

THE DETERMINANTS OF STOCK MARKET  
PRICES IN KENYA

BY

KAGUME J.W.

Research Paper Submitted to the Department of Economics, University  
of Nairobi, in Partial Fulfillment of the Requirements for the Degree  
of Master of Arts in Economics

July, 1991

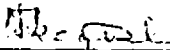
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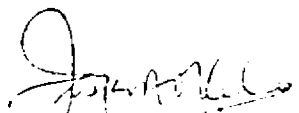
## DECLARATION

This Research Paper is my original work and has not been presented for a Degree in any other University.

  
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J. W. KAGUME

This Research Paper has been submitted for examination with our approval as University Supervisors.

  
\_\_\_\_\_  
DR. S. O. WARFA

  
\_\_\_\_\_  
MR. J.-A. OKELO

## ACKNOWLEDGEMENT

I wish to express my sincere thanks to my Supervisors, Dr. Warfa and Mr. Okelo whose advice, co-operation and assistance, made it possible for me to complete this paper. I am also indebted to Mr. Mwarania for his very helpful comments on the paper.

I would also like to thank the Ford Foundation for availing funds to sponsor me for this course, through the Ministry of Planning and National Development. My thanks are also due to the Director of Statistics for approving my leave to take the M.A. course.

I am also grateful to my lecturers particularly Dr. Ayako, Dr. Mweya, and Dr. Ngola for giving me a foundation for writing this paper through their teaching of papers on theory and analytical skills. I am grateful for their general discussions on this paper.

I wish to express my appreciation to my Father, Mr. Joseph Kagume, and my Mother, Mrs. Mary Gathigia for their tireless efforts to educate me. I could not have reached this level without their continuous encouragement and efforts. I cannot forget Ms Esther Gathigia for her encouragement and all kinds of assistance she gave me in various capacities including type-setting my work.

My special thanks go to all my classmates, particularly Mr. Nyangena, Mr. Wachira and Ms Ngugi for their very useful discussions in the course of the writing and particularly for their constructive criticisms and helpful comments on my first draft. My thanks are also due to Mr. Maina of the Capital Markets Authority for his comments on the stock market. I am also grateful to my workmates in the Central Bureau of Statistics (CBS), particularly Mr. Mukui, Mr. Wangila, and Mr. Nyongesa for their general advice to improve this paper.

Finally, I would like to state that I am wholly responsible for any errors found in this paper.

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## ABSTRACT

Kenya has made notable strides in all sectors of her economy since independence. Real Gross Domestic Product (GDP) grew at average rate of 4.8 per cent between 1964 and 1990. The prerequisites of sustained economic growth are accumulation of savings and allocation of those savings to the most productive investment. The role of the financial system is to mobilize savings and allocate them to consumption and investment.

Kenya has been able to invest a substantial proportion of her GDP and gross fixed capital formation has therefore increased. The performance of the Banking system (in terms of deposit mobilization) has been improving over the years. In addition, total lending of the Banking system has greatly increased over the years.

One area of the financial system which has not been active over the years is the stock market of the capital market. The primary market has played a minor role in mobilizing new capital. Most of the capital formation has been financed through loans obtained from the banking system. Further the number of participants in the Kenya stock market is very low compared to that of the developed countries. It was also observed that there has been a slow movement of stock market prices.

The objective of this paper was to explain the macroeconomic factors causing this trend of stock prices for the period 1973 - 1989.

The results indicate that money supply changes do not have a significant influence on the stock market. Using partial correlation analysis of the constituents of changes of money supply, we found that real domestic credit going to the private sector has a positive and significant influence on stock prices. Real domestic credit going to the public sector was found to be negatively related to stock prices. Balance of payments as a proportion of GDP was found to be negatively related to stock prices.

Real income was found to have a positive and significant effect on stock prices. The expected rate of return on stocks was found to have a positive and statistically significant effect on stock prices. The effect of the demand for quasi-money was found to be negative and statistically significant. Inflation was found to be negatively related to stock prices, but its effect was found to be statistically insignificant.

The stock market in Kenya was also found to be inefficient as stock prices do not adjust to expectations instantaneously.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

Kenya has made notable strides in all sectors of her economy since independence. Real Gross domestic product grew at average rate of 4.8 per cent between 1964 and 1990. It has grown to 4,233 million Kenya pounds in 1990.<sup>1</sup>

Sustained economic growth leads to high levels of employment and high standards of living. Other things being equal, this enables a country to achieve its desired objectives such as rapid economic growth, equitable distribution of income and employment creation. In order to have sustained economic growth, there is need to increase the capacity and efficiency of the production base. One of the pre-requisites for this to happen is an increase in capital formation of the country. Capital formation in turn depends on the mobilization of savings and the channelling of these savings to the most productive and efficient investments. This means that to achieve increased economic growth, a country has to abstain from consumption of goods

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<sup>1</sup> derived from Republic of Kenya, Development Plan 1989 - 1993, and Economic Survey, 1990, Government Printers, Nairobi.

produced and invest whatever is saved productively. On the other hand, it should be noted that it is crucial that there is an optimal balance between savings and investment to ensure growth and stability of the economy, for as Ranlett (1964) notes.

"Saving without investment taking place does not add any new productive capacity to an economy. On the other hand, because not all goods produced are taken from the market, this oversaving generates depression. On the other hand, investment without savings results in inflation ..... it is equally necessary that saving must be translated into investment if we are to achieve economic progress".<sup>2</sup>

Kenya has been able to invest a substantial proportion of her Gross National Product(GNP). Most of this has been financed from domestic savings. Table 1.1 shows the proportion of GNP that has been invested and the proportion financed from domestic and foreign sources.

**Table 1.1**

	Percent of GNP at current prices				
	1965-69	1970-74	1975-79	1980-84	1985 - 89
Gross investment*	19.7	25.4	24.5	25.3	23.5
Foreign saving	3.2	7.5	7.0	7.0	5.2
Gross National Saving	16.5	17.9	17.5	18.3	18.3

Source: Republic of Kenya, Development Plan, 1989 - 1993

\* calculated as percentage of total investment to total GNP

It can be seen from the table that the proportion of gross investment financed from domestic savings has been increasing. However a substantial proportion

<sup>2</sup> Ranlett, J.G. Money and banking. An introduction to analysis and policy, second Edition, John Wiley & Sons Inc. New York, 1969 p. 113



has been financed from foreign savings. Table 1.2 gives details of capital formation in absolute terms, in both the private and the public sector. The table also gives details of how this was financed for the period 1979 to 1989.

**Table 1.2**

Financing of capital Formation, 1979 - 1989.

	<u>Kenya million pounds</u>									
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Gross fixed capital formation	622.5	725.4	668.3	720.9	807.2	852.9	1175.1	1286.7	1522.2	1721
Changes in Stocks	166.7	133.4	96.2	89.5	220.4	136.4	140.0	305.8	370.9	411
<b>TOTAL</b>		789.2	858.8	764.5	810.4	1027.6	989.3	1315.1	1592.5	1893.1
<b>2172.5</b>										
<b>FINANCING</b>										
Grants from abroad	21.9	20.7	25.5	59.8	92.6	108.7	117.7	127.0	205.3	266
Net borrowing from abroad	328.7	326.2	260.6	88.9	86.3	79.4	35.9	409.5	403.0	484
Domestic saving	438.6	511.9	478.5	661.7	848.7	801.2	1161.5	1056.1	1284.8	1428
<b>TOTAL</b>	789.2	858.8	764.6	810.4	1027.6	989.3	1315.1	1592.6	1893.1	2172

Source: Republic of Kenya, Economic survey, Various issues, Government Printers, Nairobi .

Although the amount financed from domestic savings has been increasing, there is still a substantial amount of gross fixed capital formation financed from foreign savings in form of grants and loans. There is need therefore to increase domestic savings. This can be done through improving the efficiency

of the financial system.

It is important to note that when money is the only financial asset in the economy, expenditure can only be financed by depleting the accumulated wealth or by persuading the seller of consumption or investment goods to wait for payment. If the latter method is used, the sellers will run down their wealth stocks to finance their current costs or they will cut down their current spending and eventually run down the business. On the other hand, most of the savers lack entrepreneurial ability, managerial and technical expertise which can enable them to accumulate savings and invest them productively. In addition, most of them are discouraged from buying capital assets due to their illiquidity and the risks involved. An economy where money is the only financial asset will therefore grow extremely slowly as the incentives to save are poor and the rate of accumulation of wealth is slow.

A major financial innovation to circumvent this problem is the introduction of marketable interest bearing instruments such as bonds and bills, and marketable dividend earning shares and stocks. These instruments are more liquid and are less risky to hold than physical assets. Development of financial instruments stimulates the accumulation of savings and enables more investment to take place, thus accelerating the rate of economic growth. It should be noted that the financial instruments are created by the ultimate

borrowers of funds. They are then sold directly or indirectly to the ultimate lenders of funds. ~~The direct sale of financial claims has several disadvantages and therefore it is rather limited in the early stages of a country's development. Many small savers have little knowledge of financial analysis and they find it difficult to compare alternative investment opportunities. The majority have little knowledge of financial procedures, and even for those who are aware of financial matters, they may consider the maturity of bonds and shares to be too long. In addition their savings are usually too small to be invested in a viable project. Yet for borrowers on the other hand, the cost of raising funds is only justifiable for large amounts.~~ Indirect sale of financial claims, turns out to be the most practical form of investment in such a situation. This is done through financial intermediaries. The intermediaries collect funds from lenders and lend them in turn to 'ultimate borrowers'. They also offer a wide range of financial claims making it easy for each saver to select the one most suitable to him. To the borrower, they offer a wide range of credit facilities and he is able to select the source of finance most suitable to his requirements. Since they are able to mobilize large amounts of savings at low cost, their credit facilities are generally cheaper. To ensure that the funds borrowed are not wasted, the intermediaries so mentioned give financial and technical advise to the potential borrowers. Thus the entire financial system plays an important economic role of mobilizing resources. In Kenya, the deposits mobilized by the financial system has been

increasing over the years. On the other hand, total lending, for consumption and investment purposes, has been increasing as can be shown from table 1.3 below

**Table 1.3**

<u>Performance of financial institutions for selected years</u>								
Kenya Million pounds								
	1968	1970	1973	1980	1984	1985	1986	1987
<b>TOTAL LENDING</b>								
Commercial								
Banks	67	87	161	658	1054	1155	1463	1675
NBFI'S	8	14	35	207	516	615	643	897
<b>TOTAL</b>	<b>75</b>	<b>101</b>	<b>196</b>	<b>865</b>	<b>1570</b>	<b>1770</b>	<b>2106</b>	<b>2572</b>
<b>TOTAL DEPOSITS</b>								
Commercial								
Banks	11	26	228	700	1108	1230	1548	1680
NBFI'S	7	14	34	243	608	702	806	884
<b>TOTAL</b>	<b>18</b>	<b>40</b>	<b>262</b>	<b>943</b>	<b>1716</b>	<b>1932</b>	<b>2354</b>	<b>2564</b>

Source: Extracted from Republic of Kenya, Development Plan (1988-93) Government Printers, Nairobi.

