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# External factors that affect the Egyptian stock market

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# EXTERNAL FACTORS THAT AFFECT THE EGYPTIAN STOCK MARKET

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# EXTERNAL FACTORS THAT AFFECT THE EGYPTIAN STOCK MARKET (A STUDY OF THE EXTENT TO WHICH THE EGYPTIAN STOCK MARKET IS INTEGRATED WITH THE GLOBAL MARKETS)

A Thesis Submitted to
The Economics Department
In partial fulfillment of the requirements for the degree of
Master of Arts

By
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Bachelor of Economics

(Under the supervision of Dr. Dennis Powers)

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## DEDICATION

To my dear parents for your great support.

To my supervisor Dr. Dennis Powers for your helpful comment s and ideas.

To Dr. Charles Diamond, it was an honor for me to have you as my reader.

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# ABSTRACT

As part of the economic reform that Egypt began since the late 1980s, Egypt began to develop its financial sector by introducing certain regulations for the stock market revival in 1992. The aim was "global financial integration" for Egypt. As a result, it was supposed that Egypt is not far from any shocks that happen to other members in the world economy. On one side, some market analysts said that foreign exchange stability and low exposure to international portfolio investment might protect countries like Egypt against outside disturbances. However, others are concerned with the spill – over effect. This is especially true because during recent years the Egyptian market has witnessed a clear indication of foreign concern. But is this true as far as Egypt is concerned; Is Egypt's stock market vulnerable to external changes? This is the main question addressed in this study. To test the reaction of the stock market to external variables the following four factors were used: the changes in foreign exchange rate effect, London Stock exchange represented by the Financial Times Index, GDR prices and net foreign capital inflow. Ordinary least square procedure was used to test the effect of these four variables on the Egyptian stock exchange. The International Capital Asset Pricing Model (ICAPM) was used in testing the effect of the foreign exchange rates. The results of the study based on the tests performed proved that Egypt is not yet financially integrated. All the variables seem to have no effect on the Egyptian stock market except for the GDR prices.

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## ❖ BACKGROUND:

Globalization has become the prevailing phenomenon throughout the world. Countries all over the world tend to adopt "major transformation". The tendency is toward globalization, or integration into the world economy. The past divisions of the world economies that were prevailing during the Cold War and the decolonization era are vanishing, and are substituted by "a single and increasingly integrated world economy". That's why many developing countries during the last decades implemented certain economic and "structural adjustment" policies in order to cope with the recent global trend, and to become fully integrated within the world economy (Griffin,1996, p.1).

Consequently, Egypt was one of the developing countries that started an economic reform program at the late 1980s called the Economic Reform and Structural Adjustment Program (ERSAP). Egypt's aim, like the rest of other developing countries, is to grow and develop in order to be part of the global economy. That is why much of the aid Egypt receives from the US goes to areas like sustainable development, raising employment levels and improving quality of life. Also, in order to grow Egypt did not only depend on aid from the US, but also on foreign investment. And, for that purpose, Egypt tried to draw foreign investment through the removal of most foreign exchange constraints, unification of the exchange rate, liberalizing interest rates, decreasing tariffs by 30% and finally through privatization of the public sector mainly financed by the International Monetary Fund (IMF) and the World-Bank, which are tracing the Egyptian economic progress. Actually, many of the economic reforms listed above are indicators of what President Mubarak attempted to achieve, and that is the Egyptian integration into the global economy(Economy,1998, Internet).

As part of the globalization process, Egypt began to develop its financial sector to take the first step towards global financial integration. So, after the advent of its

economic reform program the Egyptian government introduced certain regulations especially for the Stock Market revival in 1992. This step led to the emerging of the Stock Market "as a vehicle for financing and investment" (Egyptian Economy. Preface, 1999, Internet).

As a result, Egypt as well as other developing countries is not supposed to be far from any shocks that may happen to other members in the world economy. The last Asian crisis is concrete evidence that the Middle Eastern Markets were somehow affected by what happened in Southeast Asia. So following the crisis on 27 October 1997, the Istanbul market lost 11% of its value. While, trading on the Tel Aviv Exchange was delayed on the 28th of October because of the 9% fall on early morning trading. As far as Egypt is concerned, the Global Depositary Receipts (GDR) issued by some Egyptian companies and traded on the London Exchange witnessed a sharp fall in their stock prices below the quoted prices on the Cairo Stock Exchange. Sherif Cararah, head of institutional sales at EFG-Hermes Brokerage said that this would lead to certain kind of arbitrage between those GDR traded in London and "their underlying security traded in Egypt" which would force the prices of these stocks to decrease even further (Kourouian, 1997, Internet).

On one side some market analysts are convinced that foreign exchange stability and "low exposure to international portfolio investment by Middle Eastern countries" might protect them against outside disturbances. Yet, others are concerned with the spill-over effect. On the other side, the Egyptian market during the recent years has witnessed a clear indicator of foreign concern. So, according to the "Borsa", a specialized weekly market newspaper, "trading by non-residents accounted for 51 percent of total trading in the first two weeks of October 1997." (Kourouian, 1997, Internet).

This leads us to an important question: 'Is Egypt as far as the financial sector is concerned actually integrated into the global economy? And if yes, to what extent is it integrated?' Michael Bird, head of sales for the London-based broker T-Hoare&Co. said: "No single market is excluded from the demise of global equity markets"(Kourouian, 1997, Internet).

Since, financial economics is considered one of the most important fields of economics nowadays, in this paper I am going to test the extent to which the Egyptian financial sector is vulnerable to external changes. I choose here the stock exchange in Egypt as part of the financial sector because the stock exchange is considered the real mirror that reflects the economic conditions of a country, and the extent of the success of its fiscal and monetary policies (Hassan, 1998, p.21). Also, the stock exchange in Egypt is predicted to play an important role in the movement of economic transformation that Egypt witnesses through the economic reform and economic liberalization, and finally through economic integration with the rest of the world (Hassan, 1998, p.10).

