Assessment of the Systematic Risk of Securities in the Nairobi Stock Exchange under Inflationary Conditions.

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ACKNOWLEDGEMENTS AND DEDICATION

This project could not have been successful but for the effort of many people who in one way or the other made worthwhile contributions. I firstly wish to thank the University of Nairobi whose sponsorship enabled me to pursue the programme in the first instance. My most sincere appreciation also goes to the staff of the faculty of commerce for their helpful guidance throughout the programme. I am especially indebted to my supervisor, Prof. N.D. Nzomo for kindly accepting the burden of supervision and more so for his patience during the entire project period. To Sarah, I thank you for your valued companionship. Lastly, to my colleagues and friends, I wish to register my appreciation for their support.

As always such an effort as this is fraught with errors of commission or omission. Although I have made an effort against these arising, it may turn out that some will actually arise. For these I bear the sole responsibility.

I dedicate the project to my parents, brothers and sisters without the love of whom it could not have been realised.

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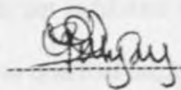## DECLARATION:
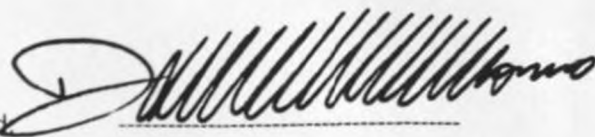
This Management Research Project is my original work and has not been presented for a degree in any other university.

Signed: ~~~~~~~~~~~~~~~~~~~~~~~ Date: 8 - 10 - 1995

Jay Murray Gichana.

This Management Research Project has been submitted for examination with my approval as university Supervisor

Signed ~~~~~~~~~~~~~~~~~~~~~~~ Date: 9 - 10 - 95

Prof. N. D Nzomo.

ABSTRACT:

This study set out to establish if General Price Level Adjusted (GPLA) accounting data conveys information that is not discernable in the currently available Historical Cost (HC) accounting data. The criteria used to assess relative information potency of the two data sets was an assessment of the relative degree of association between the alternative accounting measures and the behaviour of the prices of securities. The strength of the relationship between the alternative accounting measures of risk and the market measure of risk was assessed to determine which of the two accounting measures exhibited a closer relationship. Specifically, the relationship between HC and GPLA accounting betas with market beta was assessed to determine which set exhibited a closer relationship. The data set found to have a closer relationship was interpreted as the one that captures a larger proportion of the information set underlying the systematic risk of securities and was therefore rated to have better information value in the specific decision context of the study.

The findings of the study indicate that there is no significant difference in the relative information potency of the alternative sets of accounting data that were considered. That is, in the assessment of systematic risk both sets of accounting data conveyed largely the same information.

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ABBREVIATIONS:

AAA- American Accounting Association

AICPA- American Institute of Certified Public Accountants

APB- Accounting Principles Board

ARB- Accounting Research Bulletin

ARS- Accounting Research Series

ASC- Accounting Standards Committee (UK)

ASSC- Accounting Standards Steering Committee (UK)

CAPM- Capital Asset Pricing Model

CBS- Central Bureau of Statistics

CPI- Consumer Price Index

CPP- Current Purchasing Power

DPS- Dividends Per Share

ED- Exposure Draft

FASB- Financial Accounting Standards Board

GDP- Gross Domestic Product

GPL- General Price Level

GPLA- General Price Level Adjusted

HC- Historical Cost

IAS- International Accounting Standard

NSE- Nairobi Stock Exchange

PL- Price Level

SEC- Security Exchange Commission

SFAS- Statement of Financial Accounting Standards

SSAP- Statement of Standard Accounting Practice

CHAPTER 1: INTRODUCTION

1.1 Background

In their quest to provide information that is useful for decision making, accountants encounter various difficulties. One of the most intractable problems that has faced accountants for decades now arises from the everyday phenomenon of changing prices. There is general consensus amongst accountants that for information to be useful it must be both **relevant** and **reliable**. Relevance of information demands that it possesses both predictive and feedback values and also be timely whereas reliability requires the information to be verifiable and neutral besides having representational faithfulness. The effect of changing prices, unless given effect in financial statements is to seriously impair both these qualities of the information provided by the financial statements. For this reason, inflation being one aspect of the wider phenomena of changing prices causes considerable concern to the accountant.

Inflation arises when the general level of prices for all goods and services in an economy are continuously increasing. It reflects a continuous decline in the value or purchasing power of money as the monetary unit of account. Inflation arises either because the aggregate demand for goods and services exceeds their aggregate supply or because the volume and velocity of circulation of money in the economy exceeds aggregate supply of goods and or services.

That prices keep changing is an undeniable reality. For the accountant, inflation causes concern because of its impact on money, the traditional unit of accounting measurement. It erodes the purchasing power of money and thereby makes it "unstable, indeterminate and of varying significance to different users". (Paton, 1968:72). Effectively money becomes a "rubber" yard, representing different purchasing power at different points in time. This occasions measurement difficulties for the accountant, who has conventionally taken it to be a stable unit of measure, yet it is clearly not under inflationary conditions. Financial statements prepared without regard to the effects of inflation will give a distorted picture of the results and position of

the reporting entity. The income statement will show the result of a matching of revenues, measured in current shillings , with historical costs, measured in shillings of past periods. These results are bound to mislead, whether in prediction or evaluation for they do not measure changes in wealth in terms of purchasing power, nor do they necessarily represent amounts that can be prudently distributed, having regard to the financial requirements of business. Similarly the balance sheet loses its significance as the numbers therein are mere aggregations of numbers that do not meet measurement criteria for valid aggregation.

Another problem caused by inflation arises from its unpredictability. Unanticipated inflation causes an arbitrary re-allocation of resources between parties who have contracted in terms of money. For instance in times of rapid inflation, borrowers tend to gain at the expense of lenders as do employers at the expense of employees. This results in inequality due to the arbitrary impact of unanticipated inflation and inefficiency, due to the creation of unnecessary uncertainty by seeking to link real contractual rewards to an uncertain inflation rate, that cannot be accurately predicted.

Under these circumstances, the Historical Cost (HC) basis of accounting stands discredited. The utility of financial statements prepared under the system has been questioned by many. In recognition of this, accountants have for a long time sought for the most appropriate approach to be used in order to reflect the effects of inflation on financial statements. To date however, there has not been reached any general consensus as to what this should be. It is not surprising therefore that in majority of the countries, financial statements are still prepared under the HC basis.

Although several approaches have been proposed for reflecting the effects of changing prices on financial statements this study deals only with constant purchasing power accounting. More specifically, focus is on one variant of the approach, i.e current purchasing power accounting. Constant purchasing power accounting is set apart from the other proposed approaches by the fact that it addresses accounting

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problems that arise only from general price level changes and therefore does not address accounting problems posed by specific and relative price changes.

Constant purchasing power accounting is a consistent method of indexing accounts using a general index that reflects changes in the purchasing power of money. Thus it seeks to address the problem of inflation as popularly understood, (i.e the decline in the value of money). This is done by converting all of the currency unit measurements in accounts into units at a common date by means of the index. There are many variations of the constant purchasing power accounting technique. Sweney (1936), for instance, did not recognize gains and losses on holding money as part of profit although they did affect reserves in his balance sheet. The actual techniques can also differ in the choice between stabilization of individual transactions and averaging; the choice of the relevant price index; and in the choice of the date of the currency unit for stabilization. Current purchasing power accounting, which is the specific focus of this study has the unique feature that it takes the relevant date for currency unit stabilisation to be the year end.

Now the utility of any proposal for reform in accounting must be assessed based on the relevance and reliability of the resulting accounting data to a particular decision context. Although early empirical work on constant purchasing power accounting has demonstrated its practical feasibility and that it leads to materially different results from those of traditional accounting, all studies designed to establish the utility of the approach have so far failed to unequivocally resolve the question of whether the approach does actually provide more decision relevant information than traditional accounting.

The studies do not provide decisive enough evidence as can support any firm assertions as to whether general price level adjustments ought to be incorporated in published financial statements. This is partly a result of the variety of approaches taken, the statistical difficulties faced and the relatively narrow data coverage. Thus there is still need for further empirical work in this area. This is especially so considering that in Kenya very few studies have been done related to this area. Imbisi (1978) did a study which serves

to demonstrate the feasibility of estimating General Price Level Adjusted (GPLA) earnings data for Kenyan companies. In his study he sought to investigate the impact of inflation on the measurement of income of Kenyan companies. He estimated GPLA earnings for 58 companies quoted in the Nairobi Stock Exchange (NSE) for the year 1976 using the Gross Domestic Product (GDP) Implicit Price Deflator and found that over 70% of the firms studied had their restated incomes in excess of the corresponding HC incomes. He attributed this result to the fact that monetary gains tended to more than offset the impact of higher depreciation and other charges that arose on restatement. Whereas the study demonstrates that restatement is feasible and that it produces materially different results, it does not tell us anything as to which of the alternative measures is better. Actually the study was not designed to assess the performance of the alternative sets of data and so had no criteria for doing so. Again the study restated income statements only for the year 1976 and this limits the generalizability of his findings.

1.2 Statement of the Problem

This study addresses the question of whether GPLA data reveals information that is not revealed by the currently available HC data. If it is found that GPLA data do in fact convey additional information, then the case for incorporating GPL adjustments in published financial statements will be strengthened. If however it is found that GPLA data conveys less information or no additional information, then there would be no implied need to incorporate GPL adjustments in published financial statements.

There are a number of criteria that may be used to assess relative information content of alternative data sets. In this study, the criteria used was an assessment of the relative degree of association between alternative accounting measures and securities price behaviour. This was done by measuring the degree of association between the signals each accounting procedure (or data set) produces and the systematic risk of equity securities (ordinary shares). This degree of association will indicate the relative importance of the two data sets in assessing the securities' risk. Systematic risk is preferred because it plays a major role in determining expected returns of securities. Baran, Lakonishok & Ofer (1980) and Short(1978) employed the same criteria.

This study sought to address the problem of whether GPLA earnings convey information that is not discernable in HC earnings in the assessment of the systematic risk of ordinary shares at the Nairobi Stock Exchange. The null hypothesis (Ho) is:

Ho: GPLA earnings convey the same information set as do HC earnings in assessing the systematic risk of equity securities in the NSE.

Ha: GPLA earnings convey different information from HC earnings in assessing the systematic risk of equity securities in the NSE.

1.3 Objectives of the Study

The objectives of the study are twofold.

a)   To measure the relationship between both GPLA and HC earnings and the systematic risk of ordinary shares at the NSE.

b)   Based on this to assess the relative information potency of GPLA and HC earnings in assessing the securities' systematic risk.

1.4 Importance of the Study

The study was motivated by several considerations. First, although the subject of inflation accounting has been the focus of research for a long time, it is one area in which no general agreement has been reached regarding the best approach of dealing with its effects on financial statements. Secondly, in Kenya scarcely any research has been done related to this area. It is therefore my belief that the study will be a worthwhile step towards correcting this shortcoming. Thirdly, the study's relevance assumes greater proportion given the recent Kenyan experience of crippling inflation. In addition, evidence obtained through the study will have policy implications to standard setting accounting bodies or regulators. Finally, it is hoped that the study will stimulate further research on the subject by demonstrating feasibility and the practical difficulties that are likely to be encountered.

CHAPTER 2:   LITERATURE REVIEW

The topic of inflation accounting has received remarkable attention in the literature. Many approaches have been proposed for reflecting the effects of inflation on financial statements. These approaches address different aspects of the problems caused by changing prices. One of the problems caused by inflation is that it makes money a variable unit of measure, representing different purchasing power at different points in time. The effect is that financial statement figures are mere aggregations of amounts that are not measured on the same scale. The relevance of any information provided by such statements is therefore questionable. Furthermore the financial statements do not represent what they purport to represent. Constant purchasing power (CPP) accounting has been proposed in order to deal with this problem of inflation. An overview of this approach is given in the next section in order that a better understanding of what it entails, its strengths and weaknesses and the problems associated with it is obtained.

2.1 Constant Purchasing Power Accounting: An Introduction

The essence of the CPP technique is the translation of all measurements in financial statements into units at a common date by use of a general index as an indication of the purchasing power of the currency at different points in time. Hence the proportionate change in the index represents the "exchange rate" between currency units at different dates. Because CPP is based on the traditional historical cost system, it causes little disturbance (to the prevailing accounting principles and conventions). It involves merely restating HC financial statements, and does not detract from the system. (Gee, 1981:118).

In restating the income statement, each item therein is restated into end-of-period monetary units by multiplying it by the ratio of the price level at the end of the period to the price level when the item originated, or the average price level during the relevant period. (Largay & Livingstone, 1976:9).

The general price level adjustment introduces a new item, the purchasing power gain/loss on monetary

items in the income statement. This gain/loss in calculated by multiplying net monetary items and all changes in net monetary items by the appropriate index[1] and deducting the historical monetary values therefrom. The purchasing power gain/loss is the amount by which a monetary item "should have changed", in the face of changing price levels, to "preserve the purchasing power inherent in the item". (Largay & Livingstone, 1976: 10).

On the balance sheet, non monetary items are restated into currency units of end-of-period purchasing power by multiplying the historical amount of the item with the ratio of the price level at the year end to that of the price level when the item originated. However, monetary items are not restated since they represent fixed quantities of currency. In subsequent years, all of prior period balances, both monetary and non monetary are restated to enable interperiod comparison. Items that may have characteristics of both monetary and nonmonetary items need to be classified "according to the major purpose for which they are held" and be accounted for as such. (Largay et al, 1976:11)[2].

Theoretically GPLA accounting has two main advantages. First, general price level adjustments involve only a change in the measuring unit and so require no changes to the prevailing accounting principles. The results thereby obtained will be both objective and unambiguous once we are agreed on the choice of the relevant index. Secondly, gains or losses in purchasing power arising from the effect of inflation/deflation

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[1] The ratio of the price level at the end of the period to the price level when the item originated. In many instances, it may not be possible to identify the date of origin of the transaction causing a change in the monetary item, or it may be that an appropriate index cannot be obtained for the relevant date. In such cases, if transactions either occurred or can be assumed to have occurred evenly throughout the year, an average general price level index will suffice. It will definitely be better to use it than to do nothing at all. This approach was adopted in the illustrations given in the AICPA's **ARS6** and ASSC's **SSAP7** and in Whittington (1983:98-109).