The number of institutions in the financial system has grown greatly since independence. Currently Kenya has the Central Bank of Kenya, 26 commercial banks with 236 full branches, 87 sub-branches, 41 agencies and 127 mobile units, and a growing number of Non- Bank Financial Institutions. Commercial banks accept deposits from savers and create credit in form of loans, and discounting of bills and promissory notes issued by the private sector. They also lend money to the government by purchasing treasury bills

and bonds and investing directly in institutions owned by the government. They sometimes (though rarely) invest directly into private sector through equity participation. They act as custodians of the public money and valuables. They provide a mechanism through which money payments can be made quickly and efficiently. Other functions of the commercial banks include dealing with foreign exchange transactions on behalf of customers and giving general financial advise to investors. Thus commercial banks play a fundamental role in the country's economic development and growth.

The Central Bank of Kenya performs several functions in the economy. Being the sole currency issuing authority, it ensures monetary stability in the economy by influencing the monetary system. It regulates the volume and allocation of bank credit using cash reserve requirement, liquidity ratio and selective controls. It is required to maintain foreign exchange reserves of not less than four months imports and engages in foreign exchange dealings with commercial banks, public bodies, foreign central banks, financial institutions, government's and international financial institutions. It is the Banker and advisor to the government on financial matters and deals with all government transactions with international financial institutions and also manages the national debt. As a banker to the government, it lends to the government and also invests in government securities or public enterprise securities. Public enterprises are required to deposit their money with it. It pays interest and

redeems government bonds and treasury bills. Finally it inspects the operations of the other banks to ensure that they comply with the regulations.

The financial system also includes the Non - Bank Financial Institutions (NBFI's). Some of these NBFI's are deposit taking. They compete with commercial banks for deposits through offering higher interest rates and giving a wider range of term-deposit facilities than commercial banks. They maintain demand and time deposits at commercial banks for their current needs. They borrow and lend to the commercial banks thus creating a linkage with commercial banks. Some of these NBFI's specialize in lending for purchase or erection of buildings, while others specialize in general hire purchase financing. Others are merchant banks.

Other Financial Institutions include Insurance Companies Pension Funds and Provident Funds. Insurance companies mobilize long- term savings by collecting premiums on their contracts of Insurance on human life. They also invest in real and financial assets. Thus they have a linkage with the stock markets as they buy stocks from this market. The funds collected are banked with the various commercial banks, and earn interest. By these functions they accumulate funds and they pay out the claims due to the policy holders from those accumulated funds. Their incomes are more stable and can therefore finance long term development projects. Currently there are 37 insurance

We also have other public Development finance Institutions. These were set up to promote those essential projects which have high risk and low profitability. Due to low returns of such projects, the private sector is unlikely to invest in them and the commercial banks may not avail credit. These institutions were established to undertake long term projects with overseas investors and to enable Kenya nationals to participate more fully in industrial and commercial sectors of the economy. A few of them collect deposits from the public but their main sources of finance are grants and loans from abroad and Kenya government grants. They also provide technical advise to their clients.

The National social Security Fund (NSSF) Scheme is another institution which mobilizes long term savings. It was established in 1965 under the NSSF Act, and started operation in 1966. It is a compulsory saving scheme where both the employee and the employer are required each to contribute ten per cent of the employee's gross salary subject to a maximum of KSh.80.00 per month. The funds collected are invested in Government securities and other long term assets. Although the NSSF scheme is the most significant, there are other provident funds operated by large companies. Lastly, we have the Post Office Savings Bank. The main role of the bank is to mobilize small

savings and invest the net funds in government securities. It has many branches and thus has the widest geographical coverage. This bank competes with commercial banks for deposits.

## **1.2 The structure of Financial Markets**

As noted earlier, funds raised through the sale of financial instruments reach the ultimate borrowers either directly or indirectly. The indirect transmission involves the use of financial intermediaries as 'go-betweens' linking the ultimate lenders to the ultimate borrowers. The intermediaries sell their own instruments and use the funds so collected to acquire different instruments from the ultimate borrowers. However, the financial markets do not have their own financial instruments. They trade on financial instruments on behalf of the ultimate borrowers and lenders. Financial markets are sometimes partitioned into the money and capital markets.

### **1.2.1 The money market**

A money market deals with short term credit instruments. The time horizon for maturity of these instruments ranges from one day to one year. The instruments traded in this market are created by the government and large business concerns. The suppliers of funds in this market include commercial banks, non bank financial institutions, insurance companies, pension and provident funds. In terms of economic function, the money market mobilizes



idle money balances and since the prices of the instruments depend on market conditions, it serves as a guide to monetary policy. The money market improves the efficiency of transmission of funds for investment and consumption purposes by providing a cheap mechanism for short term borrowing. In Kenya, the main instruments traded in this market are the Treasury Bills, issued by the Central Bank; the crop finance Bills; the import and export Bills; the promissory notes; the interbank overnight call market for cash; and the recently introduced certificates of deposits.

### **1.2.2 The capital market**

In the Capital Market, the instruments traded mature over the long term (which is more than one year). They are issued by various institutions. The capital market consists of two segments, namely, the non- securities segment and the securities segment. The institutions in the non-securities segment are banks and non-bank financial institutions (NBFI's). The instruments traded in this segment are term loans and mortgages and leases.

As noted earlier, the introduction of marketable interest earning debt instruments (debentures and bonds) and dividend earning shares and stocks improves the efficiency of the saving - investment process. However, to realize this efficiency, there must be an efficient market for these instruments. The security segment of the capital market provides a mechanism whereby

buyers and sellers of these instruments meet and determine prices after which trading occurs. The securities segment may be divided into the primary market and the secondary market. Since Firms require large amounts of funds to finance their initial capital needs, and to expand in a later period, they sell securities directly or indirectly (through investment banks) to the public. The primary market deals with such sales of securities. The government may also raise funds to finance long term projects by selling its own debt instruments to the public. In Kenya, however, the government has not (since the 'mid' 1950's) used the stock market to raise development finance. The full range of securities that could be traded in the stock market are stocks, bonds, debentures, equity related bonds (convertibles and warrants) and foreign bonds. The stock market provides a machinery for bringing buyers and sellers of these securities, both new and old, in contact with one another. The stock market performs several functions in the economy. As Munga (1974) writes

"The task of mobilizing savings from idle agents and distributing them to 'active agents' is one of the major functions of the stock exchange".<sup>3</sup>

Investors in these securities, in addition to having the right to dividends or interest and any other such right attached to the securities have the right to sell their shares when they are in need of liquidity. The lenders of funds in

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<sup>3</sup> Munga, D.N. The Nairobi Stock Exchange: Its History, Organization and Role in the Kenyan Economy, M.B.A. Thesis, University of Nairobi, 1974.

this market may not wish to hold the assets until maturity, in case of redeemable preference shares or debentures, or for ever, in case of common stocks and irredeemable preference shares. Further, when there is need to expand the business, another issue may be necessary. The main function of the secondary market is to provide liquidity to security investors and to distribute the risks involved in holding securities within the society. This market provides a market place where investors can buy and sell securities, and determine the prices of securities. Although it does not support new investment, the existence of the primary market to a large extent depends on the functioning of a secondary market. The ability of firms or the government to tap funds in the primary market will therefore depend on the liquidity provided by the secondary market. The existence of a secondary market for the securities is therefore very important for the functioning of the entire capital market.

Munga outlines the economic functions of the stock exchange as

- "1. Increasing the quantity of funds available to finance industry for government;
2. directing the flow of new savings toward investments which are most desirable and the social function of enabling an investor without delay to acquire an interest in national assets of his choice and to liquidate them at will at a 'fair' price and without undergoing an unduly

complete process." <sup>4</sup>

The same writer notes that

- "1. the stock exchange must facilitate the transfer of the economy to the citizens;
2. the stock exchange must facilitate the gradual replacement of foreign national debt with local debt.
3. the stock exchange must facilitate as wide an ownership of national tool of production as is possible by stimulating investment in securities by as many people as possible." <sup>5</sup>

It is clear from the above that the stock exchange is very crucial for the economy as a whole and in particular for the functioning of the capital market. When writing on the importance of the stock market Lix notes that

"It is there and there alone that new long-term capital can be raised voluntarily from the public on a large scale and in short space of time".<sup>6</sup>

### 1.3 Government Policy

The Capital market in Kenya has developed through the initiative of the private sector. Prior to independence, the presence of the European and the

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<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Rix, M.S. Stock Exchange Economics(London: Sir Isaac Pitman & Sons Ltd) p.3

Asian communities with their relatively higher incomes and knowledge of the complexities of security transactions stimulated the development of a capital market. For this reason, the colonialists for a long time controlled most of industrial and agricultural production in Kenya. On the other hand, during the colonial era, there was very little public investment, and the little public investment was mainly financed through foreign borrowing and grants. This is an indication that the public sector played a minor role in developing the capital market.

