear definition of significant ownership.</p>	<p>1</p>
<p>5 Authority should be in place, to establish criteria for reviewing major acquisitions or investment by a bank and ensuring that corporate structures do not expose the bank to undue risks or hinder effective supervision.</p>	<p>2a</p>
<p>6 Supervisors should have authority to set minimum adequacy requirements for banks that reflect the risks that the bank undertakes and which define the components of capital, bearing in mind its ability to absorb losses (Basel Capital Accord)</p>	<p>1</p>
<p>7 A supervisory system should be in place that independently evaluates a bank's policies, practices and procedures related to the granting of loans and making of investment and the ongoing management of the loan and investment portfolios.</p>	<p>1</p>
<p>8 Supervisor must be satisfied that banks establish and adhere to adequate policies, practices and procedures for evaluating the quality of assets and the adequacy of loan loss provisions and reserves.</p>	<p>2a</p>
<p>9 Supervisor must be satisfied that management information system and limits exist in banks to restrict large exposures to single or related borrowers.</p>	<p>1</p>
<p>10 Requirements should be in place to ensure that banks lend to related companies and individuals on an arm's length basis. These extensions of credit should be effectively monitored and their risks controlled or mitigated.</p>	<p>1</p>

11	Supervisor to be satisfied as to adequacy of policies and procedures in banks for identifying, monitoring and controlling country risk and transfer risk in the international lending, and for maintaining appropriate reserves.	2a
12	Supervisors to be satisfied as to existence of systems in banks to accurately measure monitor and adequately control market risks. Supervisory powers to impose limits or capital charge should be in place.	5
13	Supervisor should be satisfied that banks have comprehensive risk management process to identify, measure, monitor and control all other material risks.	2a
14	Supervisor should determine that banks have adequate internal controls that include clear delegation, separation of functions, including independent internal and external audit and compliance functions.	1
15	Supervisor should determine that banks have adequate policies that promote high ethical and professional standards in the financial sector, to prevent money laundering.	2a
16	Effective banking supervisory system should consist of some form of both on-site and off-site supervision.	1
17	Supervisor to have regular contact with bank management and a thorough understanding of the institution's operations.	1
18	Supervisor should have a means of off-site analysis of prudential reports and statistical returns forms.	2a
19	Supervisor should have a means of independent validation of supervisory information through on-site examination or use of external auditors.	1
20	Supervisory process should have the ability to supervise the banking group on a consolidated supervision basis.	2a

21	Supervisor should be satisfied that each bank maintains adequate records drawn up in accordance with accounting policies and practices and published regularly.	1
22	Supervisor should have the ability to bring about timely remedial measures when banks fail to meet prudential or regulatory requirements, or where depositors are threatened in any other way, including ability to revoke the banking license.	2a
23	Supervisor should practice global consolidated supervision over internationally active banking organizations.	2a
24	Supervisory process should establish contact and information exchange with other supervisory authorities to ensure effective host country supervision.	2a
25	Supervision of foreign establishments must require the same high standards as are required of domestic institutions and must have powers to share information needed by the home country supervisors.	1

Appendix 4: Assessment of Implementation	
No. 6(a): Essential Criteria	Assessment
1. Laws or regulations require all banks to calculate and consistently maintain a minimum capital-adequacy ratio. At least for internationally active banks, the definition of capital, method of calculation and the ratio required are not lower than those established in the Basel Capital Accord.	Compliant (1). The Banking Act and regulations cover minimum capital requirements.
2. The required capital ratio reflects the risk profile of individual banks, in particular credit risk and market risk. Both on-balance sheet and off-balance sheet risks are included.	Largely compliant and efforts to achieve compliance are underway (2a). The required capital ratio focuses on credit risk.
3. Laws and regulations, or the supervisor, define the components of capital, ensuring that emphasis is given to those elements of capital available to absorb losses.	Compliant
4. Capital adequacy ratios are calculated and applied on a consolidated bank basis.	Materially non-compliant and efforts to achieve compliance are underway (3a). Many of the banks do not have subsidiaries and associated companies.
5. Laws or regulations clearly give the supervisor authority and powers to take measures should a bank fall below the minimum capital ratio.	Compliant (1)
6. Regular (at least semi-annually) reporting by banks to the supervisor is required on capital ratios and their components.	Compliant (1)
No. 6(b): Essential Criteria	Assessment
1. For domestic as well as internationally active banks, the definition of capital is broadly consistent with the Basle Capital Accord.	Compliant (1)

2. The supervisor clearly sets out the actions to be taken if capital falls below the minimum standards.	Compliant (1)
3. The supervisor determines that banks have an internal process for assessing their overall capital adequacy in relation to their risk profile.	Compliant (1). Done during on site inspection.
4. Capital adequacy requirements take into account the conditions under which the banking system operates. Consequently, minimum requirements may be higher than the Basel Accord.	Compliant (1). Capital adequacy requirements are higher than the Basel Accord.
5. Capital adequacy ratios are calculated on both a consolidated and a solo basis for the banking entities within a banking group.	Largely compliant and efforts to achieve compliance are underway (2a). Capital adequacy ratios are calculated on a solo basis. Consolidated supervision not yet implemented.
6. Laws or regulations stipulate a minimum absolute amount of capital for banks.	Compliant (1). The Banking Act stipulates a minimum absolute amount of US\$ 3.2m.

