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9960-37-883-7

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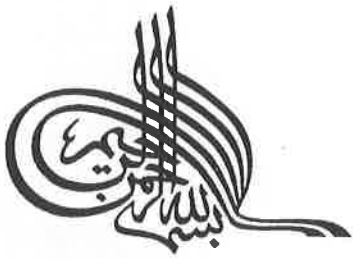

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King Fahd National Library Cataloging-in-Publication Data

Al-Heizan, Osama
The impact of macroeconomic variables on the performance of both the stock market and the mutual funds using the APT model: Evidence from the Egyptian capital market / Osama Al-Heizan; Elsayed Elsiefy
- Riyadh, 2005
... p., cm
ISBN: 9960-37-883-7

1-Stock exchange 2- Macroeconomics – Saudi Arabia
I-Elsayed Elsiefy (co-author) II-Title

339.59531 dc 1426/3793

Legal Deposit no. 1426/3793
ISBN: 9960-37-883-7

Abstract

This study aims to examine the relationship between economic fundamentals - especially inflation, the exchange rate, interest rate, government borrowing, gross domestic product (GDP) - and the performance of both stock market and mutual funds, using the APT model. For stock market performance, although these variables are used in many studies to determine economic growth in general and the stock market in particular, in the case of the Egyptian Capital Market (ECM), these variables failed to explain the determination of stock market performance during the study period. For the mutual funds performance we tested 12 models and found that model (9) is the best, according to theoretical concepts or using both the likelihood ratio and the non-nested test.

1. Introduction

Almost all of the early studies of portfolio performance compared performance of managed portfolios to a single-market index. The problem with comparing performance to a single index is that different types of assets held in the managed portfolios may perform differently from the benchmark. Funds with different investment objectives have different risk preferences and will perform differently using the same single benchmark because of their different asset holdings. It is difficult to test the Capital Assets Pricing Model (CAPM) without data on the global wealth portfolio. In the 1970s, financial researchers took a different approach to the issue of identifying a discount rate for securities. The Arbitrage Pricing Theory (APT) was developed by Stephen Ross (1976); like the CAPM, it argues that discount rates are based upon the systematic risk exposure of the security, as opposed to the total risk. Unlike the CAPM, the APT does not require that all investors behave alike. There is no agreement on the number and the identity of the APT factors.

The cost of going from the APT model to a macroeconomic multi-factor model can be attributed directly to the errors, which can be made in identifying the factors. The factors in the model can change over time, as will the risk premiums associated with each economic factor. The advantage of APT analyses based on a macroeconomic variables approach is that the factors are observable. Moreover, stocks generally have different sensitivities to each macroeconomic variable. Thus portfolio managers can develop separate forecasts of each macroeconomic variable and they can use their forecasts to design portfolios which provide the best return-to-risk performance based on the sensitivity of each stock to each macroeconomic variable, and the historical risk premiums associated with each macroeconomic variable. Overall, the various APT-related analyses provide the portfolio manager with better means to assess and control the risk and the expected return of a portfolio than is available through standard Markowitz-type portfolio analysis and the CAPM.

1. 1 The Aim of the Study

The main purpose of this study is to examine the relationship between the economic variables and stock market performance and the causality between them in the context of the APT model. Moreover the study attempts to identify the relationship between equity mutual fund performance and both foreign and Egyptian trading values in addition to economic variables. The reason for applying the study on the equity mutual funds is the advantages from the equity mutual funds, which are greatly needed by investors in emerging markets. Moreover, most of emerging bond markets suffers from obvious weakness.

1. 2 The Importance of the Study

This study proposes and implements simple plausible frameworks for studying jointly the economic fundamentals which relate to the main aspects of the performance of stock markets. In particular, the study makes several contributions. Firstly, government in developing countries have failed to recognise the need to strengthen the financial system and to set up conditions favourable to financial development (Berthelemy and Varoudakis, 1995). This study will highlight the importance of this variables and its effect on the performance of both stock market and equity mutual funds. Secondly, for the sake of transparency and full disclosure of the capital market, this study will help investors to be aware of the economic variables, especially inflation, the exchange rate, interest rate, government borrowing, gross domestic product (GDP) and foreign investment. Thirdly, this study will examine the relationship between equity mutual fund performance and, in addition to economic variables, both foreign and Egyptian trading values, using the APT model.

The remainder of this study is organised as follows. Section 2 presents a brief review of the literature concerning the financial and economic variables that are implemented in the APT model and we discuss the rationale for the variables whose effects are tested in the study. Section 3 presents the methodology and data set. The empirical results will be presented and evaluated in Section 4. A summary and conclusion will be presented in section 5.

2. Literature Review

It is generally accepted that the CAPM is not truly testable unless the market portfolio of all assets is used in the empirical test (Shanken, 1982)[1]. The arbitrage pricing theory (APT) model developed by Ross (1976, 1977) has been proposed as a testable alternative, and the natural successor to the CAPM. The market portfolio plays no special role in this theory. Whereas the derivation of CAPM requires very specific technical assumptions, Ross's theory exploits the concept of a many-assets security market.

The APT implies that the expected return is approximately a linear function of the risk premiums on systematic factors in the economy. Subsequently, they have both a large theoretical literature extending the APT and a large empirical literature

[1] Previous work shows that average returns on common stocks are related to firm characteristics such as size, earning/price, cash flow/price, book-to-market equity, past sales growth, long-term past return, and short-term past return. Because these patterns in average returns apparently are not explained by the CAPM, they are called anomalies. Moreover, the test of the CAPM indicated that the beta coefficient for individual securities was not stable, but the portfolio betas generally were stable assuming long enough sample periods and adequate trading volume. There was mixed support for a positive linear relationship between rates of return and systematic beta for portfolios of stock, with some evidence indicating the need to consider additional risk variables or a need for different risk proxies (Fama and French, 1996a, p.55; Reilly and Brown, 1997, p.322).

testing its implications (Geweke and Zhou, 1996). The APT model is based on the law of one price; two items that are the same cannot sell at different prices. The strong assumptions made about utility theory in deriving the CAPM are not necessary. In fact, the APT model description of equilibrium is more general than that provided by a CAPM–type model in that pricing can be affected by influences beyond simply means and variances. An assumption of homogeneous expectations is necessary. The assumption of investors utilizing a mean-variance framework is replaced by an assumption of the process generating security returns (Reilly and Brown, 1997; Li, 1998).

The arbitrage pricing theory is one of several financial pricing models which attempt to explain the cross-sectional variation in expected returns on assets. One of the advantages of the APT is that it drives a simple linear pricing relation approximating to that in the CAPM, without some of the latter's objectionable assumptions. The disadvantage of the APT is that it provides no clues as to what might be important factors or how to interpret the factor premiums, which appear in the pricing equation (Jonathan and Ingersoll, 1984). However, the theory is far from easy to implement. Empirical research is still in the early stages in this area (Elton et al. 2003).

An important characteristic of the APT theory is that it is extremely general. This generality is both a strength and a weakness. Although it allows us to describe equilibrium in terms of any multi-index model, it gives us no evidence as to what might be an appropriate multi-index model (Elton et al. 2003).

Two major differences between the APT model and the CAPM are (1) the APT model allows more than one generating factor and (2) the APT model demonstrates that since any market equilibrium must be consistent with no arbitrage profits, every equilibrium will be characterized by a linear relationship between each asset's expected return and its return's response loading on the common factors (Li, 1998). The APT paradigm focuses on the covariance between asset returns and factors in the return generating process, while the equilibrium CAPM paradigm emphasises the role of the covariance between asset returns and the endogenous performance-based aggregate. The logic behind the APT is much the same as the logic behind the CAPM; that is, investors get rewarded for taking on nondiversifiable risk. In the CAPM, one factor, beta (the sensitivity to the market portfolio) captures this nondiversifiable risk. In contrast, in the APT model, the measure of this nondiversifiable risk can come from several factors. The number and the identity of these factors are determined by the data on historical returns.

Equilibrium models, such as the arbitrage pricing theory, do nothing more than suggest candidates for mean-variance efficient benchmarks. This does not necessarily imply that a one-factor model is superior to the multifactor approach. Indeed, one may prefer multiple index benchmarks because they generally yield more powerful test statistics and intuition suggests that they are less likely to be inefficient than a single index (Grinblatt and Titman, 1989).

In summary both CAPM and APT models have a problem with testing.

Specifically, before we can test the CAPM we must identify and use the true market portfolio, whereas before we can test the APT we must identify the relevant factor structure which affects security return (Reilly and Brown, 1997).

The APT model requires that the returns on any stock be linearly related to a set of indices as shown in Equation (1):

$$R_{it} = \alpha_i + \beta_{i1} f_{it} + \ldots\ldots\ldots + \beta_{ik} f_{kt} + \varepsilon_{it} \qquad (1)$$

$$i = 1,\ldots\ldots\ldots, N \qquad t = 1,\ldots\ldots\ldots, T$$

Where

R_{it} : The random rate of return on the i^{th} stock,

$\alpha_i = E(R_{it})$, The expected level of return for the i^{th} stock if all factors have a value of zero,

f_{kt} The value of the K^{th} factor that impacts the i^{th} stock,

β_{ik} = The beta or factor loading of the K^{th} factor for asset i

ε_i : An unsystematic risk component, an idiosyncratic noise term associated with the i^{th} stock.

N = Number of assets, and T = the number of periods.

Each security has a unique sensitivity to each factor f_k except that any factor f_k has a value which is the same for all securities. Every factor f_k affects more than one security; if it does not, it would have been compounded in the residual term ε_i. These factors affect the returns on more than one security and are the sources of covariance between securities. A β_{ik} is unique to one security and represents an attribute of the security. This attribute may be simply the sensitivity of the security to a particular factor (Li, 1998).

Most tests of the APT model use Equation (1) to estimate the β_{ik}. However, to estimate a β_{ik} we must have a definition of the relevant f_k. The most general method in this situation is simultaneously to estimate factors f_k and firm attributes β_{ik}'s for Equation (1). It is referred to as the factor analysis. Most of the early tests of the APT model employed this methodology (Li, 1998).

If the factor model holds exactly and assets do not have specific risk, then the law of one price implies that the expected return of any asset is simply a linear function of the expected return of the other assets. If this were not the case, arbitrageurs would be able to create a long-short trading strategy which would have no initial cost, but would be certain to give positive profits (Dimson and Mussavvian, 1999).