Since independence, the government has tried to maintain positive real savings and lending interest rates. Interest rates have therefore been rising with inflation to avoid negative interest rates. The objective of the government in maintaining positive real interest rates is to promote economic development. Interest rates affect the demand and supply of investible resources. Controlled interest rates distorts the price of the resources leading to mis-allocation of financial resources. This inhibits the development of the financial sector.

The government is now moving towards a policy where interest rates are determined by market forces. This will, as noted above enhance efficient allocation of resources. There are other policies which, though indirectly, influence the interest rates. These include qualitative and quantitative control

of credit. These affect both the supply and demand for credit.

The government recognized the need to raise savings and channel the savings to the most productive investments. The measures as outlined in sessional paper No. 1 of 1986 are developing a market for short term private financing, broadening of the capital markets to provide more long term finance including risk capital, and creation of private money market instruments. The same paper proposed that sound fiscal and monetary policies to broaden and strengthen the capital market should be pursued and in particular develop the primary market for securities and reactivate the stock exchange to allow trading in secondary securities.

The fifth development plan stresses the need to reduce reliance on the external resources, and concentrate on mobilization of domestic savings for future development. It was proposed in this plan to initiate a comprehensive study on money and capital markets in Kenya. The study was carried out jointly by the Central Bank of Kenya and the International Finance Corporation in 1984. The study, as stated in the fifth Development Plan, was to focus on the following areas:

- (i) "Scope for improvement in the operations of the money market by introduction of new instruments and procedures;
- (ii) Scope for improvement in the public debt management

that would serve to facilitate development of both the money and capital markets;

- (iii) Scope for improvement of corporate debt and equity financing facilities including possibilities for making the Nairobi Stock Exchange into a more dynamic and useful institution."

The study revealed that the financial system in Kenya is dominated by commercial Banks and the deposit taking non-bank financial institutions. The absence of any significant securities market was noted to have led to a bias towards short term credit in provision of finance to the private sector. As the securities segment of the capital market is less developed, it was noted in the report that " an important objective of the financial market development in Kenya is to increase the role of the securities market subsector." The main specific objectives of developing the securities segment of the capital market were set out in the report as:

- (a) " to mobilize long term savings to finance long term investment;
- (b) to provide more risk capital (equity) to entrepreneurs;
- (c) to encourage broader ownership of productive assets thereby encouraging more savers to benefit from economic growth; and
- (d) to improve the efficiency of capital allocation through a competitive pricing mechanism which can contribute to an

increased rate of growth of the economy overall."

A number of economic/financial, fiscal, institutional and legal/regulatory factors were noted to affect development of the Kenya's capital markets to its full potential. The report identified, among others, certain aspects of taxation and monetary policy, and other legal and administrative issues. This led to the suspension of the capital gains tax in the 1985/86 budget speech. This tax was chargeable on gains arising from transfer of either property or shares listed and traded on the Nairobi stock exchange. It was introduced in 1975. The report also proposed the establishment of a capital markets development committee to oversee the development of money and capital markets. As a result, the Capital Markets Development Authority was established in January 1990. It has a strong representation from the private business sector. Its objective is to design and implement measure which would encourage Kenyan Companies to raise funds through equity. It is also charged with the responsibility of monitoring the Nairobi Stock Exchange in order to establish <sup>conditions</sup> conducive to active trading.

#### 1.4 The Stock Market in Kenya

The Nairobi stock exchange was formally incorporated in 1954 to deal with exchange of shares of publicly quoted companies or government and



municipal gilt edged stocks. Before the establishment of the Nairobi stock exchange, investors were trading on either the Bulawayo Exchange (in Rhodesia, now Zimbabwe), the Johannesburg stock exchange, or the London stock exchange. Shares and stocks were bought and sold by accountants, Auctioneers and lawyers. At that time, most of the investors were Europeans as Africans and Asians were not allowed to deal in securities. It was not until the attainment of independence ,that Africans were formally allowed to deal in exchange of securities.

Currently, the Nairobi stock exchange is made up of six stock broking firms, namely, Dyer and Blair Limited, Chandulal Shah, Francis Thuo & Company Limited, Nyaga Securities and Ngenye Kariuki & Company, all based in Nairobi. The conduct of these firms is governed by "Rules and regulations," issued by the members themselves. Under these rules, membership can be acquired by persons with at least three years experience in the brokerage business in Nairobi (or other recognized exchange) and is subject to a vote by a governing committee consisting of representatives of existing brokers. The rules also specify the minimum brokerage commissions, which are maintained at a fairly low levels. Under these rules, requirements for companies wishing to be listed on the Nairobi Stock exchange include:

- (a) a minimum issued and paid- up capital of Ksh 2.0 million;
- (b) Public offer of not less than 20 per cent of the authorized

capital, or shares with a nominal value of Ksh 1.0 million, whichever is less;

- (c) audited financial statements for the preceding five years, or since the company's inception if less than five years; and
- (d) detailed information on the intended distribution of the ordinary share capital with regard to the source of control (local or foreign).

Until recently, the Nairobi stock exchange did not have a trading floor. Trading was done via telephone, mail or by personal visit. The stock brokers deal with each other over the phone and bargain on behalf of their clients. The primary market of the Nairobi stock exchange has, since independence, played a minor role in mobilizing new capital. From table 1.4 it can be shown that although capital formation was increasing every year, between 1966 and 1983, only Ksh 221.1 million was raised through public issue of shares and debentures.<sup>7</sup>

This fact is also supported by Sessional Paper no.1 of 1986 which notes that,

"Business firms in Kenya rarely raise capital through Public issue of equity and debt securities. The main sources of local funds for new investment have been retained earnings of

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<sup>7</sup> See Central bank of Kenya and International Finance Corporation, Report on recommendations on development of money and capital markets in Kenya.1984. p.94

corporations, savings of family groups, direct government investment, and the development banks."<sup>8</sup>

Most of the activity in the stock market have been recorded in the secondary market, where previously issued securities are merely transferred to other investors. Trading in the listed securities have been declining. This can be seen from data on annual transactions obtained from brokers. The number of transactions declined from 17,000 in 1973 to about 4,000 in 1983.<sup>9</sup> There has been a slow movement of stock prices, details of which are given in table 1.4 below:

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<sup>8</sup> see Republic of Kenya, Sessional Paper no.1 on Economic Management for Renewed growth, Government Printers, Nairobi, 1986, p.39

<sup>9</sup> See Footnote 7 above.

**Table 1.4**

Trend of stock index as at December 1972 -1990

YEAR	STOCK INDEX	%CHANGE FROM PREVIOUS YEAR
1972	237.24	-
1973	227.00	-4.5
1974	175.66	-29.2
1975	206.23	17.4
1976	227.27	11.1
1977	390.55	71.8
1978	420.65	7.7
1979	354.21	-18.7
1980	378.21	6.8
1981	350.43	-7.9
1982	349.77	-0.2
1983	382.70	9.4
1984	386.43	1.0
1985	421.10	9.0
1986	505.96	20.2
1987	735.29	45.3
1988	858.64	16.8
1989	815.85	-5.2
1990	915.34	12.2

SOURCE: Republic of Kenya, Statistical Abstract, Various issues.

The stock exchange index recorded the highest annual increase of 71.8% between 1976 and 1977. This coincides with the 1977/78 coffee boom, when commodity export prices increased. The index declined by 18.7% in 1979. Between 1979 and 1985, the stock index moved within a narrow margin from 354.1 in 1979 to 421.1 in 1985, an increase of only 18.9% in 7 years. There were relatively high increases thereafter - 20.2% in 1986, 45.3% in 1987, and

16.8% in 1988. The index fell by 5.2% in 1989, and increased by 12.2% in 1990. As can be seen from these statistics, the stock index has either fallen or increased by small percentages, especially before 1985. An exception to this trend was 1977, due to the coffee boom. Another high increase was observed in 1987, but there was a drop in the following year. As a result of the relatively inactive stock market, the capital structures of companies have been highly geared. This fact is supported by sessional paper no.1 of 1986 which notes that

"Many industrial companies, both public and private suffer from a very narrow equity base and a proportionately large volume of loan capital."<sup>10</sup>

There is need therefore to have a more active stock market in order to increase the availability of equity capital.

### **1.5 Statement of the problem**

The government of Kenya recognizes, as noted in the fifth National Development Plan (1984 -1988), that dependence on external resources for development may not continue and that future development must be based on domestic resources. This calls for an increase in the rate of domestic savings. With this in mind, the government has been devoted to development of the country's money and capital markets.

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<sup>10</sup> op. cit. p.39.

The current development plan calls for improvement of the structural and operational characteristics of the money capital markets. It is noted in that plan that there is a bias towards short term credit and calls for improvement of the capital market. Development of a capital market requires use of specific policy instruments. Experience from developed countries has shown that successful development of capital markets requires a wide range of fiscal and monetary incentives to increase the supply of and demand for securities. The demand for securities in developing countries is far below the potential. The number of direct individual investors is less than 5% of the economically active population, compared to about 25% in developed countries.<sup>11</sup> In our view, Kenya is not an exception in this case. The low participation in securities is reflected in the slow movement of stock prices and the declining number of transactions, noted earlier in this paper. The slow movement of prices is an indication of a relatively inactive trading in the stock market. It is argued that this is caused by, among others, macroeconomic factors. These factors are not known. It is the intention of this paper to fill this information gap.

## 1.6 Objectives of the study

The broad objective of this study is to derive a model which can be used to explain variation in the general stock market price level in Kenya.

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<sup>11</sup> See, Industrial Review, November, 1990, Stellagraphics Ltd, Nairobi.

The specific objectives are:

1. to identify the determinants of the general stock market price level.
2. to estimate the effect of each determinant on stock price level.
3. to derive appropriate policy implications on the basis of (1) and (2) above.

