

**SIGNALING FACTORS TO INVESTMENT DECISIONS: AN EMPIRICAL
STUDY OF NAIROBI STOCK EXCHANGE.**

MA. RESEARCH PAPER

BY

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award of the degree of Master of Arts in Economics.**

Department of Economics

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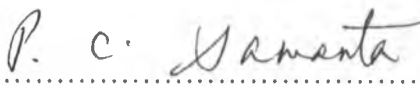
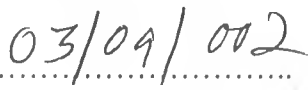
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DECLARATION

This research paper is my original work and has not been presented for a degree in any other university before.

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This research paper has been submitted for examination with our approval as University of Nairobi supervisors.

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Dedication.

To my grandmother Selinah Namachi

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ABSTRACT.

One of the main objectives of firms is to maximize Profits. This study adopts Tobin's Q theory of investment and examines the role of stock market as a signal to managers in making investment decisions.

The study aims at applying the theory empirically in Kenya. It goes further to examine the role played by Nairobi Stock Exchange (NSE) as a market for valuing quoted companies and usefulness to managers' choice of investment. Managerial perception is proxied by net sales, sales growth rate and companies cash flows. In this study, net sales have been used as a proxy for managerial perception. The study also examines the role of market perception in decision making, which is proxied by q-ratio. Role of public expenditure in the investment decision is also examined. This study uses panel data of twenty-eight listed companies for a period of twelve years.

In conclusion, market perception, managerial perception and public expenditures have been found to have a positive influence on investment decisions of firms. Out of the three factors, managers respond more to their own perception than both market and public expenditures. Market perception also seems to give a stronger signal than public expenditures.

CHAPTER ONE.

1.0.0 INTRODUCTION

Stock exchange is a market dealing with exchange of securities issued by publicly quoted companies. The key role is that it improves savings. The idea that people can save, invest money and earn some interest is an incentive for people to reduce their consumption and increase savings.

A Company that issues marketable dividend shares and stock to the public affords the interested investor a part ownership of the company. The ownership role delegates to the investor the capacity to make certain corporate decisions such as the appointment of directors, who then manage the company. Hence the investor has an influence in steering the affairs of the company. For instance, Samuel (March 1996) showed that institutional ownership has positive effect on capital spending and a negative impact on research and development expenditure of a firm but no effect on advertising. He argued that institutional ownership could contribute to firm's under-investment on intangible assets. Institutional ownership also has an effect on the share price of the firm. This is more so to block trading. In addition, stock market imposes regulation and restrictions on the quoted companies and hence influences the management of those companies.

One of the main functions of stock market is to act as a signaling mechanism to managers with regard to investment decisions. This function becomes the core of this study. Strategic management approach requires managers to make investment decision based on the cost of investment and its expected returns. Managers are therefore expected to make their investment decisions based on market perception. Unconstrained managers

are subject to an agency problem that leads them to prefer excessively smooth investment in the face of changes in fundamentals. The investment of equity-dependent firms will respond more to stock prices than that of non-equity dependent firms. This implies that, while the non-equity dependent firms would be now under-reacting to the stock prices, the investment of the equity-dependent firms may be closer to efficient on average¹.

1.1.0 BACKGROUND INFORMATION

Kenya like other developing countries aims at investing to develop domestic capital markets as a means of mobilizing external capital and domestic savings. A developed domestic capital market provides opportunity for greater fund mobilization, improved efficiency in resource allocation, provision of relevant information for investment appraisal and improved corporate discipline. Stock market is a central institution in any capital market and its ability to enhance the efficiency of investment is linked to the level of efficiency. (Black, 1988).

Most capital markets in Africa are emerging. Unlike those of developed countries, they have fewer market participants, less sophisticated and less skilled investment analysts. These affect capability of resource mobilization, efficiency in resource allocation and financial intermediation roles for foreign and domestic capital.

Majority of the world's developing countries have been striving towards ending the financial repression created in early 80's. Most of these changes have enhanced capital movement among countries affecting their development. Such countries can strengthen their capital through developing stock markets. Samanta (2002) argued that "The

¹ Researchers commonly associate a greater sensitivity of investment to stock prices with a higher degree of efficiency. see, e.g., Schorfstain (1998) and Rajan, Sevaes and Zingales (2000).

liberalization of capital account and concomitant economic reforms have attracted unprecedented levels of foreign capital flow to the world's Developing and Transitional Economies"(DTE).

Developed stock markets are important for promoting efficiency of investments. First, well functioning stock markets generate lower cost of equity capital for firms. Second, continuous adjustment of share prices in a developed stock market imposes control in the investment behavior of firms. Thirdly, in developed stock markets, investors have the opportunity to price and hedge against risk effectively. Finally stock market acts as a mechanism for attracting foreign investment, thereby increasing resource availability to the economy for investment, (Demirguc-Kunt and Levine, 1993).

1.1. 1 Role of stock exchange in an Economy

Stock exchange assists in the transfer of savings to investments in productive enterprises as an alternative to keeping the money idle. Though there may be savings in the economy, lack of established mechanism for channeling those savings into activities that create wealth would lead to resource mis-allocation. This lack of proper investment would cause stagnated growth.

A robust stock market assists in rational and efficient allocation of capital (which is a scarce resource). An efficient stock market would have the expertise and the means to prioritize access to capital by competing users so as to maximize output at least cost.

Optimal production without efficiency in use of capital may channel funds to non-productive investments.

It also promotes higher standards of accounting, resource management and transparency in management of a business. This is due to the fact that financial markets separate owners of capital on one hand and managers on the other. With this specialization, people with money without good investment decision have their money invested efficiently. Likewise people without money but with good investment decisions have a role to play too in the market. This relationship benefits both parties. In addition, it provides access to finance of different types of users by providing the flexibility of customization. Financial sector allows different capital users to raise capital in ways suited to meeting their specific needs e.g.

- a) Established companies can raise short-term finance through commercial papers.
- b) Small companies can raise long-term finance through sale of shares.
- c) The government and even municipal councils can raise funds by floating various types of bonds as an alternative to foreign currency.

Stock markets exchange provides investors with an efficient mechanism to liquidate their investment in securities. Since investors are guaranteed to sell what they have, there is mobility of capital in purchase of assets. The market also facilitates equity financing as opposed to debt financing. Debt financing has been a problem in many enterprises in both developed and developing countries, particularly in recession periods.

Stock markets improve access to finance for new and smaller companies, possible on the Alternative Investment Market Segment (A.I.M.S.). This can also be released through venture capital², which are fast becoming key players in financing small businesses. On these lines, establishment of efficient stock market is hence essential to utilize scarce resource for economic growth.

1.1.2: Sources of finance

There are various sources through which a company can use to finance its expenditure. These comprise:

- a) Internal finance where the company uses idle finance in its reserves.
- b) External debts i.e. short term or long-term credit.
- c) New equity issues.

In most cases, internal finance is most efficient in financing expenditure since it is readily available at no cost to the company. However, this method is suitable for companies with slack (unutilized capacity). Other than internal financing, the company can also opt for external finance which can be in form of short term credit i.e. trade credit with firms listed on the Nairobi stock exchange or long term loans from banks and other-banks financial institutions. These methods mainly work well for companies taking heavy investments in capital. The central bank as the highest monetary authority has an influence on credit availability in financial institutions through policies such as control of money supply, changes in reserves as well as cash ratios and interest rates.

² Venture capital involves early-stage financing including development, expansion and buoyancy financing for those enterprises, which are unable to raise funds for the normal financing channels.

Samuel (1996) argued that basing on the funding hierarchy hypothesis, a company would issue equity share after exhausting its debt capacity. Mostly, company issue equity when it wants to undertake a major capital expenditure especially aimed at expanding its operational capacity. Stock market valuations of a company share will largely determine the success of public share issue. For example if market valuation of the companies' share is higher than the price being offered in the issue, the shares are likely to be oversubscribed. Likewise if the price being offered is higher than market value the shares may be under-subscribed. The most basic test of valuation is the law of one price: the same asset cannot trade simultaneously at different prices (Baker et al. 2002).

1.1.3 Companies policies

Each company listed on the NSE has its own policies mostly based on the objective clause as outlined in the memorandum and articles of association. Due to increasing need for new technology and research, those clauses have churned up interest in stock market activity hence fostering competitiveness in the market. This has contributed to increasing need to invest in stock markets.

1.1.4 Nairobi Stock Exchange

The NSE was constituted as a voluntary association of stockbrokers registered under society act in 1954. The business of dealing in shares was confined to the resident European community. Africans and Asians were not permitted to trade in securities until after independence in 1963. Immediately after independence, stock market activity slumped due to uncertainty about the future of independent Kenya. This is because the

Europeans who were main investors decreased their investment in securities. Though the first three years were marked by steady economic growth due to growth in other sectors. Confidence in the market was again rekindled on the foreign exchange, which handled a number of highly oversubscribed public issues (NSE Market Fact File, 2001)

This growth was halted in 1972 when the oil crisis introduced inflationary pressures in the economy with depressed share prices. A 35% capital gains tax was introduced in 1975 (which was later suspended in 1985) inflicting further losses to the exchange which at the same time lost its regional character following nationalization, exchange control and other inter-territory restrictions introduced in neighboring Uganda and Tanzania. For instance in 1976, Uganda acquired a number of companies that were either quoted or subsidiaries of companies quoted on the NSE³. (NSE Market Fact File, 2001)⁴

A study done by International Finance Cooperation (IFC) and Central Bank of Kenya (CBK) in 1984 on “Development of money and capital markets in Kenya”, became a blue print for structural reform in the financial markets. It culminated in the formation of a regulatory body; the Capital Market Authority (CMA) in 1989. This aimed to assist in the creation of conducive environment for growth and development of the country's capital markets.