From the beginning of the APT, the choice of factors, number of factors and their interpretation have been hotly debated (Elton et al. 2003). Chen, Roll and Ross (1986) have hypothesised and tested a set of economic variables. They reason that return on stocks should be affected by any influence which affects either future cash flow from holding a security or the value of these cash flows to the investor (e.g., changes in the appropriate discount rate on future cash flows). They construct sets of alternative measures of unanticipated changes in the influence of the following: 1) inflation which impacts on both the level of the discount rate and size of the future cash flows; 2) the term structure of interest rates which is the differences between the rate on bonds with a long maturity and a short maturity, affecting the value of payments far in the future relative to near-term payments; 3) risk premia; that is, the differences between the return on safe bonds and more risky bonds which are used to measure the market reaction to risk; 4) industrial production; that is, the changes in industrial production which affect the opportunities facing investors and the real value of cash flows (Elton et al. 2003).Roll and Ross (1980) suggest five specific factors saying that different securities have different sensitivities to these systematic factors and that the major sources of security portfolio risk are captured in them. The five factors are (1) changes in expected inflation; (2) unanticipated changes in inflation; (3) unanticipated changes in industrial production; (4) unanticipated changes in the yield differential between low-and high-grade bonds (the default-risk premium); and (5) unanticipated changes in the yield differential between long-term and short-term bonds (the term structure of interest rate). The first three factors affect primarily the cash flow of the company and its dividends and growth in dividends. The last two affect the market capitalisation, or discount, rate (Van Horne, 2002).

Substituting into Equation (1), the Roll–Ross model may be expressed as

$$R_i = ER_i + b_{i1}(E\Delta \inf) + b_{i2}(U\Delta \inf)$$

$$+ b_{i3}(U\Delta indpro) + b_{i4}(U\Delta BRprem) + b_{i5}(U\Delta L - Srate)$$

Roll-Ross (1980) argue that the CAPM beta is too restricted a measure of risk. Several stocks may have the same beta but vastly different factor risks. If investors in fact were concerned with these factor risks, the CAPM beta would not be a good indicator of the expected return for a stock (Van Horne, 2002).

Dhrymes et al, (1984) also could not identify the actual number of factors which characterise the return generating process. When they applied the model to portfolios of different size, the number of factors changed.

Elton et al. (1995) investigate the performance of a model containing the six variables using Equation (2). Those variables are 1) the excess return on the stock market; 2) default risk that is the difference in return between corporate bonds and government bonds; 3) option which is the difference between the Lehman Brothers

GNMA index and a weighted average of the Lehman Brothers intermediate and long- term government bond indices; 4) aggregate which is a weighted average of the bond index and the high yield bond index; 5) GNP which is the change in expected real gross National Product; 6) inflation which is the change in expected inflation.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p(R_{mt} - R_{ft}) + \sum_{k=1}^{K} \beta_{pk} f_{kt} + \varepsilon_{pt} \quad (2)$$

Where

R_{pt} The rate of return of pooled mutual funds, R_{ft} = The risk free rate, α_p = The constant, β_p = The sensitivity of mutual funds to market index, R_{mt} = rate of return to the market, β_{pk} = The sensitivity of mutual funds to economic variables, f_{kt} = the economic variables, ε_{pt} = error term.

They also investigate three models continuing logical subsets of the six variables. They found that the return indices are the most important variables in explaining the time series of returns. The addition of fundamental variables leads to a great improvement in the explanation of expected returns. When they examine the percentage of expected returns explained by each variable, the fundamental variables are much more significant than all the indices with exception of the aggregate index.

Fama and French (1996a) introduce a model Equation (3) It says that the expected return on a portfolio in excess of the risk-free is explained by the sensitivity of its return to three factors: (i) the excess return on a board market portfolio $(R_m - R_f)$; (ii) the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks (SMB, small minus big); and (iii) the difference between the return on a portfolio of high-book-to-market stocks and the return on a portfolio of low-book-to-market stocks (HML, high minus low).

$$R_i - R_f = \alpha_i + \beta_i(R_m - R_f) + s_i(SMB) + h_i(HML) + \varepsilon_i \quad (3)$$

The three-factor model as in Equation (3) provides a better description of average returns than the CAPM. Because of its strong theoretical standing, the excess market return is one of the three risk-factors in the model, and their test confirms that it is important (Fama and French, 1996b).

Gruber (1996) introduces a four-index model. He uses Equation (4) to measure the performance of mutual funds, using a sample consisting of 270 mutual funds during the period 1985-1994:

$$R_{pt} - R_{ft} = \alpha_p^4 + \beta_{mp}^4(R_{mt} - R_{ft}) + \beta_{sp}(R_{st} - R_{lp}) + \beta_{gp}(R_{gt} - R_{ut}) + \beta_{dp}(R_{dt} - R_{ft}) + \varepsilon_p \quad (4)$$

Where

α_p^4 = the risk adjusted excess return measured from the four-index model. R_{pt} is the return on fund p in month t, R_{ft} = the return on a thirty day T-bill in month t, R_{mp} = the return on the S&P 500 index in month t, $(R_{st} - R_{lt})$ = the difference in return between a small cap portfolio and a large cap portfolio, $(R_{gt} - R_{ut})$ = the difference in return between a high growth portfolio and a value portfolio, $(R_{dt} - R_{ft})$ = the excess return on a bond index which represents an estimate of aggregate corporate and government bonds β_{kp} = sensitivity of the excess return on fund p to portfolio k where k can represent the market, a size factor, a growth factor, or a bond factor and ε_p = the random error in month t. Found that the i) stock of money underperforms appropriate benchmarks.

To use the APT model for the evaluation of mutual funds performance, Li (1998) used the macroeconomics variables approach suggested by Chen, Roll and Ross (1986). The five-macroeconomics shocks used in this study are: (1) the monthly growth rate in the USA's industrial production; (2) the unanticipated changes in default risk premium; (3) the unanticipated change in the slope of the term structure of interest rates; (4) the unanticipated inflation rate and (5) the unexpected change in the unemployment rate. Li (1998) obtained the market residual factor as the sixth factor. This factor may be thought of as a proxy for otherwise omitted or incompletely specified factors—the part of the market index excess return which is not explained by the other five rotated factors (Li, 1998).

Li (1998) and Connor and Korajczyk (1991) used regression in Equation (5) to evaluate the performance of each fund in the sample.

$$R_{pt} - R_{ft} = \alpha_{pt} + \beta_{UTS} UN\Delta_{UTS,1} + \beta_{URP} UN\Delta_{URP,1} + \beta_{UIP} UN\Delta_{UIP,1} + \beta_{UCPI} UN\Delta_{UCPI,1} + \beta_{UEMP} UN\Delta_{UEMP,1} + \beta_{MKTRES} MKTRES_1 + \ell_{pt} \quad (5)$$

Where

$UN\Delta_{UTS}$ = Monthly growth rate in the U.S industrial production in the united state. $UN\Delta_{URP}$ = Unanticipated changes in default risk premium. $UN\Delta_{UTS}$ = Unanticipated changes in the slope of the term structure of interest rates. $UN\Delta_{CPI}$ = Unanticipated inflation rate. $UN\Delta_{UEMP}$ = Unexpected changes in the unemployment rate. $UN\Delta_{MKTRES}$ = Market residual factor.

To sum up, both CAPM and APT models have a problem with testing. Specifically, before we can test the CAPM we must identify and use the true market

portfolio, whereas before we can test the APT we must identify the relevant factor structure which affects security return. Since APT began, the choice of factors, number of factors and their interpretation have been hotly debated

Research on the impact of economic fundamentals on the stock market has evolved in the last 10 years. We reapplied the study of Hindy et al. (1999) for the same period and found that the relation between the real price index and both the interest rate and exchange rate are significantly negative but the Durbin-Watson statistic (DW)[1] was very low (0.3925), which means that there is autocorrelation between variables.

The problems with Hindy et al.'s study that they used the Capital Market Authority Index (CMAI) as a market index; but this index has a problem of validity. Another source of evidence of the inaccuracy of the CMAI that we compare the movement of the CMA index with the movement of the PIPO (Prime Initial Offering Index) and HFI (Hermes Financial Index) during the period 1/1/1995 to 31/12/2000. While the CMAI takes an upward trend the index takes a downward trend Because there is no agreement on economic variables to be used to predict the stock market performance in general, and the mutual funds performance in particular, the study will use the variables most commonly examined and tested in the literature, besides some variables belonging to the Egyptian environment as an emerging market, which may affect the stock market performance. Following Roll and Ross (1980) we wish to examine both unanticipated changes in the yield differential between low- and high-grade bonds (the default-risk premium) and unanticipated changes in the yield differential between long-term and short-term bonds (the term structure of interest rate). But the Egyptian bond market suffers from obvious weaknesses. So the economic variables which will be examined in this study are (1) Gross Domestic Product (GDP) (2) Interest rate (3) Exchange rate (4) Inflation (5) Government borrowing and 6) foreign and Egyptian trading value. The rest of this section will outline the importance of these variables.

2. 1 Gross Domestic Product (GDP)

The broadest measure of aggregate economic activity, which is also the best-known and most often used, is the gross domestic product, or GDP. Odedokun (1996) mentioned that Wai (1980) evaluated the effects of real value domestic credit on real GDP by employing time series data for each of 13 developing countries and significant positive impacts were detected in virtually all the countries. Moreover, he mentioned that Lanyi and Saracoglu (1983) found that the growth of real money stock (wide money or M2) had a significant positive impact on the growth rate of

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[1] The simplest and commonly used statistic model to test the correlation (ρ) between the least squares residual $\hat{u}_t$ and $\hat{u}_{t-1}$ is the DW statistic. We have $DW = 2(1-\rho)$ if ρ =+1, then DW = 0, if the ρ =-1 the DW = 4. We have DW = 2 only if ρ = 0. if DW = 0 or 4, the residuals are highly correlated.

real GDP in their cross-country study covering 21 countries over the 1971-1980 period (Odedokun, 1996).

Odedokun (1996) employed time series data for 71 developing countries during the period of the 1960s to 1980s to determine and analyse the effects of financial intermediation on the growth of real GDP. Five variables were computed: 1) economic growth was measured as the annual growth rate of the real GDP; 2) labour force growth was proxied by population growth, which was in turn calculated as the annual growth rate of population size; 3) the investment/GDP ratio was computed as gross nominal fixed capital formation plus the increase in nominal stocks, both divided by the nominal GDP; 4) real export growth was calculated as the annual growth rate of real exports of goods and non-factor services; 5) financial depth was computed as the ratio of the average (end of the year and the beginning of year) of the nominal value of the stock of liquid liabilities to the nominal annual GDP (Odedokun, 1996). Odedokun found that: a) financial intermediation promotes economic growth in 85% of the 71 countries. (b) the growth-promoting effects of financial intermediation are more predominant in the low-income than in the high-income developing countries. (c) The growth-promoting effects of financial variables are practically invariant across the various countries of the globe (Odedokun, 1996).

Choe and Moosa (1999) define a number of indices for stock market development. The first is the stock market size which is measured by the value of listed shares (market capitalisation) divided by GDP. Since larger market capitalisation may not necessarily imply stock market development, they further define two variables to reflect market liquidity: the value-traded ratio is the total value of shares traded on domestic exchanges divided by market capitalisation. Additional indexes include concentration measured by the share of market capitalisation accounted for by the 10 largest stocks, volatility measured by the standard-deviation estimate based on market returns, the degree of market integration measured by the risk premium and other regulatory and institutional indicators. Using various aggregate indices defined from the above for 41 countries over 1986-1993, they find a roughly, positive correspondence between per capita income and stock market development (Choe and Moosa 1999).