From all that is written above, it seems that Egypt has entered the phase of globalization with the world economy. But as far as the stock market is concerned, is Egypt really integrated and does it respond to external variables? This will be the main topic of this study. I am going to test the response of the Egyptian Stock Market to external variables. These external variables are taken to be: the changes in foreign exchange rate effect, the London Stock Exchange represented in the Financial Times Index, the GDR prices and Net Foreign Inflow.

The Dependant Variable in my regressions in the following chapters will be the Egyptian Stock return on the market. It gives a general and whole indication about the performance of the market. Also, it helps in doing financial analysis, and analyzing other

indices through testing the relation among different indices, and their effect on the different economic sectors. Therefore, if one of the indices has a huge effect, it can be considered a leading Index to help in forecasting the future of the other indices, and consequently forecasting the future economic movement. It is simply calculated as the number of listed shares for each company multiplied by the market value for them. In other words, the Stock Price Index is a measurement of the market capitalization. It is always expressed as the ratio of the market capitalization at time t to the market capitalization in the base year which is 1992. The sum of the market capitalization is the capital of the Egyptian Financial market. The Egyptian Stock Price Index was first calculated in 1992 after the revival of the Stock Exchange in Egypt(Hassan, 1998, P.263).

- Consequently, the paper is divided as follows:

Chapter One is a literature Review including five studies conducted to test the relation between asset return and foreign exchange risk using the International Capital Asset Pricing Model (ICAPM). Two studies tested the effect of asset return in one country on the asset return in another country. All of these studies assumed global financial integration.

Chapter Two is a theoretical approach to the ICAPM as a model and its assumptions.

Chapter Three studies the effect of the changes in the foreign exchange rates on the Egyptian Stock Market using the ICAPM.

Chapter Four tests the effect of the Financial Times Index in the London Stock Exchange on the Egyptian Stock Price Index.[1] Also, the effect of the other leading world market stock exchanges is studied.

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[1] The effect of London Stock Exchange is important because it's the only international stock exchange where Egyptian issued securities are traded.

Chapter Five studies the effect of the GDR prices traded in London on its quoted prices in the Cairo Stock Exchange.

Chapter Six tests the last external factor, which is the net foreign capital inflow, and its effect on the Egyptian Stock excess returns. Also, it tests how the net foreign inflow is affected by the net return(Egyptian return minus the World return).

Chapter Seven addresses the reasons that hinder the Egyptian Stock Market integration with the rest of the World Financial markets.

And finally, Chapter Eight is a summary of my findings, and future prospects.

# CHAPTER I

# LITERATURE REVIEW

Actually, few studies have been made to test the relation between monetary tools and asset prices in models, which include a monetary sector. Not so much tests have been done to test the relation between worldwide market integration and asset pricing. The reasons are quite obvious relating to non-transparency concerning international capital markets, and the methodology used in conducting any tests of the Capital Asset Pricing Model (CAPM), domestic and international. "They have to do with the difficulty of exactly identifying the market portfolio, and with the time-varying nature of the expected return and risk measures". Previous tests of the international risk pricing relation were quite different from one another as far as the formulated assumptions and the econometric methodology are concerned. One main difference had been whether the tests are conditional or unconditional. In unconditional tests, the assumption of constant expected returns and risk measures over time was used. In conditional tests, the two above variables were allowed to vary in some way or another (Solnik, 1996,p.145).

**1.1 Harvey's Study:** In 1991, C. Harvey in his study "The World Price of Covariance Risk" designed a methodology by which the risk measures were allowed to vary freely over time, while the expected returns of the asset were assumed to vary as a linear function of a set of information variables. He used cross-sectional time-series test of the monthly returns for some countries. He found that the world price of covariance risk is varying. He defined the country risk as the conditional response of the country return to the world stock return. In other words, " the reward per unit of sensitivity is the world price of covariance risk" (Harvey, 1991).

The model used by Harvey is represented in the following equation:

$$E[r_{jt} \mid \Omega_{t-1}] = \frac{E[r_{mt} \mid \Omega_{t-1}]}{Var[r_{mt} \mid \Omega_{t-1}]} Cov[r_{jt}, r_{mt} \mid \Omega_{t-1}] \quad \textbf{(1.1)}$$

Where $r_{jt}$ is the return on a portfolio of country j equity from time t-1 to t in excess of the risk free return, $r_{mt}$ is the excess return on the world market portfolio, and $\Omega_{t-1}$ is the information set used by investors to determine prices. The ratio of the conditional expected return on the market index $E[r_{mt} \mid \Omega_{t-1}]$ to the conditional variance of the market index $Var[r_{mt} \mid \Omega_{t-1}]$ is the world price of covariance risk (Harvey,1991).

All the data used by Harvey were taken from Morgan Stanely Capital International. They are the monthly data of equity indices for 16 OECD countries and Hong Kong from December 1969 to May 1989. He calculated all the returns deducting the U.S. Treasury bill that is close to 30 days to maturity on the last trading day of the month (Harvey,1991)

He used two kinds of instrumental variables that have the ability to forecast returns: common and local instruments. The common instruments are identical for all countries, while the local instruments are specific for each country. According to his model, the conditional expected return of a country varies according to the variation in the world expected return, the volatility of the world returns and the covariance of the country return with the world return (Harvey,1991).