In 1988, the first privatization through the NSE in the successful sale of the government's 20% stake in Kenya commercial bank (NSE Market Fact File, 2001). NSE was registered

³ NSE means Nairobi stock exchange.

⁴ NSE Market fact file are monthly reports published by the Nairobi stock exchange.

under the company's act and phased out the "call over"⁵ trading system in favor of the floor based open outcry system⁶ in 1991. Largest share issue in the history of NSE was in 1996 where privatization of the Kenya Airways came on the market. More than 110,000 shareholders acquired a stake in the airline. In 1998, the government expanded the scope for foreign investment by introducing incentives for capital markets growth including the setting up of a tax free venture capital fund, removal of capital gains tax on insurance companies, investments, allowance of beneficial ownership by foreigners in local stockbrokers and fund managers. There was also licensing of dealing firms⁷ to improve market liquidity.

1.2.0 STATEMENT OF THE PROBLEM

Structural Adjustment Programs (SAP) started in 1980s were aimed at developing and enhancing performance of financial markets. With increasing privatization in mind, monetary and fiscal policies have been strengthened to boost the Kenyan financial system. Some of the policy reforms included price decontrols, trade liberalization, interest and foreign exchange rate liberalization and also changes in foreign exchange rate act. In the past few years, the government aimed at strengthening the NSE through privatization programs of government owned parastatals. There has also been an internalization of NSE through allowance of foreign parastatals in the stock market activity.

⁵ Call over system is option to buy a share of stock at a specified price on or before a specified date.

⁶ Trading among firms by dealers on the floor, where shares are ordered and sold.

⁷ Firms involved with trading in shares

Kenya should attain the above stated improvements among others of NSE as well as other policies to support achievement of private sector led economy under the free market orientation. This suggests a positive impact on the efficiency of the market. Due to this, there is need for market valuation and its implication for investment of listed companies. A change in a firm's economic activity has an impact on its worthiness, which is reflected by corresponding change in price of its share.

This study seeks to find out whether managers in Kenya base their investment decision on market valuation and whether share price affects firms' choice of investment level; managers aim at improving the performance of firms. Tobin's Q theory argues that managers can increase the wealth of shareholders by increasing their investment when the firm is highly valued by the market.

Kenya has done much towards improving performance of NSE. These include suspension of capital gains tax in 1985 and privatization of some government owned parastatals. NSE has also taken some efforts to expand such as improving its efficiency and increase of number of listed companies to the present fifty-four. However, the market has not grown to expected level as we have very few participants. Also the growth of investment in this market has been low and some companies are not consistent in their growth and investment behavior. Poorly performing companies end up closing down. Hence the study is to explain investment on the basis of market value of the company. Most studies done in this line are in developed countries like Britain, America, Germany and Japan. A similar study was done in Ghana (Kofi, 1999). Most studies done in Kenya are concerned

with stock market prices (Kagume, 1991 and Asienwa, 1992). An example of such study in Kenya was done by Gichuki (1998) though she used share index as proxy for managerial perception.

1.3.0 OBJECTIVE OF THE STUDY

For most firms, the main objective is to increase their level of investment. Likewise investors aim at maximizing their wealth.

General objective

The general objective is to examine the behaviour of stock market investors, in making investment decisions, given various alternatives.

Specific objectives are

- a) To adopt and use modified Tobin's Q-investment equation to identify and show how firms make their investment decisions.
- b) To estimate the effect of these determinants basing on the Tobin's Q-ratio, on the investment levels of firms.
- c) Policy conclusions basing on (a) and (b)

1.4.0 SIGNIFICANCE OF THE STUDY.

The goal of Structural Adjustment Program (SAP) was to reduce government involvement in economy and increase private sector involvement to achieve economic development. With this there has been an increasing need to privatize government owned enterprises since most of them are incompetent and produce low output. These policies

open up the economy leading to a competitive market. To enhance economic growth we need an efficient capital market. Seeing the developments on the NSE such as increase in the number of quoted firms, that were formally owned by the government, we can use NSE to increase investment, which also increases economic growth. To enhance the increasing need of investment, factors influencing decision to invest must be considered. An efficient stock market should collect all the information necessary for each quoted company and ensure proper valuation of a company's share index in the market.

If the managers of firms aim at maximizing the net wealth of shareholders then the market valuation is important to them; it helps them shape their investment decisions.

After investigating the responsiveness of investment to market valuation, this study would help managers and other policy makers to derive policies that are appropriate in their efforts to achieve desired level of investment and economic growth. Where the signaling is not properly perceived by listed companies, the study would assist such new firms consider market valuation signals while making investment choices and hence help in building the capacity of NSE to drive up private sector productivity. The study would also be crucial in explaining the low growth and participation in trade at the NSE and how to improve it.

CHAPTER 2

LITERATURE REVIEW

2.0.0 INTRODUCTION

There have been two contradicting views concerning role of stock markets on the investment decision of the firm. One view argues that stock market is just a casino, which has no implications. Bosworth (1995) argues that if managers are concerned about the market value of the firm in the long-run while undertaking investment decisions, they should in the short-run ignore the share price changes if they do not reflect the firm's longer term prospects. The alternative view takes stock markets as a core for investment. Fisher and Miller (1984) argue that if managers are to maximize wealth of existing shareholder, they should respond to market valuation even if it deviates from the true value of the firm. The study concentrates on the later version.

2.1.0 THEORETICAL LITERATURE

Keynes (1936) was the first to call attention on the existence of an independent decision in the economy. He observed that investment depends on the prospective marginal efficiency of capital relative to some interest rate that reflects the opportunity cost of the invested funds.

Keynes investment was later linked to growth models giving rise to acceleration theory.

These make investment a linear proportion of changes in output.

Others with similar conclusion include: neoclassical model developed by Jorgenson (1967), Jorgenson and Hall (1971) and the "Q" theory associated with Tobin (1969). The

notion of irreversibility in investment has also been given considerable attention in the investment literature (Pindyck, 1998).

The link between savings and growth as postulated by the Mckinon-Shaw hypothesis is investment. However, behaviorally savings and investments differ (Bhatia and Khatkhate, 1975; Fry, 1978) since transfer of savings to investment depends on several factors other than the real interest rate. For instance, availability of investment opportunities at rates exceeding cost of funds institutional constraints and cost of administering funds.

The Q theory explains the relationship between firm's investment decision and stock prices. In the Q theory, the firm faces convex cost of adjustment and the optimal path equates marginal valuation of capital (proxy for Q) with marginal cost of investment. The Q theory assumes equality between actual capital and desired capital (K^*). Actual capital cost is represented by replacement cost (capital output price) while desired capital (K^*) includes cost of acquisition, which is reflected through operation on financial stock market.

$$\text{Hence } Q = \frac{\text{Desired capital}}{\text{Actual capital}} = \frac{\text{Stockmarket}}{\text{outputmarket}}$$

This relationship can be used to assess the possibility of investment.

“ An investment project should be undertaken if and only if it increases the value of the shares. The securities market appraises the project, its expected contributions to the future earnings of the company and its risk. If the value of the project as appraised by the investors exceeds the cost, then the companies share will appreciate to the benefit of existing stock holders.” (Tobin and Brainard, 1968), Yoshikawa (1980).

From this it is clear that managers aim at maximizing present net worth of the company. Tobin further states that rate at which investors increase their capital stock should be matched to the value of capital relative to its replacement cost (Q-ratio). Yoshikawa using calculus found that given optimal condition, and shape of adjustment cost function, investment is an increasing function of Q. Yoshikawa (1980) agrees with Tobin and Brainard by saying that “The Q theory, allowing the divergence between the value of capital evaluated in the financial market and the price of market goods, is a theory, which explains how investment (change in capital stock) is motivated by this short-run disequilibrium.”

2.2.0 EMPIRICAL LITERATURE.

Samuel (1981) carried out a study linking the Q theory and market valuation. He employed the Q theory in a specific function in which the Q ratio determined the level of investment. The functional formulation gave a summary of all relevant expectations to current investment decisions in the Tobin's Q through forward-looking market valuation. His results and those of others based on similar analysis showed that variations in Tobin's Q is unable to explain a large part of the variation in investment. This suggests possibility of omitting important explanatory variables.

Able and Blanchard (1986) used output and profit variables (in their margins) as components of marginal Q and their conclusion gave results that had more significant effect on investment than cost of capital component. Their findings were supported by

earlier findings of (Bischoff, 1971) and (Eisner, 1978) that there is a high response of investment to changes in output than variation to user cost of capital. In the same study, Abel and Blanchard also noted that one of the reasons of the response for poor empirical performance of Q investment equation could be aggregation since most of the early studies used aggregated time series data. The individual components were first calculated at the firm level, summed up and the aggregated value used in the computation. A solution to the problem is use of firm level data for estimation.