Choe and Moosa (1999) mentioned that Demirguc-Kunt and Levine (1997) provide additional important evidence on the relationship between stock market development and financial intermediary development, using the above mentioned indexes, for stock market capitalisation and the value traded ratio are positively correlated with all of the indicators of financial intermediary development, showing that stock markets and financial intermediaries are generally complementary. Moreover, a rough evolutionary path of financial system can be observed from cross-country differences (Choe and Moosa, 1999).

2. 2 Interest Rate

Interest rates are another type of economic variable. There are many different interest rates in the economy. Interest rates vary according to who is doing the borrowing, how long the funds are borrowed for and other factors (Abel and Bernanke, 1995).

The result of studies of the relationship between the money supply and stock prices have indicated a significant relationship, but recent research indicates that stock prices generally turn before the money supply does. Therefore, we cannot use the money supply series to develop a mechanical trading rule which will outperform a buy and hold policy (Reilly and Brown, 1997).

To distinguish changes in the real value of assets from changes in nominal value, economists frequently use the concept of the real interest rate. The real interest rate on an asset is the rate at which the real value or purchasing power of the assets increases over time. The nominal interest rate is the rate at which the nominal value of an asset increases over time. In this respect the real interest rate is determined by Equation (6)[1] (Abel and Bernanke, 1995).

$$RI_{rate} = NI_{rate} - \pi \qquad (6)$$

Where

RI_{rate} Real interest rate NI_{rate} Nominal interest rate and π inflation.

Equation (6) underlies the importance of inflation in explaining the interest rate. Reilly and Brown (1997) plot the long-term interest rate and the year-to-year percentage change in the consumer price index (CPI) (as a measure of inflation).

They conclude that although the two curves generally move together, in some periods (1975, 1979 to 1980) the inflation rate exceeded the interest rate, which implies that during these periods, investors received a negative real interest rate. In contrast, during 1983 to 1985 the real interest rate was in the 8 to 10 percent range, which clearly exceeds what most investors would expect on very low risk bonds. This change in spread shows that investors are not very good at predicting inflation. This graph demonstrates the strong relationship between inflation and interest rates (Reilly and Brown, 1997).

2.2.1 Interest Rates and Bond Prices

The relationship between interest rates and bond prices is clearly negative because the only variable which changes in the valuation model is the discount factor. The

[1] Naser (1999) use the following equation $RI_{rate} = (NI_{rate} - \pi)/(1+\pi)$.

expected cash which flows from a straight non-callable bond would not change. Therefore, an increase in interest rates will cause a decline in bond prices and a decline in interest rates will increase bond prices. The size of the price change will depend on the characteristics of the bond. A longer-term bond will experience a larger price change as a result of change in interest rates. Therefore, we can anticipate a negative relationship between inflation and the rates of return on bonds because inflation generally has a direct effect on interest rates, and in turn interest rates have an inverse effect on bond prices and rates of return (Reilly and Brown, 1997).

2.2.2 Interest Rates and Stock Prices

The relationship between interest rates and stock prices is not direct and consistent. The reason is that the cash flows from stocks can change along with interest rates and we cannot be certain whether this change in cash flow will augment or offset the change in interest rates.

The relationship between inflation, interest rates and stock prices is not as direct or consistent as the relationship between interest rates and bonds. The effect of interest rate changes on stock prices will depend on what caused the change in interest rates and the effect of this event on the expected cash flows on common stock. Moreover the actual relationship between inflation, interest rates and stock prices is an empirical question and the effect varies over time. Therefore, although there has generally been a significant negative relationship between inflation, interest rates and stock prices, this is not always true. In addition, even when it is true for the overall market, certain industries or segments of the economy may have earnings and dividends which react positively to inflation and interest rate changes. In such an instance, their stock prices would be positively correlated with inflation and interest rates (Reilly and Brown, 1997).

2. 3 Inflation

The increase in expected inflation rate is positively related to an increase in uncertainty about the actual inflation rate. Subsequently, decreasing profit and loss values for lending and borrowing do not consider this variable.

Many studies have tested the relationship between the change in the growth rate of the money supply and the change in stock prices. The results of these studies have tended to change over time. Some studies imply that changes in the growth rate of the money supply could serve as a leading indicator of stock price changes. Subsequent studies have questioned these findings. Although these studies have likewise typically found a relationship between the money supply and stock prices, the timing of the relationship differs. These more recent studies have found that changes in the growth rate of the money supply did not lead stock prices, but consistently lagged stock returns by about 1 to 3 months. Moreover money changes affect stock prices, but the securities markets adjust stock prices very quickly to any

unexpected changes in money supply growth (Reilly and Brown, 1997).

2. 4 Exchange Rate

The exchange rate is an important indicator, which affects the economic stability and the stock market performance as well. The developed stock markets witness an incredible foreign investment flow, which affects and is affected by exchange rates. As the movement in exchange rates is important, we have to clarify its effect on economic stability. Exchange rates affect imports, exports, consumption and investment as it influences the wealth inferred from the stock price fluctuation.

A foreign investor's realised return consists of the actual return of the security and the return resulting from changes in the exchange rate. Currency risk is particularly evident in emerging markets because of the lack of economic stability, especially when inflation rates are high, leading to local currency devaluation.

In discussing exchange rates, we must distinguish between nominal and real exchange rates. The real exchange rate is indicated by Equation (7) (Abel and Bernanke, 1995).

$$RE_{rate} = \frac{NE_{rate} * USA_{CPI}}{EGY_{CPI}} \qquad (7)$$

Where RE_{rate} Real Exchange rate, NE_{rate} Nominal exchange rate, which is the Egyptian pound per USA dollar, USA_{CPI} USA consumer price index, EGY_{CPI} Egyptian consumer price.

A higher exchange rate (i.e. a lower value of the local currency) raises the level of risk perceived by foreign investors, thus causing lower trading volumes in the capital market. Additionally, in times of lower value for the local currency, investors tend to liquidate their local currency financial assets. Their exit from the capital market affects both the transaction value and price level.

In the case of Egypt as an emerging market, for several years Egypt's monetary policy has been defined by a desire to maintain the value of the currency at LE 3.4 to the dollar in order to protect businesses from unnecessary price volatility and to build investor confidence. Following the economic restructuring of 1991, high nominal interest rates ensured that domestic capital remained in Egypt and served to attract increased foreign funds. In the middle of the decade, it actually became a challenge to keep the currency from appreciating due to strong tourism and investment inflows. The Central Bank of Egypt (CBE) found itself in the enviable position of absorbing enormous sums of hard currency and despite efforts to sterilise the inflows with treasury paper, Egypt experienced a strong growth in liquidity. During this period, monetary officials managed to build up foreign reserves to $20 billion. This situation changed abruptly following the economic disturbances of

1997, however, and the CBE became a net provider of hard currency to the market.

2.5 Government Borrowing from Private Financial Institutions

The acute and sustained crisis in the Egyptian balance of payment indicates the structural nature of this crisis. Its cause is attributed by international institutions to the negative effects of changes in the international environment as well as being attributable to the Egyptian public sector. The main reason for the increasing demand from external funding is the shortages in Egyptian savings which did not exceed the rate of fifty percent from the investment or much less through most stages of modern history. Besides the shortage of savings, the government has an obligation to pay external and internal debt service (El Shami, 1994).

The new fiscal policy in Egypt, which began to be implemented from 1st May 1991, aimed at reducing the deficit in the state budget through increasing resources from the state and decreasing the level of growth in public expenditure. However, in view of the increasing rate of the deficit in the state budget to Gross Domestic Product (GDP), it was not possible that this new policy would result in a total reduction of deficit. Some levels of this deficit will continue to appear despite the effectiveness of these two directions. At this point, it was made conditional by both the International Monetary Fund and the World Bank that the remaining deficit has to be financed by actual resources, in the sense that the government should refrain from printing banknotes or borrowing from the banking system. To deal with its deficit, the Egyptian Government should go to the currency market with its various savings institutions to borrow, as does the private sector (Zaki, 1994).

To obtain its domestic savings requirements for closing the deficit, the government issued treasury bills with a real rate of interest, which is above the rate of inflation. The Egyptian Government became totally dependent on these treasury bills to finance the budgetary deficit. This is indicated by the high increase in the balance of treasury bills from LE500 million at the end of January 1991 to LE 17.1 billion at the end of June 1992. The share of the government in domestic debt increased to 16.2% in June 1992 from less than 4.1 % in June 1991. By March 2000, treasury bonds reached LE 25.4 billion, or what represents 15.7 of the total of domestic debt (Zaki, 1994; CBE, 2000).

The entrance of government as a borrower through treasury bills with high interest rates has resulted in the increase of the general level of prices in response to the increase in the cost of both current and capital investment. At the same time, the sharp decline in real incomes of the citizens, and the increase in the rate of unemployment and indirect taxes, have resulted in reducing the amount of income available for spending.

The local market has, therefore, witnessed a situation of severe deflation accompanied by a high increase in prices. This has resulted in an accumulation of stored goods in both the private and public sector projects. That was how Egypt

experienced the phenomenon of stagnant inflation.

The high interest rate caused by the treasury bills in addition to the huge volume of treasury bills issued by the government has resulted in the government being the only borrower in the currency market. Consequently, there is a situation of crowding around the locally available finance facilities. The main problem is that the government used these savings to finance its current deficit and not to finance public investment. In other words, these savings were liquidated for the benefit of governmental consumption. This is another dimension related to investment and growth in Egypt, which includes the currency market.

2.6 Foreign Investment

Some Arab markets such as Saudi Arabia and Kuwait allow foreigners to invest in investment funds. Oman and Bahrain, in contrast, permit foreigners to invest only in a specific group of stocks. In Tunisia, foreigners are permitted to invest in amounts not exceeding 50% of the outstanding shares of any firm and investments in excess of the 50% ceiling must be approved by the Central Bank. In Egypt, Morocco, Lebanon and Jordan, investment by foreign investors is unrestricted (Hindy et al. 1999).

As indicated in **Table (1)** the participation of foreign investors in the Egyptian market increased consistently during the six-year period ending on March 2001. There is a notable disparity between the foreign investors' share in the market capitalisation on the one hand and their share in the volume of transactions, on the other hand.