### **1.7 Significance of the study**

The government of Kenya has been determined over the past few years to create a new and stable framework for the development of the capital market<sup>12</sup>. It is also intended as noted in the current development plan, to use new stock issues as a way of indigenizing the economy. This calls for the need to develop the capital market and in particular the stock market. The ability of firms to tap the primary market depends on the extent to which securities are liquid. This requires the existence of an active secondary market for securities. It has been noted earlier in this paper that the secondary market for securities in Kenya has been relatively inactive, as reflected in the slow movement of stock prices. Since stock prices are affected by certain macroeconomic factors, it is important that such factors are understood. The results of this study will there assist policy makers to formulate appropriate and consistent policies in their efforts to develop the capital markets. The

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<sup>12</sup> see, Republic of Kenya, Budget speech, 1990/91, Ministry of Finance.

study will also provide a basis for further research in this area.

## **1.8 Organization of the rest of the Paper**

Having described the stock market, its roles, the environment within which it operates, and the trend of stock prices, we are now set to derive a model which can be used to explain of the trend of stock prices. We shall start by reviewing literature which has attempted to explain stock price movements in Kenya and other countries. This is done in chapter two. Thereafter, in Chapter three we shall develop a theoretical framework within which our analysis will be done. In the same Chapter, a model is derived and the methodology to be used in the analysis is specified. We end the chapter by giving the data type and data sources to be used. Chapter four gives the results of the estimation and finally, in Chapter five we give conclusions and policy implications.



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LITERATURE REVIEW

**2.0 Introduction**

In this section, the literature on the various studies in stock prices is reviewed. We shall start by reviewing theoretical literature on stock prices. This is done in section 2.1. We have included in this section literature on microeconomic analysis of stock prices. Since this study will use aggregate variables, it is important to understand the various microeconomic theories on securities. This refers to prices of individual securities. The section also includes a subsection of modern portfolio theory since investors do not hold single stocks, but choose to hold groups of stocks. Theoretical literature on stock market and the macroeconomy is also considered in this section. In section 2.2, we consider empirical literature on the stock market and the macroeconomy and finally, in section 2.4, we present an overview of the reviewed literature.

**2.1 Theoretical Literature**

**2.1.1 Micro economic analysis of stock prices**

**Stock valuation models**

Stock valuation models are used by security analysts to detect undervalued and overvalued securities. A security is said to be undervalued if its market

price is less than the one produced by the valuation model. The contrary holds for overvalued securities. These models are not designed to explain why people hold stocks as opposed to other assets, but rather to indicate the relative attractiveness of particular stocks in order to make appropriate buying and selling decisions.

These models assume a world of certainty and the current value of the corporation stock is taken to be the stream of future dividends or future earnings, discounted to maturity. Using these models, investors will buy undervalued securities and sell, or try to sell, overvalued securities. These models make one unrealistic assumption of certainty. Further, it is widely believed that stock markets are efficient.<sup>13</sup>

### **Modern Portfolio Theory**

It was recognized that investors do not hold single stocks but choose to hold a group of stocks. This suggests that attractiveness does not depend only on expected returns, otherwise, investors would put all their resources into the single security offering the greatest expected return. Investors, through seeking high returns generally wish to avoid risk.<sup>14</sup> Different individuals

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<sup>13</sup> A market is said to be efficient if the prices reflect all available information. For an elaboration of efficient market hypothesis and the various levels of information, see Fama, E. Capital market and the Efficient market hypothesis. Journal of finance, 1970.

<sup>14</sup> risk was taken to be the variance of the return

hold different groups of assets with varying risks and returns. Any of such group of assets is called a portfolio.

Markowitz (1952) developed a theory which is now the basis of all scientific portfolio management. This theory can be summarized as follows:

- (i) the two relevant characteristics of a portfolio are its expected return and its riskiness.
- (ii) rational investors will choose to hold efficient portfolios.
- (iii) it is theoretically possible to identify efficient portfolios by the proper analysis of information for each security, and the relationships between the return for each security and that for every other security.

In this theory, it was assumed that all assets in the portfolio are risky. Introduction of riskless assets have interesting consequences. The variance of the portfolio depends exclusively on the proportion which is invested in the risky assets. Sharpe (1963) further pointed out that if the possibility of holding riskless assets and portfolios partly purchased with borrowed funds is allowed, it is possible to select portfolios at any given point on the line defined by the return on the riskless assets and the point of tangency with the efficient frontier of risky assets. Sharpe pointed out that if the borrowing rate is the same as the rate of return on the risk free asset, then it is possible to

hold portfolios on this line beyond the point of tangency if borrowing is allowed. This line is Sharpe's capital line. It relates the expected return on an efficient portfolio to its risk as measured by the standard deviation. Its equation is,

$$E(R_p) = R_f + \frac{[E(R_m) - R_f]\sigma_p}{\sigma_m} \dots\dots\dots 2.11$$

where  $E(R_p)$  is the expected return on a portfolio,  $R_f$  is the risk free return,  $E(R_m)$  is the expected return on the market index,  $\sigma_p$  is the standard deviation in the returns on the portfolio, and  $\sigma_m$  is the standard deviation in returns on the market. This equation shows that the expected return on an efficient portfolio is a linear function of its risk as measured by the standard deviation.

The major limitation of this theory is volume of computations necessary to identify efficient portfolios. Sharpe (1969) derived a simplification which made the Markowitz theory usable. He argued that as almost all securities are significantly correlated with the market as a whole, a satisfactory simplification would be to abandon the covariances of each security with each other and security and to substitute information with the relationship of each security to the market. Thus, the return on each security can be represented by the equation,

$$R_i = a_i + b_i I + c_i \dots\dots\dots 2.12$$

where  $R_i$  is the return on security  $i$ ,  $a_i$  and  $b_i$  are parameters,  $c_i$  is a random

variable with an expected value of zero and  $I$  is the level of some index. This idea that the return on a security varies with its sensitivity to changes in the market (as measured by  $b$ ) has an implication on the pricing of financial assets and the relationship of price to this sensitivity. Using this relationship Sharpe developed the Capital Asset pricing model(CAPM). This is discussed in the next section.

### **The Capital Asset Pricing Model**

The capital asset pricing model (CAPM) describes the way prices of individual assets are determined in efficient markets. In these markets, information is freely available and reflected instantaneously in asset prices. The CAPM, developed by Sharpe, was intended to describe the market relationships which will result in equilibrium if investors behave in a manner prescribed by portfolio theory. He made the following simplifying assumptions:

- (i) that investors are risk averse.
- (ii) that investors have identical planning time horizons and that their expectations are similar with respect to each financial asset.
- (iii) that investors have identical borrowing and lending rates.
- (iv) that there are no taxes, no transaction costs and that

securities are fully divisible and the market is competitive.

- (v) that the investors are rational and they seek to hold portfolios efficient in the Markowitz sense.

Sharpe's Capital market line (explained) earlier) gives a relationship between the expected return on an efficient portfolio, the risk free rate of return and the return on the market portfolio. As this holds only for efficient portfolios, it does not describe relationships between the rates of return on individual assets (or inefficient portfolios) and their standard deviations.

4.2.2

Sharpe's CAPM describes the relationship between risk and return for any asset. The relationship between the expected return on any asset (or portfolio) and the riskless rate and the market return is given by:

$$E(R_i) = R_f + [E(R_m) - R_f]b_i \dots\dots\dots 2.13$$

where  $R_i$  is the return on the asset (or portfolio),  $R_f$  is the return on a riskless asset,  $R_m$  is return on the market, and  $b_i$  (called the beta coefficient) is the measure of the sensitivity of the return of the asset to movements in the market. Despite the unrealistic assumptions made in deriving this model, empirical tests of the model have produced conclusions which fit the model quite well. However, this is a partial equilibrium model, and basically it describes the risk - return relationship of any asset (or portfolio). Although

empirical tests have proved that the model works well, the model does not tell us what causes the risk. We argue that risk is caused by macroeconomic factors.

### **2.1.2 Stock Market and the Macroeconomy**

There are competing views on the interplay between the stock market and the macroeconomy. One view begins with the idea that some real factors (typically unobservable to researchers) lead to variations in prospective real rate of return on capital. Given the discount rates for owners of capital, an increase in prospective returns raises stock prices and vice versa. Researchers have attempted to use surrogate measures for these real factors (or economic fundamentals) that determine stock prices. The commonly used surrogates include overall economic activity (as captured by GDP measures); business investment; consumption; household wealth; household investment; inflation; credit; money supply; interest rates; and so on. The typical approach in studies starting from these premisses is to regress some measure of general stock market price against measures of the above variables.

The second approach to the interplay between the stock market and the macroeconomy takes changes in stock prices to be random and as such they are not related to economic fundamentals. This appears to be the view that

Keynes held when he termed stock markets as gambling casinos.<sup>15</sup> Recently, this view has regained academic respectability with the work of Shiller (1990) and his colleagues.<sup>16</sup> Economists who view the stock market as a gambling casino would not carry out regressions between stock market prices and economic variables.

As of now, none of the views has gained supremacy over the other. This study is clearly based on the first view of stock market dynamics.

## 2.2 The Empirical Literature.

There are studies which have done to explain the variation of the stock market as represented by the stock market index. Such studies have used several statistical methods in the analysis. A number of variables have been found to be statistically significant in explaining the movement of stock prices.

Pattison (1971) tested a model of the relationship between stock market prices and economic aggregates. He described the level of and the adjustment of stock prices by equations. His first equation linked the stock market price

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<sup>15</sup> See Keynes J.M, *The General Theory of Employment, Money and interest rates.*

<sup>16</sup> Most of this has been collected together as reproduced in form of a book of readings. See *Market Volatility*, Edited by R.Shiller, MIT press, 1990.



index that prevailed in each period to an index of aggregate industrial production, the consumer price index, and profits in the industry. He argued that the industrial production index represent the level of demand in the economy which is expected to spill over into the demand for the industry whose stock market index is being examined. The consumer price index was used as a proxy for the cost pressures facing the economy. Investment in machinery and equipment was also added, but as it was found to be unrelated to the stock market indices in most cases, it was dropped from further work.

His first equation was

$$S_{it} = a_1 + a_2Q_t + a_3P_t + a_4T_{it} \dots\dots\dots 2.21$$

where  $S_{it}$  = Stock index i in period t

$Q_t$  = Volume index of industrial production in period t

$P_t$  = the consumer price index in period t

$T_{it}$  = profits of industry i in period t

$a_1, a_2, a_3, a_4$  are the coefficients he estimated.