The tests he performed showed that all stock returns move together to some extent. For some cases, the results were different. So the correlation between U.S. and UK returns is 49%, while that between U.S. and Japan is only 27%. As for the dividend yields, the correlation between the U.S. and Canada is 84% which indicates the high degree of integration between the two countries (Harvey,1991).

The regressions using local information variables showed higher $R^2$ for only two countries, Austria and Norway. The two most important local information variables were the lag of the country's return and the local dividend yield (Harvey,1991).

As for the reward per unit of risk, it was found that this reward is varying for different countries although it should be the same in a globally integrated market. So, in the U.S. the reward for market volatility is 5.4, while in Japan it's 13.1. The final conclusion was that the "the world price of risk is not the appropriate price of covariance risk." (Harvey,1991). He did not include currency risk factors.

**1.2 Chan's, Karolyi's and Stulz's Study:** In 1992, K.C. Chan, G.A.Karolyi and R.Stulz conducted a study named "Global Financial Markets and the Risk Premium on U.S. Equity". In their study they used a GARCH representation of the variance/covariance matrix of the U.S. and Japanese stock markets. Their data consisted of the daily excess returns of the S&P 500 and of a portfolio of other foreign assets. They found that the conditional expected excess returns on the U.S. assets are significantly related to the conditional covariance of the S&P 500 with Japan's Nikkei 225 index, but not significantly related to the conditional variance of the S&P 500. Actually, in their study they focused on a certain relation represented in the equation below:

$$E(r_{dt+1} \mid \Omega_t) = \lambda\, [w_{dt}\, \mathrm{var}(r_{dt+1} \mid \Omega_t) + (1 - w_{dt})\, \mathrm{cov}(r_{dt+1}, r_{ft+1} \mid \Omega_t)] \quad \textbf{(1.2)}$$

$$\lambda > 0 \quad , \quad 0 < w_{dt} < 1 .$$

Where E(.) is the conditional expectation operator, $r_{dt+1}$ is the excess return on the U.S. domestic assets, $\Omega_t$ is the investors' information set at time t, $\lambda$ is the individual relative risk aversion, $w_{dt}$ is the capitalization of the U.S. market portfolio as a fraction of world wealth at time t, and $r_{ft+1}$ is the excess return on non U.S. market portfolio (Chan, Karolyi and Stulz, 1992).

They used three indices for foreign assets which are the Nikkei 225 Stock Average, the Morgan Stanely Japan index in yen and the Morgan Stanely EAFE index in dollars. The estimates of their equation for the U.S. excess returns in dollar above revealed that the conditional covariance of the U.S. returns with the Nikkei return had a significant positive effect on U.S. conditional expected returns, but the conditional variance of the U.S. returns wasn't significant. Therefore, their results supported the hypothesis that the U.S. risk premium is priced on a global basis during the sample period 1978-89. What was surprising was the lack of significant coefficient on the variance. Also, the results using the Morgan Stanely Japan index and EAFE as foreign indices were consistent with those obtained using the Nikkei225 (Chan, Karolyi and Stulz, 1992).

As a result, they were unable to reject the ICAPM at the 5% level of significance, but it was rejected at the 10% level for the Nikkei indices. The three researchers found no evidence that pricing risk differs between Japanese and U.S. equity. In addition, there was no proof of market segmentation.[3] Also here, the currency risk factors were not included.

**1.3 Dumas' and Solnik's Study:** In 1993, there was significant development pioneered by B.Dumas and B.Solnik in their study "The World Price of Foreign Exchange Risk". These two economists included currency risk factors in the international risk pricing relation. They looked at the major capital markets and found support for international asset pricing and market integration. Also, they tested the significance of the currency risk factors, which turned out to be significant. Their results rejected the domestic CAPM. On the other hand, they accepted the international CAPM which includes a

[3] Market Segmentation is the opposite of integration. It can be caused by several factors such as: increasing costs to some or all investors, restrictions on foreign ownership of shares, something which can generate economically and statistically significant stock price premia on shares foreigners own like in Mexico, and laws and regulations.

foreign-exchange risk premia because it is more capable of explaining empirically the structure of worldwide rates of return than does the domestic one (Dumas and Solnik, 1995).

The test by Dumas and Solnik depended on allowing moments of rates of return to vary over time in relation to certain lagged instrumental variables. Dumas and Solnik used instrumental variables which were endogenous or internal to the financial market such as: the excess rate of return on the world index lagged one month, the U.S. bond yield, the U.S. index dividend yield, one-month rate of interest on a Eurodollar deposit, a January dummy and a constant. The international asset-pricing model used by Dumas and Solnik is represented in the equation below:

$$E[r_{jt} \mid \Omega_{t-1}] = \sum_{i=1}^{L} \lambda_{i,t-1} \operatorname{cov}[[r_{jt}, r_{n+i,t} \mid \Omega_{t-1}] + \lambda_{m,t-1} \operatorname{cov}[r_{jt}, r_{mt} \mid \Omega_{t-1}] \quad \textbf{(1.3)}$$

Where $r_{jt}$ is the nominal return on asset j, j=1…m, from time t-1 to t, in excess of the rate of interest of the currency in which returns are measured, $r_{mt}$ is the excess return on the world market portfolio, and $\Omega_{t-1}$ is the information set that investors use in choosing their portfolios. The time-varying coefficients $\lambda_{i,t-1}$, i=1….L, are the world prices of exchange rate risk. The time-varying coefficient $\lambda_{m,t-1}$ is the world price of market risk (Dumas and Solnik, 1995).

Dumas and Solnik said that investors from different countries buy the same goods at different prices. As a result, they have different returns for the same assets. That's why there should be a covariance with exchange rates because investors hedge against the exchange rate risk. Deviations from the purchasing power parity (PPP) have to be accounted for when measuring the rates of return on assets (Dumas and Solnik, 1995).