Table (1) Foreign Participation in Egyptian Stock Market
(As percent of total trading volume)

	1996	1997	1998	1999	2000
Foreign Participation *(As percent of total trading volume)*	32%	33%	39%	42%	25%

Source: CMA & Egyptian Stock Exchange Bulletins

Further analysis of the determinants of the transaction volume indicates that in most of the months during the period in question, October 1996 to June 1999, the amounts of purchases made by foreigners exceeded their sold amounts (for 19 months purchases exceeded and for 14 months sales exceeded). This does not

necessarily mean that the foreign investors' holding periods are long enough to qualify them as investors rather than speculators. Foreign investors' volume of transactions during 1997 amounted to LE 6721.3 million, which represents 33.1% of the total volume of floor transactions. Table (1) shows that this value increased annually. This indicates a relatively high turnover, since foreign investors' share in the total market capitalisation represents only 6.2%. We can conclude that the share of foreign capital in the total market capitalisation is relatively small. This may reassure the sceptics who fear that foreign investment may enable foreigners to control the national economy. The large volume of foreign investors' transactions in spit of their small volume of total market capitalisation indicates an above average turnover of their investments. The high turnover, in turn, has two interpretations. Firstly, foreigners do not buy securities in order to hold them for long periods. This is another source of reassurance with respect to the fear of foreign control over the economy. Nonetheless, it is a source of worry with respect to the speculation activity performed by the experienced foreign institutions, given the lack of matching experience on the part of the local investor. Secondly, they might play a role in leading the market movement, given the vast experience enjoyed by some of them (Hindy et al. 1999). The study attempts to identify the relationship between the volume of foreign investors' transactions and mutual fund performance.

The inflow of foreign portfolio investment towards emerging capital markets has led to improvements in some of the markets' vital signs, such as the volume of trade and the turnover rate. It has also improved the organisational and institutional infrastructure of the markets. Nonetheless, some may fear that the inflow of foreign direct investment (FDI) may be detrimental to the general economy. Continuous inflow may lead to adjustment problems, whereas irregular inflow may lead to economic instability upon the arrival and the departure of capital (Hindy et al. 1999).

The problems associated with continuous flow may be classified into problems related to the probability of a sudden exit from the market as well as those associated with the inability of the economy's capacity to absorb the inflowing capital. The probability of a sudden exit may be likened to the situation of money acquired via short-term bank loans (hot money), where the borrower faces the worries of how to redeem the loan shortly after acquiring the money. Hot money may cause some seriously negative side effects such as fluctuations in currency and/or interest rates (Hindy et al. 1999).

The exit of capital from the market may be attributed firstly to the temporary nature of the incoming capital (hot money), where the main attraction to the market is a result of certain market malfunction or a deficient policy leading to a wide gap between interest rates locally and abroad. Secondly, there may be a negative shock due to some unexpected political occurrence, a dramatic fall in the price of a major export commodity, or a sudden modification in the taxing system affecting the returns achieved by foreign investors (Hindy et al. 1999).

In any case, the foreign investors will react by liquidating their holdings of financial securities, leading to a decline in their market prices. Additionally, when

foreign investors convert the local currency proceeds of their security sales to their home currencies, this will lead to declining value, a higher interest rate on local currency deposits or both, depending on the adopted system of determining the exchange rate (Hindy et al. 1999). There is limited econometric empirical work to support the link between FDI and growth, and between the FDI and the stock market, particularly in developing countries.

3. Data Set and Methodology

To determine the economic variables which affect the stock market in general and mutual funds in particular, this section will describes the data collections, the research methodology and the methodology of model specifics, for both stock market and equity mutual funds.

3. 1 Data Collection

3.1.1 Data Collection for Stock Market Performance

For the impact of economic variables on the stock market performance, the study relies on the data published by the Information Centre of the Capital Market Authority (CMA), the monthly report of the Central Bank of Egypt (CBE), the monthly report of the Cabinet's Information and Decision Support Centre (IDSC), the information published by the Central Agency for public Mobilisation and Statistics (CAPMAS), and the International Financial Statistics (IFS). The study spans the period from January 1994 to August 2000. Monthly data of the studied variables were compiled for the period which begins in the year 1994, which is the beginning of real capital market activity. Following Hindy et al. (1999), the period 1992 to 1994 was excluded, since market activity had not adequately developed and the organisational structure had not taken full shape. Appendix (1) shows the calculation and the source for each variable.

3.1.2 Data Collection for Mutual Funds Performance

Besides the data used to test the performance of the stock market, to evaluate the mutual fund performance, at the beginning of this study, the intention was to use the whole population of mutual funds in the Egyptian capital market as a case study - 21 mutual funds altogether and all the market indices, totalling 7. Due to the difference of inception dates and because of data constraints, the optimal period to pick the biggest sample of mutual fund and market index is the period 8th May 1997 to 15th November 1998 (the sample during this period is 13 mutual fund and 5 market indices).

During this period, the performance of the Egyptian capital market dropped down in a constant way. Thus, the rates of return for most of the sample and market indices which appear are negative in value. One explanation of this drooping down may be related to South Asian crisis. Beim and Calomiris, (2001) maintained that the reason for high correlation between countries is that, investors are often poorly informed and easily imagine the worst. When one country suffers a financial collapse, it is natural to worry about which other countries might have a similar problem, without understanding the precise details. This may cause other countries' securities to be sold although if later information proves this fear unfounded, they should soon recover (Beim and Calomiris, 2001). Supporting this the finding by Edwards and Susmel (2001) which, find strong evidence of volatility co-movements across emerging countries, especially among the Mercosur countries (Edwards and Susmel, 2001). Another explanation mentioned by Green et al. (2000) which found that transactions costs are an important share market volatility and the regulatory regime therefore needs to take account of the impact of regulation on such costs (Green et al. 2000). As this period does not reflect the typical performance of the Egyptian market, the researcher extended the period of the study from 20th of June 1996 to 10th June 1999. This time span included a period of relative market stability, rise and decline. The result of this was that the members of the sample went down to 7 mutual funds and 4 market indices. The data consist of weekly rates of return and investment goals for 7 funds which existed from 20th June 1996 to 10th June 1999.

3.2 Research Methodology

3.2.1 The Research Methodology for stock Market Performance

Independent Variable

From economic theory it is clear that economic variables which are economic growth, interest rate, inflation rate, exchange rate and government borrowing have a significant impact on stock market performance.

Gross Domestic Product (GDP): Although it is an important indicator on economic performance level, it is difficult to collect monthly data for this variable. So we divided the yearly gross rate of GDP over 12 months. A positive relationship between GDP and both stock market and mutual funds performance is expected.

Interest Rate: The interest rate of the three-month deposits was the only interest rate to be considered in this analysis, as it is the closest alternative to investing in securities in the Egyptian stock market. It will be represented by both nominal and real investment rates. A negative relationship between interest rate and both stock market and mutual funds performance is expected.

Inflation Rate: The study analyses the individual impact of the inflation rate to

identify the effect of this variable on stock market performance, which reflects the investor's knowledge of this variable. A negative relationship between the inflation rate and both stock market and mutual funds performance is expected.

Exchange Rate: The study calculates the real exchange rate, because the Egyptian policy is to peg the Egyptian pound to the USA dollar. The investor's decisions in the stock market should be based on the real value of currency used in their investment. For this reason the study will calculate the effect of both real and nominal exchange rates. A negative relationship between the exchange rate and both stock market and mutual funds performance is expected.

Government Borrowing: This represents both the net claims on central government (Line 52an in IFS) and public sector (Line 52c in IFS) divided by domestic credit (Line 52 in the IFS), using Equation (8):

$$GOVBOR = \{Lines(52an + 52c)\} / \{Line52\} \quad (8)$$

Where $GOVBOR$ is the government borrowing. A negative relationship between government borrowing and both stock market and mutual funds performance is expected.

Dependant Variable

The study will consider a set of market indices (CMAI, EFGI, HFI and PIPO)[1] to help in the evaluation process of stock market activities. Moreover, as it will be used as an indicator of an investor's acceptance of security, we exclude the change of price level by dividing the dependent variable value by the Consumer Price Index (CPI)[2].

3.2.2 The Research Methodology for Mutual Funds Performance

Independent Variable

Three more independent variables will be added to the independent variable used for stock market performance. These are:

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[1] In this study we will take four indices as a benchmark, Capital Market Authority index (CMAI) is an index of all listed stocks based on year-end 1992 as 100; Egyptian Financial Group (EFGI) it is a large cap index including active traded companies with a market capitalisation of LE 650 million and above. It contains 22 companies; Hermes Financial Index (HFI), is a broad based index including all activity traded companies with a minimum three month trading value of LE 7 million, a minimum of 200 transactions and a minimum 20 days traded the index. It contains 41 companies; and finally, the prime initial offering index (PIPO).

[2] when we regressed the independent variables with any single market index it was not significant. So we pooled all indices together in stacked form, where all of the data for a variable are grouped together, but separated from the data for other variables. In the most common form, the data for different cross-sections are stacked on top of one another, with each column representing a variable.

1. Market Index Excess Return: This variable has been used frequently in previous studies and it was the most significant variable that affected mutual fund performance (Elton et al. 1995). We used PIPO as a market index because it is a more accurate market index than other indices, due to the fact that it has the highest correlation coefficient with all funds and indices.

2. Foreign Trading Value: At the beginning we decomposed the foreign total trading value to the foreign trading value as a seller and foreign trading value as a buyer. But we found that foreign trading value as a seller has a high correlation with nominal interest rate and nominal exchange rate. Moreover when we added it to the regression model it changed the sign of most variables in the equations. Consequently, we chose the foreign total trading value. Because foreign investors do not buy securities in order to hold them for long periods. Moreover there is doubt on speculation activity performed by the experienced foreign institutions, given the lack of matching experience on the part of the local investor. So the study expects a negative relationship between foreign trading value and mutual funds performance.

3. Egyptian Trading Value: The rise of demand for securities from domestic investors will lead to an increase in the price of securities, which will lead to an increase in the rate of return of mutual funds. So it is logical that there is a positive relationship between Egyptian trading value and mutual funds performance.

3. 3. 3 Estimating Equations

3.3.3.1 Estimating Equations for stock Market Performance

Two regression models were constructed. The dependent variable for these two models is the pooled market indices. Two sets of independent variables were used. Set one includes the real exchange rate, real interest rate, government borrowing and the growth rate of the GDP, while set two includes inflation, the nominal exchange rate, the nominal interest rate, government borrowing and GDP gross rate. Following Murinde (1993) we consider the linear forms of trend correction for each variable and the standard deviation or the variance taken. We consider a linear trend form as in equation (9) (Murinde, 1993).

$$\pi_t = \alpha_0 + \alpha_1 T + \varepsilon_1 \qquad (9)$$

Where π_t denotes the inflation. T is a time index: $T = 1,2,3,.....n$, ε_1 is a normally distributed error term.

A regression run of equation (9) yields the residuals as shown in Equation (10):

$$\hat{\varepsilon}_1 = \pi - \hat{\pi} \qquad (10)$$

Where ε_t denotes non-squared residuals. This represents the deviation of inflation about their growth trend. We did the same for all dependent and independent variables. From the Arbitrage Pricing Theory (APT) of Ross (1976), using these processors, Equation (1) leads to the production of four models, as shown in Equations 13, 14, 15, and 16.