Measured Q contains significant information for investment behavior (Blundell et.al, 1992). The implied adjustment process is slow and hence measured Q is not a sufficient statistic in explaining investment as predicted by the underlying theory. The results were found applicable to panel data studies and aggregated time series.

Lewellen et.al (1994) argued that the methods used to estimate Tobin's Q ratios are imperfect in design and arbitrary in implementation. They came up with an alternative procedure in which the key approach is an improved measure of fixed asset replacement costs, thus proper identification of the vintages of fixed assets that are in place for a firm. The method was applied to a large sample of non-financial co-operation and showed that existing methods in general produced a downward biased measure of Q, which does not give accurate results in ordering firms using their Q. In conclusion (summer, 1981) study suggested that the Q ratio is not adequate in describing the behavior of capital expenditure at the firm level. A solution to this is to model an investment equation that in addition incorporates other factors that seem to influence business investment.

Hayashi (1982) in his study derived an optimal rate of investment as a function of marginal Q adjusted for tax parameters. He stated that rate of investment is a function of Q ratio. In his analysis, Q ratio was considered as market value of new additional goods to their cost of replacement. In most cases average Q is used in empirical works as a proxy for marginal Q, since the latter is unobservable. If a firm is a price taker with constant returns to scale in both production and installation then marginal Q and average Q would be the same. If the firm is a price maker the average Q is expected to be higher than the marginal Q by the monopoly rent. He went further to explain that marginal Q which was crucial in a firm's investment decision should reflect tax rules concerning corporate tax, investment tax credit and depreciation formulas. This was all summarized in the modified Q ratio.

Mairasse and Dormant (1985) considered investment decision as a function of expectations since their focus was on the future. They concluded that only permanent increase in sales and cash-flow would increase a firm's net investment. Short-term or transitory changes must be met by utilization of existing capital.

Blanchard et.al (1990,1993) had a different view in which Q ratio was split into two parts representing market and managerial perceptions. Proxies such as sales cash flows and dividends are captured in market perception.

Sales should be considered as a proxy for future demand of a firm's products and may signal profitability of investment (Morck et.al, 1990). Use of sales as a fundamental has its base in accelerator theory of investment. The theory emphasizes the role of demand factor and argues that past level of output is most important determinant of future output.

This implies sales account for future demand of firm's products and could signal profitability of investment.

Studies done in united states of America (Samuel, 1996) incorporating approaches of Mairesse and Dormant (1985); Blanchard et.al.(1993).Samuel adopted the model of investment equation by Summers (1981).

$$(I/K)_{it} = C + (1/b)Q_t \dots \dots \dots (i)$$

Where I = Investment

K = Replacement cost of capital.

Q= Ratio of stock markets' valuation of the firm to its replacement cost.

B =Adjustment cost parameter.

He estimated the Tobin's Q equation (average Q) using 603 manufacturing firms for the period 1972 to 1990. His results showed that average Q was statistically significant as an explanatory variable for investment. However, adjusted r^2 was 0.16 confirming what other empirical researchers had found, based on the above equation. Consequently variation in Q explains little variation in investment. The residual was also highly serially correlated suggesting omission of important explanatory variables.

Like the findings of Abel and Blanchard (1996), Samuel also observed another shortcoming of the standard Q-model that is associated with aggregation of time series data for all firms with different backgrounds and characteristics. He linked the shortcoming to firms making little use of new equity issue and the stock prices appear to have much noise suggesting investment may not solely be driven by Q-ratio. Results

obtained showed that using aggregation, there is no one to one correspondence between findings from firm level and aggregated regression. However, regression from firm level showed some precision. Hence firm level results are more accurate and can be relied on unlike aggregated results. He concluded that managerial and market perception elements are key variables of firms' decision making on capital expenditures. Most important was managerial perception than market perception.

In conclusion basing on equation (i), Samuel did not find any useful relationship between investment, stock price and Q-ratio. He argued that Q-ratio could be reacting to information relevant to the firm and therefore it can predict changes in investment without causal link between Q-ratio and investment.

Due to this weakness, Samuel modified the Q-ratio similar to estimation strategies of Blanchard et.al (1990,1993). Q-ratio was split into two components thus market and managerial valuation. This gives

$$Q = V/K = (V/F) \cdot (F/K) \dots \dots \dots (ii)$$

Where

Q= Ratio of market value ,

V = Replacement cost of capital.

K and F= Fundamental (proxied by sales, cash flow and dividends.

(V/F) Represents market valuation

(F/K) Represents managerial valuation

From this the following investment equation in logarithmic form was estimated with terms as explained above.

$$\ln(I/K) = a_0 + a_1(L_1) \ln(F/K) + a_2(L_2) \ln(V/F) + e \dots\dots\dots(iii)$$

The coefficients $a_1(L_1)$ and $a_2(L_2)$ represents proxies for managerial and market valuation respectively. These coefficients can be explained as elasticities. Three proxies for fundamentals were used in his analysis; thus sales, cash flows and dividends. The results showed that both market and managerial perception were important though the later seemed to be more important.

Using the second approach (including both market and managerial perception), Samuel developed equation three further to use proxies for both market and managerial perception, unlike equation three which had only proxies for fundamentals. He came up with the fourth equation as below.

$$(I/K) = \beta_0 + \beta_1(L_1) F + \beta_2(L_2) V + e \dots\dots\dots(iv)$$

Where F= managerial valuation with cash flow, sales level as well as growth in sales and dividends as proxies.

V = Market valuation proxies by Q ratio and real stock prices.

Coefficients are as explained above.

The results from analysis of parameters implied that managers pay more attention to their valuation than those conveyed by the market.

The effect of earnings announcement on the price fluctuations has been studied by adjusting to the general movement of the market. The residual returns have been investigated over the previous twelve months and the six months following each early announcement. By cumulating the mean residual of all the companies in the sample, it appears that the stock market anticipated correctly the effect of earnings announcement before it's publicly released.

The companies with disappointing earnings have seen their share prices fall anomaly in the month before the public announcement. Conversely for the companies with unexpected good news. The price adjustment is almost non-existence after the public announcement (Ball and Brown, 1968).

Unexpected variations of the dividends are associated with the price movements in similar direction (Charest, 1978), (Asquiler and Mullin, 1983). Fama, Fisher, Jensen, Roll (FFJR), have investigated the adjustment speed of the stock prices following the stock splits. The financial appreciation was seen as good news. The impression of the shareholder to receive additional shares should be evaluated positively through increase in the stock prices. The stock split increases the number of shares per shareholder without modifying the capital structure. A study was done by FFJR using a sample of 940 stock splits for 622 securities listed at New York Stock Exchange between 1927 and 1959. The results show that cumulative residual returns in the previous month of the stock splits are positive.

Studies done in USA in the 1970s on the information of the listed companies showed that investment strategies are based on annual and quarterly earnings report. Beaver (1968), May (1971), Hagerman (1973), Grat (1980) and Morse (1982). Their results show that accounting earnings are handy to investors stock price rise or decline according to the announcement of good or bad earnings. These reactions reveal that investors revise their anticipations and modify the composition of their portfolio when they are informed about the published earnings. This implies there's a relationship between changes in accounting earnings and the behavior of stock prices.

Myers and Majluf (1984) present a signaling model that combines investment and financing decisions. Managers better than anyone else are assumed to know the true future value of the firm and of any project that it might undertake. Further more they are assumed to act in the interest of shareholders. Assuming information is symmetric and investors are rational, shareholder and other new members are willing to invest only if they expect positive returns.

2.2.0 OVERVIEW OF LITERATURE.

Empirical studies on signaling role of stock market are limited compared to studies in the market such as market efficiency. Most studies done are in the developed countries. But the empirical literature reviewed show that the results differ according to the proxies used to represent managerial fundamental, data applied could affect the results (i.e. company specific and aggregated data.) The variation in investment level is explained by Q theory since investment is an increasing function of Q (Kofi, 1999). Sometimes Q ratio can react

to available information to the firm enabling Q to predict change in investment without necessarily having a causal link (Samuel, 1996). Panel data if used performs relatively better.

This study would consider the above factors by using firm level data and panel data techniques. Sales initially used as managerial proxies would play an important role in the formulation of q ratio. Cash flow as an alternative to sales would represent managerial perception. (Samuel, 1996)

Similar study in Ghana found Q coefficient to be significant at various levels showing high correlation between firm capital investment and cash flow (Kofi, 1999). Though it was numerically lower than the constant term, which was attributed to lack of other contributory variables. He goes further to argue that cash flow is important in listed firms' capital expenditure behavior. He concluded that managerial valuation is more influential than market perception in firms' capital investment. This is attributed to the fact that managers understand better prospects of the company than investors.

CHAPTER THREE.

METHODOLOGY.

3.0.0 Introduction

The study will generally focus on the application of Tobin's Q-investment model, which has been applied in other empirical works to explain the relationship between investment, sales, Tobin q and public expenditures.

3.0.1 Tobin's Q –Theory

The q theory of investment advanced by James Tobin and William Brainard (1968), Tobin (1969) is based on the assumption that the managers aim at maximizing the present net worth of the company; the market value of the outstanding shares. Basing on this argument, an investment should only be undertaken if and only if it increases the value of the shares.