[2] See Largay & Livingstone, **Accounting For Changing Prices**, Wiley/Hamilton, (1976) pp. 48-51 for guidance in classifying those items in which the monetary and nonmonetary distinction is not clear-cut

on the firm's monetary items are measured and disclosed separately. Accordingly, the income figure obtained is arguably a better measure in prediction and evaluation, removing as it does, the "fictitious" element from reported income. Recall that prediction is aided if the confounding effects of unusual events, or usual but unpredictable events are removed from the prediction function; and that evaluation requires that comparisons be made across items of comparable significance.

However GPLA accounting suffers from a number of shortcomings. Note that the general price level adjustments called for under the technique only deal with one aspect of changing prices - that of inflation as is popularly understood. Indeed the case for GPLA accounting rests primarily on the variability of the currency unit which renders it inappropriate for measurement. GPLA claims to produce a stable currency unit for purposes of measurement. This has been objected to on two grounds.

First, the use of an index of general price levels fails to account for the fact that movements in prices of specific items will often differ from the movements of the index. The question is whether a single general index is appropriate for reflecting price changes of the specific assets of the firm. As Mathews (1965)[3] argues, the use of a single index to adjust historic cost financial statement items is, on its own , of little significance, unless the movement in the specific prices of those items is reflected first. For the application of a single general price level index to historical cost data which are themselves expressed in terms of prices prevailing in different periods will not even aid comparison. Whittington (1983) also makes the same point[4].

The other line of attack on CPP accounting is that the general adjustment of historic cost is not an appropriate method of valuing assets and liabilities. It is clear that because CPP entails no change to the

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[3] See Mathews, R.L, "Price Level Changes and Useless Information"; **Journal of Accounting Research**, Vol. 13, 1965, pp.133-135 for a stinging criticism of the AICPA's ARS6, which also generally applies to CPP accounting.

[4] See pp. 84-90 of his book, **Inflation Accounting: An Introduction to the Debate**, Cambridge, Cambridge Univ. Press, 1983 for detailed arguments.

prevailing accounting principles, it is not free from many of the weaknesses inherent in the historical cost system. Specifically, general price level adjustment will not produce economic values - current market prices for assets and liabilities. Again, such adjustments, by leaving the realization criterion unchanged fail to identify and reflect holding gains and losses. Note however that this criticism is more properly directed at the historical cost system rather than CPP. Indeed, proponents of CPP have typically viewed it as complementary to rather than in competition with, current values. (Whittington, 1983:84).

2.2 The Monetary Non-Monetary Distinction

The distinction between monetary and non monetary items is important because it determines the accounting treatment accorded to this items. Heath (1972)[5] in an insightful and interesting article considers various definitions offered by other writers and finds all wanting. He suggests a definition that he claims avoids the difficulties he associates with the others. However, for the purposes of this paper, a loose definition, offered by Hendricksen will suffice.

Monetary assets are claims to a fixed sum of money representing general purchasing power. Examples are cash and contractual claims to a given amount of money - receivables and investments which pay a fixed amount of income (interest or dividend) and that will be repaid in future at a fixed amount (Hendricksen, 1970:206). When monetary assets are held during a period of inflation, their value in terms of purchasing power is eroded due to the decline in the value of money. Hence, a purchasing power loss is suffered during inflation, while a purchasing power gain is enjoyed during deflation by holding monetary assets.

Monetary liabilities are obligations to pay a fixed sum of money at some time in future, irrespective of

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[5] In an article reproduced in **Readings in Inflation Accounting**, Edited by Wanless & Forrester, pp. 62-74.

intermediate changes in the value of money. Examples are accounts payable and long term obligations payable in a fixed sum. In contrast with monetary assets, holding monetary liabilities during periods of inflation/deflation results in purchasing power gains/losses.

Non-monetary assets are claims to a variable amount of the money representing a predetermined quantity of purchasing power. They include all rights expressed in terms of a fixed sum of money at some future date. Examples include stocks and fixed assets. Non monetary liabilities include obligations to provide given amounts of goods/services or an equivalent amount of purchasing power, even though the payment might be in cash (Hendricksen, 1970:208).

2.2.1 Gains and Losses on Monetary Items:

To establish if an entity holding both monetary assets and monetary liabilities has a net purchasing power gain or loss, one has to compare the loss arising from holding monetary assets against the gain due to the holding of monetary liabilities. The net position can be summarized as below.

Table I Gains/Losses on Monetary Items

Net Monetary	Inflation	Deflation
Asset Position	PP Loss	PP Gain
Lability Position	PP Gain	PP Loss

Source: Wolk et al , (1989:358)

Two steps are involved in the computation of purchasing power gains and losses. First, the amount of the claim is restated for the change in the purchasing power of money during the year, or during the period over which it was held, if longer than a year. Secondly, the restated amount is then compared with the current value of the asset or liability at the end of the accounting period. The difference is the purchasing power gain or loss. (Hendricksen, 1970:208-209).

Controversy surrounds the nature and manner of disposition of purchasing power gains and losses. One view is that purchasing power gains and losses should be included in the income of the current period, but that it should be distinguished from income on continuing operations.(Wolk, et al, 1983:393).

Another view is that purchasing power losses on monetary assets should be recognized as soon as the index increases, whereas gains should be spread over either the life of the assets purchased with the funds or over the life of the debt itself (Gynther 1966:153). A third interpretation is that because of the rapid turnover of monetary working capital items, the purchasing power gain and losses on them can be thought of as realized as they occur, but that the purchasing power gain and loss from holding of long term debt should not appear in the current operating statement until it is realized through the payment of the bonds (Hendricksen, 1970:210).

A fourth view is that from the firms perspective, the gains and losses on long term debt are not determinant of income but rather an adjustment of the total equity of the firm - a shift from bondholders' equity to stockholders' equity but the firm is unaffected by the existence of long term debt. Hence, even though the gain/loss on long term debt should be included (when reporting net income to stockholders) a distinction should be made between the purchasing power gains/losses on monetary working capital and the gains or losses on long term debt (Hendricksen, 1970:210-211).

Some objections have been raised against reporting purchasing power gains and losses. One is a question of measurement difficulties which put to test the reliability of the results obtained. It is argued that the timing of increases/decreases on monetary items (or, as is usual, assumptions thereof) will influence the amount

of reported gain or loss, making it variable and so subject to bias. Another is that purchasing power gains and losses are based on changes in subjective values, expressed in terms of personal utilities that may apply to an individual but not to a business enterprise. Another objection is based on the premise that reporting purchasing power gains /losses separately could be of no value as these gains/losses are irrelevant to users both in evaluation and prediction. (Hendricksen 1970: 212)

2.3 Choice of the Relevant Index

Earlier it was mentioned that CPP adjustments entail the translation of HC financial statements using an index of prices that reflects changes in the value of money. The discussion thus far proceeded on the assumption that the relevant index for restatement was a settled issue. In this section, the problems of index number construction and use will be considered highlighting the different viewpoints in this regard and the arguments raised for each.

A price index is an average of prices prevailing for all members of the class of items to which it applies. (Chambers, 1966:228). It expresses the general level of prices prevailing at any time for all items represented in it. In constructing an index of prices, the essence is to reduce changes in many prices to a single index. But so to do entails that an arbitrary choice be made of the commodities to include and that a calculation be made of the ratio of current price to that of the base period. But if there are differences in the rate of price change for different commodities, the selection of the commodities to be included and the relative weights to be attached in the averaging process is bound to affect the magnitude of the index. This is the central issue at debate on index numbers. (Whittington, 1983:65). The arbitrariness in sample selection certainly introduces possibilities of sampling error. In any case, the appropriateness of the resulting index to any one user can be questioned on two grounds: (1) that the commodities included in computing the

index are not representative of the firm's products; and (2) that the weights attached to each product may not be relevant to a particular firm.

There are two main schools of thought concerning the choice of a relevant index. One school advocates the use of one general index for all necessary adjustments of expenses (mainly depreciation and cost of goods sold), which index should represent the movement in the prices of all goods and services in the economy. Proponents wish to adjust for general price changes by simply restating historic cost statements rather than change the basis of accounting. The other school advocates the use of specific indexes, arguing that for the individual firm, the effects of general price movements are irrelevant and that instead the historic cost of each item should be restated to reflect the current cost of that item. (Gynther, 1966:41-42). The Sandiland's Committee[6] suggested the use of specific indices in estimating the current costs where more objective current measures could not be obtained, and Mathew and Grant (Gynther 1966:43) both support the use of specific indices.

Proponents of each school hold firmly to their beliefs, arguing for the usefulness of one to the exclusion of the other. Kerr (1956) attributes the difference of opinion to differences in the concepts of capital to be maintained implicit in each school. Thus, proponents of a single general index wish to maintain the purchasing power of the capital originally contributed (or the financial capital), whereas advocates of specific indexes wish to have the physical capital (or the firm's productive capacity) maintained. (Gynther, 1966:42-43). A similar explanation is given by Gynther (1966:43) in the statement:

> ...it all depends on one's environment and on one's subconscious ideas on for whom or for what accounting systems are maintained. If... the whole purpose of accounting is to look after the interests of shareholders, ... the use of one general index will be favoured... .However, if... the prime purpose of accounting is to assist the entity (the firm)...the use of specific indexes will be favoured.

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[6] A body set up in 1973 by the then Dept. of Trade and Industry (UK) "to consider the application of the new techniques to company accounting within the framework of existing or future Companies Acts".

This explanation is intuitively appealing because it is based on the plausible argument that only after the firm has retained its productive capacity (by matching its revenues with its specific current costs of assets used up in earning that revenue) can it be of real benefit to its shareholders in the long run. Otherwise, capital, (defined as productive capacity) would be dissipated in excessive taxes and liquidating dividends and this is clearly counter to the firms long term health. These are by no means the only schools of thought regarding index numbers. Gynther (1966:59-60) discusses a number of other ideas that do not fit in either of the two schools above.[7]

Clearly the issue of what index to use in restatement is not easily settled. Note that even when accepting one general index there is still need for further specification since there exist various types of general indices. For purposes of empirical research, a variety of index numbers have been proposed. Imbisi (1978) offers a fairly comprehensive review of the various general indices available in Kenya[8]. In that study he employed the GDP Implicit Price Deflator for restatement purposes because he found it to be the most comprehensive of all the available indices. For the same reason this index was used in the present study. The next section briefly reviews the restatement procedures that have been employed by previous researchers to estimate GPLA data.

2.4 Restatement Procedures

Previous researchers [Petersen (1973), Cutler & Westwick (1973), Davidson & Weil (1975), Hanna & Basu (1976), Baran (1976), Parker (1977), Beaver & Manegold (1975)] have worked out restatement procedures that may be used to adjust HC financial statements in order to estimate GPLA data. Although these

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[7] Readers may wish to refer to pp. 59-60 of his book, **Accounting for Price Level Changes: Theory and Procedures**, Headington Hill Hall, Oxford, Pergamon Press Ltd. (1966).

[8] Interested readers may wish to refer to pp.42-74 of his Unpublished MBA Thesis (1978), Univ. of Nairobi.

procedures have differences it has been shown that they are adequate enough to be used in empirical research. For instance, Ketz (1978) sought to validate the methods employed by Petersen, Parker and Davidson & Weil. He concluded that any of the procedures could be used for purposes of empirical research. Imbisi (1978) reviewed the procedures used by Cutler & Westerwick, Davidson & Weil, Hanna & Basu and FASB's (1977) field tests. In general he concluded that Hanna & Basu not only attempted the most complete estimation but also validated their restatements to a greater degree than the other researchers. He found their procedures to be the best where adequate information, especially regarding capital expenditure is available, but where this is not the case, he recommends more general methods like those of Davidson & Weil for restating depreciation.

The essence of price level adjustments is captured in the restatement of the cost of goods sold, including the inventory acquisition cost and depreciation expense, along with the associated asset cost and accumulated depreciation; and the introduction of monetary gain (loss) arising from holding monetary items during the period.

In restating cost of goods sold, Imbisi (1978) assumed that in addition to other expenses other than depreciation, cost of goods sold occurred evenly throughout the year. This was necessitated by the fact that information on stock acquisition dates is not normally disclosed. Baran et al (1980) restated cost of goods sold based on the assumption that purchases occurred evenly throughout the year. Cutler and Westwick's procedure for restating depreciation gives exactly the same result as Davidson and Weil's procedure when straight line depreciation is used. However Cutler and Westwick's methodology is more appealing because it is relatively straightforward and has lower data requirements in order for it to be used.

2.5 Systematic Risk in Context

This study deals with the assessment of systematic risk of securities. It is therefore important to make a note on risk in general and systematic risk in particular. This is the object of this section. The total risk of a risky asset has been classified as either systematic or unsystematic risk. (Weston and Copeland [1986:414]. The latter refers to that risk which relates to the individual security or firm and the general characteristics of the industry from which it is drawn. It has been well established in the finance literature on portfolio theory that this type of risk can be completely diversified away at no cost by simply holding assets in portfolios rather than in single securities. For this reason, the market will not pay a risk premium to investors for bearing this kind of risk. Consequently, this risk is not significant to investors when forming expectations about returns on individual securities in the market.

In contrast, systematic risk arises due to market-wide conditions and relates to more or less all securities in the market. This type of risk cannot be eliminated by diversification and for this reason, the market will pay a risk premium to investors to bear it. This means that the returns on any security in the market will largely be influenced by the asset's perceived level of systematic risk.

Systematic risk is measured by the covariance of the asset's returns with the returns on a portfolio comprising all the assets in the market. This measure of risk is usually standardized by dividing it with the variance of the returns on the market portfolio. The standardized measure of risk is what is known as beta. Under the Capital Asset Pricing Model (CAPM) formulation, *beta*[10] is the sole security specific variable

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[9] The beta value in the market model (i.e market beta) is a measure of the systematic risk of a security. It is possible to compute a beta value for accounting income (i.e accounting beta) by regressing the firms' time series of earnings on an index of average accounting earnings for the economy. Such a beta would measure the sensitivity of the firm's earnings to economy-wide changes.

determining the relative riskiness of each security and therefore its expected return. Even though there are empirical findings that question the validity of the CAPM formulation, *beta* has been shown to possess significant explanatory power of differential *ex post* returns amongst securities and portfolios. Gonedes (1974) provides considerable evidence suggesting that accounting information, especially earnings in various forms are determinants of security prices. Beaver et al (1970) and Beaver & Manegold (1975) argue that earnings volatility is one factor affecting security price volatility. Moreover it was found that the systematic volatility in earnings as captured by accounting *beta* is an important explanatory variable in market *beta*.The strength of the relationship between the market and the accounting beta (restated and non-restated) can therefore be taken to indicate their relative information content. Following on Baran, et al (1980), both market and accounting *betas* were estimated.