3.3.3.1.1 Unit Root Test

The importance of stationary and non-stationary time series lies in testing the presence of unit roots in order to avoid the problem of spurious regression. The most economic time series are non-stationary, and this finding raises the importance of conducting unit root tests for empirical analysis using time-series. If a variable contains a unit root, then it is non-stationary. There are several ways of testing for the existence of unit root. Following Santoso (2001) we use Augmented Dickey-Fuller (ADF) and Philips Perron's (PP) (1997) structural break unit root test to test the null hypothesis that a series contains a unit root (Santoso, 2001).

When the null hypothesis is rejected, then the series are stationary, $y \sim I(0)$. A non-rejection of the unit root null hypothesis for level data raises the question as to whether its first difference is stationary series are achieved. The general model to test unit roots of a series y_t in ADF as in equation (11).

$$\Delta y_t = \psi y_{t-1} + \sum_{i=1}^{k} \psi_i \Delta y_{t-i} + \mu + \gamma t + u_t, u_t \sim \text{IID}(0, \sigma^2) \quad (11)$$

Where μ is a constant, t is a time trends variable and Δ is the first differencing symbol.

Following Hall, (1994) we chose the lag length which minimise the Schwarz criterion.

We tested the stationary of each of the data series by using both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP), some variables are not stationary but after taking the first difference of the lag level of those series the data tend to be Stationarity so we use the first order *I(1)* on the regressions for those variables.

For the pooled market indices we use t-bar panel unit root test suggested by Im et al (1997) according to the following equation,

$$\psi_{\_t} = \frac{\sqrt{N}\{t_{NT}(P,\rho) - \frac{1}{N}\sum_{i=1}^{N} E[t_{iT}(P_i,0) \mid \beta_i = 0]\}}{\sqrt{\frac{1}{N}\sum_{i=1}^{N} Var[t_{iT}(P_i,0) \mid \beta_i = 0]}} \quad (12)$$

where $t_{NT}(P,\rho)=\frac{1}{N}\sum_{i=1}^{N}t_{iT}(Pi,\rho i)$, $t_{iT}(pi,\rho i)$ is the individual t statistic for testing $\beta_i=0$. The values of $E[t_{iT}(P_i,0)\mid\beta_i=0]$ and $Var[t_{iT}(P_i,0)\mid\beta_i=0]$ have been evaluated via stochastic simulations, and are reported in Im et al. (1997) table.

We examined the panel unit root test for pooled market indices. We found that the pooled of market indices is stationary at 5% level of significance.

3.3.3.1.2 Summary Statistics for Data of Stock Market Performance

We have tested the presence of autocorrelation for the asset returns for the period January 1994 to August 2000, but all of the null hypotheses were rejected except for inflation. All equations were estimated by the OLS technique.

$$RSMP=\alpha+\beta_1 INFLATION+\beta_2 NEXCH+\beta_3 NINTER+\beta_4\Delta GOVBOR+\beta_5 GDP+\varepsilon_1 \quad (13)$$

$$\varepsilon_{RSMP}=\alpha+\beta_1\varepsilon_{inflation}+\beta_2\Delta\varepsilon_{NEXCH}+\beta_3\varepsilon_{NINTER}+\beta_4\Delta\varepsilon_{GOVBOR}+\beta_5\varepsilon_{GDP}+\ell_1 \quad (14)$$

$$RSMP=\alpha+\beta_1\Delta REXCH+\beta_2 RINTER+\beta_3\Delta GOVBOR+\beta_4 GDP+\varepsilon_2 \quad (15)$$

$$\varepsilon_{RSMP}=\alpha+\beta_1\Delta\varepsilon_{REXCH}+\beta_2\varepsilon_{RNINTER}+\beta_3\Delta\varepsilon_{GOVBOR}+\beta_4\varepsilon_{GDP}+\ell_2 \quad (16)$$

Where

$RSMP$ Is the stock market performance measuring by the rate of return of pooled market indices. α is constant, $REXCH$ is the real exchange rate, $RINTER$ is the real interest rate, $GOVBOR$ is the government borrowing, $NEXCH$ nominal exchange rate, $NINTER$ nominal interest rate. $INFLATION$ Inflation rate, Δ is the first difference operator, $\varepsilon_{INFLATION}$ is the inflation rate shock, ε_{NEXCH} is the nominal exchange rate shock, ε_{NINTER} is the nominal interest rate shock, ε_{GOVBOR} is the government borrowing shock, ε_{GDP} is the growth rate of GDP shock, ε_{REXCH} is the real exchange rate shock ε_{RINTER} is the real interest rate shock $\beta_1,\beta_2,\beta_3,\beta_4$

and β_5 are the sensitivity for each variable to the change on $RSMP$.

3.3.3.2 The Research Methodology for Mutual Fund Performance

Following Elton et al (1995) we can rewrite equation (1) as in equation (17) (Elton et al. 1995).

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \sum_{k=1}^{K} \beta_{pk} f_{kt} + \varepsilon_{pt} \qquad (17)$$

Where

R_{pt} = The rate of return of pooled mutual funds, R_{ft} = The risk free rate, α_p = The constant, β_p = The sensitivity of mutual funds to the market index, R_{mt} = The rate of return to the market index β_{pk} = The sensitivity of mutual funds to economic variables f_{kt} = The economic variables, ε_{pt} error term.

As we did in the stock market performance models, for mutual funds we pool them as a dependent variable and we use the same two sets of independent variables as are used in the stock market performance models. We add two more variables for further explanation of the mutual funds excess return; these are the Egyptian trading value and the foreign trading value. These two variables will be treated at the real and nominal rates. This will introduce eight models as in Equations 18 to 25.

3.3.3.2.1 Unit Root Test

As we did with stock market performance, we test the unit root of each of the data series by using both the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. Some variables are not stationary, but after taking the first difference of the lag level of these series, the data tend to be stationary so we use the first difference *I(1)* on the regressions for these variables. Moreover we examined the panel unit root test for pooled mutual funds excess return using the Im et al. (1997) model, which was stationary.

3.3.3.2.2 Summary Statistics for Data of Mutual Funds Performance

We have tested the presence of autocorrelation for the asset returns for the period 1996:6-1999:6., but all the null hypotheses were rejected, except Misr1_rf, Nategy2_rf, PIPOcpi_rf, inflation and REXCH. All equations were estimated by the

OLS technique.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 INFLATION + \beta_2 \Delta NEXCH + \beta_3 \Delta NINTER + \beta_4 \Delta GOVBOR + \beta_5 GDP \quad (18)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 INFLATION + \beta_2 \Delta NEXCH + \beta_3 \Delta NINTER + \beta_4 \Delta GOVBOR + \beta_5 GDP + \beta_6 NEGYPTR + \beta_7 NFORTR \quad (19)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 \varepsilon_{INFLATION} + \beta_2 \varepsilon_{NEXCH} + \beta_3 \Delta \varepsilon_{NINTER} + \beta_4 \Delta \varepsilon_{GOVBOR} + \beta_5 \varepsilon_{GDP} \quad (20)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 \varepsilon_{INFLATION} + \beta_2 \varepsilon_{NEXCH} + \beta_3 \Delta \varepsilon_{NINTER} + \beta_4 \Delta \varepsilon_{GOVBOR} + \beta_5 \varepsilon_{GDP} + \beta_6 \varepsilon_{NEGYPTR} + \beta_7 \varepsilon_{NFORTR} \quad (21)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 REXCH + \beta_2 \Delta RINTER + \beta_3 \Delta GOVBOR + \beta_4 GDP \quad (22)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 REXCH + \beta_2 \Delta RINTER + \beta_3 \Delta GOVBOR + \beta_4 GDP + \beta_5 REGYPTR + \beta_6 RFORTR \quad (23)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 \varepsilon_{R\,EXCH} + \beta_2 \Delta \varepsilon_{RINTER} + + \beta_3 \Delta \varepsilon_{GOVBOR} + \beta_4 \varepsilon_{GDP} \quad (24)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_{12} \varepsilon_{REXCH} + \beta_2 \Delta \varepsilon_{RiNTER} + + \beta_3 \Delta \varepsilon_{GOVBOR} + \beta_{45} \varepsilon_{GDP} + \beta_5 \varepsilon_{REGYPTR} + \beta_7 \varepsilon_{RFORTR} \quad (25)$$

where

$\varepsilon_{NEGYPTR}$ is the nominal Egyptian trading value, ε_{NFORTR} is the nominal foreign trading value, $\varepsilon_{REGYPTR}$ is the real Egyptian trading value, and ε_{RFORTR} is the real foreign trading value

In the next section of this study we will employ this methodology to test

descriptions of relative pricing models for both stock market performance and mutual funds performance.

4. Empirical Results

4.1 Result for Stock Market Performance

Table (2) shows the results for the four models, which are shown in Equations 13 to 17. It shows that from model (1) only the nominal exchange rate has a significant negative relationship with stock market performance. But for inflation, nominal interest rate and government borrowing there are significant positive relationships with stock market performance. Finally, the gross rate of GDP has an insignificant negative relationship with stock market performance. This model has $R^2 = 0.11$ which means that the success of the regression in predicting the values of the dependent variable within the sample is small[1]. For model (2) when we used the shock for all explanatory variables we found no great difference than model (1), except for inflation rate shock. It has insignificant positive relationship with stock market performance, and R^2 still very low at 9%. For model (3) we use the real exchange rate, real interest rate, government borrowing and gross rate of GDP. We found that only the real exchange rate has an insignificant negative relationship with stock market performance. The growth rate of GDP has insignificant positive and so have both the real interest rate and government borrowing. The R^2 still very low at 1.5%. Model (4) is the shock for all variables used in model (3); it shows that the real exchange rate still has an insignificant negative relationship with the stock market, and the growth rate of GDP becomes significantly negative with stock market performance. R^2 still very low at 4.7%.

[1] The R-squared (R^2) statistic measures the success of the regression in predicting the values of the dependent variable within the sample. It is the fraction of the variance of the dependent variable explained by the independent variables. The statistic will equal one if the regression fits perfectly, and zero if it fits no better than the simple mean of the dependent variable. It can be negative if the regression does not have an intercept or constant, or if the estimation method is two-stage least squares.