The data used by Dumas and Solnik are the monthly excess return on equity and currency holdings measured in a common currency the U.S. dollar for four countries: Germany, the United Kingdom, Japan, and the United States. They included also three-exchange risk premia for each of the currencies of the above three countries excluding the United States.

The results of Dumas' and Solnik's tests revealed that foreign-exchange risk premia are very important when determining the assets rates of return in the international financial market. "Once these risk premia are included in the Arbitrage Pricing Model (APM), no evidence of segmentation between currency markets and stock markets is found." (Dumas and Solnik, 1995).

**1.4 Bartov's, Badnar's and Kaul's Study:** In 1995, Eli Bartov, Gordon M.Badnar and Aditya Kaul conducted a study called "Exchange Rate Variability and the Riskiness of U.S. Multinational Firms: Evidence from the Breakdown of the Bretton Woods System". The study tested the effect of exchange rate variability on the riskiness of U.S. Multinational Firms through examining the relation between exchange rate variability and fluctuations in stock returns and dividing this relation into elements of systematic and nonsystematic risk. The study concentrated on two time intervals around 1973, the transfer from fixed exchange rate system to floating exchange rates. The results showed a significant increase in the volatility of U.S. multinational monthly stock returns during the period of increasing volatility of exchange rates. Moreover, the results suggested that the increase in exchange rate variability in the early 1970s was observed by investors to be accompaigned by an increase in the riskiness of cash flows of multinational firms that demanded a sort of compensation in terms of higher expected returns (Bartov, Badnar and Kaul, 1995, Internet).

**1.5 Tai's Study:** Finally in 1997, Chu-Sheng Tai of the Ohio State University wrote a dissertation by the name of "An Empirical Investigation of International Asset Pricing: Market Segmentation and Foreign Exchange Risk". In his dissertation, he said that the two dimensions that make finance more difficult in the international market are market segmentation and foreign exchange risk. Nowadays, with the spread of globalization that financial markets witness these two dimensions require that many issues have to be rethought in "an international context". These many issues are; investment analysis, risk management, asset pricing and capital budgeting facing financial professionals. According to the standard portfolio theory if diversification doesn't eliminate the effect of exchange risk, a risk premium has to be added to account for the exposure to this factor (Tai, 1997, Internet).

Mainly, the study concentrated on the effects of foreign exchange risk and market segmentation on the asset pricing in Asia-Pacific markets. In particular, Tai adopted conditional testing of the model when he considered "time-varying feature of risk premia and control for possible regime switches such as capital liberalization". The preliminary results of his tests showed rejection for the unconditional world CAPM. On the other hand, the results accepted the extended version of the conditonal world CAPM accounting for foreign exchange risk. Also, he found no proof of market segmentation between the foreign exchange market and the equity market (Tai, 1997, Internet).

Actually, the available empirical evidence is incomplete and the results are varying over time with the increasing liberalization of world financial markets and the reduction of transaction costs. Previous studies and researches seem to support the conclusion that assets are priced in an integrated international financial market. The results of course may differ for the emerging and small markets where the constraints are still significant (Solnik, 1996, p.145).

# CHAPTER II

# THEORETICAL APPROACH

From a practical point of view, any investor should be concerned about the reaction of the capital market to any financial confusion which the exchange rates movements are one of them. "The international investor who uses domestic currency to value a portfolio, measures total return as the sum of returns on the assets, in local currencies plus any currency movements". So the investor should put into consideration the market and exchange risk. Far from the nonsystematic risk which can be eliminated through diversification, "the reaction of asset prices to fluctuations in asset currencies is a matter of prime concern for international investors". If the purchasing power parity relation holds, i.e if exchange rate movements are simply a reflection of the inflation rate, then our analysis is not meaningful. In this case the exchange rate movements don't have any significant influence on the economy or asset prices (Solnik, 1996, p.148-49).

In reality, the purchasing power parity doesn't hold as has been proved by several studies. Actually, this has been more relevant since the advent of floating exchange rate system. This means that the actual effect of exchange rate movements exceeds that of inflation. That's why the exchange rate movements are assumed to have a notable impact on the domestic economies and in particular the stock markets (Solnik, 1996, p.149).

Certainly the volatility of exchange rates influences both the total return and any investments denominated in foreign currency. Sometimes the exchange rate variability effect on the asset return is greater than that of the capital gain or income especially in the short run. But in the long run, its impact is not the main element of a diversified portfolio's total return. This is because in the long run the devaluation of one currency is often neutralized by the appreciation of another (Solnik, 1996, p.105). From what is mentioned above, it seems that the exchange rates are not easy to be expected. That's why in my study I will test and examine the effect of exchange rate variability on the

stock price index in Egypt which is considered one of the main economic and financial indicators of any country.

**2.1 The original ICAPM:** In my study, I will use the International Capital Asset Pricing Model to test the effect of foreign exchange movements on the Stock Price Index of Egypt. This model was formulated by R.C. Merton in 1973, and later advanced by J.C. Cox, J.E. Ingersoll and S.A. Ross in 1985 and D.T. Breeden in 1986 (Newman, 1992).

- As a theoretical model; in the ICAPM:

$$Y = \alpha + \delta w_p + \beta_1 x_1 + .....\beta_k x_k. \qquad (2.1)$$

Where;

Y= excess return on one asset

$$= r_m - r_f. \qquad (2.2)$$

= return on one asset – (risk-free rate).

- **N.B.** The $r_m$ here is the return on one asset for the domestic market.
- Risk-free rate ($r_f$) = 3 months depositary rate which's 9%.
- $r_m = \dfrac{P_t + D - P_{t-1}}{P_{t-1}}.$ (2.3)

Where $P_t$ is the price of one asset, and $D$ is the dividend of an asset.