The next section reviews some of the prior empirical work with the objective of bringing into focus the criteria that have so far been employed in evaluating the utility of GPLA data.

2.6 Evaluation Criteria:

Previous researchers on CPP or GPLA accounting have taken a number of directions. Earlier work[11] applied GPLA adjustments to actual companies with a view to establishing their materiality and any problems of interpretation and application arising. Although these studies demonstrated both the feasibility and materiality of GPLA adjustments, evidently they were not enough to herald reform.

Other researchers have sought to identify the relative utility of GPLA data as against HC data in the context of the user. Dyckman (1969) used investment analysts as subjects and found that CPP data led to different

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[10] Defined as the covariance of the security's returns and the returns on the market portfolio standardized by the variance of the return from the market portfolio.

[11] By Sweney (1936), Jones (1949 & 1955), Cutler and Westerwick (1973), Petersen (1973, 1975 &1978), Davidson & Weil (1975), Parker (1977) and others. These studies are not reviewed in this paper.

decisions by the users. Heintz (1975) and McIntyre (1975) both used students as surrogates for investors and asked them to make decisions based on alternative sets of data (i.e both HC & GPLA). Heintz examined the effects of PL adjustments on investment decision making. The setting of the study was a laboratory experiment in which subjects were consistently provided with either conventional, restated or both conventional and restated financial statements for three actual but disguised companies as well as a limited amount of other information. They were then asked to make a series of common stock evaluations and purchase decisions. The behaviour of the "investors" was then analyzed and comparisons made. The general findings of the study were that investors who used only restated or both restated and conventional financial statements did not make forecasts that were different from those made by investors who used only conventional statements. However isolated differences were noted between users of either conventional versus combined or restated versus combined only. However the study suffered from a number of acknowledged limitations[12] that may invalidate these results.

McIntyre's study was substantially the same as that of Heintz except that he tested Edward & Bell's model which calls for both GPL adjustments as well as the restatement of accounts to current replacement costs. Tests conducted all failed to show any advantage to users of current cost financial statements. But again methodological problems were noted. The suitability of students as surrogates for investors and the laboratory setting are common points of weakness in both studies.

Another line taken by researchers has been the assessment of the predictive ability of alternative accounting numbers. One of these approaches has sought to assess the relative ability of GPLA and HC data in predicting bankruptcy. Ketz (1978) sought to establish which set of data (accounting ratios) performed better in the prediction of bankruptcy. He tested the null hypothesis that the ability to discriminate between failing and non-failing firms does not improve if one used GPL financial statements rather than HC financial

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[12] Not stated in this paper.

statements. The results of his study led him to judge the efficacy of the two accounting models as equal. In misclassifying non-failed firms, both systems were judged equal. However in misclassifying failed firms, the GPL model was found to contain a lower error rate, thereby implying that it was better. The model was also found to be better in the light of the expected cost of misclassification. Overall the results tended to support the position that GPLA adjustments have greater utility - were better predictors of bankruptcy.

Norton & Smith (1979) sought to compare the prediction of bankruptcy based on ratios computed from GPL financial statements to the prediction based on ratios computed from traditional financial statements. They found that both GPL and traditional ratios exhibited the ability to predict bankruptcy and inspite of sizable differences in magnitude that existed between GPL and HC financial statements, little difference was found in bankruptcy predictions. Kimura (1982) reported similar findings.

An alternative line of research attempts to establish if GPLA data have any differential impact on share prices over HC data. Basu (1977) estimated CPP data for some American companies and working within the efficient market framework found it to be no better in explaining "unsystematic risk". Baran, Lakonishok & Ofer (1980) conducted two studies. Both set out to evaluate the extent to which GPLA data contained information not provided by the currently available HC data. In one of the studies, the criteria they used was to assess the relative ability of both sets of data in explaining bond rating. Their general conclusion was that GPLA data appeared to contain information that is not included in the HC data. In their other study, the criteria used to assess relative performance was the degree of association between alternative accounting measures and security price behaviour. Their conclusion, consistent with their other study was that GPLA data appeared to contain information that is not included in HC data.

Short (1978) also found some evidence that GPL adjustments do improve the ability of accounting data in explaining market risk. He examined the question of whether general price level data are superior to HC data regarding their ability in the assessment of systematic risk. In order to compare the explanatory power of

GPL and HC data he developed two regressions. One regressed estimated betas on selected historical accounting ratios while the other regressed the same estimated betas on GPL adjusted accounting ratios. He compared the coefficients of determination to determine which set of data had greater explanatory power. Results indicated that PL data had greater explanatory power than HC data. However both sets of data seemed to apparently fail to explain a considerable amount of variation in market risk. This may have been due to omitted variables, especially non accounting data, errors in dependent variables or errors in the independent variables.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 The Population

The population of the study was all companies listed in the Nairobi Stock Exchange whose ordinary shares are traded in the exchange. As of 31 December 1993, there were a total of 54 companies quoted in the exchange whose ordinary shares were being traded in the exchange.

3.2 Sampling Plan

A sample of 10 companies (listed in Appendix A) was chosen, including only those firms that had 10 years of financial statement data from 1984 to 1993 inclusive. Initially it was planned that 18 years of financial statement data were to be used but because of availability limitations for years prior to 1983, the number of years studied was reduced to 10. All the companies had to satisfy two other conditions. First, they must have been continuously listed in the exchange over the relevant period and secondly they should not have changed their date for the fiscal year end. The second condition was meant to reduce the points in time at which index numbers had to be estimated. Initially 12 companies satisfied these conditions but two (ICDC Investments & Kenstock) were subsequently dropped because of their specialized nature of business (both are investment companies).

The analysis was conducted separately for the following periods:

1984 - 1988.....First sub period

1989 - 1993.....Second sub period

1984 - 1993.....Total period

The two sub-periods had widely different inflation rates so that we could expect *apriori* to find different association between price-level restated data and security price behaviour in the second sub-period as compared with the first sub-period. Going by the inflation figures published by the Central Bureau of

Statistics (CBS) in the various issues of the Economic Survey, the inflation rate ranged from a low of 5.7% (1986) to a high of 12.3 (1987) for the first sub-period. Comparable figures for the second sub-period were 10.5% (1989) and 46% (1993) respectively as measured by changes in the weighted Consumer Price Index (CPI) for Nairobi[13].

3.3 Data Collection

Secondary data was used in this study. HC data obtained from the financial statements of the companies in the sample for the relevant period were restated to obtain estimated GPLA data since this information was not publicly available. The GDP Implicit Price Index was used for all the restatements. This index was chosen inspite of the fact that it may not be the most accurate measure of inflation firstly because inflation defies precise measurement, and because previous studies have used an equivalent index. Although this index is not readily available, it can be computed if the relevant data, i.e the GDP stated both at current (market) prices and constant prices is available. The data employed to compute the index was obtained from various issues of the Economic Survey which is published annually by the Central Bureau of Statistics. To obtain the index for any one year, GDP at current prices is divided by GDP at constant prices for that year.

When this was done, four different series of index numbers were obtained corresponding to the four different "base periods" that have been used to date. An additional series developed by Imbisi (1978) was also obtained because GDP data for the years 1965-1967 inclusive were not readily available. In order to obtain a single series for the whole period, these series were spliced in order to change them to a common base period[14]. The complete series thus obtained, with 1982 being the base year is reported in the first column

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[13] The CBS prepares three different CPIs for Nairobi and a few others for the major towns like Mombasa, Kisumu and Nakuru. The rates indicated here were measured by the weighted CPI with the weights being .768, .209, & .023 respectively for the Lower, Middle & Upper Income classes respectively.

[14] The simple computational splicing procedure is well illustrated in Imbisi (1978).

of Appendix A(1). The other columns report the indices applicable to each of the companies in the sample since they had different fiscal year-ends. The assumption is that over any one year, the movement in the index occurred uniformly.

The procedures used in this study to effect the restatement of cost of goods sold and depreciation and to compute the monetary gains or losses arising upon restatement are set out below.

Cost of Goods Sold (COGS)

Since published financial statements of Kenyan companies do not provide information on purchases and sometimes sales, it is not possible to determine the cost of goods sold. For this reason similar assumptions were made as those made by Imbisi (1978) and restatement proceeded from net income. The main assumption made was that over any one year, all expense and revenue items other than depreciation occurred uniformly throughout the year and that therefore the use of the average index for the year would adequately reflect the effect of general price level changes on these items.

Depreciation Expense

This was restated using Cutler & Westerwick's procedures. The procedure was employed because of its simplicity and the fact that it requires less data to be used. Again most of the companies in the sample used the straight line method of depreciation, such that reasonable estimates of asset lives could be obtained. Adjusted Depreciation was computed as follows.

HC amount x Index at current year end

  Index at date of purchase.

Date of purchase   = Current year end minus average age of assets

Average age of assets = Accumulated depreciation

  Depreciation charge for current year.

Monetary Gain (Loss)

This was computed as below, following Baran, et al.

if   NMt = Net Monetary assets at the end of year t,

Pt = The GDP Implicit Price Index at the end of year t,

PA_t = The Average GDP Implicit Price Index of year t,

and   G = Gain (Loss) on net monetary items,

Then, $G = NM_t - (NM_t \times P_t / P_{t-1}) + (NM_t - NM_{t-1}) \times Pt / PAt$

Net monetary items were defined as:

Current Assets (excluding inventory, marketable securities and prepaid expenses)

less

Current and Long term liabilities (excluding deferred taxes, deferred income and customer

advances)

3.4 Data Analysis Technique

For purposes of analyzing data, estimates of both accounting and market *beta* were required.

Accounting *betas* were estimated from the following time series regression using annual observations.

$$X_{it} = a_i + b_i X_{mt} + e_{it}$$

where X_{it} =   Value of some earnings variable in period t.

In this study, the earnings variable was defined as net

income before depreciation divided by market value, i.e

(NI +Dep.)/MV.

X_{mt} = A market wide index of earnings in period t.

This was defined as the arithmetic average of the sample earnings in period t, excluding the earnings of the firm for which the beta is being estimated.

a_i & b_i = estimated intercept and accounting beta for security i respectively.

e_{it} = the stochastic error term associated with X_{it}.

Market *beta* was estimated from the following time series regression using monthly observations.

$$R_{it} = a_{it} + B_i R_{mt} + E_{it}$$

where R_{it} = *ex post* return on security i in period t;

$$= (P_{it} - P_{t-1})/P_{it-1} + D_{it}/P_{it-1}$$

and P_{it} = Price of security i in period t,

D_{it} = Dividends paid on security i in period t

R_{mt} = *ex post* return on the market portfolio in period t represented in this study by the return on the NSE index.

a_i, B_i = intercept and slope (market beta) respectively of the assumed linear relationship between R_{it} & R_{mt}.

E_{it} = stochastic error term associated with R_{it}.

Note that beta estimates thus obtained, especially accounting betas are prone to large estimation errors (Baran, Lakonishok & Ofer [1980:28]. In attempting to reduce these measurement errors, Baran et al used

the "Bayesian Adjustment" procedure proposed by Vasiceck (1973)[15]. The procedure modifies the estimated

beta of a single security, by allowing for prior information to be incorporated in the adjustment procedure.

Specifically, each bayesian adjusted beta is computed as the weighted average of the mean cross-sectional

beta and the estimated single security beta[16]. The effect of the procedure is to adjust the beta estimates

towards the beta of the sample distribution (usually a value close to one). Thus betas smaller than one will

usually be increased whereas betas larger than one are usually reduced. This procedure was also employed

in the present study in order to reduce these measurement errors.

For each of the companies in the sample, six market beta estimates were computed (i.e one for each

combination of period and adjustment procedure). Similarly a total of twelve accounting betas were

computed for each firm - one for each combination of period, adjustment procedure and accounting data

set. Having obtained the estimated beta values, the binomial test of significance was employed to assess

the relative information content of the alternative data sets. Results obtained are reported in the chapter 4.

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[15] See Vasiceck A.O.,"A Note on Using Cross-Sectional Information in Bayesian Estimation of Security Betas", in **Journal of Finance**, (Dec. 1973) pp. 1233-1239.

[16] The actual adjustment procedure is as follows:

If $B^\wedge$ = Adjusted Beta Estimate;

$B\sim$ = Mean of the cross-sectional betas for the sample firms;

B_i = Estimated beta coefficient for security or firm i;

$S^2 B\sim$ = Variance of cross-sectional betas, $B\sim$;

and $S^2 B_i$ = Variance of Estimated B_i ;

Then, $B^\wedge = \dfrac{(B\sim /S^2 B\sim + Bi/S^2 B_i)}{(1/S^2 B\sim + 1/S^2 B_i)}$

CHAPTER 4: RESULTS AND INTERPRETATION:

4.1 Results of Restating HC Financial Statements:

It was indicated in chapter three that for lack of published GPLA data, HC financial statement data had to be restated to obtain estimates of GPLA data. The actual restatements are illustrated for Kenya Breweries Limited for the year 1984 in this section. The results are then presented and an attempt made to draw inferences therefrom. However it should be noted that while the restatement procedures employed enabled us to obtain estimates of GPLA data the degree of error associated with this estimates cannot be known because there was no data available against which our estimates could be verified[17].

Adjusted Depreciation: This was computed as the HC depreciation expense multiplied by the ratio of the price level at the year end to that of the price level when the asset was purchased. The year-end index used for the restatement of depreciation expense for KBL was 115.71, being the average index for the years 1983 and 1984. The fiscal year end for the company is 30th June. Following the specified methodology in chapter 3, the actual computation is:

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[17] This could be not a problem if there was GPLA data prepared by the companies themselves. Due to the failure to validate GPLA estimates, the conclusions arrived at in this study may be invalid to the extent that the estimation procedures wrought about material errors.