Table (2) The result of the four models using to evaluate the stock market performance												
Variable	Model (1)			Model (2)			Model (3)			Model (4)		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
α	3.447622	3.636042	0.0003	0.01795	4.436317	0	-0.048745	-0.884222	0.3773	0.015948	3.892101	0.0001
INFLATION	0.01429	2.003724	0.046									
NEXCH	-1.040064	-3.755748	0.0002									
NINTER	0.011654	3.256564	0.0013									
GOVBOR	1.907818	2.792797	0.0056				1.076963	1.554697	0.1211			
GDP	-1.415615	-0.801759	0.4233				0.82085	0.446193	0.6558			
$\varepsilon_{INFLATION}$				0.000663	0.872309	0.3837						
ε_{NEXCH}				-0.019327	-2.866048	0.0044						
ε_{NINTER}				0.000945	2.553391	0.0112						
ε_{GOVBOR}				0.017184	2.523731	0.0121				0.013744	2.012309	0.0451
ε_{GDP}				-0.062806	-2.279438	0.0233				-0.083117	-3.012688	0.0028
Δ REXCH							-0.015444	-0.442921	0.6581			
RINTER							0.006401	1.033373	0.3023			
$\Delta\ \varepsilon_{REXCH}$										-4.95E-05	-0.144549	0.8852
ε_{RINTER}										0.000183	0.30473	0.7608
R-squared	0.112542			0.091162			0.015035			0.047323		
Durbin-Watson stat	1.658998			1.636431			1.514011			1.556686		

We examined the correlation matrix between dependent and independent variables. We found that there are multicollinearity problems in terms of the inter-correlation among the explanatory variables. The inter-correlation between government borrowing and both the real exchange rate and growths rate of GDP are 0.789 and 0.80 respectively. To avoid this problem we re-regress Equation (13), excluding government borrowing the first time and the growth rate of GDP on the second time. For Equation (20) we do the same between government borrowing and the real exchange rate. This process does not change the result from the original equations. The result remain unchanged for the sign of the coefficient, the significance of variables and finally the explanatory power R^2 is still very low, although these variables are used in many studies to determine the economic growth in general and stock market in particular (Odedokun, 1996; Reilly and Brown, 1997). In the case of the Egyptian capital market these variables failed to explain the determination of stock market performance, even after excluding all variables that have high inter-correlation and when we use the shock for all variables. All models fail to predict the stock market performance which reflects the fact that the Egyptian emerging market is not affected by the exchange rate, interest rate, inflation, government borrowing and growth rate of the GDP. So other variables need to be added for further explanation.

4.1.1 The Granger Causality Test for Market Performance

Following Prodhan and Jelic (2001), we applied the Granger causality test. The purpose of this test is to know whether stock market performance precedes the economic fundamentals or the reverse, or whether the movements are contemporaneous, this is the purpose of Granger causality (Maddala, 1992; Prodhan and Jelic, 2001). The issue of causality between a financial development and economic growth is theoretically controversial. At an empirical level, probably the earliest attempt at evaluating the relationship between financial and economic development, as shown in the survey by Odedokun (1996), is that of Patrick (1966), who reached the conclusion that causation runs from financial to economic development while the direction of causation is reversed at a later stage.

Luintel and Khan (1999) found bi-directional causality between financial development and economic growth in the 10 countries which they surveyed. The later studies report mixed results on the direction of causality (Luintel and Khan, 1999). Choe and Moosa (1999) examine the relationship between the development of financial systems and economic growth taking Korea as a case study and using annual data covering 1970-1992. They focus on the relative development of financial intermediaries and capital markets, and their impact on the portfolio behaviour of the household and business sectors. They show that financial development in general leads economic growth and that financial intermediaries are more important than capital markets in this relationship (Choe and Moosa, 1999)..

By employing the causality testing framework proposed by Granger (1969), Odedokun, (1996) mentioned that the same conclusion was arrived at by Fritz (1984) on the basis of data for the Philippines. Jung (1986) used the Granger's causality testing framework with data for 19 developed and 37 developing countries and the preponderance of his evidence was in support of a supply-led relationship between financial and economic development, irrespective of the stage of development. In direct contrast, Odedokun, (1996) mentioned that Goldsmith (1989) found that the direction of causation was from economic to financial development, regardless of the stage of development (Odedokun, 1996).

Table (3) shows the Granger causality test between stock market performance and economic fundamentals. It shows that the causality is from stock market performance (measuring by a pool of market indices) to inflation, the nominal exchange rate, growth rate of GDP and the real interest rate. Moreover there is bi-causality between stock market performance and government borrowing.

Table (3) Granger causality test between Stock Market Performance and Economic Fundamentals

	$F_{Statistic}$	*Probability*	χ^2	*Probability*
Inflation Granger Cause Market Indices Performance	0.640974	0.589201	1.922922	0.588558
Market Indices Performance Granger Cause Inflation	4.577134	0.003775	13.7314	0.003295
Nominal Exchange Rate Granger Cause Market Indices Performance	0.807577	0.490508	2.422732	0.489417
Market Indices Performance Granger Cause Nominal Exchange Rate	3.242665	0.022441	9.727996	0.021026
Nominal Interest Rate Granger Cause Market Indices Performance	0.700796	0.552232	2.102387	0.55143
Market Indices Performance Granger Cause Nominal Interest Rate	1.762201	0.154504	5.286602	0.151974
Government Borrowing Granger Cause Market Indices Performance	4.216654	0.006127	12.64996	0.005458
Market Indices Performance Granger Cause Government Borrowing	7.298109	0.000099	21.89433	0.000069
Growth Rate of GDP Granger Cause Market Indices Performance	0.322944	0.808781	0.968832	0.808793
Market Indices Performance Granger Cause Growth Rate of GDP	6.14789	0.000458	18.44367	0.000356
Real Exchange Rate Granger Cause Market Indices Performance	0.638659	0.590667	1.915978	0.590028
Market Indices Performance Granger Cause Real Exchange Rate	12.42563	0	37.27688	0
Real Interest Rate Granger Cause Market Indices Performance	1.603521	0.18869	4.810563	0.186206
Market Indices Performance Granger Cause Real Interest Rate	4.787505	0.002848	14.36251	0.002451

4.2 Results of Mutual Fund Performance

Table (4), following Elton et al. (1995), shows regression of each economic variable on the pooled mutual fund excess return using Pooled Least Squares. It shows that the market index excess return and both real and nominal Egyptian trading transactions have a significant positive relationship with mutual funds performance. Meanwhile the real exchange has positive significant relationship.

Table (4) the impact of each economic variable on the mutual funds excess return (Pooled Least Squares)

Variable	Coefficient	t-Statistic	Prob.
PIPOCPI_RF	9.442248	19.22225	0.000
REXCH	0.945642	2.082904	0.0382
Δ RINTER	0.088215	0.636673	0.5249
Δ GOVBOR	-2.57368	-0.332873	0.7395
GDP	205.0447	4.479516	0.0000
INFLATION	0.035896	0.143219	0.8862
Δ NEXCH	-10.66372	-0.519652	0.6038
RFORTR	-0.000243	-0.812319	0.4175
REGYTR	0.000375	2.291715	0.0228
NFORTR	-0.000263	-0.999987	0.3184
NEGYTR	0.000245	1.756833	0.0803

The signs for the rest of the variables are in agreement with the hypotheses except for inflation, which has an insignificant positive relationship with mutual funds performance; this means that investors are generally unaware of the effect of inflation on investment value. Moreover, this may be the reason for real exchange to have a significant positive relationship with mutual funds performance.

Elton, Gruber and Blake (1995) developed four APT models for explaining expected returns in the bond market. They utilise indexes as well as unanticipated changes in economic variables as factors driving security returns. They found that return indices are the most important variables in explaining the time series of bond fund returns. In contrast to Elton et al. (1995) who examined the models for market bonds, while these methods were useful in some cases, the Egyptian bond market suffers from obvious weakness. Egyptian government-issued bonds are mainly purchased by financial institutions, which are the main constituents of this market.

Corporate bond issues, in contrast, are limited. The share of corporate bonds in the new issues is relatively small, but is in a state of constant growth. So this study will reapply these models to equity mutual funds.

Table (5) shows the results of regressing the eight models, which are shown in Equations 18 to 25. This shows that the market index excess return has a significant positive relationship with mutual funds excess return at 1% level of significance whether used as it is or used as shock. This result is quite logical because when the market index goes up it reflects the fact that the prices of most stocks go up and if this is the case then the rate of return of mutual funds will go up too, and also the converse. This result is in agreement with Elton et al (1995), who found that about 73 percent of the expected bond fund is explained by market index (Elton et al 1995).

Inflation rate has a significant negative relationship with the mutual funds excess return at 1% level of significance whether used as it is or used as shock. This relationship is logical. The inflation leads to a reduction in the rate of return, due to the decrease of purchasing power during the investment period.

The Nominal exchange rate has a significant negative relationship with the mutual funds excess return at 5% level of significance only on model (1). A negative relationship between the mutual funds and nominal exchange rate is logical. As mentioned before, a higher exchange rate raises the level of risk perceived by foreign investors, which leads to lower trading volumes and reduce the stock's price. For model (2) it was insignificantly negative at any level of significance. When we use shock for the nominal exchange rate, it has an insignificant positive relationship on model (3) and an insignificant negative relationship for model (4).

The nominal interest rate has an insignificant positive relationship with the mutual funds excess return in models (1) and (2) but an insignificant negative relationship in models (3) and (4).

Government borrowing has a significant negative relationship with the mutual funds excess return at 10% level of significance at least for all models except model (8), where the relationship was insignificantly negative. It is logical too, for, once the Egyptian government become totally dependent on treasury bills with a high interest rate to finance the budgetary deficit, an increase in the general level of prices resulted. Moreover most of the investors sold their stocks to buy treasury bills which have a high rate of return and little risk.

The growth rate of GDP has a significant positive relationship with the mutual funds excess return at 10% level of significance for all models, except for model (8) which was insignificantly positive. It is reasoned that the growth rate of GDP indicates an expanding economy with ample opportunity for a firm to increase sales which leads to increased profits and a higher stock price as well.