His second equation was intended to explain period to period changes in stock market indices. This explanation was based on expectations and finance. It was assumed that investors can forecast future equity prices using his first equation and that they would acquire or dispose of equities, and thus driving index up or down, according to the difference between this estimated level of prices and the level of the previous period. He assumed that the immediate term changes in equity is a partial adjustment since investors are

acting on the basis of expectations of events many periods in the future.

As regards finance, he argued that the actual movement of equity prices depend on the cost and availability of finance which depend on monetary authorities rather than the activities determined by the market. In his first equation, changes in money supply were used to measure the availability of funds. In his second equation, changes in industrial bond yields were used to reflect the changing opportunity cost. financial variables were used in separate versions of the second equation.

$$S_i = b_1 (S_{i,t+j} - S_{i,t-1}) + b_2 M \dots\dots\dots 2.22(a)$$

$$S_i = c_1 (S^*_{i,t+j} - S_{i,t-1}) + c_2 R \dots\dots\dots 2.22(b)$$

$S_{i,t+j}$  is the forecast level for index  $i$  in period  $t+j$  as calculated from equation 2.21,  $M$  is the money supply,  $R$  is an average of industrial bond yields,  $b_1$ ,  $b_2$ ,  $c_1$ ,  $c_2$  are parameters he estimated. He tested the model with data for four industries' equity prices obtained from Toronto stock exchange and Canadian economic aggregates.

Estimates of equation 2.22(a) showed that consumer prices effect is significant for all the four industries, and also for the aggregated level of stock prices for all industries. Industrial output was found to be significant for the aggregate level of stock prices and for chemical industry. The coefficient of profits was statistically insignificant for all the industries.

However, the model explained at least 91% of the variations in stock prices. For his second set of equations, he found that stock prices are positively related to the average of industrial bonds yields, a proxy for interest rates, and also to the changes in money supply.

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Homa and Jaffee (1971) developed and estimated the relationship between money supply and the stock index. They used the standard valuation formula which assumes that the value of a share is the discounted value of expected dividends. This can be written as:

$$P_0 = \sum_{t=1}^{\infty} \frac{D_0(1+g)^t}{(1+r_t+h_t)^t} \dots\dots\dots 2.23$$

where,  $P_0$  = current price of a share of common stock.

$D_0$  = current level of dividends.

$g_t$  = rate of growth of dividends.

$r_t$  = riskless rate of interest.

$h_t$  = risk premium.

Thus, the stock price is determined by the level and growth of dividends, the riskless rate of interest, and the risk premium. They argued that money supply is positively related to the level and growth of dividends and negatively related to the riskless rate of interest and the risk premium. The main channel of influence of money supply is the interest rate, which was assumed to be

flexible. They argued that an increase money supply, given demand for money, will raise interest rates. This will reduce interest sensitive expenditures like capital investment. A decrease in expenditure will then cause a decrease in the firm's sales and thus a decrease in its earnings. The relationship between money supply and the stock market was estimated using regression analysis as:

$$SP = -26.77 + 0.61M + 3.14G + 1.46G_{-1} + 0.87U_{-1}$$

.....2.24

$R_2 = 0.968$

where, M is the level of money supply, G is the growth rate of money supply,  $G_{-1}$  is G lagged by one period.

Despite the pronounced serial correlation, the results indicated that there is an important linkage between money supply and common stock prices. However money supply is not the only factor that influence stock prices, and they should have used a more complete model. Further their study was done U.S.A. where the interest rates depend on market forces whereas in Kenya the interest rates are controlled by the Government and thus do not depend on market conditions.

Keran (1971) used the same framework, but used a different set of proxies for the variables in equation 2.23. The dividend growth rate ( $g_t$ ) is proxied by a distributed lag on past and present values of the real corporate earnings ( $e$ ),

while the corporate bond rate ( $r$ ) is used as a proxy for the riskless rate of interest and the risk premium. His best results are obtained when the corporate bond rate is replaced by its determinants namely, the current and past growth rates of real income( $y$ ), the percentage change in price level( $p$ ) and the growth rate in money supply( $m$ ). Using Canadian data,he estimates the equation as:

$$SP_t = -30.68 + 1.31 \sum_{i=0}^2 m_{t-i} - 5.37 \sum_{i=0}^7 y_{t-i} - 11.96 \sum_{i=0}^{16} p_{t-i} + 4.8 \sum_{i=0}^{19} e_{t-i}$$

.....2.25

where  $p$  = growth rate of the price level.

$m$  = growth rate of real money supply.

$y$  = growth rate of real income.

$e$  = corporate real earnings.

He gets an  $R^2$  of 98% and the coefficients have the expected signs.

In a later study, Hamburger and Kochin (1972) expanded the approach adopted by Keran and make alterations. They added the current price level whose effect on the level of stock prices was assumed to be instantaneous. In order to identify the direct effect of the money supply on stock prices, they introduced the corporate bond rate,  $r$ , into the model. The model they

estimated was:

$$SP_t = -77.93 + 1.45p_t - 9.67r_t + 7.03 \sum_{i=0}^7 m_{t-i} - 4.14 \sum_{i=0}^7 y_{t-i} + 2.43 \sum_{i=0}^{16} P_{t-i} + 1.42 \sum_{i=0}^6 e_{t-i} \dots\dots\dots 2.26$$

Their R<sup>2</sup> was 0.9855. Their results are statistically superior to Keran's.

Pesando (1982) evaluated the potential contribution of the Keran, Hamburger-Kochin (H-K), and Homa-Jaffee (H-J) models to the problem of forecasting the level of common stock prices. He re-estimated the models using both Canadian and American data, tested their structural stability and their sensitivity to possible specification error. The results of the re-estimated models indicate a high R<sup>2</sup> and the coefficients of the models were correctly signed, except the corporate bond rate and the price level in the H-K model. In testing the structural stability of the models, the level of corporate earnings is replaced by its rate of growth. The explanatory power of both the Keran and H-K models dropped slightly. This suggests that the level of corporate bond rate is more relevant in explaining the variation of stock prices than the rate of growth. In view of the high R<sup>2</sup> and the statistical significance of the coefficients, we argue that the models developed by Keran, H-K, and H-J are appropriate in explaining the level of stock prices in those countries. However, the conditions in those countries are different from the ones we

have here and we need to develop a model suitable to our economy.

Cooper(1974) intended to give a plausible framework for estimating the relationship between money supply and stock market returns. His analysis is based on a combination of the Simple Quantity theory (SQ) of money and the Efficient Market (EM) hypothesis (SQ-EM theory). The SQ model assumes that as the money supply increases more than increased demand, individuals tend to shift out of money holdings to other financial assets, physical assets and current consumption. Consequently, the prices of all assets increases. He assumed that individuals hold wealth in forms, stocks and money. He argues that the quantity of each asset held depend on the marginal returns of these assets. When these are equal, the portfolio is said to be balanced. The stock returns were assumed to be affected by both the unanticipated component of changes in money supply and the anticipated component. He derived the model as:

$$r^{st} = A(L)m_t^a + B(L)m_t^u + e_t \quad \dots 2.27$$

where,  $m_t^a$  is the anticipated (forecast) component of money changes,  $m_t^u$  is the unanticipated money change,  $e_t$  is an error term,  $A(L)$ ,  $B(L)$  are polynomials in  $L$  such that  $L^j X_t = X_{t-j}$ .

He tested the model with Standard and Poor's Composite (SP500) index and found a low  $R^2$  for quarterly data and a high one for annual data.

On the basis of these results, he considered it to be difficult to assess the validity of the model by regression analysis and proposed to use spectral analysis. He found that money supply changes are an important determinant of the market rate of return on stocks. He also concluded that returns may lead money changes as anticipations about future money supply changes will be included in current prices. However, this study takes money supply changes as the only determinant of stock prices.

A negative relation between stock prices and inflation was consistently observed by authors who used U.S. data. Expected inflation, unexpected inflation, and changes in expected inflation were all seen to be negatively related to stock returns.

Fama and Schwert (1971) showed that stock returns were negatively related to inflation, unanticipated inflation, and change in expected inflation. Lintner (1975); Body (1976); Jaffe and Mandelker (1976); and Nelson (1975), found a negative relation between stock returns and expected inflation as well as unanticipated inflation.

In contrast, Firth (1979) regressed nominal monthly stock returns on current and past realized inflation rates in Britain. The coefficient for current inflation was always positive and often significant. However, when he



introduced lagged inflation, the co-efficient was negative.

The basic theoretical framework of all these papers was Fisherian. Fisher hypothesized that expected real returns are determined solely by real factors and therefore expected real returns are independent of inflationary expectations. This hypothesis can be tested by a regression model of the form:

$$r_t = c_0 + c_1 I_t + c_3 (I_{t+1} - I_t) + u_t \dots\dots\dots 2.38$$

Bruno (1983) tested the model using data from nine countries namely U.S.A., Japan, U.K., Switzerland, France, Germany, Netherlands, Belgium and Canada. The Fisherian assumption that real returns is independent of inflationary expectations was rejected in each country. Also, stock returns were negatively related to inflation, which confirms results by other authors.

Geske and Roll (1982) proposed a reverse causality model in which government policy plays a central role. They argue that changes in inflationary expectations are caused by movement in stock prices. According to them, when stock prices fall, then economic activity falls and therefore the government revenues. It will then be expected that the government will run a deficit and will take inflationary measures to finance the deficit. They noted that the inclusion of money growth rate in the regression makes the coefficient of expected inflation to be statistically insignificant. After carrying out several regressions, they concluded that the link between inflation and

stock returns in through inflationary expectations and more specifically revisions in expectations.