	F/HOLD PROPERTY K£	L/HOLD PROPERTY K£	PLANT & EQUIPMENT K£	MOTOR VEHICLES K£	TOTAL K£
Acc. Dep. (A)	1,745,058	1,092,331	11,637,067	4,441,254	18,915,710
Dep. Exp. (B)	441,313	343,239	3,848,989	696,745	5,330,286
Av. Age (C)	4 Yrs	3 Yrs	3 Yrs	6 Yrs	4 Yrs
P/Date	1980	1981	1981	1978	1980
Y/E Index(D)	115.71	115.71	115.71	115.71	115.71
P/D Index.(E)	78.29	86.07	86.07	69.50	78.29
R/Dep'n	652,246	461,441	5,174,469	1,160,005	7,877,984
			TOTAL ACROSS		7,448,160

KEY :**Acc. Dep.** represents accumulated depreciation to 1984 by asset class,

Dep. Exp. represents the depreciation charge for the year,

Av. Age refers to the average age of the asset obtained by dividing (B) into (A),

P/Date refers to the purchase date of the asset, obtained as 1984-(C).

Y/E stands for year end,

R/Dep'n stands for restated depreciation expense for the year obtained as (A)x(D)/(E).

The foregoing computations show that the difference between adjusted depreciation by category of assets and that obtained when total depreciation expense is restated can be quite substantial. It was deemed appropriate to use the figure obtained by category but in a few cases, (i.e Carbacid [1986], Consolidated Holdings [1991], Sofar [1990] & Kakuzi [1983]), the total depreciation was adjusted since the data by asset category was not readily available. The results of restating depreciation are reported in Appendix B. As can be observed the percentage change arising on adjusting for general price changes can be considerable. The impact of the adjustment is especially remarkable for the year 1993 when the rate of price change was

particularly high. The observed differences could however be compensated for by monetary gains arising upon restatement and thus need not be considered significant in isolation.

Adjusted Net Income[18]: This was obtained by multiplying reported HC Net Income with the ratio of the year end index to the average index for the particular year. For the KBL case for 1984:

$$\text{Restated NI} = \text{HC NI} \times \frac{\text{Index at 30.6.1984}}{\text{Average Index for 1983-1984}}$$

$$= 4,006,660 \times \frac{115.71}{110.12}$$

$$= 4,210,049.$$

Appendix D reports the results of restating net income for half-year change in prices. It can be observed that for all the companies in all the years, the percentage difference is less than ten, suggesting that except for depreciation all other costs and revenues are not materially affected by changes in the general level of prices.

The Monetary Gain/(Loss): In order to compute this, assets were first classified into either the monetary or non-monetary category as specified in chapter 3. The net monetary liability (asset) position was then computed for each year and restated to obtain the monetary gain or loss. For KBL for the year 1984, this was done as follows:

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[18] Note that in this study, adjusted or restated net income is used only in reference to the effect of making the General Price Level Adjustment on the reported HC net income and should not be confused with GPLA net income. The latter is defined in this study as the sum of adjusted net income and monetary gains arising upon restatement less any additional depreciation and monetary losses arising.

Net Mon. Liab./(Asset) at 30.6.1984   37,958,460

Net Mon. Liab./(Asset) at 30.6.1984 x Y/E Index

Average Index

i.e, 37,958,460 x 115.71/110.12   (42,018,305)

Change in NML during Year x (Y/E Index)/ (Av. Index)

i.e   2577337 x 115.71/110.12   (2,708,222)

Net Monetary Loss   (6,768,067)

The results of monetary gains/(losses) computation are reported in appendix C.

The impact of the foregoing adjustments is reported in Appendix E which reports HC net income against GPLA net income. GPLA net income is obtained as the sum of restated net income as computed above and monetary gains **less** additional depreciation and any monetary losses arising upon restatement. It can be observed that for all the companies and for most of the years the difference between HC and GPLA net income is quite substantial in terms of magnitude.

4.2 Estimated Accounting and Market Betas

The HC and GPLA net income figures obtained were used to estimate the accounting variables to be used in calculating the betas required for analysis. The earnings variable was defined as net income before depreciation divided by market value, where market value was obtained as the product of a firm's bid price[19] and the number of ordinary shares issued. The accounting variables used in the regressions to estimate accounting betas are reported in Appendix F. The independent variable was defined as the sample

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[19] Bid prices were used for two reasons. One is that transactions prices which could have been used were not recorded in a consecutive order and therefore there was no rationale for a transaction to be picked. The other is that mid-market prices (bid-offer averages) are subject to a possible bid-offer spread effect and were therefore deemed inappropriate. (West, 1986:33).

average of the earnings variables of the firms in the sample, excluding that of the firm for which the
particular beta was being estimated. This was in order to avoid a situation whereby a particular firm's
earnings are regressed against an average part of which are those earnings themselves, a situation likely
to induce spurious correlation.

TABLE 2   <u>ACCOUNTING BETA ESTIMATES</u>

<u>TOTAL PERIOD</u>   <u>1ST HALF-PERIOD</u>   <u>2ND HALF-PERIOD</u>

CODE	UNADJUSTED HC			UNADJUSTED HC			UNADJUSTED HC		
	<u>BETA</u> X1	<u>SE BETA</u>	<u>R²</u>	<u>BETA</u> X5	<u>SE BETA</u>	<u>R²</u>	<u>BETA</u> X9	<u>SE BETA</u>	<u>R²</u>
001	-0.152	0.305	0.030	-0.718	1.229	0.102	-0.180	0.105	0.495
002	0.230	0.089	0.456	0.222	0.226	0.243	0.246	0.196	0.334
003	1.750	0.631	0.490	2.367	1.531	0.443	1.235	1.369	0.213
004	-0.046	0.063	0.061	-0.024	0.059	0.053	0.059	0.149	0.049
005	0.692	0.507	0.189	-0.036	1.572	0.000	0.227	0.789	0.028
006	0.579	0.201	0.508	0.137	0.364	0.045	0.256	0.359	0.145
007	-0.039	0.098	0.019	0.313	0.113	0.720	-0.138	0.215	0.121
008	0.082	0.086	0.103	0.382	0.256	0.427	-0.083	0.081	0.258
009	0.089	0.134	0.053	0.215	0.286	0.158	0.081	0.314	0.022
010	5.660	0.938	0.820	5.426	2.368	0.636	7.118	1.776	0.843
Average	0.885	0.305	0.273	0.828	0.800	0.283	0.882	0.535	0.252
Variance	2.818			2.906			4.466		
Std Devi	1.679			1.705			2.113		

Table 2	UNADJUSTED			UNADJUSTED			UNADJUSTED		
(contd)	GPLA			GPLA			GPLA		
CODE	BETA	SE BETA	R^2	BETA	SE BETA	R^2	BETA	SE BETA	R^2
	X3			X7			X11		
001	-0.032	0.318	0.001	-2.124	2.018	0.269	0.079	0.107	0.154
002	0.075	0.038	0.326	0.131	0.059	0.621	0.145	0.037	0.838
003	0.429	0.282	0.224	1.477	1.468	0.252	0.470	0.384	0.333
004	-0.014	0.010	0.218	-0.061	0.033	0.528	-0.015	0.016	0.230
005	0.179	0.110	0.248	0.245	0.551	0.062	0.138	0.169	0.181
006	0.077	0.178	0.023	-1.016	1.039	0.242	-0.009	0.076	0.005
007	-0.051	0.057	0.093	-0.167	0.310	0.088	-0.030	0.080	0.046
008	-0.004	0.037	0.001	-0.256	0.114	0.625	0.018	0.056	0.033
009	0.151	0.145	0.119	1.361	0.748	0.525	0.169	0.065	0.691
010	8.158	0.247	0.993	7.284	0.872	0.959	8.115	0.429	0.992
Average	0.897	0.142	0.225	0.687	0.721	0.417	0.908	0.142	0.350
Variance	5.876			5.808			5.791		
Std. Devi	2.424			2.410			2.409		

TABLE 2 contd

CODE	TOTAL PERIOD UNADJUSTED			1ST SUB PERIOD UNADJUSTED			2ND SUB PERIOD UNADJUSTED		
	MARKET BETA X13	SE BETA	R^2	MARKET BETA X15	SE BETA	R^2	MARKET BETA X17	SE BETA	R^2
001	0.417	0.314	0.015	0.860	0.767	0.021	0.369	0.393	0.015
002	-1.438	0.373	0.112	0.064	0.482	0.000	0.534	0.534	0.139
003	-0.096	0.433	0.004	0.596	0.844	0.009	0.586	0.586	0.002
004	0.161	0.316	0.002	0.510	0.702	0.009	0.409	0.409	0.001
005	1.784	0.457	0.115	0.313	1.458	0.001	0.465	0.465	0.233
006	0.163	0.260	0.003	-0.634	0.659	0.016	0.317	0.317	0.010
007	1.297	0.257	0.178	-0.156	0.906	0.001	0.217	0.217	0.446
008	0.922	0.211	0.139	0.062	0.517	0.000	0.259	0.259	0.205
009	0.415	0.195	0.037	0.428	0.356	0.024	0.268	0.268	0.040
010	-0.042	0.932	0.000	2.055	1.892	0.020	1.240	1.240	0.002
Average	0.358	0.375	0.061	0.410	0.858	0.010	0.330	0.469	0.109
Variance	0.691			0.461			0.918		
Std Devi	0.831			0.679			0.958		

The earnings variables were regressed separately for the total (single) period, the first half-period and the

second half-period. The resulting accounting betas, with their associated standard errors and coefficients of determination are shown in Table 2. This table also contains estimated unadjusted market betas which were obtained by running the regressions specified in chapter 3.[20] Although further analysis of these betas will be conducted later on it seems appropriate to make a few observations at this stage.

4.3 Observations and Interpretations

At the single period level we note that except for one case, the signs of the beta estimates are the same for both sets of accounting data. This appears to suggest that in assessing systematic risk, the two sets of accounting data do convey at least some similar information. Secondly it can be observed that HC beta estimates are consistently higher than their GPLA counterparts. This suggests that risk levels are assessed differently depending on the set of accounting information used. In 8 of the 10 cases, GPLA beta estimates are associated with a lower standard error (SE) than HC beta estimates. Apparently then, the estimation of HC accounting betas is more prone to error than that of GPLA betas. Comparing the coefficients of determination reveals that there is no difference in the strength of the indicated relationship as between HC and GPLA data sets, since in 50% of the cases GPLA data indicates a stronger relationship between accounting earnings and the sample average whereas in other 50% percent of the cases HC data indicates a stronger relationship. This means that both sets of data convey the same information set.

Looking at the first sub period, it can be noted that in 6 of the 10 cases GPLA betas are higher than corresponding HC beta estimates. The inherent implication is that the alternative accounting data sets do convey different information. The signs associated with the beta estimates are however not consistent in this

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[20] The actual variables are not reported for the sake of brevity. Note that for each company, there were 120 data points (12 months x 10 years). Note also that it was deemed logical to divide annual dividends into monthly dividends by simply dividing into twelve months. The inherent assumption here is that shareholders would view dividend income the same whether declared/paid on a monthly basis or an annual basis.

sub period as they were for the total period. This suggests that the division of the period into sub periods may bring out more information than if analysis was conducted only for the total period. It can also be observed that in 6 of 10 cases, HC betas exhibit a higher susceptibility to estimation error as measured by the SE than GPLA betas. This is consistent with the corresponding finding for the total period. Again in 8 of 10 cases, R^2 is higher for the GPLA betas as against HC betas, suggesting that alternative average earnings do not account for the same amount of movement in the earnings of any one firm.

The findings for the second sub-period suggest that systematic risk is assessed differently by the different sets of accounting information. In 8 of the 10 cases, GPLA beta estimates are lower than corresponding HC betas. Again the signs of the estimated betas are not consistent. As between the sub-periods, there is no difference in the risk level indicated by HC betas since in 5 of the 10 cases the magnitude of the betas is higher in the second sub-period than the first sub-period. On the other hand, the GPLA betas for the second half-period are lower than for the first sub-period in 8 of the 10 cases. That risk levels as indicated by GPLA betas should be assessed differently in each sub-period makes sense since the rates of inflation (an important component of risk) in the two periods were different . Also in 7 of the 10 cases, the HC beta estimates for the second sub-period are closer to corresponding total period betas, suggesting that total period results are influenced more by price changes in the second sub-period than the first sub-period. This seems reasonable if one takes into account the fact that the rate of price changes was significantly higher in the second sub-period than in the first sub-period. This finding also applies to GPLA betas, for in 9 of the 10 cases, the second sub-period betas are closer to the corresponding total period betas than those of the first sub-period. Consistent with the findings for the total and first sub-period, GPLA beta estimates are subject to a lower SE in 9 of 10 cases than the HC counterparts. In 6 of the 10 cases, GPLA betas exhibit a stronger relationship between accounting earnings and the market average than do HC betas. However the significance of these results cannot be established at this stage.

Table 3 reports some general statistics of both accounting and market beta estimates. The average market

beta is not close to one as expected. This finding is profound if it is not the result of error because it suggests that the assumption normally held that market beta for any security should be close to one does not hold for the securities represented in the sample. The mean accounting betas

TABLE 3

General Statistics for Beta Estimates (Bayesian Adjusted cross-sectional standard deviations in parenthesis)

	TOTAL PERIOD				1ST SUB-PERIOD				2ND SUB PERIOD			
	B~	S	S_B~	R^2	B~	S	S_B~	R^2	B~	S	S_B~	R^2
Mkt Beta	.36	.831	.375	.06	.41	.679	.858	.01	.328	1.01	.469	.109
		(.34)				(.21)				(.48)		
HC Beta	.88	1.68	.305	.273	.83	1.71	.8	.28	.882	2.11	.535	.252
		(1.24)				(1.27)				(1.7)		
GPLA Beta	.90	2.42	.142	.225	.68	2.41	.721	.41	.908	2.41	.142	.350
		(2.1)				(2.1)				(2.1)		

Key: B~ - Average bayesian adjusted beta

R^2 - Average Coefficient of determination of beta estimates.