Thus the rate of investment (speed at which investors wish to increase their capital stock) should be related inherently to Q, which is the rate of capital relative to its replacement costs.

Normally the equilibrium value of q is one. If the value of q is greater than one (>1) it stimulates investments while a value less than one ($Q < 1$) discourages investments.

3.0.2 Estimation Technique

OLS estimation technique would be used in this analysis. Both the depended and independent variables are made stationary through differencing to avoid problems of spurious regression, which have no economic implication. In this case, the normal tests such as t, F and chi (χ^2) do not hold.

Diagnostic tests for autocorrelation, heteroscedasticity and functional form shall be performed to test the adequacy of the model and appropriate transformation of variables performed if need arise.

3.1.0 Panel data analysis of market and managerial perception of investment across firms.

Panel (longitudinal) data is derived from a given sample of observations of individuals over a period of time. Since the data set cuts across different units, it captures differences in behavior and therefore has more advantages over either time series or cross sectional data sets. For instance panel data gives the investigator a large number of data points and hence improves efficiency of the estimates through the increase in degrees of freedom and reduction in colinearity among the explanatory variables⁸. Panel data also has the ability to isolate effects of specific actions, treatment or general policies.

In addition to the gains made through constructing and testing of more complicated models, panel data enables a solution to one essential econometric problem especially dealing with omitted variables. Thus by utilizing information on both inter temporal, dynamic and the individuality of the entities being investigated, one stands better chances of controlling the effect of missing or unobserved⁹ variables. This is done through differencing of individual observation with respect to and/or by taking derivatives from the mean across individuals at a given time.

⁸ Hsio , c(1996), An analysis of panel data, Cambridge university press p.2

⁹ Hsio, c(1996) pp.4-5

In panel data, studies OLS estimate are doubtful since there is possibility of autocorrelation, heteroscedasticity and cross sectional correlation problems. There is distrust as to why one should pool the individual observational units and assume homogeneity. To ensure above-mentioned problems are taken care of, we consider testing for both heteroscedasticity and selectivity bias¹⁰. This is done to ensure reliability of the results by avoiding specification bias.

3.1.1 Heterogeneity bias

Sometimes it is difficult to assume random generation of economic variables while compiling panel data using assumption of parametric probability distribution function. If the assumption holds, the standard statistical method could be used. Tests are conducted by imposing some restrictions on the panel data model to investigate heterogeneity (or otherwise) of intercept and slope coefficients across firms.

3.1.2 Selectivity bias

The sample may randomly be drawn from the population and hence could result to selectivity bias. The sample selection procedure introduces correlation between the explanatory variable and the error term leading to downward bias regression line. Consequently, it is appropriate to test for this process.

In selecting and presenting results as outlined above we can use the four main specification techniques below. This relationship seeks to find out whether differences in

¹⁰ Ibid pp5-8

firm characteristics represented by slope and intercept term affects investment. Hence testing for homogeneity of slopes and intercepts.

a) Constant slope coefficient with varying intercepts over individuals.

$$y_{it} = \delta_i + \sum \beta_k x_{kit} + U_{it}, \quad i=1 \dots n, \\ t=1 \dots n$$

b) Constant slope coefficient with varying intercepts over individual and time.

$$y_{it} = \delta_{it} + \sum \beta_k x_{kit} + U_{it}, \quad i=1 \dots n, \\ t=1 \dots n$$

c) All the coefficients varying over individuals.

$$y_{it} = \delta_i + \sum \beta_k x_{kit} + U_{it}, \quad i=1 \dots n, \\ t=1 \dots n$$

d) All the coefficients varying over time and individuals.

$$y_{it} = \delta_{it} + \sum \beta_{kit} x_{kit} + U_{it}, \quad i=1 \dots n, \\ t=1 \dots n$$

y_{it} = Dependent variable for unit I at time t.

x_{it} = matrix of independent variables

δ, β are coefficients vectors

u_{it} = error term

i = Number of firms.

t = time in years

3.2.0 Theoretical Framework

Given that managers of firms aim at maximizing sales of their companies, then market valuation of the company has an impact on the explanatory variable for the variation in investment. In a free market economy, the market plays an important role in the valuation of the company through share prices; market valuation is well captured by Tobin Q ratio.

We expect investment to be an increasing function of Q ratio, since increase in investors valuation of the company induce the managers to increase level of investment leading to an increase in the networth of the company. Sometimes there are market inefficiencies such that manager's valuation may not always be right; another tool to use is the sales turn over which can be taken as managers' proxy for valuation.

3.2.1. Model Specification.

We initially adopt Hayashi model where we use aggregated annual data for companies quoted on the NSE for the period 1990 to 2001. This gives sum of investments of all companies in a given year.

$$(I/k)_t = \beta_0 + \beta_1 Q_t + E_t \dots\dots\dots(1)$$

Where I =net investment (increment in total net assets of all the Companies)

K= aggregated replacement cost of capital of all companies.

$(I/K)_t$ = Ratio of aggregate net investment to aggregate replacement

cost of capital of all the companies at the time period t.

Q_t = Tobin average q - ratio for the company which is the ratio of market capitalization to aggregate replacement cost of capital at the same time period t.

E_t = white noise

Market capitalization is derived by adding the present market value of all the companies quoted on NSE at the end of trading period.

We can modify equation (1) if Tobin's Q-ratio does not explain large part of variation in investments thus we modify by adding increase in sales and public expenditures of all quoted companies.

$$(I/K)_t = \beta_0 + \beta_1 Q_t + \beta_2 H_t + \beta_3 M_{it} + E_t \dots\dots\dots(2)$$

To avoid aggregation problem we can estimate firm specific relationship between investment and market valuation by using company specific data.

3.3.0 Modified Tobin q ratio

Tobin's q ratio summarizes the market expectations regarding future profitability and hence an important explanatory variable for investment. However, managers need to rely also on own perception in investment decision-making.

$$(I/K)_{it} = \beta_0 + \beta_1 Q_{it} + \beta_2 H_{it} + \beta_3 M_{it} + E_{it} \dots \dots \dots (3)$$

Where H_{it} = Managerial fundamentals proxied by percentage growth rate in sale for the period.

We can estimate these equations using OLS. We shall then test for autocorrelation, which would be corrected, if present.

3.3.1 Hypothesis testing

- 1-Market valuation has a positive influence on investment level
- 2-Manegerial fundamentals positively influence investment.
- 3.Public expenditures have a positive influence on investment level.

3.4 Data type and sources

This study will use secondary data from period 1990 to 2001 on annual basis. Data will be obtained from companies' published financial statements. A table showing raw data used is given in table one (All values are given in thousands of Kenya shillings). The study will consider twenty-eight firms out of the total fifty-four. This is due to the availability of data. Selected firms must also have existed consistently for the past twelve years.

3.5 Limitation of study.

The study is restricted only to how stock markets influence investment behaviors in Kenya, though there are other factors. This study can be reliable assuming that the stock market is an efficient market.

CHAPTER FOUR

RESULTS.

4.0.0 Introduction

The chapter mainly concentrates on estimation and discussion of equation three, using panel data of twenty-eight firms listed on the Nairobi stock exchange. The key explanatory variables in this case are: growth in sales (managerial perception), Tobin's q and public expenditures.

4.0.1 Empirical Testing

TSP43 econometric programme was used to conduct unit root tests and examine time series properties of both dependent and explanatory variable so as to overcome problems of spurious regression. The tests showed stationarity of the data sets. A summary of unit root tests is given in appendix A.

4.1.0 Estimation of OLS results.

Q-ratio was obtained by taking net sales (in levels) divided by replacement cost of capital. To achieve uniformity in data inputs, all the values are expressed in ratios. A summary of balanced results of means of all variables (in logs) in the analysis of the twenty-eight firms is given in Table two.

Since most of the values for Tobin's Q are less than one, it is an indication that investment environment at the NSE is not conducive for most of the companies. This may explain why some companies close down few years after starting and why growth of investment for listed companies is low. The other reason for low value of average q may

be due to the fact that firms prefer managerial perception in decision making to market perception, which is represented by Q ratio. After testing for unit root, the next thing is to test for correlation between variables. Presence of correlation would make the results unreliable.

The correlation matrices of the model used in the analysis are given below

Table 4.1

Correlation matrix

Pearson

Corr	(I/K)	H	Q	M
(I/K)	1.000			
H	0.242	1.000		
Q	-0.022	0.143	1.000	
M	-0.20	-0.227	-0.085	1.000

Sig(1tailed)

	(I/K)	H	Q	M
(I/K)	-	0.000	0.343	0.356
H	0.000	-	0.004	0.000
Q	0.343	0.004	-	0.059
M	0.356	0.000	0.059	-

Sample size N=336

Key

(I/K)= investment

H = net sales

Q = Tobin's q (average q)

M = public expenditure.

Basing on this table, the highest correlation coefficient is 0.242 for two tailed and 0.356 for single tail. The first value shows the correlation between sales and investments while the second shows investment and public expenditures. All the other correlation coefficients are less than these values. The results imply there is no serious multicollinearity problem in the analysis.

4.1.1 OLS results for Q-ratio, net sales and public expenditure formulation

The procedure for analyzing panel data using TSP43 version was followed and the results are as given below. Results for plain regression are given in appendix B .In linear regression, it's assumed that the omitted factor that affect the dependent variables are accounted for by the white noise term i.e. the mean of error term being equal to zero. Applying this analysis in the model gives what's called the pooled model, which takes similar form as the OLS estimation procedure. In this study, such analysis termed as total (plain) OLS model.