Kraft and Kraft (1977) questioned the relationship between stock prices and the various determinants found in the previous studies. They maintained that equity markets are efficient and that asset prices reflect all current and anticipated information. They noted that while strong relationships are suggested by empirical results, causal relationships are not evident. They therefore proposed to test the causal relationship between stock prices and the determinants. The determinants they used are money supply, changes in money supply, corporate interest rate, and a measure of risk. Moody AAA corporate bond rate was used to measure the sum of riskless rate of interest and the risk premium. They used SP500 index as a measure of stock prices. They intended to use the causality test suggested by Sims (1974). Their results indicated no causal relationship running from money supply, percentage change in money supply, Moody's AAA corporate bond rate to common stock prices. However, in their regressions, they failed to include both the past and future values of the explanatory variables as suggested by Sims. In addition, Sims' causality test is more cumbersome and as such they could have used the direct Granger's causality test.<sup>17</sup>

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<sup>17</sup> See Granger W.J. "Investigating causal relationship by Econometric and Cross spectral methods." Econometrica, 37(1969)pp424-438

We are doubtful about their findings as they misinterpreted Sim's methodology.

Singh and Talwar (1982) noted that the relationship between money supply and stock prices and also the relationship between interest rates and stock prices have been empirically tested and that few tests have been carried out on the relationship between fiscal policy and stock prices. They argued that authorities use fiscal and monetary policies to regulate economic activity and as stock prices reflect the level of economic activity, stock prices must reflect changes in fiscal and monetary policies. They used a stepwise procedure based on Akaike's (1969) final prediction error (fpe) criterion to estimate the lead time between monetary and fiscal policies and stock prices and the Granger's (1969)<sup>18</sup> concept of causality to fit multiple autoregressions. The federal government expenditure deficit or surplus was used as a proxy for net posture of fiscal policy. For the stock of money supply, they used M1, and the discount rate at the end of every quarter was used as a proxy for interest rate. The index of canadian common and industrial stocks listed on the Toronto stock was used to measure changes in stock market prices. Their results show that stock market anticipates money changes and that the influence of interest rates when separated from that of money supply was found to be negligible on stock prices. The relationship between monetary and fiscal policies and

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<sup>18</sup> Ibid

stock prices was found to be bidirectional. All the above studies have were done in developing countries.

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The few studies done in Kenya do not employ regression analysis. For example, Arowolo (1971) attributed the increase in share prices immediately after independence to political uncertainty. He noted that there was restriction of capital movements to sterling areas in 1965 and this led to accumulation of funds within the economy. This in turn caused an increased rate of economic growth in 1966. He argued therefore that share prices are affected by political factors and the rate of growth of the economy. No attempt was made to test the above hypotheses empirically.

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Munga (1974) in his study on the Nairobi stock exchange concluded that both economic and political factors are important in explaining the trend in share prices between 1955 to 1966 and the trend after that is mainly explained by the economic factors. Using descriptive analysis, he outlined the economic factors as earnings per share, capitalization rate and earnings as a percentage of net assets. His study was based on stocks for companies, Kenya Breweries and Brooke Bond(K) Ltd, and was therefore a micro-study. He did not investigate the macroeconomic variables affecting the trend of share prices.

### 2.3 Overview of the Literature

In this chapter literature a number of studies done to explain the movement of stock prices have been reviewed. We started by reviewing theoretical

literature on microeconomic analysis on stock prices. This analysis includes stock valuation models which are used by security analysts to detect overvalued and undervalued securities and on the basis of these models, they make appropriate buying and selling decisions. Using such models, security analysts can only make profits if the security market is inefficient. However, it is widely believed that security markets are efficient. We have also reviewed literature on the modern portfolio theory developed by Markowitz (1952) and modified by Sharpe (1963). The basic conclusion of this theory is that the return on any asset (or portfolio) is a linear function of the risk of that asset (or portfolio). This theory has led to the development by Sharpe of the Capital Asset Pricing Model (CAPM). This model is very popular in finance literature.

On the macroeconomy and the stock market we have noted that there are conflicting views on the interplay of the stock market and the macroeconomy. One view considers stock prices to behave in a random manner and as such, it is argued, they are unrelated to economic variables. In the other view, it is argued that stock prices respond to certain economic variables (called economic fundamentals), unknown to researchers. Empirical studies have used several surrogates for these economic fundamentals. Such surrogates include inflation, money supply, changes in money supply, profitability of firms, National income, interest rate etc.

Our view is that stock prices respond to macroeconomic variables. The few studies that have been done in Kenya on the stock market use descriptive analysis. They have not tested the statistical significance of the effects of the economic variables used to explain the trend of stock prices. We intend to use regression analysis to test the statistical significance of the effects of macroeconomic variables on stock prices.

Most of the empirical studies on stock prices and the macroeconomy have been done in developing countries. The stock markets in developing countries are relatively more efficient. In addition, the economic conditions in these countries are different from ours. For, example, the interest rates in developing countries are determined by market forces and there is more public awareness of stock trade. Also, developed countries have a greater variety of financial assets. We therefore need a model which is suitable to our economy. In developing such a model, We shall give a theoretical framework and the model we shall use will come from this framework.

## CHAPTER THREE

### METHODOLOGY

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#### Introduction

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In this chapter, we shall start, in section 3.2, by giving a theoretical framework within which the trend of stock prices in Kenya can be explained. Thereafter, in section 3.3, an econometric model is specified. The method of estimation is given in section 3.5. We end the chapter with section 3.6 which gives a description of the data type and data sources.

#### Theoretical Framework

Trading in securities is done by the Nairobi Stock Exchange by telephone. In a perfectly competitive market, the price of a commodity depends on the forces of demand and supply. This fundamental concept will be applied to the stock market in Kenya. There are certain macroeconomic factors that affect the demand and supply of stocks. One of these factors is changes in money supply. If people have more money than they desire to hold, they will shift their money holdings to other assets, including financial assets. As stocks is one of these financial assets, the demand for stocks increases and consequently stock prices increases. Starting from an equilibrium condition, people will have more money than they desire to hold if there is an increase in money supply without a corresponding increase in demand for money, or

if for some reason, there is a decline in demand for money, with money supply remaining constant. Therefore, assuming that demand for money is a stable function of income, stock prices increases if the proportion of money supply to income increases.

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We would also expect that if real incomes increases, the demand for all assets, including stocks increases. This implies that an increase in real incomes will cause stock prices to rise. The demand for any commodity is influenced by demand of substitutes. Quasi- Money is a good substitute for stocks. We expect that the amount of quasi-money as a proportion of total money is negatively related to demand for stocks and consequently the stock prices.

It is important to note at this point that the main reason why people buy stocks is the return they expect to earn on the stocks. Without this expectation, there would be no need to invest in stocks due to the risk involved. Investors would choose to hold riskless assets. Therefore the demand for stocks, and consequently stock prices, depend on the return investors expect to earn. This return is in form of dividends and a capital gain. This will depend the profitability of firms.

In an efficient stock market, stock prices will reflect all available information



about the economy. However, we are doubtful about the efficiency of the stock market in Kenya. This is due to the fact that the number of participants in this market is very low compared to that of the developed countries. In addition, there are only six stock brokers, all based in Nairobi, and therefore they are not all over the country<sup>19</sup>. Also there are costs associated with trading in stocks, which is not the case in an efficient market. We can conclude therefore that information is not fully incorporated in the stock prices. This implies that the adjustment of prices at any one time is partial.

### 3.3 Model Specification

The demand for stocks, and consequently the stock prices will be influenced by changes in money supply without a corresponding change in demand for money. this can written as:

$$SP^e = f(M/Y) \quad \dots\dots\dots 3.1$$

where,  $SP^e$  = stock price in an efficient market.

M = money supply

Y = nominal income

As real incomes increase, the demand of all assets, including financial assets like stocks, increases. Thus, stock prices will also depend on real incomes

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<sup>19</sup> Even a microeconomic study done by Parkinson (1987), using the Efficient Market Hypothesis and the Capital Asset Pricing Model (CAPM), revealed that the Nairobi Stock Exchange is technically inefficient. See Parkinson, J.M., "The EMH and the CAPM on the Nairobi Stock Exchange". East African Economic Review, vol.2 No.2,1987 pp 105- 110.

and equation 3.1 can therefore be written as:

$$SP^e = f(M/Y, y) \dots\dots\dots 3.2$$

where,  $y$  is the real income.

The demand for stocks will also depend on the demand of substitutes. Quasi-money is a close substitute for stocks. The demand for quasi-money can be measured by the ratio of quasi-money to total money. Equation 3.2 therefore becomes:

$$Sp^e = f( M/Y, y, QM/M ) \dots\dots\dots 3.3$$

where  $QM$  = is quasi-money

$M$  = money stock

The main reason why people hold stocks is the return,  $(SR)$ , they expect to get from the stocks. This return is in form of dividends and a capital gain, when the stock prices appreciate. Including this variable in equation 3.3, we obtain the equation describing the movement of stock prices as:

$$SP^e = f(M/Y, y, QM/M, SR, u ) \dots\dots\dots 3.4$$

where,  $u$  is an uncorrelated error term with zero mean.

Finally, we should note that inflation reduces the real value of funds available for consumption and other purposes. We therefore expect the demand for stocks to decrease with inflation. An increase in inflation will therefore cause

Stock prices to decline. Including this variable in our equation, we obtain,

$$SP^e = f(M/Y, y, QM/M, SR, INFL, u) \dots\dots\dots 3.5$$

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Now,  $SP^e$  is the stock price in an efficient market. It is the price at which both the buyers and sellers of stocks will be willing to trade in an efficient market. The setting of this price will be based on the investors' expectations about the values of the explanatory variables in equation 3.5. It will be assumed that, since the investors willingly trade at the price  $SP^e$ , they are able to forecast this price on the basis of their expectations. We are now left with the question of how these expectations are formed. This suggests that we need to come up with a plausible hypothesis on this. We shall assume that the investors base their expectations on the previous values of the explanatory variables. These are the values of the explanatory variables lagged by one period. Therefore equation 3.5 becomes,

$$SP^e = f((M/Y)_{t-1}, y_{t-1}, (QM/M)_{t-1}, SR_{t-1}, (INFL)_{t-1}, u_{t-1}) \dots\dots 3.6$$

Assuming a linear functional form, equation 3.6 becomes,

$$SP^e = \alpha_0 + \alpha_1(M/Y)_{t-1} + \alpha_2 y_{t-1} + \alpha_3 (QM/M)_{t-1} + \alpha_4 SR_{t-1} + \alpha_5 (INFL)_{t-1} + u_{t-1} \dots\dots\dots 3.7$$

However, the stock market in Kenya is not efficient as is indicated by the

relatively low number of participants, the number and location of the stock brokers and the trading costs involved. Thus, stock prices in Kenya do not adjust fully to available information. This implies that the actual change in stock prices is only a fraction of the change which will occur in an efficient market. This can be written as:<sup>20</sup>

$$SP_t - SP_{t-1} = \delta(SP_t^e - SP_{t-1}) + v_t \dots\dots\dots 3.8$$

$$0 < \delta \leq 1$$

Where,  $\delta$  is the price adjustment coefficient,  $SP_t$  is the actual stock price.