S - Cross-sectional standard deviation of betas

S_B ~- Average standard deviation of estimated betas

TABLE 4 **UNADJUSTED V ADJUSTED HISTORIC COST ACCOUNTING BETAS:**

	SINGLE PERIOD		FIRST SUB-PERIOD		SECOND SUB-PERIOD	
COMPANY	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
001	-0.152	0.119	-0.718	-0.322	-0.18	0.014
002	0.23	0.401	0.222	0.377	0.246	0.362
003	1.75	1.523	2.367	1.973	1.235	1.17
004	-0.046	0.198	-0.024	0.194	0.059	0.21
005	0.692	0.742	-0.036	0.185	0.227	0.347
006	0.579	0.659	0.137	0.314	0.256	0.371
007	-0.039	0.203	0.313	0.445	-0.138	0.049
008	0.082	0.292	0.382	0.496	-0.083	0.094
009	0.089	0.287	0.215	0.372	0.081	0.228
010	5.66	4.409	5.426	4.249	7.118	5.977

UNADJUSTED V ADJUSTED GPLA ACCOUNTING BETAS:

	SINGLE PERIOD		FIRST SUB-PERIOD		SECOND SUB-PERIOD	
COMPANY	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
001	-0.032	0.103	-2.124	-1.711	0.079	0.201
002	0.075	0.195	0.131	0.213	0.145	0.257
003	0.429	0.497	1.477	1.361	0.47	0.535
004	-0.014	0.118	-0.061	0.049	-0.015	0.121
005	0.179	0.283	0.245	0.31	0.138	0.251
006	0.077	0.196	-1.016	-0.766	-0.009	0.126
007	-0.051	0.087	-0.167	-0.042	-0.03	0.108
008	-0.004	0.127	-0.256	-0.117	0.018	0.149
009	0.151	0.259	1.361	1.262	0.169	0.278
010	8.158	7.102	7.284	6.315	8.115	7.054

Table 4 (Contd)

UNADJUSTED V ADJUSTED MARKET BETAS:

COMPANY	SINGLE PERIOD		FIRST SUB-PERIOD		SECOND SUB-PERIOD	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
001	0.417	0.382	0.86	0.552	0.369	0.347
002	-1.438	-0.376	0.064	0.301	-1.631	-0.662
003	-0.096	0.173	0.596	0.469	-0.189	0.066
004	0.161	0.278	0.51	0.441	0.089	0.206
005	1.784	0.941	0.313	0.379	1.95	1.146
006	0.163	0.279	-0.634	0.08	0.24	0.282
007	1.297	0.742	-0.156	0.231	1.483	0.91
008	0.922	0.589	0.062	0.3	1.001	0.666
009	0.415	0.381	0.428	0.416	0.419	0.373
010	-0.042	0.195	2.055	0.929	-0.434	-0.058

4.5 Matrix Correlation Between Accounting and Market Betas:

Table 5 reports the correlations between accounting and market beta estimates. For the total period, it can be observed that both the unadjusted HC and GPLA betas exhibit just about the same correlation with corresponding market betas. Similar results apply when adjusted betas are considered. However, whereas unadjusted betas show a weak inverse relationship, adjusted betas show a fairly strong positive correlation. Overall it appears that both sets of accounting beta estimates exhibit similar relationship with corresponding market betas. Note however that both the unadjusted and the adjusted HC accounting betas do exhibit a slightly stronger relationship. Two inferences are suggested by these results. One is that both HC and GPLA beta estimates convey the same information with regard to the assessment of the systematic risk of securities while the other is that the bayesian adjustment does have a significant impact on the beta estimates as evidenced by the conflicting magnitude and direction of the indicated correlations.

For the first half-period, the correlation between unadjusted accounting betas (both HC and GPLA) and the

TABLE 5

MATRIX CORRELATION COEFFICIENTS

MARKET BETAS

	SINGLE PERIOD		FIRST SUB-PERIOD		SECOND SUB PERIOD	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
HC Unadj.- TP	-0.185					
FHP			-0.185			
SHP					0.813	
HC Adj. - TP		.813				
FHP				-0.322		
SHP						-0.322
GPLA Unadj. - TP	-0.18					
FHP			-0.18			
SHP					0.808	
GPLA Adj.- TP		0.808				
FHP				-0.282		
SHP						-0.282

corresponding market betas is exactly the same as reported for the total period. In contrast, the correlation between the period's adjusted accounting betas with the corresponding market betas presents a totally different picture. For whereas there was an indicated strong positive relationship for the total period, the indicated correlation in this sub-period is not only weak but also inverse. This implies that conducting the analysis by sub-period is likely to bring out information that could not be obtained if the analysis was

conducted only for the total period.

The results for the second sub-period indicate that there is a strong positive relationship between unadjusted HC and GPLA betas and the corresponding market betas. "Surprisingly", this finding is consistent with those of the correlation between the total period's adjusted betas. It should have been expected that the findings would be more consistent with those of their counterparts for the total period, but this evidently is not the case. As between the alternative accounting beta estimates, there is no significant difference in the correlations suggesting that there is no difference in the information content of the underlying accounting data sets. The correlations of the period's adjusted accounting betas with associated market betas are consistent with those of the first half-period. As between the alternatives there is no significant difference between the findings of both the HC and GPLA betas.

4.6 Spearman's and Kendall's Tau Rank Correlation coefficients:

The Spearman's rank correlation coefficients are reported in Table 6 below and this will enable us to assess the relative information content of the alternative accounting procedures. In this case similar results (in terms of their significance) apply whether the analysis is for the single period, the first sub-period or the second sub-period. All the reported coefficients (100%) are not statistically significant at 0.01 level of significance and for $n = 10$. Note that a spearman coefficient is statistically significant if it equals or exceeds the Tabled value[21]. The interpretation to be attached to this finding is that there is no significant difference in the

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[21] In this study, use was made of Table 13, prepared by Roscoe T.J., in his book titled **Fundamental Research Statistics for the Behavioral Sciences,** 2nd Edition, published by Holt, Rinehart & Winston Inc. Forthworth, Chicago (1975), pp. 439

TABLE 6

SPEARMAN'S RANK CORRELATION COEFFICIENTS

		SINGLE PERIOD		FIRST SUB-PERIOD		SECOND SUB PERIOD	
		Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
HC Unadj.-	TP	-0.358					
	FHP			-0.358			
	SHP					0.37	
HC Adj. -	TP		0.37				
	FHP				-0.358		
	SHP						-0.358
GPLA Unadj. -	TP	-0.408					
	FHP			-0.408			
	SHP					0.182	
GPLA Adj. -	TP		0.189				
	FHP				-0.467		
	SHP						-0.467

Table 6 (contd)	KENDALL'S TAU RANK CORRELATION COEFFICIENTS					
	SINGLE PERIOD		FIRST SUB-PERIOD		SECOND SUB-PERIOD	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
HC Unadj.- TP	-0.244					
FHP			-0.244			
SHP					0.289	
HC Adj. - TP		0.289				
FHP				-0.244		
SHP						-0.984
GPLA Unadj. - TP	-0.244					
FHP			-0.244			
SHP					0.111	
GPLA Adj. - TP		0.111				
FHP				-0.289		
SHP						-0.289

TP = Total Period   FHP = First Half Period   SHP = 2nd Half Period

indicated level of systematic risk whether one is using HC or GPLA data to assess this risk. That is both sets of accounting data would communicate similar information in assessing the systematic risk of equity securities. Similar results were obtained using the Kendall's Tau rank correlation coefficients.

Chapter 5: CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS:

5.1 Conclusion:

The study set out to investigate whether GPLA accounting data conveys information that is not currently discerned from conventional HC data in the assessment of systematic risk of equity securities. The null hypothesis tested in the study stated that GPLA earnings convey the same information set as do HC earnings in the assessment of the systematic risk of equity securities in the NSE.

The findings of the study indicate that this hypothesis cannot be rejected. This means that both HC and GPLA earnings communicate the same information as far as the assessment of the systematic risk of ordinary shares at the NSE is concerned. The matrix coefficients of correlation exhibit a similar relationship, whether HC or GPLA betas are used and at all the levels of analysis. This means that both the underlying sets of data contain largely the same information. Similarly, all the Spearman's and Kendall's tau rank correlation coefficients were not statistically significant for the total period as well as for both sub periods. This leads to the conclusion that in the context of assessing systematic risk of securities both the HC and GPLA data convey largely similar information. The fact that there was very strong correlation (over 95% in all cases) between HC and GPLA betas also leads to the conclusion that the underlying sets of data are largely the same. This conclusion is consistent with those of Beaver et al, [(1970); (1975); (1982) and (1984)], Basu (1977), and Gonedes (1974) but is inconsistent with the findings by Baran, et al (1980) and Short (1978).

Another conclusion that may be drawn from the study is that conducting analysis at three levels actually brings out more information than if analysis is conducted only for the total period. This finding is important because of it's implications to future research efforts in this area.

The implication of the study's findings is that adjustments for general price level changes add no additional information value to the currently available HC financial statements with regard to the ability of accounting data in assessing the systematic risk of ordinary shares. The implication for accounting policy makers is that they need not be concerned that price level changes distort the information provided under the conventional HC system, for the GPLA adjustment does not constitute any significant improvement in terms of informational value.

5.2 Limitations:

In interpreting the results of this study one must bear in mind a number of limitations. The first limitation arises from the fact that GPLA data was not publicly available and therefore had to be estimated. Furthermore the results of the estimation procedures employed were not validated for lack of actual restated data produced by the companies themselves. Consequently it is not possible to state the degree of error inherent in the estimated GPLA data employed. Note that given the lack of certain information as would enable comprehensive restatement, a number of assumptions had to be made, the main one being that all expense and revenue transactions other than depreciation occurred uniformly throughout the year. This assumption may only hold by coincidence.

Another limitation of the study relates to the size of the sample. The study employed a sample of only ten companies that had to satisfy closely defined criteria. Although there is no reason to expect biased representation of the population, it is possible that the sample selected was not truly representative. This would place severe limitations to the generalizability of the study's findings.

The other limitation relates to the choice of the relevant index for making price level adjustments. Given that inflation cannot be precisely characterised (or therefore measured), the choice of an index such as the GDP Implicit Price Deflator can only be an approximation. The index will not necessarily reflect the impact of price changes on specific companies.

5.3 Recommendations:

This is the first known study that has attempted to evaluate two alternative accounting procedures in the context of the usefulness of the resulting data in the assessment of the systematic risk of ordinary shares in the NSE. As with all such studies the findings of the study need collaboration in replication studies. It would be especially important to conduct a similar study covering all the companies whose ordinary shares are traded in the NSE to establish whether the finding that market beta is not close to one (as is suggested by the finance literature) actually holds or is due to error.

Moreover, the study considered only one of the proposed approaches for dealing with changing prices in the financial statements of companies. Many other approaches have been proposed and there is a need to explore the practicality of these approaches in the Kenyan context. A fruitful effort would be a study designed to improve on the estimation procedures used in this study to obtain GPLA data as more and more of the requisite data is becoming publicly available. Such a study would also seek to validate the resultant estimates by searching for GPLA data from those companies, if any prepare them.

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Appendix A

COMPANY CODE	COMPANY NAME	FISCAL YEAR END
001	CAR & GENERAL	30th September
002	CARBACID INVESTMENT LTD	31st July
003	CONSOLIDATED HOLDINGS	30th September
004	CREDIT FINANCE CORPORATION	31st March
005	E.A CABLES	31st December
006	E.A OXYGEN	30th September
007	E.A PACKAGING	30th June
008	KAKUZI LTD	28th February
009	KENYA BREWERIES LTD	30th June
010	SOFAR INVESTMENTS LTD	31st July

APPENDIX A(1)

INDEX NUMBERS

Yr. Ended Co. Code Year		28/2 008	31/3 004	30/6 007 & 009 (Average)	31/7 002 & 010	30/9 001, 003 & 006	31/12 005
1964	29.78						
1965	29.29	29.70	29.66	29.54	29.49	29.41	29.29
1966	29.58	29.34	29.36	29.44	29.46	29.51	29.58
1967	30.17	29.68	29.73	29.88	29.92	30.02	30.17
1968	30.88	30.29	30.35	30.53	30.58	30.70	30.88
1969	31.61	31.00	31.06	31.25	31.31	31.43	31.61
1970	32.48	31.76	31.83	32.05	32.12	32.26	32.48
1971	33.57	32.66	32.75	33.03	33.12	33.30	33.57
1972	35.77	33.94	34.12	34.67	34.85	35.22	35.77
1973	37.34	36.03	36.16	36.56	36.69	36.95	37.34
1974	44.62	38.55	39.16	40.98	41.59	42.80	44.62
1975	49.94	45.51	45.95	47.28	47.72	48.61	49.94
1976	58.25	51.33	52.02	54.10	54.79	56.17	58.25
1977	68.74	60.00	60.87	63.50	64.37	66.12	68.74
1978	70.25	68.99	69.12	69.49	69.62	69.87	70.25
1979	74.72	71.00	71.37	72.49	72.86	73.60	74.72
1980	81.85	75.91	76.50	78.29	78.88	80.07	81.85
1981	90.28	83.26	83.96	86.07	86.77	88.17	90.28
1982	100	91.90	92.71	95.14	95.95	97.57	100.00
1983	109.06	101.51	102.27	104.53	105.29	106.80	109.06
1984	122.36	111.28	112.39	115.71	116.82	119.04	122.36
1985	133.36	124.19	125.11	127.86	128.78	130.61	133.36
1986	146.22	135.50	136.58	139.79	140.86	143.01	146.22
1987	153.97	147.51	148.16	150.10	150.74	152.03	153.97
1988	168.02	156.31	157.48	161.00	162.17	164.51	168.02
1989	183.28	170.56	171.84	175.65	176.92	179.47	183.28
1990	198.35	185.79	187.05	190.82	192.07	194.58	198.35
1991	221.28	202.17	204.08	209.82	211.73	215.55	221.28
1992	253.14	226.59	229.25	237.21	239.87	245.18	253.14
1993	313.6	263.22	268.26	283.37	288.41	298.49	313.60