The assumption concerning the disturbance term does not necessarily hold, in the case where different individuals are observed over time. Cross-section characteristics of similar data may provide variations to the assumption of random distribution property held by the error term.

In panel data it's appropriate to use variable intercept (fixed effect model) method in case homogeneity assumption is rejected so as to capture heterogeneity across individuals and through time. This implies F-statistic as obtained for total (plain) OLS within and between models is to establish heterogeneity (or otherwise) of parameters. A summary of F-test results is given in Table 4.2 below.

Table 4.2:

F-test for Heterogeneity

Constancy of estimated coefficients	8.1055
Verses differences in coefficient. i.e. ($A_i, B=A_i, B_i$)	(0.0000)
Constancy of overall slope coefficients	9.0411
Verses differences in intercepts and slopes i.e. ($A_i, B=A_i, B_i$)	(0.0020)
Constancy of both coefficients	9.000
Verses only intercept and Slope i.e. ($A, B=A_i, B$)	(0.0061)

Under the null hypothesis that the preferences for common intercept and slopes are constant over time for all listed firms i.e. $A, B=A_i, B_i$. The F-test for equation three using the pooled regression model is rejected at 1% level of significance. These strong rejection

of the null hypothesis implies individual firm differences may affect investment decision hence need to find out whether heterogeneity is captured by differences in intercepts and/or slope coefficients.

The above tests lead us to analyze the between and within models. Testing for differences in intercept per firm but with common slope coefficient that's constant over time as against heterogeneity of these coefficients i.e. A_i , $B=A_i$, B_i . This hypothesis is rejected also at 1% level, of significance. This further strengthens the investigation of variation in both intercept and slope parameters across individual firms. A final test for constant pooled slope and intercept coefficients as against varying intercept was also rejected at 1% level of significance. The later two tests confirm the first test, which rejects parameter constancy of pooled regression results.

Differences in characters of firms such as; size, sources of finance, type of goods and other crucial determinants of listed firms' investment behaviour, which may constitute omitted variables are key determinants in explaining firms' investment in capital. From this analysis, it's not suitable to consider stock market valuation, net sales per listed firm and public expenditure as sufficient determinants of firms' investment decisions. Basing on the above, we now consider separate firm effects by looking at the calculated fixed effect model.

4.2.0 Fixed effect model

This model produces individual specific values as opposed to overall intercept in the pooled aggregated model. The model (otherwise called variable intercept model) assumes differences across units and over time. The differences are considered as effects of individual specific variables with fixed constants over time and captured by allowing for differences in the constant term of regression model.

Table 4.3 FEM. Results.

Variable	Estimated Coefficient.	Standard Error	t-statistic	{p-Value}
Constant	0.2113	0.080298	1.10120	{0.1632}
Q	0.3716	0.096115	2.44918	{0.0200}
H	0.6423	0.432194	7.94555	{0.0000}
M	0.1510	0.28925	1.8197	{0.1104}

$$R^2 = 0.6021$$

From these results, the coefficient for growth in sales (H) is the highest giving a value of about 0.64, which is very significant at 1% level of significance. From our hypothesis, it is true that sales affect investment positively. The high coefficient implies that managerial perception (represented by net sales) determines a larger proportion of investment decision than both market and public expenditure. The coefficient for market perception (Q) is approximately 0.37 which is significant at 5% level. Apart from

managerial perception, firms should also base on market perception in their investment process. Public expenditure has the lowest coefficient of about 0.15, which is not significant at standard testing levels. Though not very important, public expenditures are also crucial in signaling investments. An increase in public expenditures used in improvement of communication i.e. infrastructure over the years in Kenya has led to an increase in investments. Differences across firms also influence investment decisions as is depicted from the constant value, given that the value is positive though not significant.

Finally basing on the R^2 of approximately 0.60 implies that about 60 % of the factors signaling investment decisions at NSE are captured by net sales, Tobin q and public expenditure. The equation showing this relationship is given as:

$$(I/K) = 0.2113 + 0.37Q + 0.64H + 0.15M + E_i$$

The model appears to fail in capturing all the relevant variables, which determine investment decisions. This leads us to examine the random effects model.

4.2.1. Random effect model

Table 4.4

Variable	Estimated Coefficient.	Standard Error	t-statistic	{p-Value}
Constant	0.2767	0.955094	1.87128	{0.0610}
Q	0.5922	0.085345	2.14395	{0.0200}
H	0.8014	0.85623	8.68166	{0.0000}
M	0.3112	0.697287	1.70317	{0.0804}

$$R^2 = 0.6407$$

From these results, net sales continue to be the most determining factor in investment decisions. The coefficient of net sales also improved to about 0.80 remaining significant at 1% level. Coefficient of Tobin Q has also improved to about 0.59 and it's significant at 10 % level. The coefficient for the constant term has also improved and with the expected positive sign. Public expenditures (M), in this model has become significant at 10% level with a coefficient of about 0.3. This analysis shows that, though Tobin's Q and public expenditures do not show high signal to investment decisions but they are important in making investment decisions for the firm. The R^2 has improved drastically to 0.6407. This implies that; net sales, Tobin's Q and public expenditures explains 64.07 % of the factors that signal investment decisions of listed firms on the NSE. From this, random effect model (REM) is preferred to fixed effect model (FEM). The model equation for investment is given as

$$(I/K) = 0.2767 + 0.59 Q + 0.8 H + 0.31 M + E_i$$

The two models i.e. FEM and REM were also compared using the Hausman specification test.

Hausman test of H_0 : RE vs. FE $CHISQ(3) = 5.1102$ p-value {0.1639}

The test fail to reject the null hypothesis at any standard level of significance. This implies one cannot analytically separate individual firm effects from the regression results since estimates from the random effect model are asymptotically efficient.

Considering the higher value of R^2 obtained, the random effects are also seen to be efficient than the fixed effects.

The choice of REM indicate presence of individual specific effect under control of management as opposed to firm specific effects, which can be included in managerial perception. In view of the above factors, managerial fundamental represented by net sales form a crucial component in the investment decision of the companies listed at the Nairobi Stock Exchange than both market perception and public expenditures. Managerial fundamental came out strongly to influence investment than market perception because of inefficiencies in the stock market as a result of information asymmetry and other factors contributing to inefficiencies.

CHAPTER FIVE

CONCLUSIONS AND POLICY.

5.0 CONCLUSIONS.

Tobin's Q-theory gives the relationship between investment and market valuations. Though most companies in Kenya are not listed on the Nairobi stock exchange, but this theory can be applied at firm level. In modifying this theory, the study also includes net sales and public expenditures. Data of twenty-eight companies were collected and analyzed. Findings of the study shows that sales are very significant in signaling the investment decision of listed firms while Tobin Q (market perception) and public expenditures show a weak relationship to investment decisions. This would imply that managers are not strongly responsive to short term stock market valuation while making investment decision. Marginal Q and/or average q measures the marginal change in the value of firm due to a unit change in investment. It implies that managers should invest when the q value is greater than one so as to capitalize on profits. However, the finding from this study does not show a strong relationship between investment and market valuation. This is possibly caused by market inefficiencies, and other reasons such as:

- (a) Since most managers aim at increasing sales and hence profits of firms, it does not necessarily seem to be the case that increase in Tobin's Q would be followed by increased investments.
- (b) Managers mostly base their investment decisions on inside information, which is consistent with company's policies, objectives and takes little concern to market information and/or perception.

A close look at company financial statements indicate that managers do not pay more attention to market perception unless the firm wants to raise capital through sale of shares at NSE. This conclusion does not imply that market valuation is absolutely of no value to managers. If the company has a higher market value than its assets, the difference is termed as intrinsic value of the firm, which is reflected in managerial efficiency. This is why listed firms with a high Tobin Q are well managed compared to others.

5.1 POLICY

Basing On the results obtained and considering a situation of a developing country such as Kenya, given that stock market may not be important in a firms' capital expenditure decisions, it should neither be a casino. For industrialization of this country, we need development of stock market and its' signaling role to investment albeit small .To say the least, in the context of the results obtained, stock market fails short again to surpass managerial perception as signaled by net sales.

In consideration of firm managers undertaking capital expenditure decisions at the firm level, evidence shows that whereas stock market signals are important, but they seem to be only of secondary importance. Though stock market plays a minimal role in firms' investment decisions, it still counts as a reliable factor.

Government expenditure has been considered and its' role seem to be the least after managerial perception and market valuation. Though the role of public expenditure has not been looked at keenly in signaling investment at NSE, it's consideration may improve the activities of private sector investment. Investment in infrastructure may improve total

investments by the private sector, which increases output in the economy. From this analysis, public expenditure can act as stimuli for private investment. Thus, reacting to the above signals and raising required funds would help us to achieve long-term growth vision of industry.

The low but significant value of market perception term of stock market signaling property is due to the fact that NSE mainly concentrates on performing other functions as outlined in part (1.1.1) of this study. Since this seems to be short-term functions NSE should focus on the long-term function such as a signal to investment decisions.