Simplifying equation 3.8 gives,

$$SP_t = (1 - \delta) SP_{t-1} + \delta SP_t^e + \delta v_t \dots\dots\dots 3.9$$

Substituting equation 3.6 into 3.8 we obtain,

$$SP_t = \alpha_0 \delta + (1 - \delta) SP_{t-1} + \alpha_1 \delta (M/Y)_{t-1} + \alpha_2 \delta y_{t-1} + \alpha_3 \delta (QM/M)_{t-1} + \alpha_4 \delta SR_{t-1} + \alpha_5 \delta (INFL)_{t-1} + u^*_t \dots\dots\dots 3.10$$

where,  $u^*_t = \delta u_{t-1} + v_t$

Equation 3.10 describes the movement of stock market prices in Kenya

### 3.4 Method of Estimation

In order to achieve the objectives of this study, an econometric model which is derived above as equation 3.10 above is estimated. An econometric

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<sup>20</sup> This is an adaptation of Nerlove's partial adjustment model. See Nerlove, "Estimation of the elasticities of supply of selected Agricultural Commodities." Journal of Farm Economics vol. 38, 1956.

analysis involves measuring the variables included in equation 3.10, and using ordinary least squares method (ols) to estimate their respective impacts on the dependent variable. We also used partial correlation analysis to estimate the separate impacts of the constituents of money supply. This was to enable us make appropriate conclusions.

### 3.5 Data Type and Data Sources

This study uses secondary data. The data used is for the period 1973 - 1989. In order to capture any lags in effects of the explanatory variables, the study uses quarterly data. In addition, we intend to use real values. The real value of the stock index is found by deflating the NSE stock price index by the consumer price index (CPI) for the middle income group. The ratio of money supply to income is computed as M1 (currency in circulation and demand deposits) divided by the estimated value of quarterly nominal gross domestic product (GDP). The rate of return on stocks is taken as the rate of change of the NSE stock index between successive periods. It is computed using the equation,

$$SR_t = (SP_t - SP_{t-1}) / SP_{t-1} \dots\dots\dots 3.11$$

The demand for the substitute to stocks, taken as the ratio of quasi- money to total money, is computed using M2 (M1 plus quasi- money (savings and time deposits)) as total money. The above information is obtained from central Bank of Kenya quarterly reports, the International Financial Statistics,

the various issues of Kenya Economic Survey and the Kenya Statistical Abstracts. These publications give GDP on annual basis. Since the study uses quarterly data, we had to estimate GDP on quarterly basis. An appropriate method is to look for a variable which is highly correlated with GDP then if that variable is available on quarterly basis we can use it to estimate GDP on quarterly basis. We took exports to be highly correlated with GDP and used the quarterly values of exports to derive estimates of GDP for those periods.<sup>21</sup>

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<sup>21</sup> Based on annual data for the period 1983 to 1989, the coefficient of correlation of exports and gdp was found be as high as 0.8114.

## CHAPTER FOUR

### EMPIRICAL RESULTS

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The estimated equation gives a good fit of the model to explain the determinants of stock market prices in Kenya. The model explains about 96% of the variations of the stock market price, as measured by the stock index.

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The lagged stock market price was found to be positively related to the current stock price level. The coefficient of the lagged stock market price level was estimated as 0.84199. This implies that the price adjustment coefficient is estimated as 0.159 which is rather low. This is the degree to which stock prices in Kenya adjust to investors' expectations. The complete

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results of the estimates are given in table 4.1 below

**Table 4.1**                      **Results of the regression.**

Variable	Coefficient	T-Statistic
C	0.1750	0.6704
SPR(-1)	0.8410	18.3438
(M/Y)(-1)	0.2257	1.1084
SR(-1)	1.0633	4.1880
y(-1)	0.0064	2.8760
(QM/M)(-1)	-1.3943	-2.5995
INFL(-1)	-0.5715	-1.1256

$R^2 = 0.95897$ , D.W. = 2.2017, F - Statistic = 218.1608

The coefficient of money supply as a proportion to GDP was found to be positively related to stock prices. However, this coefficient was found to be statistically insignificant at 5% level. This is a surprising result when compared to findings of studies done in developing countries. The statistical insignificance of this coefficient implies that the demand for stocks in Kenya is not significantly influenced by the overall changes in money supply. That is, existence of excess money supply or demand does not significantly influence the stock market. In order to explain this effect we shall use partial correlation analysis on the constituents of money supply changes and stock prices. The money supply identity is obtained by consolidating the balance sheets of the banking system. This gives the identity as:

$$DM + D(DCPRT) + D(DCPUB) + D(NFR) \dots\dots 4.1$$

where, DM = change in money supply, D(DCPRT) is the change in domestic credit going to the private sector, D(DCPUB) is the change in domestic credit going to the public sector, and D(NFR) is the change in net foreign reserves. The change in domestic credit going to the private sector was found to be positively correlated with stock prices. The explanation for this result is that domestic credit going to the private sector facilitates availability of inputs and this increases the profitability of firms. Also domestic credit increases the amount of funds available for consumption and investment. The availability of funds for investment increases the demand for stocks and consequently stock prices increases. Domestic credit going to the public sector was found

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to be negatively correlated with stock prices. We can explain this result as follows. Domestic credit going to the public sector reduces amount of funds available to the private sector. Since domestic credit is negatively related to domestic credit going to the private sector, and domestic credit going to the private sector is positively related to stock prices, we can infer that domestic credit going to the public sector is negatively related to stock prices. This is the result we have above. The other constituent of changes in money supply is the change in net foreign assets. This was found to be negatively correlated to stock prices. Given that domestic credit going to the private sector has a significant negative impact on changes in net foreign assets,<sup>22</sup> we argue that this significant negative impact renders its effect on stock market insignificant.

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The rate of return on stocks was found to be positively related to stock prices. The coefficient of this variable was found to be statistically significant at 5% level. This is an indication that the behaviour investors in the stock market is significantly influenced by the return they expect to earn from holding stocks.

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<sup>22</sup> Mwega, F. M. and S.M. Ngola tested the direction of causality between the flow of domestic credit and changes in net foreign assets and found that the flow of domestic credit has a significant negative impact on net foreign reserves. See "Causal directions in the relationship between domestic credit and changes in net foreign reserves". Savings and Development, No.3- 1988 - XII, Finafrica Foundation, Milano (Italy).

Real income was found to be positively related to stock prices. This agrees with the theory that as real incomes increase the demand for commodities, including stocks increases. The coefficient of this variable was also found to be statistically significant at 5% level.

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The demand for substitute financial assets, measured as the ratio of quasi money to total money (M2) was found to be negatively related to stock prices. The coefficient of this variable was also found to be statistically significant at 5% level.

Inflation was found to be negatively related to stock prices. This confirms findings of other others in developing countries. However, the coefficient of this variable was found to be statistically insignificant at 5% level. This is an indication that inflationary expectations do not significantly influence the stock market in kenya.

## CONCLUSIONS AND POLICY IMPLICATIONS

### 5.1 Conclusions

There are several variables which have been found in this study to affect stock market prices in Kenya. These include the rate of return on stocks as the most significant determinant of stock prices, apart from the lagged stock market price. The rate of return on stocks was found to be positively related to stock prices. A 10% increase of the lagged rate of return will cause the current real value of the stock market price to increase by 10.6%. This indicates a high influence of this variable on the stock market. An increase in stock prices is an indication of an increase in demand for stocks.

The demand for substitute financial assets, measured as the proportion of quasi - money to total money stock was found, to be negatively related to stock prices. The coefficient of this variable was found to be statistically significant. This is an indication that the demand for substitute financial assets has a significant influence on the stock market. An increase in the proportion of quasi -money to money stock (M2) by 10% will depress stock market prices, in real terms, by about 14%. Real domestic product was found to be positively related to stock prices. The coefficient of this variable was also found to be statistically significant at 5% level. This agrees with the

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ory that as real income increases, the demand for consumption and investment commodities increases. On the basis of the data used in this study, increase in real incomes by 10% will cause the stock market price to rease by about 0.06%.

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pre were other variables which were found to be statistically insignificant.

e proportion of money supply (M1) to nominal income was found, as

pected, to be positively related to stock prices. However, the coefficient of

s variable was found to be statistically insignificant at 5% level. Partial

relation analysis on the constituents of money supply revealed that

domestic credit going to the private sector is positively related to stock prices.

was also revealed that domestic credit going to the public sector is

negatively correlated with stock prices and the balance of payments,as a

proportion to GDP was found to be negatively related to stock prices. The net

effect on stock prices of the three constituents of changes in money supply

was found to be insignificant.This is an indication that the overall change in

money supply does not significantly affect the stock market in

Kenya.Inflation was found to be negatively related to stock prices. This result

agrees with that other studies in developed countries. However, the coefficient

of this variable was found to be statistically insignificant at 5% level.

## 5.2 Policy implications

As the government aims at increasing the activity in the stock market, certain policies need to be reviewed. This study has revealed that the expected rate of return on stocks is positively related to the stock market prices. It was also revealed that the expected rate of return has a significant influence on stock prices. This implies that the demand for stocks is significantly influenced by the rate of return the investors expect from stocks.