	HC Depreciation (A)	ADJUSTED Depreciation (B)	Difference (B) – (A)	Percentage Difference [(B) – (A)]/(A)
COMPANY: 001				
1983	306,036	514,719	208,683	68%
1984	355,399	618,443	263,044	74%
1985	356,482	680,675	324,193	91%
1986	356,971	700,128	343,157	96%
1987	308,426	827,606	519,180	168%
1988	353,290	836,255	482,965	137%
1989	401,462	993,936	592,474	148%
1990	476,451	945,896	469,445	99%
1991	530,646	1,023,401	492,755	93%
1992	690,300	1,362,082	671,782	97%
1993	867,600	1,779,294	911,694	105%
COMPANY: 002				
1983	131,093	172,091	40,998	31%
1984	157,687	176,227	18,540	12%
1985	162,762	200,521	37,759	23%
1986	187,591	189,027	1,436	1%
1987	262,563	283,130	20,567	8%
1988	286,859	332,784	45,925	16%
1989	294,797	373,099	78,302	27%
1990	443,705	455,256	11,551	3%
1991	694,101	770,160	76,059	11%
1992	730,735	917,862	187,127	26%
1993	767,159	1,150,012	382,853	50%
COMPANY: 003				
1983	232,088	287987	55,899	24%
1984	139,794	216241	76,447	55%
1985	178,363	270663	92,300	52%
1986	194,455	293395	98,940	51%
1987	222,691	324601	101,910	46%
1988	255,078	328848	73,770	29%
1989	266,000	412575	146,575	55%
1990	262,000	398717	136,717	52%
1991	241,000	406285	165,285	69%
1992	238,000	278098	40,098	17%
1993	195,000	503030	308,030	158%
COMPANY: 004				
1983	735,380	1,021,289	285,909	39%
1984	684,600	1,008,462	323,862	47%
1985	666,067	1,140,347	474,280	71%
1986	601,769	1,180,278	578,509	96%
1987	498,060	1,012,434	514,374	103%
1988	939,618	1,420,516	480,898	51%
1989	1,077,761	1,657,645	579,884	54%
1990	1,861,521	2,501,337	639,816	34%
1991	3,047,077	3,881,506	834,429	27%
1992	3,641,798	4,984,876	1,343,078	37%
1993	5,731,359	8,477,684	2,746,325	48%
COMPANY: 005				
1983	107,814	210,094	102,280	95%
1984	113,249	243,926	130,677	115%
1985	127,127	258,719	131,592	104%
1986	111,266	288,679	177,413	159%
1987	91,095	320,979	229,884	252%
1988	82,552	346,233	263,681	319%
1989	49,801	267,397	217,596	437%
1990	64,656	367,879	303,223	469%
1991	78,528	429,580	351,052	447%
1992	92,380	475,560	383,180	415%
1993	116,694	441,731	325,037	279%

	HC Depreciation (A)	ADJUSTED Depreciation (B)	Difference (B) − (A)	Percentage Difference [(B) − (A)]/(A)
COMPANY: 006				
1983	295,416	782,602	487,186	165%
1984	331,856	890,415	558,559	168%
1985	478,162	1,059,071	580,909	121%
1986	548,256	1,218,010	669,754	122%
1987	624,260	1,592,508	968,248	155%
1988	740,399	1,793,625	1,053,226	142%
1989	772,109	1,823,131	1,051,022	136%
1990	816,529	3,169,627	2,353,098	288%
1991	1,449,958	3,545,732	2,095,774	145%
1992	1,474,466	4,095,284	2,620,818	178%
1993	1,544,609	11,861,486	10,316,877	668%
COMPANY: 007				
1983	172,525	391024	218,499	127%
1984	181,223	440926	259,703	143%
1985	160,011	441788	281,777	176%
1986	116,878	360793	243,915	209%
1987	108,086	368809	260,723	241%
1988	129,295	379264	249,969	193%
1989	211,888	431843	219,955	104%
1990	374,999	537256	162,257	43%
1991	434,534	649851	215,317	50%
1992	523,167	808112	284,945	54%
1993	546,945	974647	427,702	78%
COMPANY: 008				
1983	292,504	409,602	117,098	40%
1984	319,730	478,249	158,519	50%
1985	362,615	586,168	223,553	62%
1986	381,014	645,718	264,704	69%
1987	428,337	718,832	290,495	68%
1988	439,195	780,675	341,480	78%
1989	442,250	856,545	414,295	94%
1990	470,850	899,662	428,812	91%
1991	569,100	1,069,843	500,743	88%
1992	720,600	1,302,655	582,055	81%
1993	810,150	1,551,930	741,780	92%
COMPANY: 009				
1983	4,669,781	5,953,910	1,284,129	27%
1984	5,330,286	7,448,160	2,117,874	40%
1985	5,647,192	8,799,587	3,152,395	56%
1986	5,949,496	9,995,954	4,046,458	68%
1987	5,508,792	9,683,990	4,175,198	76%
1988	7,731,795	12,371,314	4,639,519	60%
1989	8,004,574	12,605,791	4,601,217	57%
1990	8,401,327	15,422,152	7,020,825	84%
1991	9,527,950	15,526,703	5,998,753	63%
1992	10,275,300	19,485,900	9,210,600	90%
1993	10,575,600	24,663,100	14,087,500	133%
COMPANY: 010				
1983	374,564	377,287	2,723	1%
1984	511,800	571,992	60,192	12%
1985	511,700	630,407	118,707	23%
1986	487,500	491,231	3,731	1%
1987	844,550	910,705	66,155	8%
1988	908,800	1,054,296	145,496	16%
1989	894,600	901,068	6,468	1%
1990	1,389,950	1,519,884	129,934	9%
1991	1,200,050	1,446,550	246,500	21%
1992	1,129,250	1,141,865	12,615	1%
1993	0	0	0	

001 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	1,115,216	107		
1984	3,614,723	119	113	2,220,703
1985	4,497,676	131	125	486,725
1986	2,760,243	143	137	(2,078,226)
1987	1,931,262	152	148	(976,134)
1988	5,269,453	165	158	3,037,239
1989	6,463,061	179	172	657,790
1990	7,255,926	195	187	214,000
1991	7,850,459	216	205	(221,117)
1992	6,857,300	245	230	(1,999,312)
1993	10,367,550	298	272	1,599,768

002 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	26,489	105		
1984	(101,892)	117	111	(123,888)
1985	(224,015)	129	123	(105,135)
1986	(404,792)	141	135	(150,905)
1987	(446,801)	151	146	(12,093)
1988	(795,176)	162	156	(300,806)
1989	(728,695)	177	170	135,651
1990	(509,707)	192	184	271,626
1991	(738,054)	212	202	(163,919)
1992	(1,380,941)	240	226	(499,464)
1993	(2,352,363)	288	264	(584,558)

003 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	1,408,902	107		
1984	(698,569)	119	113	(2,141,630)
1985	(285,288)	131	125	460,163
1986	(104,491)	143	137	198,911
1987	473,473	152	148	565,770
1988	(26,309)	165	158	(517,327)
1989	1,008,000	- 179	172	987,628
1990	1,513,000	195	187	398,017
1991	715,000	216	205	(915,858)
1992	428,000	245	230	(364,265)
1993	239,000	298	272	(259,515)

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004 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	(1,156,088)	102		
1984	(1,302,086)	112	107	(24,035)
1985	(1,452,525)	125	119	5,897
1986	(1,640,132)	137	131	(45,464)
1987	(2,018,916)	148	142	(223,014)
1988	(2,444,748)	157	153	(285,030)
1989	(3,087,917)	172	165	(389,639)
1990	(3,731,275)	187	179	(340,359)
1991	(4,587,818)	204	196	(476,139)
1992	(5,542,194)	229	217	(326,269)
1993	(8,219,117)	268	249	(1,488,228)

005 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	12,122	109		
1984	176,622	122	116	152,415
1985	137,859	133	128	(52,824)
1986	11,126	146	140	(133,635)
1987	(353,347)	154	150	(355,154)
1988	(718,488)	168	161	(315,511)
1989	(554,993)	183	176	221,003
1990	(2,037,461)	198	191	(1,373,480)
1991	(1,944,545)	221	210	322,790
1992	(3,438,042)	253	237	(1,098,783)
1993	(3,856,814)	314	283	457,715

006 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	1,377,430	107		
1984	3,446,289	119	113	1,786,018
1985	3,223,467	131	125	(546,451)
1986	2,262,344	143	137	(1,219,464)
1987	1,664,267	152	148	(721,331)
1988	2,233,307	165	158	408,145
1989	853,592	179	172	(1,517,343)
1990	556,060	195	187	(356,367)
1991	(459,949)	216	205	(1,018,389)
1992	(1,426,092)	245	230	(832,289)
1993	4,105,147	298	272	5,180,926

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007 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	63,874	105		
1984	(107,746)	116	110	(168,808)
1985	(46,209)	128	122	69,459
1986	346,994	140	134	378,353
1987	(71,517)	150	145	(428,121)
1988	253,427	161	156	317,926
1989	1,871,737	176	168	1,518,418
1990	1,774,323	191	183	(254,686)
1991	1,447,358	210	200	(486,585)
1992	1,116,619	237	224	(496,768)
1993	2,374,708	283	260	907,537

008 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	(125,142)	102		
1984	235,982	111	106	354,992
1985	(582,459)	124	118	(795,740)
1986	(989,473)	136	130	(334,629)
1987	(2,477,593)	148	142	(1,331,670)
1988	(2,375,563)	156	152	246,704
1989	(2,663,920)	171	163	(58,072)
1990	806,950	186	178	3,547,155
1991	534,850	202	194	(330,743)
1992	999,750	227	214	370,619
1993	1,236,650	263	245	54,702

009 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	40,535,847	105		
1984	37,958,460	116	110	(6,768,067)
1985	38,162,102	128	122	(3,793,369)
1986	29,838,699	140	134	(11,478,508)
1987	64,725,108	150	145	31,353,449
1988	66,528,040	161	156	(2,965,049)
1989	76,166,399	176	168	3,127,122
1990	90,759,770	191	183	7,359,001
1991	99,383,500	210	200	(862,940)
1992	98,850,100	237	224	(13,470,020)
1993	140,480,700	283	260	17,985,086

010 Year	Net Mon. Liability	Year End Index	Average Index	Monetary Gain/Loss
1983	1,167,958	105		
1984	997,275	117	111	(288,752)
1985	50,550	129	123	(998,003)
1986	1,372,250	141	135	1,252,191
1987	4,619,350	151	146	3,033,115
1988	5,901,550	162	156	881,546
1989	7,168,000	177	170	669,581
1990	7,922,850	192	184	107,394
1991	8,405,800	212	202	(353,942)
1992	3,230,050	240	226	(5,927,290)
1993	(144,750)	288	264	(3,655,658)

001

Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	577,678	608,987	31309	5%	577,678	2,566,646	(1,988,968)	−344%
1985	237,320	248,319	10999	5%	237,320	410,851	(173,531)	−73%
1986	(849,342)	(887,833)	−38491	5%	(849,342)	(3,309,215)	2,459,873	−290%
1987	491,037	506,049	15012	3%	491,037	(989,265)	1,480,302	301%
1988	869,506	903,787	34281	4%	869,506	3,458,061	(2,588,555)	−298%
1989	665,632	694,581	28949	4%	665,632	759,896	(94,264)	−14%
1990	(181,927)	(189,276)	−7349	4%	(181,927)	(444,721)	262,794	−144%
1991	325,631	342,281	16650	5%	325,631	(371,591)	697,222	214%
1992	445,300	473,929	28629	6%	445,300	(2,197,165)	2,642,465	593%
1993	938,650	1,030,709	92059	10%	938,650	1,718,783	(780,133)	−83%

002

Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	173,238	182,231	8993	5%	173238	39803	133,435	77%
1985	182,085	190,952	8867	5%	182,085	48,058	134,027	74%
1986	265,569	277,467	11898	4%	265,569	125,126	140,443	53%
1987	308,365	318,813	10448	3%	308,365	286,153	22,212	7%
1988	403,817	418,568	14751	4%	403,817	71,837	331,980	82%
1989	454,460	474,228	19768	4%	454,460	531,577	(77,117)	−17%
1990	564,412	587,586	23174	4%	564,412	847,661	(283,249)	−50%
1991	552,712	579,622	26910	5%	552,712	339,645	213,067	39%
1992	441,070	468,545	27475	6%	441,070	(218,046)	659,116	149%
1993	1,210,578	1,321,835	111257	9%	1,210,578	354,424	856,154	71%

003

Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	928,618	978,947	50329	5%	928,618	(1,239,130)	2,167,748	233%
1985	149,293	156,212	6919	5%	149,293	524,075	(374,782)	−251%
1986	477,502	499,142	21640	5%	477,502	599,112	(121,610)	−25%
1987	245,307	252,807	7500	3%	245,307	720,667	(475,360)	−194%
1988	76,000	78,996	2996	4%	76,000	(405,598)	481,598	634%
1989	205,000	213,916	8916	4%	205,000	1,054,968	(849,968)	−415%
1990	353,000	367,260	14260	4%	353,000	628,559	(275,559)	−78%
1991	(1,095,000)	(1,150,987)	−55987	5%	(1,095,000)	(2,232,130)	1,137,130	−104%
1992	80,000	85,143	5143	6%	80,000	(319,220)	399,220	499%
1993	(895,000)	(982,778)	−87778	10%	(895,000)	(1,550,323)	655,323	−73%

004

Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	418,863	438,610	19747	5%	418,863	398,382	20,481	5%
1985	428,473	451,421	22948	5%	428,473	433,604	(5,131)	−1%
1986	553,689	577,958	24268	4%	553,689	503,569	50,121	9%
1987	703,535	732,147	28612	4%	703,535	483,414	220,121	31%
1988	912,522	940,348	27826	3%	912,522	631,273	281,249	31%
1989	1,078,954	1,126,002	47048	4%	1,078,954	707,368	371,586	34%
1990	1,186,923	1,237,226	50303	4%	1,186,923	864,876	322,048	27%
1991	1,574,960	1,643,535	68575	4%	1,574,960	1,125,675	449,286	29%
1992	2,411,892	2,551,987	140095	6%	2,411,892	2,158,564	253,328	11%
1993	3,790,218	4,087,411	297193	8%	3,790,218	2,461,866	1,328,352	35%