Technology should also be incorporated in listed firms so as to enhance efficiency and performance of the signaling factors. Improved technology in the firms would enhance faster communication both within and between firms. Given this scenario, we would have a faster and improved signal of managerial, market and public expenditure. This in particular may lead to improvement in market perception as a signal to investment decisions.

Since stock market acts as a signal to investment, more firms should be listed for improved capital investment and growth of industrial sector. The government should reduce its borrowing and increase investment. Increased borrowing would lead to rise in interest rates, which would have a negative effect to investments. Increased expenditure especially on infrastructure would also help to increase investments in the country especially the firms, which are situated away from cities.

Privatization of government owned parastatals is also a way through which we can increase activities at NSE. This can be done through sale of the shares of such companies through the stock market.

In summery, the above suggestions need to be coupled with seminars, workshops, organized teaching programes and çourses etc. for management of listed firms to increase their knowledge in the search of efficient investment decisions.

In conclusion, it's worth mentioning that stock market inefficiency, which is a characteristic of most markets, would always create room for information asymmetry. Due to this, managerial fundamentals would remain strong in investment decisions of firms.

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TABLE 1.
RAW DATA ('000 K.sh.)

1. Brook Bond

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	86	1070292	44141	48875	488750	28483.8
1991	66	1114267	53816	48875	488750	28333.2
1992	66	1183870	67770	48875	488750	25842
1993	66	5648001	6061295	48875	488750	23025.6
1994	74	5333128	5377442	48875	488750	34362.1
1995	74	5342640	4825689	48875	488750	41194.2
1996	74	6010589	5348635	48875	488750	38695.8
1997	74	5647447	4447963	48875	488750	64834.4
1998	198959	5270976	4220851	48875	488750	73431.1
1999	161196	4126715	3123166	48875	488750	78348
2000	222457	4377176	4117143	48875	488750	77963.1
2001	222457	4344054	4117143	48875	488750	78380.7

2. KaKuzi

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	9260	312408	136983	13067	65333	28483.8
1991	9963	418994	169635	13067	65333	28333.2
1992	10665	479250	184525	13067	65333	25842
1993	11126	1347493	337585	13067	65333	23025.6
1994	11126	14933313	905139	13067	65333	34362.1
1995	10959	1427929	696582	19600	98000	41194.2
1996	10959	1527815	939644	19600	98000	38695.8
1997	10798	2169883	1278010	19600	98000	64834.4
1998	10959	2243576	1258425	19600	98000	73431.1
1999	10962	2003486	1090782	19600	98000	78348
2000	10813	1964051	1212796	19600	98000	77963.1
2001	74648	1992272	1250943	19600	98000	78380.7

3. SASINI

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	6000	1157276	3635540	37500	375000	28483.8
1991	6000	1201537	4195282	37500	375000	28333.2
1992	6000	1201537	4195282	37500	375000	25842
1993	6000	1201537	4195282	37500	375000	23025.6
1994	194986	1201537	8340159	750000	750000	34362.1
1995	28797	3434888	8808568	750000	750000	41194.2
1996	190839	3616069	10364064	750000	750000	38695.8
1997	415963	3791423	10842600	750000	750000	64834.4
1998	464155	4385831	11726706	750000	750000	73431.1
1999	208878	4965893	11037539	750000	750000	78348
2000	405177	4889986	10895622	100000	1000000	77963.1
2001	256031	4769894	10363992	100000	1000000	78380.7

4 B.A.T

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	858	1345120	123014	20158	100940	28483.8
1991	810	1408120	163112	20158	100940	28333.2
1992	888	3673500	228906	20158	100940	25842
1993	888	3952840	358002	168000	412000	23025.6
1994	1718	200896	423418	161290	403220	34362.1
1995	1714	492997	531466	161294	806460	41194.2
1996	230	10236000	6261000	245600	1230	38695.8
1997	171000	10608000	5537000	366600	1835	64834.4
1998	1430000	10504000	4951000	362952	1815000	73431.1
1999	2155000	10959000	6767000	362932	1815000	78348
2000	1020000	12249000	7813000	362951	1815000	77963.1
2001	628000	12146000	8931000	362959	1815000	78380.7

5.BAMBURI

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	220600	138877	18414130	50166	12541	28483.8
1991	220600	144369	20311140	60197	15049	28333.2
1992	975020	149629	39177240	60197	15049	25842
1993	2044400	168042	60097380	60197	15049	23025.6
1994	8259	37695000	73803	4212823	21069	34362.1
1995	5989	403927	109630	4212823	21069	41194.2
1996	410091	449735	154363	5899352	29497	38695.8
1997	437011	484004	170437	9438963	47195	64834.4
1998	7125	544093	203043	9438963	47195	73431.1
1999	8061	605443	212008	9438963	47195	78348
2000	1648	628784	219413	9438963	47195	77963.1
2001	1648	643128	155474	11326755	56634	78380.7

6.CARBACID

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	83000	99523	308100	490	9800	28483.8
1991	83000	99523	308100	490	9800	28333.2
1992	83000	333452	601225	21570	107850	25842
1993	83000	351788	841700	21570	107850	23025.6
1994	83000	372765	953460	21570	107850	34362.1
1995	82378	440511	1149785	21570	107850	41194.2
1996	82378	660120	1211794	21570	107850	38695.8
1997	82378	598836	1182869	21570	107850	64834.4
1998	82378	581213	1092291	21570	107850	73431.1
1999	82378	577125	1084245	21570	107850	78348
2000	82378	530346	1029549	21570	107850	77963.1
2001	82378	547712	1015704	21570	107850	78380.7

7.CROWN BERGER.

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	83000	99523	308100	490	9800	28483.8
1991	83000	99523	308100	490	9800	28333.2
1992	83000	333452	601225	821570	107850	25842
1993	83000	351788	841700	21570	107850	23025.6
1994	83000	372765	953460	21570	107850	34362.1
1995	82378	440511	1149785	21570	107850	41194.2
1996	82378	660120	1211794	21570	107850	38695.8
1997	82378	598836	1182869	21570	107850	64834.4
1998	82378	581213	1092291	21570	107850	73431.1
1999	82378	577125	1084245	21570	107850	78348
2000	82378	530346	1029549	21570	107850	77963.1
2001	82378	547712	1015704	21570	107850	78380.7

8.DUNLOP

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	2615	16242	50118	400	2000	28483.8
1991	2615	18956	45165	400	2000	28333.2
1992	2615	25925	61839	400	2000	25842
1993	5500	36344	83210	400	2000	23025.6
1994	3044	45484	87514	400	2000	34362.1
1995	440	55616	101877	400	2000	41194.2
1996	1554	63709	90302	400	2000	38695.8
1997	1116	103799	86387	2000	10000	64834.4
1998	8100	105771	78697	10000	200000	73431.1
1999	8100	103851	83539	10000	200000	78348
2000	8100	107042	67852	10000	200000	77963.1
2001	8100	107042	67850	10000	200000	78380.7

9. EA. CABLES

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	200	142995	20672	144000	54000	28483.8
1991	200	142995	150725	2160000	54000	28333.2
1992	60	142995	198608	324000	81000	25842
1993	100	142995	350544	324000	81000	23025.6
1994	3845	217240	390066	324000	81000	34362.1
1995	5722	235460	439036	16200	101250	41194.2
1996	9242	258614	517891	20250	101250	38695.8
1997	21324	326072	522802	20250	101250	64834.4
1998	4197	419688	506191	20250	101250	73431.1
1999	25550	400538	370219	20250	101250	78348
2000	3620	360577	399255	20250	101250	77963.1
2001	3819	337176	358161	20250	101250	78380.7

10 EA POTLAND

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	2	235445	501351	120000	3000000	28483.8
1991	2	219400	586899	120000	3000000	28333.2
1992	2	83504	788512	120000	3000000	25842
1993	2	381823	1096811	120000	3000000	23025.6
1994	2	472167	1603842	120000	3000000	34362.1
1995	2	4130511	1646830	120000	3000000	41194.2
1996	1	265899	1680430	120000	3000000	38695.8
1997	1	1414499	1744040	126000	630000	64834.4
1998	1	1700206	2177468	126000	630000	73431.1
1999	1	821620	2357170	90000	450000	78348
2000	1	1625516	2918148	90000	450000	77963.1
2001	1	2556847	3169645	90000	450000	78380.7

11 EA BREWERIES

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	241115	1879270	7184501	42657	426570	28483.8
1991	241115	199638	8070384	42657	426570	28333.2
1992	241115	2042482	9073094	51188	511884	25842
1993	385440	2426297	12036504	51188	511884	23025.6
1994	410474	7504732	18016316	51188	511884	34362.1
1995	478597	7181353	20170961	51188	511884	41194.2
1996	425451	7847940	22351009	65521	655216	38695.8
1997	425911	9944323	22952678	65521	655216	64834.4
1998	2146938	10440759	25778213	93602	936022	73431.1
1999	2571501	5596931	25248788	93602	936022	78348
2000	2571501	6171216	25448122	97402	974022	77963.1
2001	3170659	8067688	26813674	109631	1090305	78380.7