The real exchange rate has an insignificant positive relationship with the mutual funds excess return at any level of significance. As well as the real interest

Table (5) The result of the eight models used to evaluate the Mutual Funds performance												
	Model (1)			Model (2)			Model (3)			Model (4)		
Variable	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
α	1.036976	3.851541	0.0001	0.905306	2.616527	0.0095	-0.097744	-2.286341	0.0231	-0.204208	-4.82961	0
PIPOCPI_RF	9.694281	20.9372	0	9.817213	20.68371	0						
INFLATION	-0.737028	-4.738804	0	-0.532801	-2.758593	0.0063						
Δ NEXCH	-25.53688	-1.971411	0.0498	-20.5495	-1.517365	0.1306						
Δ NINTER	0.043573	0.183425	0.8546	0.12613	0.48379	0.629						
Δ GOVBOR	-16.50951	-3.17077	0.0017	-12.72284	-2.308017	0.0219						
GDP	84.72235	2.921338	0.0038	84.92792	2.62879	0.0092						
NEGYTR				-4.36E-05	-0.427099	0.6697						
NFORTR				0.000196	1.039306	0.2998						
$\varepsilon_{PIPOCPI}$							9.530641	14.97142	0	10.33434	16.22945	0
$\varepsilon_{INFLATION}$							-0.080807	-4.070321	0.0001	-0.077655	-3.479864	0.0006
ε_{NEXCH}							0.247431	1.362474	0.1743	-0.175271	-0.977321	0.3295
$\Delta\ \varepsilon_{NINTER}$							-0.044111	-1.539658	0.1249	-0.022834	-0.828122	0.4085
ε_{GOVBOR}							-0.230547	-3.460008	0.0006	-0.215683	-3.220589	0.0015
ε_{GDP}							187.6487	2.849939	0.0047	228.1175	3.548271	0.0005
ε_{NEGPTR}										-3.21E-05	-0.270364	0.7871
ε_{NFORTR}										0.000102	0.445331	0.6565
REXCH												
Δ RINTER												
RFORTR												
REGYTR												
ε_{REXCH}												
ε_{RINTER}												
ε_{REGYTR}												
ε_{RFORTR}												
R-squared	0.684188			0.699998			0.521808			0.60047		
Durbin-Watson stat	1.983946			1.973863			1.415819			1.665012		

Table (5) continue The result of the eight models used to evaluate the Mutual Funds performance

Variable	Model (5)			Model (6)			Model (7)			Model (8)		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
α	0.5130	0.5680	0.5705	0.5861	0.6512	0.5156	1.5333	19.2029	0.0000	1.5451	17.4199	0.0000
PIPOCPI_RF	9.4328	20.6712	0.0000	9.7594	20.3886	0.0000	9.4140	21.7722	0.0000	9.6281	20.4721	0.0000
INFLATION												
Δ NEXCH												
Δ NINTER												
Δ GOVBOR	-11.7769	-2.3233	0.0210	-9.3196	-1.7483	0.0818						
GDP	80.1190	2.8529	0.0047	80.7055	2.6972	0.0075						
NEGYTR				0.0000	-0.4168	0.6772						
NFORTR				0.0003	1.3055	0.1931						
$\varepsilon_{PIPOCPI}$												
$\varepsilon_{INFLATION}$												
ε_{NEXCH}												
$\Delta\ \varepsilon_{NINTER}$							-0.0920	-1.8292	0.0685	-0.0705	-1.3442	0.1802
ε_{GOVBOR}							0.8144	1.7571	0.0801	0.7938	1.6143	0.1079
ε_{GDP}												
ε_{NEGPTR}												
ε_{NFORTR}												
REXCH	0.1040	0.3742	0.7086	0.0575	0.2093	0.8344						
Δ RINTER	0.3520	3.9023	0.0001	0.2446	2.3771	0.0183						
RFORTR												
REGYTR							-0.0005	-0.1813	0.8563	-0.0011	-0.3948	0.6934
ε_{REXCH}							0.0567	5.2644	0.0000	0.0457	4.0574	0.0001
ε_{RINTER}										-0.0001	-0.6899	0.4910
ε_{REGYTR}										0.0004	1.7450	0.0824
ε_{RFORTR}												
R-squared	0.6719			0.6927			0.6799			0.7080		
Durbin-Watson stat	2.0075			1.9837			2.0342			1.9986		

rate, it surprisingly has a significant positive relationship with the mutual funds excess return at 10% level of significance at least. Neither foreign nor Egyptian trading values (on real or nominal values) have any effect on the mutual funds excess return. All models have a Durbin-Watson Statistic nearly equal to 2, which means no autocorrelation problem.

The nominal interest rate was not significant at any level from model (1) to model (4) according to Equations (18) to (21), so we exclude it from these models.

Table (6) shows the results for all these models using Equations (26) to (29). For model (9) all variables are significant at 5% level of significance at least. Moreover the sign for variables is in agreement with the theory. Model (10) shows - as expected - that there is significant positive relationship between the mutual funds excess return and both the market index and growth of the GDP. At the same time,there is significant negative relationship between the mutual funds excess return and both inflation and government borrowing. The nominal exchange rate has an insignificant negative relationship with mutual funds execs return. Both the Egyptian trading value and the foreign trading value have an insignificant relationship with the mutual funds excess return but with a sign opposite to the expected one. When we use shock for the variables in model (9), model (11) shows the same result, except that the nominal exchange rate has an insignificant positive relationship with the mutual funds excess return. Model (12) shows the result of the shock of variables used in model (10); there is no difference between the two models.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 INFLATION + \beta_2 NEXCH + \beta_3 \Delta GOVBOR + \beta_4 GDP \quad (26)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 INFLATION + \beta_2 NEXCH + \beta_3 \Delta GOVBOR + \beta_4 GDP + \beta_5 NEGYPTR + \beta_6 NFORTR \quad (27)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 \varepsilon_{INFLATION} + \beta_2 \varepsilon_{NEXCH} + \beta_3 \Delta \varepsilon_{GOVBOR} + \beta_4 \varepsilon_{GDP} \quad (28)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + \beta_1 \varepsilon_{INFLATION} + \beta_2 \varepsilon_{NEXCH} + \beta_3 \Delta \varepsilon_{GOVBOR} + \beta_4 \varepsilon_{GDP} + \beta_5 \varepsilon_{NEGYPTR} + \beta_6 \varepsilon_{NFORTR} \quad (29)$$

Table (6) The result of the four models using to evaluate the Mutual Funds Performance After e Excluding Nominal Interest Rate												
	Model (9)			Model (10)			Model (11)			Model (12)		
Variable	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
α	1.05191	4.102519	0.0001	0.957277	2.926324	0.0038	-0.096441	-2.341911	0.02	-0.210442	-5.060219	0
PIPOCPI_RF	9.712766	21.51698	0	9.835234	20.84552	0						
INFLATION	-0.741627	-4.844145	0	-0.563871	-3.098089	0.0022						
Δ NEXCH	-24.57984	-2.080511	0.0385	-17.46414	-1.459478	0.1458						
Δ NINTER												
Δ GOVBOR	-16.94822	-3.68075	0.0003	-14.0173	-2.919966	0.0039						
GDP	83.0399	3.02295	0.0028	79.11957	2.648925	0.0087						
NEGYTR				-2.96E-05	-0.301445	0.7634						
NFORTR				0.00017	0.941445	0.3475						
$\varepsilon_{PIPOCPI}$							9.18779	15.11799	0	10.34123	16.26558	0
$\varepsilon_{INFLATION}$							-0.078741	-4.147676	0	-0.072011	-3.409971	0.0008
ε_{NEXCH}							0.264441	1.683952	0.0934	-0.218434	-1.27589	0.2033
$\Delta\ \varepsilon_{NINTER}$												
ε_{GOVBOR}							-0.186057	-3.176982	0.0017	-0.191497	-3.215324	0.0015
ε_{GDP}							202.2937	3.12082	0.002	236.9561	3.738423	0.0002
ε_{NEGPTR}										-5.04E-05	-0.43055	0.6672
ε_{NFORTR}										0.000137	0.607787	0.5439
REXCH												
Δ RINTER												
RFORTR												
REGYTR												
ε_{REXCH}												
ε_{RINTER}												
ε_{REGYTR}												
ε_{RFORTR}												
R-squared	0.684214			0.699467			0.511905			0.599732		
Durbin-Watson stat	1.982022			1.972485			1.404867			1.658162		

4.2.1 Granger Causality Test for Mutual Funds Performance

Table (7) shows the Granger causality between mutual funds performance and economic fundamentals. Bi-causality was found between mutual funds performance and all variables except the real exchange rate, which the causality from real interest rates to mutual funds performance.

Table (7) Granger Causality Test Between Panel Mutual Funds Performance and Economic Fundamentals

	F-statistic	Probability	Chi-square	Probability
Market Index Granger Cause Mutual Funds Performance	4.147621	0.006901	12.44286	0.00601
Mutual Funds Performance Granger Cause Market Index	3.124616	0.026644	9.373848	0.024712
Real exchange rate Granger Cause Mutual Funds Performance	0.429567	0.732009	1.288702	0.731818
Mutual Funds Performance Granger Cause real exchange rate	23.0534	0	69.1602	00000
Real interest rate (FD) Granger Cause Mutual Funds Performance	10.0619	0.000003	30.1857	0.000001
Mutual Funds Performance Granger Cause real interest rate (FD)	2.095409	0.101676	6.286226	0.098485
Government Borrowing (FD) Granger Cause Mutual Funds Performance	12.45577	0	37.36732	0.0000
Mutual Funds Performance Granger Cause Government Borrowing (FD)	8.244479	0.000031	24.73344	0.000018
Inflation Granger Cause Mutual Funds Performance	3.150019	0.025769	9.450056	0.023869
Mutual Funds Performance Granger Cause Inflation	9.58483	0.000005	28.75449	0.000003
Nominal exchange rate (FD) Granger Cause Mutual Funds Performance	2.489485	0.061186	7.468454	0.058375
Mutual Funds Performance Granger Cause nominal exchange rate (FD)	10.69429	0.000001	32.08286	0.000001
Nominal interest rate (FD) Granger Cause Mutual Funds Performance	10.69429	0.000001	32.08286	0.000001
Mutual Funds Performance Granger Cause Nominal interest rate (FD)	3.8082	0.010854	11.4246	0.009638
Real foreign transaction Granger Cause Mutual Funds Performance	5.165178	0.001843	15.49553	0.001439
Mutual Funds Performance Granger Cause Real foreign transaction	3.002187	0.03158	9.00656	0.029204
Real Egyptian transaction Granger Cause Mutual Funds Performance	18.93769	0	56.81308	0.0000
Mutual Funds Performance Granger Cause Real Egyptian transaction	10.58483	0.000005	29.75449	0.0000
Nominal foreign transaction Granger Cause Mutual Funds Performance	5.039044	0.002176	15.11713	0.001719
Mutual Funds Performance Granger Cause Nominal foreign transaction	3.050113	0.029665	9.150339	0.027357
Nominal Egyptian transaction Granger Cause Mutual Funds Performance	18.88483	0	56.65448	0.0000
Mutual Funds Performance Granger Cause Nominal Egyptian transaction	12.45577	0.101676	37.36732	0.0000

4. 3 Selection of the Preferred Model

We used two tests to choose between the models; the first is the Likelihood Ratio (LR) and the second is the non-nested test.

4.3.1 Likelihood Ratio (LR) Test

The log-likelihood ratio (LR) test is formulated as in Equation (30). The LR test statistic is an asymptotically chi-square distribution with degree-of-freedom equal to the number of the restrictions imposed.

Table (8) shows that we reject the null hypothesis that Egyptian trading values and foreign trading can be excluded from the model, whereas we do not reject the null hypothesis that nominal interest rate can be excluded from the estimation, except in model (11).

$$LR = -2(LLR - LLU) \tag{30}$$

Where LR is the Likelihood Ratio, LLR is the natural logarithm Likelihood restricted and LLU is the natural logarithm Likelihood unrestricted.