- $\alpha$ = Constant.
- $W_p = r_m - r_f$ = world market risk premium. (2.4)
- **N.B.** The $r_m$ here is the return for the world market.
- $X_1.....X_k$ = risk premia on currencies 1 to k.

So Y which is the excess return on one asset j, is regressed on $W_p$ which is the world market risk premium and $X_1.....X_k$ which're the risk premia on the currencies from 1 to k. And Y which is the excess return on one asset j is equal to $r_m - r_f$ which is the return on one asset j – the risk-free rate as shown earlier (Solnik, 1996, p.141).

The ICAPM was developed under the main assumption that the people of any country are concerned with the returns and risks measured in the local currency. This means that the Egyptian investors care about the Egyptian Pound returns. All other assumptions still hold in the case of a domestic CAPM which is simply a relation between the asset return and market movements (Solnik, 1996, p.140), and they are:

1. All what matters for investors is risk and returns, they are seeking for less risk and more returns.
2. All investors have to agree about the expected return and risk of all assets (Solnik, 1996, p.138). Actually this assumption seems to be very weak. It's not possible to find such an agreement because of asymmetric information.[3]
3. A risk-free interest rate is available with infinite borrowing and lending potential at this rate.
4. No transaction costs or taxes are found (Solnik, 1996, p.138).

Actually, the last two assumptions are very weak because this does not happen in the real world. There is no infinite borrowing or lending, nor is there no transaction costs.

Also, all investors choose their demands for each asset based on a mean-variance optimization or expected utility maximization with the local currency as the base currency. All investors'demands are summed up and put equal to the supply of assets or the market capitalization (Solnik, 1996, p.140).

[3] Asymmetric Information means to have inadequate information about the other party involved in a transaction, that may lead to wrong decisions.

# CHAPTER III

# TESTING THE EFFECT OF EXCHANGE RATE ON THE EGYPTIAN STOCK PRICE INDEX

**3.1 Methodology:** The ICAPM is used to test the effect of changes in exchange rates on the Egyptian Stock Price Index. Yet, there are few modifications to the original model that I will mention in the first place. The modified model is used to test the extent of the relation between the exchange rate variability and the Egyptian Stock Price Index. Since I explained the original ICAPM in the previous chapter, I will not go into details concerning this model and I will state directly the changes that I have made. I will assume that:

1) $Y_t$ is the weekly percentage change in the Stock Price Index of Egypt, which is an approximation of the capital gain.
2) $W_{pt}$ is the percentage change in the weekly World Price Index.
3) $X_1 \ldots\ldots X_k$ are the weekly percentage changes in the foreign exchange rates.

So, the percentage change in the Egyptian Stock Price Index is regressed upon the weekly percentage change in the World Price Index and the weekly percentage change in the exchange rate movements of the countries selected. The equation is as follows:

$$Y_t = \alpha + \delta W_{pt} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 X_{6t} + \varepsilon_t \quad \textbf{(3.1)}$$

Where $Y_t$ is the weekly % change in the Egyptian Stock Price Index, $W_{pt}$ is the weekly % change in the World Price Index, $X_{1t}$ is the weekly % change in the Egyptian exchange rate with the Sterling Pound, $X_{2t}$ is the weekly % change in the Egyptian exchange rate with the Canadian Dollar, $X_{3t}$ is the weekly % change in the Egyptian exchange rate with the U.S. Dollar, $X_{4t}$ is the weekly % change in the Egyptian exchange rate with the French Franc, $X_{5t}$ is the weekly % change in the Egyptian exchange rate with the

Deutsche Mark, and $X_{6t}$ is the weekly % change in the Egyptian exchange rate with the Saudi Riyal.[4]

❖ The null hypothesis to be tested is: (using 5% level of significance)

$$H_{\circ}: \alpha = 0$$
$$H_1: \alpha \neq 0$$
$$H_{\circ}: \delta = 0$$
$$H_1: \delta \neq o$$
$$H_{\circ}: \beta_1 .... \beta_6 = 0$$
$$H_1: \beta_1 .... \beta_6 \neq 0$$

All I want to reach is to test the effect of the foreign exchange movement on the Stock Price Index of Egypt. In applying the ICAPM, I used the Ordinary Least Square (OLS) procedure to estimate the parameters of the equation. I used the t-statistics to test the significance of the betas. Also, I used an F-test, test of multicollinearity, autocorrelation, heteroskedasticity and normality.

**3.2 Data Sources and Description:** Most of the data were taken from the Egyptian Capital Market Authority. I used the Stock Price Index of the Capital Market Authority, the official one. The data of the World Price Index were taken from "The Economist" magazine. I used weekly data from the 9th of January 1996 till the 16th of June 1998. So I have 128 observations. The data of the foreign exchange rates were taken from the Pacific site on the Internet in terms of U.S. dollars. I then converted them into the Egyptian exchange rate. All the variables included in the equation were calculated as a percentage change weekly in order to get a trend. These foreign exchange rates were chosen on the basis of which countries have direct and significant effect on the Egyptian

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[4] For simplicity, I will use abbreviations for the above variables throughout the paper instead of the % changes for each variable. So, the % change in the World Price Index is written as WPI. The exchange rate with the Sterling Pound is written as GBP. The exchange rate with the Canadian Dollar is written as CAD. The exchange rate with the U.S. Dollar is written as USD. The exchange rate with the French Franc is written as FRF. The exchange rate with the Deutsche Mark is written as DEM. The exchange rate with the Saudi Riyal is written as SARL. While, the % change in the Egyptian Price Index is written as EPI.