005 Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	228,650	241,791	13141	6%	228,650	263,529	(34,879)	−15%
1985	28,490	29,716	1226	4%	28,490	(154,700)	183,190	643%
1986	477,814	499,792	21978	5%	477,814	188,744	289,070	60%
1987	636,731	653,169	16438	3%	636,731	68,131	568,600	89%
1988	690,763	720,904	30141	4%	690,763	141,713	549,050	79%
1989	1,639,117	1,710,318	71201	4%	1,639,117	1,713,725	(74,608)	−5%
1990	1,185,534	1,232,349	46815	4%	1,185,534	(444,354)	1,629,888	137%
1991	1,308,997	1,380,525	71528	5%	1,308,997	1,352,263	(43,266)	−3%
1992	1,899,115	2,026,651	127536	7%	1,899,115	544,688	1,354,427	71%
1993	3,355,690	3,713,676	357986	11%	3,355,690	3,846,354	(490,664)	−15%

006 Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	738,901	778,948	40047	5%	738,901	2,006,407	(1,267,506)	−172%
1985	704,894	737,562	32668	5%	704,894	(389,798)	1,094,692	155%
1986	1,082,240	1,131,285	49045	5%	1,082,240	(757,933)	1,840,173	170%
1987	1,017,454	1,048,560	31106	3%	1,017,454	(641,019)	1,658,473	163%
1988	946,566	983,886	37320	4%	946,566	338,805	607,761	64%
1989	1,179,902	1,231,217	51315	4%	1,179,902	(1,337,148)	2,517,050	213%
1990	1,420,752	1,478,144	57392	4%	1,420,752	(1,231,321)	2,652,073	187%
1991	1,465,873	1,540,823	74950	5%	1,465,873	(1,573,339)	3,039,212	207%
1992	1,789,317	1,904,353	115036	6%	1,789,317	(1,548,754)	3,338,071	187%
1993	2,648,365	2,908,106	259741	10%	2,648,365	(2,227,845)	4,876,210	184%

007 Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	255,818	268,804	12986	5%	255,818	(159,707)	415,525	162%
1985	451,181	641,680	190499	42%	451,181	429,362	21,819	5%
1986	618,255	767,900	149645	24%	618,255	902,338	(284,083)	−46%
1987	574,627	706,994	132367	23%	574,627	18,150	556,477	97%
1988	901,731	1,067,150	165419	18%	901,731	1,135,107	(233,376)	−26%
1989	1,203,793	1,477,287	273494	23%	1,203,793	2,775,750	(1,571,957)	−131%
1990	1,177,857	1,617,136	439279	37%	1,177,857	1,200,194	(22,337)	−2%
1991	1,476,364	2,001,521	525157	36%	1,476,364	1,299,719	176,645	12%
1992	2,700,848	3,421,554	720706	27%	2,700,848	2,639,841	61,007	2%
1993	3,848,698	4,785,406	936708	24%	3,848,698	5,265,241	(1,416,543)	−37%

008 Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	1,683,320	1,760,608	77288	5%	1,683,320	1,957,081	(273,761)	−16%
1985	2,379,532	2,509,993	130461	5%	2,379,532	1,490,700	888,832	37%
1986	1,857,468	1,938,364	80896	4%	1,857,468	1,339,032	518,436	28%
1987	2,259,109	2,354,978	95869	4%	2,259,109	732,813	1,526,296	68%
1988	1,220,359	1,255,706	35347	3%	1,220,359	1,160,930	59,429	5%
1989	1,662,662	1,735,146	72484	4%	1,662,662	1,262,780	399,882	24%
1990	1,697,102	1,769,634	72532	4%	1,697,102	4,887,977	(3,190,875)	−188%
1991	1,168,550	1,217,887	49337	4%	1,168,550	386,401	782,149	67%
1992	2,420,150	2,557,989	137839	6%	2,420,150	2,346,554	73,596	3%
1993	3,702,900	3,979,818	276918	7%	3,702,900	3,292,741	410,159	11%

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009 Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	4,006,660	4,210,049	203389	5%	4,006,660	(4,675,892)	8,682,552	217%
1985	4,916,065	5,161,293	245228	5%	4,916,065	(1,784,471)	6,700,536	136%
1986	8,052,299	8,411,215	358916	4%	8,052,299	(7,113,751)	15,166,050	188%
1987	11,101,264	11,496,083	394819	4%	11,101,264	38,674,334	(27,573,070)	-248%
1988	5,534,041	5,727,937	193896	4%	5,534,041	(1,876,631)	7,410,672	134%
1989	6,238,390	6,509,866	271476	4%	6,238,390	5,035,771	1,202,619	19%
1990	6,553,319	6,824,593	271274	4%	6,553,319	7,162,770	(609,451)	-9%
1991	10,439,450	10,934,532	495082	5%	10,439,450	4,072,839	6,366,611	61%
1992	12,043,950	12,781,896	737946	6%	12,043,950	(9,898,724)	21,942,674	182%
1993	18,429,800	20,063,976	1634176	9%	18,429,800	23,961,563	(5,531,763)	-30%

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010 Year	HC Net Income	Restated Net Income	Difference Amount	%	HC Net Income	GPLA Net Income	Difference Amount	%
1984	133,620	140,556	6936	5%	133,620	(208,388)	342,008	256%
1985	529,789	555,588	25799	5%	529,789	(561,122)	1,090,911	206%
1986	89,850	93,875	4025	4%	89,850	1,342,335	(1,252,485)	-1394%
1987	(998,150)	(1,031,969)	-33819	3%	(998,150)	1,934,990	(2,933,140)	294%
1988	(741,650)	(768,741)	-27091	4%	(741,650)	(32,691)	(708,959)	96%
1989	(1,322,850)	(1,380,392)	-57542	4%	(1,322,850)	(717,279)	(605,571)	46%
1990	0	0	0		0	(22,540)	22,540	
1991	(2,180,750)	(2,286,925)	-106175	5%	(2,180,750)	(2,887,367)	706,617	-32%
1992	(1,575,950)	(1,674,118)	-98168	6%	(1,575,950)	(7,614,023)	6,038,073	-383%
1993	(12,400)	(13,540)	-1140	9%	(12,400)	(3,669,198)	3,656,798	-29490%

001 Year	No. of Ord. Shares	Price Kshs.	Ordinary dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		3.75									
1984	12458920	3.75	253177	2336048	0.02032	0.39943	0.58259	933,077	3,185,089	1.36345	0.31611
1985	12458920	4.00	189884	2491784	0.01524	0.23830	0.51717	593,802	1,091,526	0.43805	0.29594
1986	12458920	2.50	158235	1557365	0.01270	−0.31616	0.56502	(492,371)	(2,609,087)	−1.67532	0.72419
1987	12458920	5.25	253177	3270467	0.02032	0.24445	0.31889	799,463	(161,659)	−0.04943	0.99311
1988	12458920	6.50	474708	4049149	0.03810	0.30199	0.34344	1,222,796	4,294,316	1.06055	0.60571
1989	12658872	10.00	158236	6329436	0.01250	0.16859	0.20767	1,067,094	1,753,832	0.27709	0.44216
1990	12658872	5.25	210981	3322954	0.01667	0.08863	0.48626	294,524	501,175	0.15082	0.56752
1991	16878496	6.50	210981	5485511	0.01250	0.15610	−0.02671	856,277	651,810	0.11882	−0.18644
1992	16878496	7.50	253200	6329436	0.01500	0.17942	0.09143	1,135,600	(835,083)	−0.13194	−1.91190
1993	16878496	9.50	506350	8017286	0.03000	0.22529	0.11165	1,806,250	3,498,077	0.43632	−1.04523

002 Year	No. of Ord. Shares	Price Kshs.	Ordinary dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		6.75									
1984	1741824	8.50	87091	740275	0.05000	0.44703	0.58259	330,925	216,030	0.29182	0.31611
1985	1741824	10.00	87091	870912	0.05000	0.39596	0.51717	344,847	248,579	0.28542	0.29594
1986	1741824	10.00	119315	870912	0.06850	0.52033	0.56502	453,160	314,153	0.36072	0.72419
1987	2090188	14.50	104509	1515386	0.05000	0.37675	0.31889	570,928	569,283	0.37567	0.99311
1988	2090188	14.50	117050	1515386	0.05600	0.45578	0.34344	690,676	404,621	0.26701	0.60571
1989	2508227	15.00	125411	1881170	0.05000	0.39829	0.20767	749,257	904,676	0.48091	0.44216
1990	2508227	18.00	140460	2257404	0.05600	0.44658	0.48626	1,008,117	1,302,917	0.57717	0.56752
1991	3009873	24.50	118117	3687094	0.03924	0.33816	−0.02671	1,246,813	1,109,805	0.30100	−0.18644
1992	3009873	31.00	118117	4665303	0.03924	0.25117	0.09143	1,171,805	699,816	0.15000	−1.91190
1993	3009873	30.00	279918	4514810	0.09300	0.43806	0.11165	1,977,737	1,504,436	0.33322	−1.04523

003 Year	No. of Ord. Shares	Price Ordinary Kshs.	dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		1.75									
1984	8541240	1.90	213531	811418	0.02500	1.31672	0.58259	1,068,412	(1,022,889)	−1.26062	0.31611
1985	8541240	2.65	160148	1131714	0.01875	0.28952	0.51717	327,656	794,738	0.70224	0.29594
1986	8541240	2.75	213531	1174421	0.02500	0.57216	0.56502	671,957	892,507	0.75996	0.72419
1987	8541240	3.75	213531	1601483	0.02500	0.29473	0.31889	471,998	1,045,268	0.65269	0.99311
1988	8541240	3.60	213531	1537423	0.02500	0.28462	0.34344	437,580	(76,750)	−0.04992	0.60571
1989	8541239	3.75	214000	1601482	0.02505	0.29410	0.20767	471,000	1,467,543	0.91637	0.44216
1990	8541239	4.25	108000	1815013	0.01264	0.33884	0.48626	615,000	1,027,276	0.56599	0.56752
1991	8541239	8.25	0	3523261	0.00000	−0.24239	−0.02671	(854,000)	(1,825,845)	−0.51823	−0.18644
1992	8541239	2.00	0	854124	0.00000	0.37231	0.09143	318,000	(41,122)	−0.04815	−1.91190
1993	8541239	2.00	0	854124	0.00000	−0.81955	0.11165	(700,000)	(1,047,293)	−1.22616	−1.04523

004 Year	No. of Ord. Shares	Price Ordinary Kshs.	dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
		12.75									
1984	4800000	12.25	6000000	2940000	1.25000	0.15411	0.58259	453,093	448,805	0.15265	0.31611
1985	4800000	11.75	6000000	2820000	1.25000	0.16375	0.51717	461,776	490,621	0.17398	0.29594
1986	6000000	11.30	7500000	3390000	1.25000	0.17221	0.56502	583,778	562,583	0.16595	0.72419
1987	6000000	15.75	7500000	4725000	1.25000	0.15417	0.31889	728,438	534,036	0.11302	0.99311
1988	6000000	17.25	7500000	5175000	1.25000	0.18541	0.34344	959,503	702,299	0.13571	0.60571
1989	7000000	16.00	8750000	5600000	1.25000	0.20229	0.20767	1,132,842	790,251	0.14112	0.44216
1990	7000000	18.00	8750000	6300000	1.25000	0.20317	0.48626	1,279,999	989,942	0.15713	0.56752
1991	12000000	20.00	10500000	12000000	0.87500	0.14394	−0.02671	1,727,314	1,319,750	0.10998	−0.18644
1992	12000000	24.00	12000000	14400000	1.00000	0.18014	0.09143	2,593,982	2,407,808	0.16721	−1.91190
1993	12000000	24.00	15000000	14400000	1.25000	0.28311	0.11165	4,076,786	2,885,750	0.20040	−1.04523

005 Year	No. of Ord. Shares	Price Ordinary Kshs.	dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		8.25									
1984	3200000	5.00	88000	800000	0.02750	0.42737	0.58259	341,899	507,455	0.63432	0.31611
1985	3200000	5.00	64000	800000	0.02000	0.19452	0.51717	155,617	104,019	0.13002	0.29594
1986	3200000	3.50	100000	560000	0.03125	1.05193	0.56502	589,080	477,423	0.85254	0.72419
1987	3200000	5.75	200000	920000	0.06250	0.79112	0.31889	727,826	389,110	0.42295	0.99311
1988	3200000	11.50	200000	1840000	0.06250	0.42028	0.34344	773,315	487,946	0.26519	0.60571
1989	7200000	6.75	450000	2430000	0.06250	0.69503	0.20767	1,688,918	1,981,122	0.81528	0.44216
1990	10800000	17.50	450000	9450000	0.04167	0.13230	0.48626	1,250,190	(76,475)	−0.00809	0.56752
1991	10800000	27.00	675000	14580000	0.06250	0.09517	−0.02671	1,387,525	1,781,843	0.12221	−0.18644
1992	16200000	36.00	1012500	29160000	0.06250	0.06830	0.09143	1,991,495	1,020,248	0.03499	−1.91190
1993	16200000	44.50	1620000	36045000	0.10000	0.09633	0.11165	3,472,384	4,288,085	0.11896	−1.04523

006 Year	No. of Ord. Shares	Price Ordinary Kshs.	dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		6.50									
1984	5083200	6.75	203328	1715580	0.04000	0.62414	0.58259	1,070,757	2,896,822	1.68854	0.31611
1985	5083200	8.50	228744	2160360	0.04500	0.54762	0.51717	1,183,056	669,273	0.30980	0.29594
1986	5083200	9.00	254160	2287440	0.05000	0.71280	0.56502	1,630,496	460,077	0.20113	0.72419
1987	5083200	9.50	254160	2414520	0.05000	0.67993	0.31889	1,641,714	951,489	0.39407	0.99311
1988	6099840	10.50	355491	3202416	0.05828	0.52678	0.34344	1,686,965	2,132,430	0.66588	0.60571
1989	6099840	12.25	396490	3736152	0.06500	0.52247	0.20767	1,952,011	485,983	0.13008	0.44216
1990	8539776	13.00	555085	5550854	0.06500	0.40305	0.48626	2,237,281	1,938,306	0.34919	0.56752
1991	10674720	15.00	833978	8006040	0.07813	0.36420	−0.02671	2,915,831	1,972,393	0.24636	−0.18644
1992	10674720	26.50	960725	14144004	0.09000	0.23075	0.09143	3,263,783	2,546,530	0.18004	−1.91190
1993	10720220	38.00	1554432	20368418	0.14500	0.20586	0.11165	4,192,974	9,633,641	0.47297	−1.04523