12 K NATIONAL MILLS

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	68720	947248	2088019	20171	100853	28483.8
1991	65860	883565	2252240	20171	100853	28333.2
1992	51700	1607106	2786564	20171	100853	25842
1993	62893	1542508	3299781	20171	100853	23025.6
1994	60207	1638838	5922324	20171	100853	34362.1
1995	9454	1831982	7010224	20171	100853	41194.2
1996	7658	1807038	7346890	20171	100853	38695.8
1997	8261	1923631	9154870	26894	134471	64834.4
1998	7274	2150050	9298336	67236	336178	73431.1
1999	7312	1768742	6785916	67236	336178	78348
2000	986002	989982	6740607	67236	336178	77963.1
2001	888737	896572	7106310	67236	336178	78380.7

13 UNGA GROUP

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	905136	1322624	2234096	5207	26033	28483.8
1991	13473	1253888	2432425	5207	26033	28333.2
1992	1639297	2217482	2985365	5207	26033	25842
1993	1604121	2097504	3357870	5207	26033	23025.6
1994	1759665	2236017	5993799	5207	26033	34362.1
1995	2190371	2704426	7100668	5207	26033	41194.2
1996	2223670	2759643	7437740	5207	26033	38695.8
1997	2400413	2945451	9270823	7810	39049	64834.4
1998	2372891	2508794	9418920	46859	234294	73431.1
1999	2008774	2183907	6903494	46859	234294	78348
2000	1104691	1349457	6829041	46859	234294	77963.1
2001	994673	1224500	7106310	52954	264772	78380.7

14 .KENYA OIL

YEAR.	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	780	1782	23984	15000	6000	28483.8
1991	780	1894	34613	15000	6000	28333.2
1992	780	3693	55587	15000	6000	25842
1993	780	4323	82669	15000	6000	23025.6
1994	780	6891	112180	15000	6000	34362.1
1995	780	10894	100919	15000	6000	41194.2
1996	780	12433	113143	15000	6000	38695.8
1997	780	14518	135103	15000	6000	64834.4
1998	41663	906763	3665651	15000	6000	73431.1
1999	34008	1122812	4097363	15000	6000	78348
2000	266165	1255866	6565948	15000	6000	77963.1
2001	328946	17233530	109592240	15000	6000	78380.7

15 KENYA POWER

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	267541	3097982	2901840	1800	218840	28483.8
1991	303620	3712304	3824734	1800	218840	28333.2
1992	1500	3727764	4556374	1800	218840	25842
1993	187135	3963546	5001004	1800	218840	23025.6
1994	4300	4000725	9279744	1800	218840	34362.1
1995	4300	4718329	12957798	1800	218840	41194.2
1996	4300	5363083	18422731	1800	109800	38695.8
1997	4300	6397552	18422731	1800	109800	64834.4
1998	5101389	7243798	18073232	1800	109800	73431.1
1999	3161674	9835140	18422731	1800	1625560	78348
2000	1099154	9581674	15512527	1800	1625560	77963.1
2001	2100816	9581614	16670114	1800	1625560	78380.7

16. TOTAL
KENYA

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.	
1990	15807		328	3185541	13700	70000	28483.8
1991	14380		328	3185541	13700	70000	28333.2
1992	142500		380	3777522	28000	70000	25842
1993	200000		600	5016044	27400	140000	23025.6
1994	39789		670	8054544	54800	140000	34362.1
1995	141792		902	8811368	54800	140000	41194.2
1996	180066		1075	9832752	54800	140000	38695.8
1997	236130		1065	15719320	54800	280000	64834.4
1998	232922		1240	12728770	54800	280000	73431.1
1999	159321		1615	14068135	54800	280000	78348
2000	159321		1635	10418985	54800	280000	77963.1
2001	159321		2264	18384800	54800	280000	78380.7

17 GEORGE WILLIAMSON

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.	
1990	8600		429	105820	87563	1095	28483.8
1991	8600		451	167500	87563	1095	28333.2
1992	8596	295228	191344	87563	21891	21891	25842
1993	8596	550485	301046	87563	21891	21891	23025.6
1994	101725	746391	721177	87563	21891	21891	34362.1
1995	101725	717342	520483	8756320	43782	43782	41194.2
1996	101725	712663	638858	8756320	43782	43782	38695.8
1997	101725	713148	813294	8756320	43782	43782	64834.4
1998	111919	824837	1096770	8756320	43782	43782	73431.1
1999	111877	1176438	934425	8756320	43782	43782	78348
2000	111877	1375658	1045177	8756320	43782	43782	77963.1
2001	111877	1442761	1255517	8756320	43782	43782	78380.7

18 .A BAUMAN

YEAR.	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.	
1990	22468	50484	106809	3840066	12800	12800	28483.8
1991	22231	76351	156948	3840066	12800	12800	28333.2
1992	22035	83637	190182	3840066	12800	12800	25842
1993	22035	85524	216380	3840066	12800	12800	23025.6
1994	60050	177106	234154	3840066	12800	12800	34362.1
1995	20219	389367	2316310	3840066	12800	12800	41194.2
1996	36398	382496	246993	3840066	12800	12800	38695.8
1997	43294	352519	227377	3840066	19200	19200	64834.4
1998	43294	352519	227377	3840066	19200	19200	73431.1
1999	58813	289945	139319	3840066	19200	19200	78348
2000	55218	289945	117836	3840066	19200	19200	77963.1
2001	55218	289945	117836	3840066	19200	19200	78380.7

19 CITY
TRUST LTD.

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	852	1241	20665	48223	12056	28483.8
1991	1382	1315	1878	48223	12056	28333.2
1992	30171	54	7027	2893198	14466	25842
1993	42362	62097	7737	3471705	17359	23025.6
1994	18393	49554	15478	4166046	20830	34362.1
1995	16156	6326	16013	4166046	20830	41194.2
1996	7404	129951	28091	4166046	20830	38695.8
1997	7404	14780	40829	4166046	20830	64834.4
1998	173503	207938	47716	4166046	20830	73431.1
1999	173503	207938	15592	4166046	20830	78348
2000	173503	211797	12818	4166046	20830	77963.1
2001	171898	211821	12220	4166046	20830	78380.7

20 EAAGADS

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE.
1990	588	52547	515	6431	8039	28483.8
1991	588	50180	1175	6431	8039	28333.2
1992	588	50180	1175	6431	8039	25842
1993	588	60861	37430	6431	8039	23025.6
1994	588	148990	93608	6431	8039	34362.1
1995	588	99816	47111	6431	8039	41194.2
1996	64	99816	46772	6431	8039	38695.8
1997	64	125448	85058	6431	8039	64834.4
1998	64	140204	144758	6431	8039	73431.1
1999	64	150877	54861	6431	8039	78348
2000	54	154532	61154	6431	8039	77963.1
2001	1687	154532	64378	8039	10049	78380.7

21 EXPRESS LTD

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	119681	130647	123085	1200	6000	28483.8
1991	133495	126339	145868	4800	24000	28333.2
1992	2007	137480	168635	4800	24000	25842
1993	32	140534	2046967	4800	24000	23025.6
1994	2634	245732	387236	4800	24000	34362.1
1995	20	371810	467650	4800	24000	41194.2
1996	20	337224	559471	4800	24000	38695.8
1997	20	121808	585993	4800	24000	64834.4
1998	10125	329911	2826711	4800	24000	73431.1
1999	10125	316562	3221241	4800	24000	78348
2000	10125	270725	3172049	4800	24000	77963.1
2001	16943	265571	3595292	4800	24000	78380.7

22 EA PACKAGING

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	18617	172826	42557	6400	32000	28483.8
1991	2041	178640	52693	6400	32000	28333.2
1992	28181	200273	83431	6400	32000	25842
1993	56598	241031	118703	6400	32000	23025.6
1994	101572	326622	134877	6400	32000	34362.1
1995	188625	360270	98802	7680	32000	41194.2
1996	221594	381031	71548	7680	1920	38695.8
1997	1.2E+07	19301495	11802	7680	1920	64834.4
1998	250279	348473	38612	7680	1920	73431.1
1999	24612	322269	590114	7680	3840	78348
2000	19935	21947	1101616	7680	3840	77963.1
2001	13329	274344	1270627	7680	3840	78380.7

23 OCHARDS

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	40	7787	17746	400	3000	28483.8
1991	40	5698	9223	400	3000	28333.2
1992	75380	1757	2992	400	3000	25842
1993	1251	2313	639	400	3000	23025.6
1994	3708	29255	40744	400	3000	34362.1
1995	5952	32036	37744	400	3000	41194.2
1996	2273	38530	61202	400	3000	38695.8
1997	1433	29023	86026	400	3000	64834.4
1998	2560	22725	66315	400	3000	73431.1
1999	1458	22108	69095	400	3000	78348
2000	6840	21924	58921	400	3000	77963.1

2001 6840 21924 58921 400 3000 78380.7

24. CAR AND GENERAL

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	7858	6020	272581	16878	8639258	28483.8
1991	229	15915	445676	16878	8639258	28333.2
1992	3843	324	472165	16878	8639258	25842
1993	172920	356597	747975	16878	84392	23025.6
1994	12225	600430	866876	20254	101271	34362.1
1995	12225	594382	825389	20254	101271	41194.2
1996	12315	300217	756376	22280	111398	38695.8
1997	12315	258917	606996	22280	111398	64834.4
1998	12550	343463	550751	22280	111398	73431.1
1999	12550	302005	420973	22280	111398	78348
2000	27427	498218	428591	22280	111398	77963.1
2001	27427	464389	434550	22280	111398	78380.7