Appendix 5: Dependent variable RISK measured as risk-weighted assets ratio to total assets

Correlations		RWART	SIZE	BHC	LEVD	CAPT	RWART1	RPG	RPL
		RWART	Pearson Correlation	1.000	.192*	-.211**	.167*	.300**	.449**
	Sig. (2-tailed)	-	.018	.009	.040	.000	.000	.875	.000
	N	153	153	153	152	153	153	153	153
SIZE	Pearson Correlation	.192*	1.000	.306**	.142	-.191*	.113	.396**	.049
	Sig. (2-tailed)	.018	-	.000	.081	.018	.165	.000	.550
	N	153	153	153	152	153	153	153	153
BHC	Pearson Correlation	-.211**	.306*	1.000	-.035	-.216**	-.103	.109	.005
	Sig. (2-tailed)	.009	.000	-	.667	.007	.205	.178	.952
	N	153	153	153	152	153	153	153	153
LEVD	Pearson Correlation	.167*	.142	-.035	1.000	.021	.118	.080	.071
	Sig. (2-tailed)	.040	.081	.667	-	.802	.146	.326	.388
	N	152	152	152	152	152	152	152	152
CAPT	Pearson Correlation	.300**	-.191*	-.216*	.021	1.000	.075	-.618**	.055
	Sig. (2-tailed)	.000	.018	.007	.802	-	.360	.000	.503
	N	153	153	153	152	153	153	153	153
RWART1	Pearson Correlation	.449**	.113	-.103	.118	.075	1.000	-.018	.169*
	Sig. (2-tailed)	.000	.165	.205	.146	.360	-	.822	.037
	N	153	153	153	152	153	153	153	153
RPG	Pearson Correlation	-.013	.396**	.109	.080	-.618**	-.018	1.000	-.014
	Sig. (2-tailed)	.875	.000	.178	.326	.000	.822	-	.859
	N	153	153	153	152	153	153	153	153
RPL	Pearson Correlation	.358**	.049	.005	.071	.055	.169*	-.014	1.000
	Sig. (2-tailed)	.000	.550	.952	.388	.503	.037	.859	-
	N	153	153	153	152	153	153	153	153

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Appendix 6: Dependent variable capital

Correlations

		CAPT	BHC	SIZE	LEVD	INC	DEPT	CAPT1	RPG	RPL	RWART
CAPT	Pearson Correlation	1.000	-.216**	-.191*	.021	.045	-.279**	.550**	-.618**	.055	.300**
	Sig. (2-tailed)	.	.007	.018	.802	.580	.000	.000	.000	.503	.000
	N	153	153	153	152	153	152	153	153	153	153
BHC	Pearson Correlation	-.216**	1.000	.306**	-.035	-.064	.147	-.144	.109	.005	.211**
	Sig. (2-tailed)	.007	-	.000	.667	.432	.071	.075	.178	.952	.009
	N	153	153	153	152	153	152	153	153	153	153
SIZE	Pearson Correlation	-.191*	.306**	1.000	.142	.167*	.194*	-.111	.396**	.049	.192*
	Sig. (2-tailed)	.018	.000	-	.081	.039	.017	.170	.000	.550	.018
	N	153	153	153	152	153	152	153	153	153	153
LEVD	Pearson Correlation	.021	-.035	.142	1.000	.007	-.267**	.043	.080	.071	.167*
	Sig. (2-tailed)	.802	.667	.081	-	.927	.001	.603	.326	.388	.040
	N	152	152	152	152	152	152	152	152	152	152
INC	Pearson Correlation	.045	-.064	.167*	.007	1.000	.168*	-.264**	.002	.264**	.323**
	Sig. (2-tailed)	.580	.432	.039	.927	.	.038	.001	.982	.001	.000
	N	153	153	153	152	153	152	153	153	153	153
DEPT	Pearson Correlation	-.279**	.147	.194*	-.267**	.168*	1.000	-.162*	.054	.294**	.278**
	Sig. (2-tailed)	.000	.071	.017	.001	.038	.	.046	.507	.000	.001
	N	152	152	152	152	152	152	152	152	152	152
CAPT1	Pearson Correlation	.550**	-.144	-.111	.043	-.264**	-.162*	1.000	-.406**	.044	.224**
	Sig. (2-tailed)	.000	.075	.170	.603	.001	.046	.	.000	.589	.005
	N	153	153	153	152	153	152	153	153	153	153
RPG	Pearson Correlation	-.618**	.109	.396**	.080	.002	.054	-.406**	1.000	-.014	-.013
	Sig. (2-tailed)	.000	.178	.000	.326	.982	.507	.000	.	.859	.875
	N	153	153	153	152	153	152	153	153	153	153
RPL	Pearson Correlation	.055	.005	.049	.071	.264**	.294**	.044	-.014	1.000	.358**
	Sig. (2-tailed)	.503	.952	.550	.388	.001	.000	.589	.859	.	.000
	N	153	153	153	152	153	152	153	153	153	153
RWART	Pearson Correlation	.300**	-.211**	.192*	.167*	.323**	.278**	.224**	-.013	.358**	1.000
	Sig. (2-tailed)	.000	.009	.018	.040	.000	.001	.005	.875	.000	.
	N	153	153	153	152	153	152	153	153	153	153

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

There is absence of serial correlation from the results shown in table appendix 5 and 6 on correlations.

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