Stock Market. In other words, the basis for selecting these countries' exchange rates with the Egyptian Pound depends on which countries are trading in the Egyptian Stock Exchange.

### 3.3 Empirical Results:

**A) The Significance of the Parameters:** Table 1(a) shows the significance of the estimated parameters denoted by $\hat{\beta}$ for all variables. The values between parentheses show the value of the t-statistics. Using 5% level of significance for two-tails test if $t_{cal}$ is greater than $t_{tab}$, we reject the null hypothesis that the parameters of the equation are equal to zero (Pindyck and Rubinfeld, 1991). Since I have 128 observations and 8 explanatory variables, the number of degrees of freedom is 120. Based on this, the $t_{tab}$ =1.98. In this case, we reject the null hypothesis that $\alpha$ equals zero for the constant. On the other hand, we accept the null hypothesis that $\delta = 0$ for the WPI. Also, we accept the null hypothesis that $\beta_1 \ldots\ldots \beta_6 = 0$ for the foreign exchange variables. This means that none of these variables affect the EPI.

As shown in Table 1(b), the coefficient of determination $R^2$ is 0.044 meaning that the explanatory variables of the equation explain only 4.4% of the variation in the EPI which is very low. $R^2$ is used to determine the percentage of variation in Y due to its regression on X (Pindyck and Rubinfeld, 1991).

Looking to the F-statistics in table 1(b), using 5% level of significance and number of degrees of freedom equal to $F_{(k-1,n-k)}$ which in our case equal to $F_{(7,120)}$, the $F_{critical}$ =2.09. The F-Stat. tests the null hypothesis that the whole regression is not significant( Pindyck and Rubinfeld,1991). Since the $F_{cal} < F_{critical}$, we conclude that the

❖ Table 1(a): OLS regression in applying the ICAPM

| *No.* | *Independent Variable* | $\hat{\beta}$ |
|---|---|---|
| 1 | C | 0.005 |
| | | (2.344) |
| 2 | WPI | -0.181 |
| | | (-1.172) |
| 3 | GBP | -0.075 |
| | | (-0.291) |
| 4 | CAD | 0.643 |
| | | (1.469) |
| 5 | USD | -0.501 |
| | | (-0.058) |
| 6 | FRF | -0.557 |
| | | (-0.459) |
| 7 | DEM | 0.426 |
| | | (0.358) |
| 8 | SAUDI | -1.921 |
| | | (-0.194) |

❖ Table 1(b):

| $R^2$ | *S.E. of Regression* | *D.W.* | *F-Stat.* |
|---|---|---|---|
| 0.044 | 0.025 | 1.332 | 0.794 |

❖ Table 2(a):OLS regression after correcting for Autocorrelation

| *No.* | *Independent Variable* | $\hat{\beta}$ |
|---|---|---|
| 1 | C | 0.006 |
| | | (1.753) |
| 2 | WPI | -0.167 |
| | | (-1.198) |
| 3 | GBP | -0.059 |
| | | (-0.260) |
| 4 | CAD | 0.696 |
| | | (1.821) |
| 5 | USD | -5.226 |
| | | (-0.684) |
| 6 | FRF | -0.272 |
| | | (-0.255) |
| 7 | DEM | 0.302 |
| | | (0.289) |
| 8 | SAUDI | 1.898 |
| | | (0.242) |
| 9 | AR(1) | 0.364 |
| | | (4.145) |

❖ Table 2(b):

| $R^2$ | *S.E. of Regression* | *D.W.* | *F-Stat.* |
|---|---|---|---|
| 0.163 | 0.023 | 2.148 | 2.878 |

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**All the tables were produced using the E-Views Program.**

**Sources: The Capital Market Authority in Egypt , The Economist magazine (January 1996-June 1998),and Intenet- Pacific Exchange Rate Service (http://pacific.commerce.ubc.ca).**

whole regression is not significant in explaining the variation in the EPI and we can't reject the null hypothesis.

**B) Correction for Autocorrelation:** As can be seen from the Durbin-Watson in table 1(b), D.W. is 1.332. Durbin-Watson tests the null hypothesis of no serial correlation is present in the equation or ($\rho$ =0) against the alternative hypothesis that $\rho \neq 0$. It is calculated as $d \cong 2(1-\rho)$ (Pindyck and Rubinfeld, 1991 ). At N=128 and K=7 and 5% level of significance, $d_l = 1.57$ and $d_u = 1.78$.The D.W. in table 1(b) is 1.332 which is lower than $d_l = 1.57$ meaning that we've a serious autocorrelation. And we reject the null hypothesis of no serial correlation.

Accordingly, this lead us to correct for autocorrelation using Cochrane Orcutt procedure. "This procedure involves a series of iterations, each of which produces a better estimate of $\rho$ than the previous one"(Pindyck and Rubinfeld,1991). The estimates after correcting for autocorrelation are provided in table 2(a). Still the estimated betas are not significant, but the coefficient of AR(1) is positive and significant.

The coefficient of determination $R^2$ increased in value from 4.4% to 16.3% after correcting for autocorrelation as can be seen in table 2(b). That's due to the addition of AR(1) in the equation. Also, the D.W. increased to 2.148 due to the correction of serial correlation.

**C) ML-ARCH:** As can be seen from the coefficient of ARCH(1) and GARCH(1) in table 3(a), they are positively signed. This means that the variance is not constant and it is changing from time to time, and that the error is serially correlated. In other words, the conditional variance depends on past squared error (Davidson and Mackinnon,1993). Also, we have a negatively significant constant. The other coefficients are insignificant. This leads us to conclude that there's a dynamic structure in the second moment. This means also that the EPI is affected by the past periods.