25 STANDERD NEWSPAPER

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	22	59820	265	8541	50000	28483.8
1991	20	34840	218	8541	50000	28333.2
1992	20	39380	312	8541	42800	25842
1993	20	65920	414	8541	42800	23025.6
1994	20	70300	520	8541	42800	34362.1
1995	20	61200	591	8541	42800	41194.2
1996	20	52081	726520	8562	42802	38695.8
1997	20	93684	820332	8562	42802	64834.4
1998	100020	150319	974152	8562	64152	73431.1
1999	100020	159872	1113720	8562	64152	78348
2000	45414	78493	1162044	12812	64152	77963.1
2001	81771	234687	1162044	12812	64152	78380.7

26. NATION NEWSPAPER

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	17853	136058	700540	9507	47537	28483.8
1991	6848899	138773	684889	9507	47537	28333.2
1992	843893	142795	8438893	9507	47537	25842
1993	843893	142795	8438893	9507	47537	23025.6
1994	257474	743331	1295788	11884	59421	34362.1
1995	134962	988980	1537963	11884	59400	41194.2
1996	159700	568500	1895700	11884	89100	38695.8
1997	199100	697400	2182000	11884	178300	64834.4
1998	204000	839300	2409600	11884	35600	73431.1
1999	215400	1744200	2450500	11884	178300	78348
2000	245700	2113300	3022600	11884	35700	77963.1
2001	253600	2106600	3538800	11884	35700	78380.7

27.LIMURU TEA

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	278	12093	24828	200	4000	28483.8
1991	205	9737	21157	200	4000	28333.2
1992	25	18479	30935	200	4000	25842
1993	119	62775	79703	200	4000	23025.6
1994	4008	172557	43936	200	4000	34362.1
1995	849	12032	35310	200	4000	41194.2
1996	2157	174778	43923	200	4000	38695.8
1997	3668	172333	53825	200	4000	64834.4
1998	21348	31728	65883	200	4000	73431.1
1999	24752	35029	51212	200	4000	78348
2000	25548	43075	5629	200	4000	77963.1
2001	14737	37654	45429	200	4000	78380.7

28 KAPCHORUA

YEAR	INVEST	CAPITAL	SALES	SHARES	SH.CAPIT	PE
1990	9	152535	56580	1956	9780	28483.8
1991	20	145480	95020	1956	9780	28333.2
1992	9	162427	105378	1956	9780	25842
1993	9	295659	143703	1956	9780	23025.6
1994	9	341574	275842	1956	9780	34362.1
1995	9	330836	182936	3912	19560	41194.2
1996	9	332301	187722	3912	19560	38695.8
1997	9	345305	259518	3912	19560	64834.4
1998	9	390538	341578	3912	19560	73431.1
1999	9	524912	325568	3912	19560	78348
2000	11	606971	345311	3912	19560	77963.1
2001	11	637598	345183	3912	19560	78380.7

KEY

PE=Public expenditure

BAT=British American Tobacco

SH.CAPI=Share capital

Source.

❖ Company specific financial statements from NSE and CMA.

❖ Economic and statistical surveys of Kenya (various issues.)

TABLE 2**BALANCED RESULTS OF MEANS OF VARIABLES(in logs)**

Panel(T=12,mean,BYID)

Dbalanced Data N=28,T=12,NOB=336

Firm	L(I/K)	LQ	LH	EM
1:	6.92133	-0.83943	14.22404	10.25709
2:	9.43649	-0.89479	13.30862	10.25709
3:	10.75496	0.42829	15.26755	10.25356
4:	10.54260	0.19535	14.91833	10.25179
5:	10.60695	-0.082843	13.037381	10.22111
6:	11.32221	0.76612	13.70176	10.15976
7:	10.23164	0.78515	12.92249	10.15976
8:	6.98070	-0.054697	11.44760	10.04436
9:	6.14257	0.64051	13.14392	10.04436
10:	4.28563	1.04924	15.03718	10.31126
11:	12.92759	0.98896	16.22439	10.44471
12:	11.26942	1.19512	15.47770	10.50516
13:	11.26942	1.75923	14.11257	10.62605
14:	11.82009	1.33933	14.32872	10.62605
15:	11.38192	3.32767	16.16272	10.56349
16:	11.03308	6.19435	14.68599	10.56349
17:	11.01032	0.23676	13.00365	10.90756
18:	9.84389	0.37961	10.82306	11.07959
19:	8.69387	-2.00593	9.43974	11.12109
20:	6.12431	-0.023152	11.92449	11.20410
21:	8.80971	0.43560	12.85673	11.20410
22:	8.93215	0.043152	11.31648	11.26892
23:	6.46452	0.22614	10.09940	11.26892
24:	9.19183	-1.55874	9.76188	11.26391
25:	5.66919	-1.55874	9.76188	11.26391
26:	12.45873	1.50734	14.53834	11.26577
27:	7.71248	0.082717	10.84213	11.26933
28:	2.89723	-0.43522	12.00088	11.26933

APENDIX. A

SUMMARY OF UNIT ROOT TEST

	L(I/K)	LQ	LH	LM
w.t.d	-5.26065	-5.43953	-5.06037	-1.78823
Dickey-F	-5.46267	-5.61564	-5.31012	-2.26396
Phillips	-64.53939	-75.96962	-56.06932	-9.189913
<u>p-values</u>				
w.t.d	0.000108	0.000063	0.000196	0.07764
Dickey-F	0.000003	0.060013	0.000054	0.04539
Phillips	3.23015D-06	2.13412D-07	0.000024	0.49298
<u>Number of lags</u>				
w.t.d	2.0000	2.0000	2.0000	2.0000
Dickey-F	2.0000	2.0000	2.0000	2.0000
Phillips	2.0000	2.0000	2.0000	2.0000

Appendix B

Total(plain OLS) Estimates

Dependent variable: L(I/K)

Std.dev. of dependent variable.=3.69205

$R^2 = 0.716151$

Sum of squared residuals=3579.38

$R^2 = 0.709016$

Variance of residuals=10.7813

Variable	Estimated Coefficient	S.E	t-Statistics.
LQ	-0.040562	0.090298	0.449198
LH	0.763686	0.096115	2.94555
LM	0.549384	0.432194	1.67115
C	6.83811	5.28925	1.29283

F test of A, B=A_i, B_i: F(88,244) =8.1055, p-value={0.0000}

Critical F value for diffuse prio (leamer,p.114) =9.9496

Between {OLS on means} Estimates.

Dependent variable: L{I/K}

Means of dependent variable =9.04483

S.E of reg. =2.26502

s.t.d dev of dependent variable=2.54162

sum of squared residuals =123.128

$R^2 = 0.464056$

variance of residual =5.13033

$R^2 = 0.45813$

Variable	Estimated Coefficient	S.E	t-Statistics.
LQ	0.242338	0.088067	2.75174
LH	0.413257	0.284521	5.36783
LM	0.119021	1.15482	1.80437
C	0.123105	15.03658	1.074486

Within (Fixed Effect) Estimations:

Dependent variable L(I/K)

Sum of squared residual =1988.15

Variance of residuals =6.51853

$R^2 = 0.5756$

S.E of regression =2.55314

$R^2 = 0.5432$

Variable	Estimated Coefficient	S.E	t-Statistics.
LQ	0.310146	0.35748	0.867423
LH	0.574803	0.343928	8.67129
LM	0.228569	1.032670	3.197926
C	-1.14228	12.3355	-1.74486

F test for A,B=A_i,B_i F(27,305)=9.0411,p-value={0.0000}

Critical value for diffuse nprior (leamer,p.114)=6.7316.

Total(plain OLS) Estimates

Dependent variable: L(I/K)

Std.dev. of dependent variable=3.69205

$R^2 = 0.716151$

Sum of squared residuals=3579.38

$R^2 = 0.709016$

Variance of residuals=10.7813

Variable	Estimated Coefficient	S.E	t-Statistics.
LQ	-0.040562	0.090298	0.449198
LH	0.763686	0.096115	7.94555
LM	0.549384	0.432194	2.27115
C	6.83811	5.28925	1.29283

F test of A, B=A_i, B_i: F(88,244) =8.1055, p-value={0.0000}

Critical F value for diffuse prio (leamer,p.114) =9.9496

Between {OLS on means} Estimates.

Dependent variable: L{I/K}

Means of dependent variable =9.04483

S.E of reg. =2.26502

s.t.d dev of dependent variable=2.54162

sum of squared residuals =123.128

$R^2 = 0.764056$

variance of residual =5.13033

$R^2 = 0.745813$

Variable	Estimated Coefficient	S.E	t-Statistics.
LQ	0.242338	0.088067	2.75174
LH	0.613257	0.284521	5.36783
LM	0.319021	1.15482	1.80437
C	0.123105	15.03658	2.074486

Within (Fixed Effect) Estimations:

Dependent variable L(I/K)

Sum of squared residual =1988.15

Variance of residuals =6.51853

$R^2 = 0.3956$

S.E of regression =2.55314

$R^2 = 0.3544$

Variable	Estimated Coefficient	S.E	t-Statistics.
LQ	0.310146	0.35748	0.867423
LH	0.574803	0.343928	8.67129
LM	0.228569	1.032670	3.197926
C	-1.14228	12.3355	-1.74486

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