We therefore expect that any policy which reduces this rate will also reduce the demand for stocks. The activity in the stock market may not increase unless such policies are avoided. For example, currently the dividends earned by investors are taxed twice, once at the corporate tax rate and then on the recipient. Based on the results of this study, such a policy is likely to reduce the demand for stocks, as reflected in the change in stock prices. There are other costs associated with sale of shares. These are brokerage commissions, transfer fees, stamp duties and telephone or transport expenses incurred by the sellers or buyers of stocks in the secondary market. These costs reduce the effective return on the stocks. There is need, therefore, to keep these costs to a minimum. It is important to note that the rate of dividend depend on the profitability of firms. The profitability of firms will in turn depend on sales and costs and availability of inputs. In order to stimulate activity in the stock market, there is need to pursue policies which will increase the profitability of firms. Such policies include promotion of sales domestically and

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promoting exports. As regards input costs, there is need to reduce these costs. Also, availability of inputs can be facilitated by increasing domestic credit going to the private sector. It is important to note that, for most of the firms, especially the manufacturing firms, a substantial proportion of their inputs is imported. The cost of these inputs, measured in Kenya currency will be low if the value of the shilling against other currencies is high. It is therefore important to pursue policies which will make the value of the shilling against other currencies to be high. The government may therefore pursue policies to increase the foreign exchange earnings of the country.

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The demand for substitute financial assets (taken as the ratio of quasi-money to money stock, M1) was found to be negatively related to stock prices. We would therefore expect that policies encouraging holding of quasi-money, especially when the policy is discriminating against holding stocks, will reduce the demand for stocks. For instance, dividends paid by firms is not an allowable deduction for tax. At the same time interest on loans borrowed by the firms from the banks is not taxable. This policy makes it advantageous for firms to borrow funds from commercial banks instead of floating shares. It also acts as a disincentive on demand for stocks in the secondary market. In order to increase activity in the stock market, the authorities may either remove one of the taxes on dividends or remove both taxes on dividends, or remove the tax disadvantages on holding stocks compared to other financial

assets. There are other policies which may be pursued in order to reduce the negative impact of the demand for quasi-money on stock prices. Such policies include introducing a wider variety of financial assets. For example, the private sector can introduce its own industrial bonds. With a greater variety of financial assets to hold, the public is likely to purchase more of them and thus reduce the demand for quasi-money.

It should be noted that inflation reduces the real value of savings. That is, it reduces the real value of funds which could be available for investment. We expected inflation to be negatively related to stock prices. The results of this study were not different from our expectation. However, the coefficient of inflation was found to be statistically insignificant and as such no meaningful conclusions can be made.

The study also revealed that the stock market in Kenya is inefficient. This is evidenced by the low level of the stock price adjustment coefficient (estimated as 0.159), and the trading costs involved. The efficiency of the stock market can be enhanced by increasing the number of participants in the stock market. This will depend on the extent to which the public knows about the stock trade. If more people know about the intricacies of the stock market, the stock market is likely to be more active. There is need therefore to impart such knowledge to the public. The public can be informed through

radios, TVs and newspapers. However, as the majority of the people live in the rural areas, and as such they may not get the information through the above media. There is need to inform them through local barazas, or any other appropriate method which would intensify public awareness.

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The efficiency of the stock market will also depend on the physical trading environment. During the period of our study, the Nairobi Stock Exchange did not have a trading floor. Later this year, it got a small trading floor and the activity increased. The activity can further <sup>be</sup> increased if the Nairobi Stock exchange had branches in most of the major towns in Kenya. It may be necessary to increase the number of stock brokers, which is currently standing at six. This will enhance public awareness of the stock trade and also reduce the incidental costs of selling or buying stocks.



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# APPENDIX: DATA USED IN THE REGRESSIONS

## YEAR Qtr.

1973	SP	MI	QM	CPI	XPT	DCPRT	DCPUB	DCPUB
1	250.14	3286.63	1314.56	70.20	614.98	2273.12	174.80	3141.95
2	245.73	3493.41	1418.83	72.20	646.26	2340.70	173.86	2244.52
3	252.91	3581.29	1488.19	77.20	589.65	2581.44	233.24	2938.70
4	227.00	3861.66	1494.39	78.10	579.08	3003.88	224.24	3941.11
1974								
1	241.24	4141.78	1523.09	82.30	767.13	3244.56	193.88	
2	227.12	4083.51	1624.49	84.30	782.65	3651.57	171.42	
3	202.87	3925.27	1730.53	88.00	801.69	3828.83	222.28	
4	175.66	4016.01	1803.27	88.80	875.80	3998.06	165.15	
1975								
1	178.40	3911.10	1940.08	99.00	907.23	3884.90	215.88	
2	177.28	4051.40	2024.55	100.70	767.31	4012.38	219.67	
3	183.93	4053.40	2143.18	103.00	733.24	4071.16	279.57	
4	206.23	4539.93	2274.21	105.20	988.14	4384.09	297.67	
1976								
1	208.18	4910.82	2424.64	110.50	1455.70	4530.08	292.35	
2	196.83	4965.17	2466.27	111.40	1627.69	4801.28	245.55	
3	203.73	5164.61	2644.35	112.30	1660.65	4663.82	228.48	
4	227.27	5674.31	2780.36	112.80	1668.89	5089.15	225.25	

Data, contd.

YEAR Qtr.

1977	SP	MI	QM	CPI	XPT	DCPRT	DCPUB	DCPUB
1	262.48	7021.61	3081.48	120.50	2566.97	5635.72	181.54	3141.95
2	284.80	7496.01	3456.03	123.00	2732.36	5909.23	200.70	2244.52
3	343.35	8131.05	3743.67	126.20	2281.51	6452.03	209.91	2938.70
4	390.55	8427.36	3985.74	127.40	1977.93	6971.43	253.80	3941.11
1978								
1	421.93	8669.68	4492.80	131.90	2045.95	7783.10	285.66	
2	434.49	8431.66	4603.96	134.00	2079.88	8690.57	331.55	
3	440.34	8617.03	4668.81	136.80	1462.65	8639.51	212.50	
4	420.65	9301.14	4816.65	137.60	1816.24	9076.22	197.55	
1979								
1	346.25	9056.25	4970.18	138.80	1694.29	9150.41	251.15	
2	364.60	9150.97	5334.51	144.60	1789.41	9470.57	218.87	
3	374.63	9314.75	5651.54	147.00	1830.75	9573.18	220.96	
4	354.21	10636.94	5759.28	152.00	2330.64	10409.62	227.91	
1980								
1	360.79	10605.73	5637.88	156.30	2425.43	10761.92	225.40	
2	365.81	10196.18	5694.00	159.50	2351.06	11299.91	246.87	
3	377.29	10249.70	6180.33	163.70	1737.93	11618.42	336.30	
4	378.27	9899.54	6308.48	169.20	2173.33	11876.42	349.06	

YEAR Qtr.

1981

	SP	CPI	M1	QM	XPT	DCPRT	DCPUB	
1	372.47	10452.70	6700.25	173.50	2239.75	12044.55	282.17	DCPUB
2	356.84	9726.65	6752.06	180.70	2555.06	12147.38	233.87	3141.95
3	361.59	10565.93	7046.19	188.10	2376.31	12097.24	258.25	2244.52
4	350.43	11105.55	7258.88	211.10	2637.75	12851.83	341.99	2938.70

1982

1	349.53	11418.31	7318.84	221.10	2425.43	13271.05	299.28	3941.11
2	349.22	11163.74	7159.42	232.70	2351.06	13833.48	417.38	
3	348.84	11806.66	7962.19	236.30	1737.93	13854.98	363.61	
4	349.77	13352.16	7972.09	249.80	2173.33	14072.42	560.17	

1983.

1	367.99	12631.27	7911.98	259.30	2753.19	14298.78	741.91	
2	367.51	12272.77	7893.61	263.80	2620.25	14475.81	910.04	
3	377.32	12941.15	8090.81	273.00	3365.36	14563.21	1022.22	
4	382.70	13930.85	8434.50	274.90	2462.14	15080.84	1154.12	

1984

1	385.01	13398.96	8249.88	321.90	4266.03	14975.12	1458.90	
2	385.42	13417.06	8799.34	327.50	3534.47	18300.00	1501.65	
3	386.02	14637.50	9464.17	332.20	3202.53	15737.01	1514.44	
4	386.43	15302.90	9939.12	348.40	3957.27	16653.02	1543.86	

## YEAR Qtr.

1985

	SP	MI	QM	CPI	XPT	DCPRT	DCPUB	DCPUB
1	391.14	14451.09	10166.63	321.90	3813.77	17162.20	1627.00	3141.95
2	401.17	14476.66	10248.25	327.50	3678.82	17577.48	1632.79	2244.52
3	413.49	14929.34	10508.09	332.20	3759.74	18726.53	1664.96	2938.70
4	421.10	15740.68	11188.36	348.40	3952.61	19137.31	1753.37	3941.11

1986.

1	448.11	17662.04	11922.30	350.50	4251.72	20257.58	1702.12	
2	467.79	17868.00	12491.16	353.00	4848.76	20781.97	1769.97	
3	485.75	20293.54	13788.73	355.60	5241.71	21221.12	1696.66	
4	505.96	20870.74	14814.76	368.60	4575.77	22682.24	1878.80	

1987

1	530.47	22260.80	15229.84	376.70	4117.58	23216.86	1946.46	
2	606.64	21249.20	15930.94	381.40	3693.19	22781.07	2952.06	
3	667.87	21552.49	17048.56	385.90	3480.79	23326.72	3462.46	
4	735.29	22888.18	16777.97	405.50	3694.54	24253.32	3605.62	

1988.

1	784.29	21007.84	17296.37	415.80	4222.93	24731.36	3968.41	
2	829.00	21199.26	17569.48	428.30	4643.51	26729.47	2725.93	
3	851.24	22083.84	17769.44	441.80	4547.62	26982.25	3526.87	
4	858.64	24229.47	18587.57	452.70	4725.26	28098.71	3423.98	