**D) Testing the Multicollinearity:** As can be seen from table 4(a); the multicollinearity between the explanatory variables is not high. Yet, there are few exceptions. On one hand, the exchange rate of the Egyptian Pound with the Deutsche Mark is highly correlated to the exchange rate of the Egyptian Pound with the French Franc. It's approximately 99%. Also, we have very high correlation in the case of the Egyptian exchange rate with the U.S. Dollar and the Egyptian exchange rate with the Saudi Riyal. The correlation is 99%. This is very logical since the two most demanded currencies in Egypt are the U.S. Dollar and the Saudi Riyal. On the other hand, the Egyptian exchange rate with the U.S. Dollar is moderately correlated to the Egyptian exchange rate with the other European countries.

**E) Summary Statistics:** The statistics in table 4(b) show that the average % change in the Egyptian exchange rate with the Canadian Dollar, the Deutsche Mark and the French Franc represented by the Mean, is very small and even negative. However, it's somehow a little bit higher in the case of Sterling Pound, Saudi Riyal and U.S. Dollar. Still, there is a very small variation.

As for the Standard Deviation, it's defined as the square root of the variance $\sigma$ which is a measurement of risk (Pindyck and Rubinfeld, 1991). In table 4(b), we find that the risk associated with the Egyptian exchange rate with the U.S. Dollar and the Saudi Riyal is the smallest risk, about 0.2%. While the highest risk is achieved in the case of the Egyptian exchange rate with the French Franc and the Deutsche Mark and which is 1.2%.

In testing Normality, the Jarque-Bera statistic was used. It tests the null hypothesis of normally distributed disturbances. It considers the third and fourth moments of the OLS residuals. If these moments do not have certain specified values, the null hypothesis has to be rejected. The test has a $\chi^2$ distribution with two degrees of

❖ **Table 3(a): ML-ARCH Test**

| *No.* | *Independent Variable* | $\hat{\beta}$ |
|---|---|---|
| 1 | C | -0.003 |
| | | (-2.157) |
| 2 | WPI | -0.017 |
| | | (-0.219) |
| 3 | GBP | -0.108 |
| | | (-0.950) |
| 4 | CAD | 0.606 |
| | | (2.157) |
| 5 | USD | 0.406 |
| | | (0.081) |
| 6 | FRF | 0.464 |
| | | (0.658) |
| 7 | DEM | -0.433 |
| | | (-0.609) |
| 8 | SAUDI | -2.173 |
| | | (-0.404) |
| | C | 3.05E-05 |
| 9 | | (1.716) |
| 10 | ARCH(1) | 1.255 |
| | | (5.027) |
| 11 | GARCH(1) | 0.240 |
| | | (4.782) |

❖ **Table 3(b):**

| $\overline{R}^2$ | *S.E. of Regression* | *D.W.* |
|---|---|---|
| -0.079 | 0.027 | 1.199 |

❖ **Table 4(a): Correlation Matrix**

| *No.* | *Variables* | *CAD* | *DEM* | *FRF* | *GBP* | *SAUDI* | *USD* | *WPI* |
|---|---|---|---|---|---|---|---|---|
| 1 | CAD | 1.000 | -0.007 | 0.007 | 0.089 | 0.503 | 0.493 | 0.184 |
| 2 | DEM | -0.007 | 1.000 | 0.987 | 0.540 | 0.224 | 0.211 | -0.119 |
| 4 | FRF | 0.007 | 0.987 | 1.000 | 0.541 | 0.234 | 0.216 | -0.135 |
| 5 | GBP | 0.089 | 0.540 | 0.541 | 1.000 | 0.234 | 0.229 | -0.012 |
| 6 | SAUDI | 0.503 | 0.224 | 0.234 | 0.234 | 1.000 | 0.990 | 0.062 |
| 7 | USD | 0.493 | 0.211 | 0.216 | 0.229 | 0.990 | 1.000 | 0.063 |
| 8 | WPI | 0.184 | -0.119 | -0.135 | -0.012 | 0.062 | 0.063 | 1.000 |

❖ **Table 4(b): Group Statistics**

| *No.* | *Variables* | *CAD* | *DEM* | *FRF* | *GBP* | *SAUDI* | *USD* | *WPI* |
|---|---|---|---|---|---|---|---|---|
| 1 | Mean | -0.001 | -0.002 | -0.002 | 0.001 | 3.43E-05 | 3.71E-05 | 0.003 |
| 2 | Median | -0.001 | -0.002 | -0.003 | 0.001 | 4.56E-05 | 0.000 | 0.005 |
| 3 | Maximum | 0.016 | 0.030 | 0.031 | 0.025 | 0.005 | 0.005 | 0.034 |
| 4 | Minimum | -0.015 | -0.029 | -0.029 | -0.029 | -0.005 | -0.005 | -0.048 |
| 5 | Std. Dev. | 0.006 | 0.012 | 0.012 | 0.010 | 0.002 | 0.002 | 0.015 |
| 6 | Skewness | 0.360 | 0.108 | 0.123 | -0.181 | 0.282 | 0.359 | -0.709 |
| 7 | Kurtosis | 3.032 | 3.143 | 3.273 | 3.054 | 4.719 | 4.681 | 3.991 |
| 8 | Jarque-Bera | 2.773 | 0.358 | 0.719 | 0.718 | 17.456 | 17.843 | 15.969 |
| 9 | Probability | 0.249 | 0.836 | 0.698 | 0.698 | 0.000 | 0.000 | 0.000 |
| 10 | Observations | 128 | 128 | 128 | 128 | 128 | 128 | 128 |

**All tables were produced using the E-Views Program.**

**Source: The Capital Market Authority ,The Economist Magazine (January1996-June 1998), and Internet- Pacific Exchange Rate Service (http://pacific.commerce.ubc.ca).**

freedom. If the JB statistic is greater than the critical $\chi^2$ value, we reject the null hypothesis of normally distributed disturbances. The critical value of $\chi^2$ at 2 degrees of freedom and 5% level of significance is 5.99(Cuthbertson,Hall and Taylor,1992). In our case, the null hypothesis of normally distributed disturbances is rejected in the case of the Egyptian exchange rate with the U.S. Dollar, and the Egyptian exchange rate with the Saudi Riyal. Also, the null hypothesis is rejected in the case of the variation in the World Price Index. When the errors are not normally distributed, the estimators are still unbiased but not necessarily efficient. However, the null hypothesis is accepted in the case of the other explanatory variables meaning that the errors are normally distributed.