4.3.2 Test for Non-Nested Hypotheses for Mutual Funds Performance

To choose between the twelve models which were used to evaluate the mutual funds performance, we applied the non-nested test. The hypotheses are said to be non-nested since the explanatory variables under one of the hypotheses are not a subset of the explanatory variables in the other (Maddala, 1992). Several tests have been suggested for testing such non-nested hypotheses. The J-test proposed by Davidson and MacKinnon (1993) provides one method of choosing between two non-nested models. The idea is that if one model is the correct model, then the fitted values from the other model should not have explanatory power when estimating that model. So we will use the non-nested test to distinguish between the two set of economic variables, that is the nominal and the real. Model (9) will represent the first group and model (5) will represent the second group. We first estimate model (9) and retrieve the fitted values. Then we estimate model (5) including the fitted values from model (9). The result is as in **Table (9a)**. The fitted values from model (9) (?FIT9) enter significantly in model (5) and we can not reject model (9). We must also test model (5) against model (9). We estimate model (5), retrieve the fitted

Table (8) Likelihood Ratio Test					
Model (1),(2)					
LLR	LLU	$D-F$	LR	χ^2	Description
-144.181	-125.17	2	38.023	5.99	Reject the null hypothesis
Model (3),(4)					
LLR	LLU	$D-F$	LR	χ^2	Description
-159.983	-133.492	2	52.9812	5.99	Reject the null hypothesis
Model (5),(6)					
LLR	LLU	$D-F$	LR	χ^2	Description
-144.707	-126.23	2	36.954	5.99	Reject the null hypothesis
Model (7),(8)					
LLR	LLU	$D-F$	LR	χ^2	Description
-148.248	-125.751	2	44.9932	5.99	Reject the null hypothesis
Model (9),(10)					
LLR	LLU	$D-F$	LR	χ^2	Description
-144.707	-125.308	2	38.7964	5.99	Reject the null hypothesis
Model (11),(12)					
LLR	LLU	$D-F$	LR	χ^2	Description
-162.259	-132.941	2	58.6364	5.99	Reject the null hypothesis
Model (1),(9)					
LLR	LLU	$D-F$	LR	χ^2	Description
-144.139	-144.181	1	-0.0836	3.84	Do not reject the null hypothesis
Model (2),(10)					
LLR	LLU	$D-F$	LR	χ^2	Description
-125.308	-125.17	1	0.2778	3.84	Do not reject the null hypothesis
Model (3),(11)					
LLR	LLU	$D-F$	LR	χ^2	Description
-162.259	-159.983	1	4.552	3.84	Reject the null hypothesis
Model (4),(12)					
LLR	LLU	$D-F$	LR	χ^2	Description
-132.941	-133.492	1	-1.1032	3.84	Do not reject the null hypothesis

values and estimate model (9) including the fitted values from model (5). **Table (9b)** gives the result of this "reverse" test. The fitted values (?FIT5) are again statistically significant and we can not reject model (5).

For models 5 and 9 both of the fitted values are statistically significant so we cannot reject both models. However, model 9 has all signs correct and there is no multicolliearity between variables; hence the study recommends model 9 to be used to predict the mutual funds performance for emerging Egyptian stock market.

Table (9a) test of non-nested hypotheses for Mutual Funds performance between models (9) and (5)

Dependent Variable: ?_RF
Method: Pooled Least Squares
Sample(adjusted): 1996:07 1999:06
Included observations: 36 after adjusting endpoints
Total panel (balanced) observations 252

Variable	Coefficient	t-Statistic	Prob.
α	-1.511968	-1.312374	0.1906
PIPOCPI_RF	-0.197489	-0.071491	0.9431
REXCH	0.478717	1.505735	0.1334
Δ RINTER	0.039071	0.299159	0.7651
Δ GOVBOR	1.016666	0.15325	0.8783
GDP	-3.802077	-0.107096	0.9148
?FIT9	1.014924	3.656618	0.0003
R-squared	0.659324		
Durbin-Watson stat	1.998963		

Table (9b) test of non-nested hypotheses for Mutual Funds performance between models (9) and (5)

Dependent Variable: ?_RF
Method: Pooled Least Squares
Sample(adjusted): 1996:07 1999:06
Included observations: 36 after adjusting endpoints
Total panel (balanced) observations 252

Variable	Coefficient	t-Statistic	Prob.
α	1.112022	22.30111	0
PIPOCPI_RF	9.812297	111.7527	0
INFLATION	-0.429784	-14.29162	0
Δ NEXCH	1.350596	0.583977	0.5598
Δ GOVBOR	-19.40587	-21.6757	0
GDP	63.12369	11.81833	0
?FIT5	0.979366	86.92271	0
R-squared	0.989172		
Durbin-Watson stat	2.497787		

Table (10) shows the test for cointegration and the existence of a long relationship between the variables included in model (9) and the mutual funds performance. Johansen test is used with the lag length of 1.

Table (10) Cointegration test between Economic Fundamental Included in Model (9) and Allied Mutual Fund

$H_0 : r$	$N-r$	Eigenvalue $(\hat{\lambda}_i)$	Likelihood Ratio $-T\sum \log(1-\hat{\lambda}_i)$	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0	6	0.804191	146.6953	94.15	103.18	None **
1	5	0.708745	91.25432	68.52	76.07	At most 1 **
2	4	0.515634	49.3134	47.21	54.46	At most 2 *
3	3	0.392548	24.66628	29.68	35.65	At most 3
4	2	0.200244	7.717884	15.41	20.04	At most 4
5	1	0.003542	0.120633	3.76	6.65	At most 5

Table (10) Continue Cointegration test between Economic Fundamental Included in Model (9) and Cairo Mutual Fund

$H_0 : r$	$N-r$	Eigenvalue $(\hat{\lambda}_i)$	Likelihood Ratio $-T\sum \log(1-\hat{\lambda}_i)$	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0	6	0.823816	155.731	94.15	103.18	None **
1	5	0.756844	96.69931	68.52	76.07	At most 1 **
2	4	0.456307	48.62149	47.21	54.46	At most 2 *
3	3	0.389818	27.90291	29.68	35.65	At most 3
4	2	0.266921	11.10698	15.41	20.04	At most 4
5	1	0.016044	0.549927	3.76	6.65	At most 5

Table (10) Continue Cointegration test between Economic Fundamental Included in Model (9) and EAB Mutual Fund

$H_0 : r$	$N-r$	Eigenvalue $(\hat{\lambda}_i)$	Likelihood Ratio $-T\sum \log(1-\hat{\lambda}_i)$	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0	6	0.802062	156.3309	94.15	103.18	None **
1	5	0.75068	101.2576	68.52	76.07	At most 1 **
2	4	0.524763	54.03105	47.21	54.46	At most 2 *
3	3	0.398945	28.73702	29.68	35.65	At most 3
4	2	0.26948	11.42871	15.41	20.04	At most 4
5	1	0.021897	0.752761	3.76	6.65	At most 5

Table (10) Continue Cointegration test between Economic Fundamental Included in Model (9) and Misr-1 Mutual Fund

$H_0 : r$	$N-r$	Eigenvalue $(\hat{\lambda}_i)$	Likelihood Ratio $-T\sum \log(1-\hat{\lambda}_i)$	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0	6	0.786172	162.4343	94.15	103.18	None **
1	5	0.775734	109.9865	68.52	76.07	At most 1 **
2	4	0.581714	59.15915	47.21	54.46	At most 2 **
3	3	0.445273	29.52508	29.68	35.65	At most 3
4	2	0.237697	9.489605	15.41	20.04	At most 4
5	1	0.007666	0.261645	3.76	6.65	At most 5

Table (10) Continue Cointegration test between Economic Fundamental Included in Model (9) and NAEGY-1 Mutual Fund						
$H_0 : r$	$N-r$	Eigenvalue $(\hat{\lambda}_i)$	Likelihood Ratio $-T\sum\log(1-\hat{\lambda}_i)$	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0	6	0.816646	134.4657	94.15	103.18	None **
1	5	0.678138	76.79032	68.52	76.07	At most 1 **
2	4	0.410782	38.24679	47.21	54.46	At most 2
3	3	0.265715	20.2622	29.68	35.65	At most 3
4	2	0.24159	9.761	15.41	20.04	At most 4
5	1	0.010501	0.358934	3.76	6.65	At most 5

Table (10) Continue Cointegration test between Economic Fundamental Included in Model (9) and NAEGY-2 Mutual Fund						
$H_0 : r$	$N-r$	Eigenvalue $(\hat{\lambda}_i)$	Likelihood Ratio $-T\sum\log(1-\hat{\lambda}_i)$	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0	6	0.859458	169.7248	94.15	103.18	None **
1	5	0.686852	103.0084	68.52	76.07	At most 1 **
2	4	0.632347	63.5317	47.21	54.46	At most 2 **
3	3	0.435353	29.51078	29.68	35.65	At most 3
4	2	0.252436	10.07792	15.41	20.04	At most 4
5	1	0.005459	0.186118	3.76	6.65	At most 5

Table (10) Continue Cointegration test between Economic Fundamental Included in Model (9) and Saieb-1 Mutual Fund						
$H_0 : r$	$N-r$	Eigenvalue $(\hat{\lambda}_i)$	Likelihood Ratio $-T\sum\log(1-\hat{\lambda}_i)$	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0	6	0.792055	145.1313	94.15	103.18	None **
1	5	0.683521	91.73496	68.52	76.07	At most 1 **
2	4	0.533117	52.61796	47.21	54.46	At most 2 *
3	3	0.425379	26.72093	29.68	35.65	At most 3
4	2	0.200746	7.883437	15.41	20.04	At most 4
5	1	0.007759	0.264834	3.76	6.65	At most 5

Summary and Conclusion

The aim of this study was to examine the relationship between the economic fundamentals - especially inflation, the exchange rate, interest rate, government borrowing and gross domestic product (GDP), and the performance of stock market, as well as the causality between them. Moreover, the study attempts to identify the relationship between equity mutual fund performance and also, as well as economic variables, both foreign and Egyptian trading values.

For stock market performance, although these variables are used in many studies to determine the economic growth in general and stock market in particular, in the case of the Egyptian capital market these variables failed to explain the determinants of stock market performance. Even after excluding all variables which have high inter-correlation and when we use the shock for all variables, the models all fail to explain the stock market performance. This indicates that the exchange rate, interest rate, inflation, government borrowing or the growth rate of the GDP does not affect the Egyptian stock market during the study period. For further research other variables need to be added to explain the stock market performance, or alternatively other proxies could be used to measure the fundamental variables.

The Granger causality test between stock market performance and economic fundamentals was applied. It shows that there is causality from the stock market performance (measuring by the pooled market indices) to inflation, the nominal exchange rate, the growth rate of GDP and the real interest rate. Moreover there is bi-causality between the stock market performance and government borrowing.

For Mutual funds performance we tested 12 models and found that model (9) is the best, whether according to the theoretical concept or using both the Likelihood ratio and the non-nested tests. There is Granger causality between the mutual funds performance and economic variables. We found bi-causality between mutual funds performance and all variables except real exchange rate, which the causality from real interest rates to mutual funds performance.

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