007 Year	No. of Ord. Shares	Price Ordinary Kshs.	dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		4.75									
1984	6400000	5.00	280000	1600000	0.04375	0.27315	0.58259	437,041	281,219	0.17576	0.31611
1985	6400000	6.00	432000	1920000	0.06750	0.31833	0.51717	611,192	871,150	0.45372	0.29594
1986	6400000	8.00	368000	2560000	0.05750	0.28716	0.56502	735,133	1,263,131	0.49341	0.72419
1987	6400000	10.00	496000	3200000	0.07750	0.21335	0.31889	682,713	386,959	0.12092	0.99311
1988	6400000	15.00	736000	4800000	0.11500	0.21480	0.34344	1,031,026	1,514,371	0.31549	0.60571
1989	6400000	18.50	1088000	5920000	0.17000	0.23914	0.20767	1,415,681	3,207,593	0.54182	0.44216
1990	6400000	22.00	1088000	7040000	0.17000	0.22058	0.48626	1,552,856	1,737,450	0.24680	0.56752
1991	6400000	27.00	1088000	8640000	0.17000	0.22117	−0.02671	1,910,898	1,949,470	0.22563	−0.18644
1992	6400000	27.50	1280000	8800000	0.20000	0.36637	0.09143	3,224,015	3,447,953	0.39181	−1.91190
1993	6400000	37.50	1600000	12000000	0.25000	0.36630	0.11165	4,395,643	6,239,888	0.51999	−1.04523

008 Year	No. of Ord. Shares	Price Ordinary Kshs.	dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		12.75									
1984	13066666	13.25	816667	8656666	0.06250	0.23139	0.58259	2,003,050	2,435,330	0.28132	0.31611
1985	13066666	14.75	898333	9636666	0.06875	0.28455	0.51717	2,742,147	1,490,700	0.15469	0.29594
1986	13066666	19.75	898333	12903333	0.06875	0.17348	0.56502	2,238,482	1,339,032	0.10377	0.72419
1987	13066666	25.00	898333	16333333	0.06875	0.16454	0.31889	2,687,446	732,813	0.04487	0.99311
1988	13066666	28.00	653333	18293332	0.05000	0.09072	0.34344	1,659,554	1,160,930	0.06346	0.60571
1989	13066666	27.75	718666	18129999	0.05500	0.11610	0.20767	2,104,912	1,262,780	0.06965	0.44216
1990	13066666	24.50	718650	16006666	0.05500	0.13544	0.48626	2,167,952	4,887,977	0.30537	0.56752
1991	13066666	17.00	653350	11106666	0.05000	0.15645	−0.02671	1,737,650	386,401	0.03479	−0.18644
1992	13066666	25.50	816650	16659999	0.06250	0.18852	0.09143	3,140,750	2,346,554	0.14085	−1.91190
1993	13066666	37.00	980000	24173332	0.07500	0.18670	0.11165	4,513,050	3,292,741	0.13621	−1.04523

009 Year	No. of Ord. Shares	Price Kshs.	Ordinary dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		9.50									
1984	35547532	12.10	3199000	21506257	0.08999	0.43415	0.58259	9,336,946	2,772,268	0.12891	0.31611
1985	35547532	12.25	3555000	21772863	0.10001	0.48516	0.51717	10,563,257	7,015,116	0.32220	0.29594
1986	35547532	15.75	4088000	27993681	0.11500	0.50018	0.56502	14,001,795	2,882,203	0.10296	0.72419
1987	42657040	16.00	4266000	34125632	0.10001	0.48673	0.31889	16,610,056	48,358,324	1.41707	0.99311
1988	42657040	18.50	4266000	39457762	0.10001	0.33620	0.34344	13,265,836	10,494,683	0.26597	0.60571
1989	42657040	17.75	4266000	37858123	0.10001	0.37622	0.20767	14,242,964	17,641,562	0.46599	0.44216
1990	42657040	13.50	4265750	28793502	0.10000	0.51938	0.48626	14,954,646	22,584,922	0.78438	0.56752
1991	42657040	17.25	6185300	36791697	0.14500	0.54271	−0.02671	19,967,400	19,599,542	0.53272	−0.18644
1992	51188448	20.00	7038400	51188448	0.13750	0.43602	0.09143	22,319,250	9,587,176	0.18729	−1.91190
1993	51188448	40.00	8957950	102376896	0.17500	0.28332	0.11165	29,005,400	48,624,663	0.47496	−1.04523

010 Year	No. of Ord. Shares	Price Kshs.	Ordinary dividend	Market Value	Annual Div. Per Share	HC (NI+Dep'n)/MV	Average	HC NI +Dep'n	GPLA NI +Dep'n	GPLA (NI+Dep'n)/MV	Average
1983		2.50									
1984	3515350	2.75	70300	483361	0.02000	1.33528	0.58259	645,420	363,604	0.75224	0.31611
1985	3515350	3.00	79100	527303	0.02250	1.97513	0.51717	1,041,489	69,285	0.13140	0.29594
1986	3515350	3.00	79100	527303	0.02250	1.09491	0.56502	577,350	1,833,566	3.47726	0.72419
1987	3515350	3.00	0	527303	0.00000	−0.29129	0.31889	(153,600)	2,845,695	5.39670	0.99311
1988	3515350	1.65	0	290016	0.00000	0.57635	0.34344	167,150	1,021,605	3.52258	0.60571
1989	3515350	2.50	0	439419	0.00000	−0.97458	0.20767	(428,250)	183,789	0.41825	0.44216
1990	3515350	4.00	0	703070	0.00000	1.97697	0.48626	1,389,950	1,497,344	2.12972	0.56752
1991	3515350	3.00	0	527303	0.00000	−1.85984	−0.02671	(980,700)	(1,440,817)	−2.73243	−0.18644
1992	3515350	2.00	0	351535	0.00000	−1.27071	0.09143	(446,700)	(6,472,158)	−18.41113	−1.91190
1993	3515350	2.00	0	351535	0.00000	−0.03527	0.11165	(12,400)	(3,669,198)	−10.43765	−1.04523

BIBLIOGRAPHY

Baran A., Lakonishok J., & Ofer R. A., "The Value of General Price Level Adjusted Data to Bond Rating" **Journal of Business Finance and Accounting** Vol.7 No.1 (1980) pp. 135_149

------------"The Information Content of General Price Level Adjusted Earnings: Some empirical Evidence", **the Accounting Review**, Vol.LV, No.1 (1980).

Basu, S. " Inflation Accounting, Capital Market Efficiency and Security Prices", **The Society of Management Accountants of Canada**, Hamilton, Ontario, (Sept. 1977).

Beaver W.H., Kettler P., & Scholes M., "The Association Between Market Determined and Accounting Determined Risk Measures", **the Accounting Review**, (Oct. 1970) pp. 654_682.

Beaver W. H., & Manegold J., "The Association Between Market determined and Accounting Determined Measures of Systematic Risk : Some Further Evidence", **Journal of Finance and Quantitative Analysis**, (June 1975), pp. 231_284.

Bloom R., & Elgers P.T, **Accounting Theory and Policy: A Reader**, 2nd Ed.,Orlando, Florida; Harcourt Brace Jovanovich Inc. (1987).

Chambers R. J., **Accounting, Evaluation and Economic Behaviour**, Eaglewood Cliffs, N. J.; Prentice Hall Inc. (1966).

Cutler, R.S., and Westwick, C.A., "The Impact of Inflation Accounting on the Stock Exchange", **Accountancy**, Vol. 84, No. 55, (March 1973), pp. 15-24.

Davidson, S. & Weil, R.L., "Inflation Accounting: What Will General Price Level Adjusted Income Statements Show?", **Financial Analysts Journal**, (Jan-Feb. 1975), pp. 27-31.

Devon, P.C., & Kolodny, R., "Price Level Reporting and its Value to Investors", **Accounting and Business Research**, Vol. 9, No. 33, (Winter, 1978), pp. 19-24.

Dyckman, T.R., "Investment Analysis and General Price-Level Adjustments", **Studies in Accounting Research**, No.1 (1969), AAA.

Edwards E. O., & Bell P.W., **The Theory and Measurement of Business Income**, Berkerly, Univ. of Calfornia Press, (1970).

Friend I. & Blume M., " Measurements of Portfolio Performance Under Uncertainty", **The American Economic Review**, (Sept. 1970), pp. 561_575

Glen N. J., "The Monetary and Non Monetary Distinction", **the Accounting Review**, Vol. XL (1965), pp.321-323

Gonedes. N. " Evidence on the Information Content of accounting Numbers : Accounting_Based and Market Based Estimates of Systematic Risk", **Journal of Finance and Quantitative Analysis** June 1973 pp. 404_444.

----------"Capital Market Equilibrium & Annual Accounting Numbers: Empirical Evidence", **Journal of Accounting Research,** (spring 1974), pp. 26_62.

Gynther R. S.,**Accounting For Price Level Changes: Theory and Procedures**, Headington Hill Hall, Oxford; Pergamon Press Ltd, (1966).

---------- "Why use General Purchasing Power?", Accounting and Business Research, Vol. 4, No. 2 (Spring 1974), pp. 141-157.

Heath, L.C., "Distinguishing Between Monetary and Nonmonetary Assets and Liabilities in General Price Level Accounting", **the Accounting Review**, Vol. 47, No. 3, (July, 1972).

Heintz J.A.. "Price Level Restated Financial Statements and Investment Decision Making", **the Accounting Review** (Oct.1973), pp. 679_689

Hillison, W.A., "Empirical Investigation of General Purchasing Power Adjustments on Earnings Per Share and the Movement of Security Prices", **Journal of Accounting Research**, Vol. 17, No. 1 (Spring, 1979), pp. 60-73.

Hendricksen E. S., **Accounting Theory**, Homewood, Illinois: Irwin Inc. (1970), pp. 200-231.

Imbisi E.A., "The Impact of Inflation on the Measurement of firms in Kenya in 1976, **Unpublished MBA Thesis**,(1978), U.O.N

Ketz E.J., "The Validation of Some GPL Estimating Models", **the Accounting Review** (Oct. 1978) pp. 952_960.

----------, " The Effect of GPL Adjustment on the Predictive Ability of Accounting Ratios", **Journal of Accounting Research**, Vol. 16 Supplement, 1978, pp. 273-284.

Kimura J. H., "The Predictive Accuracy of Accounting and Non Accounting Information under Inflationary Conditions", **An Unpublished Doctoral Dissertation**, Univ. of Calfornia, LA, USA (1982).

Largay J. A., & Livingstone J. L., **Accounting for Changing Prices**, Santa Barbara, Wiley & Sons Inc. (1976).

Lee G. A., **Modern Financial Accounting**, Nelson House, Surrey, Nelson & Sons ltd. (1981).

---------- "The Accounting Entity Concept, Accounting Standards, and Inflation Accounting", **Accounting & Business Research**, No.38, (1980)

Mathews R. L., "Price Level changes and useless Information", **Journal of Accounting Research,** Vol. III (1965).

McDonald B., & Morris, M.H "The Relevance of SFAS33 Inflation accounting Disclosures in the Adjustment of Stock Prices to Inflation", **the Accounting Review,** Vol.LIX No. 3 (July 1984), pp. 432-446.

McIntyre, E. V. "Current Cost Financial Statements and Common Stock Investment Decisions", **the Accounting Review**, (1975) pp. 575-585.

Morris, R.C., "Evidence of the Impact of Inflation Accounting on Share Prices", **Accounting and Business Research**, Vol. 5, No. 18, (spring, 1975), pp. 82-90.

Norton C.L., & Smith R.E., "A Comparison of General Price Level and Historic Cost Financial Statements in the Prediction of Bankruptcy" **the Accounting Review** (Jan. 1979) pp. 72_87.

Nunthiraparkorn T. & Millar A.J., "Changing Prices, Accounting Earnings and Systematic Risk", **Journal of Business Finance and Accounting**, Spring 1987, pp. 1-25.

Nzomo N. D., **Advanced Financial Accounting**, Nairobi, Kenya Literature Bureau, (1985).

Paton W. A., " Observations on Inflation from an Accounting Stance", **Journal of Accounting Research**, Vol. VI (Spring 1968), pp.72-85

Parker J.E " Impact of Price_Level Accounting", **the Accounting Review** (Jan 1977) pp. 69_96.

Peasnell, K.V., and Skeratt, L.C.L., "How Well Does a Single Index Represent Nineteen Sandiland's Plant and Machinery Indices?", **Journal of Accounting Research**, Vol. 15, No. 1 (spring 1977), pp. 458-568.

------- "Income-Group Inflation rates and General purchasing Power Adjustments: An empirical Test of the Homogeneity Hypothesis", **Accounting and Business Research**, Vol. 9, No. 33, (Winter, 1978), pp.45-59.

Petersen, R.J, "Interindustry Estimation of General Price Level Impact on Financial Information", **the Accounting Review** (Jan. 1973). pp. 34_43.

----------"An Examination of the effects of Changes in the General Price Level on Published Financial Statements",
Unpublished Doctoral Dissertation, Univ. of Washington, June 1971.

Short D.G, "The Impact of the Price Level Adjustment in the Context of Risk Assessment", **Journal of Accounting Research**, Vol. 16, (1978), pp. 259-272.

----------, "The impact of the Price Level adjustment on the Meaning of Accounting Ratios", **Journal of Business Finance and Accounting**, Vol. 7 No. 3, (1980), pp. 377-391.

Wanless P. T., & Forrester D.A.R, **Readings in Inflation Accounting**, Chichester, Wiley & Sons (1979).

Warner F. "A Study of the Predictive Significance of Two Income Measures", **Journal of Accounting Research,** (May 1970) pp. 123-136.

Weston J.F, and Copeland T.E, (1986), **Managerial Finance**, 8th Ed., The Dryden Press, Orlando, Florida.

Wolk H. I., Francis J.R., & Tearney M. G., **Accounting Theory: A Conceptual and Institutional Approach**, PWS Kent, 2nd Ed. (1989).

Whittington G., **Inflation Accounting: An Introduction to the Debate**, Cambridge, Cambridge Univ. Press, (1983).