**F) ARCH Test:** This test is performed by regressing the sum of square of residuals on its lag as follows:

$$\hat{RESID}2 = \alpha + \rho\hat{RESID}2(-1) + \nu_t \qquad \textbf{(3.2)}$$

We found from table 5(a) that this regression resulted in a positively significant coefficient of the lag and the constant. This means that we have an autoregressive conditional heteroskedasticity in the disturbance.

**G) Breusch-Godfrey Correlation LM Test:**. This test is performed by regressing the residual on the explanatory variables and the first and second lag of the residual. The equation is written as follows

$$\varepsilon_t = \alpha + \delta W_{pt} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 X_{6t} + \varepsilon_{t-1} + \varepsilon_{t-2} \quad \textbf{(3.3)}$$

We obtain the value of $nR^2$ or obs* $R^2$ from the regression. Here, we are going to test the null hypothesis of no serial correlation or $\rho = 0$. The null hypothesis will be rejected at 95% level of confidence if the calculated value is greater than the critical value distributed as $\chi^2$ at 2 degrees of freedom (Cuthbertson, Hall and Taylor,1992).

❖ **Table 5(a): ARCH Test**

| $C$ | $RESID\hat{}2(-1)$ | F-Stat. | $nR^2$ | $R^2$ |
|---|---|---|---|---|
| 0.000<br>(3.995) | 0.229<br>(2.639) | 6.964 | 6.702 | 0.053 |

❖ **Table 5(b): Breusch-Godfrey Serial Correlation LM Test**

| *No.* | *Variables* | $\hat{\beta}$ |
|---|---|---|
| 1 | C | 0.000<br>(0.059) |
| 2 | WPI | -0.014<br>(-0.102) |
| 3 | GBP | 0.043<br>(0.183) |
| 4 | CAD | -7.12E-05<br>(-0.000) |
| 5 | USD | -0.878<br>(-0.095) |
| 6 | FRF | 0.587<br>(0.522) |
| 7 | DEM | -0.447<br>(-0.406) |
| 8 | SAUDI | 0.288<br>(0.031) |
| 9 | RESID(-1) | 0.282<br>(2.973) |
| 10 | RESID(-2) | 0.227<br>(2.460) |

❖ **Table5(c ):**

| *F-Stat.* | $nR^2$ | $R^2$ |
|---|---|---|
| 11.627 | 21.073 | 0.165 |

All tables were produced using the E-Views Program.

Source: The Capital Market Authority , The Economist magazine (January 1996-June 1998), and Internet-Pacific Exchange Rate Service (http://pacific.commerce.ubc.ca).

In our case the critical value is 5.99, while the $nR^2$ is 21.073 as can be seen in table 5(c). So the calculated value exceeds the critical value which leads us to reject the null hypothesis of no serial correlation. Also, the lags of the residuals have significant coefficients as shown in table 5(b). The problem of autocorrelation was corrected by the Cochrane-Orcutt procedure in table 2.

**H)Ordinary Least Square Regression with Lags:** We performed another regression of the EPI on the WPI and the other Foreign exchange explanatory variables but with two lags for each explanatory variable as shown in table 6(a). This regression has somewhat higher coefficient of determination $R^2$=10.9% as shown in table 6(b) than the ordinary Least Square regression of table 1(a). Still, the betas are not significant for all explanatory variables except the constant. Also, the D.W.reveals serious autocorrelation as indicated in table 6(b).

**I) The Lag Equation after Correcting for Autocorrelation:** An autoregressive process of order one was performed on the lag equation in table 6(a) and produced the results shown in table 7(a). The insignificant betas are still prevailing as table 7(a) shows in the numbers between parentheses. Only the coefficient of AR(1) is significant. The $R^2$ is now higher due to the autoregressive process as shown in table 7(b). The $F_{cal}$ is 1.44 which is less than the $F_{tab}$ =1.57. This means that still the whole regression is not significant.

- **A General comment:** It seems somehow strange of course to find no effect of the changes in the foreign exchange rates included in our equation on the Egyptian Stock Price Index. Egypt is now seen as globally integrated in the world markets as mentioned

❖ **Table 6(a): Ordinary Least Square with Lags**

| *No.* | *Variables* | $\hat{\beta}$ |
|---|---|---|
| 1 | C | 0.007 |
| | | (2.592) |
| 2 | WPI | -0.302 |
| | | (-1.703) |
| 3 | WPI(-1) | 0.010 |
| | | (0.063) |
| 4 | WPI(-2) | -0.268 |
| | | (-1.541) |
| 5 | GBP | -0.019 |
| | | (-0.072) |
| 6 | GBP(-1) | 0.118 |
| | | (0.427) |
| 7 | GBP(-2) | -0.069 |
| | | (-0..244) |
| 8 | CAD | 0.723 |
| | | (1.386) |
| 9 | CAD(-1) | 0.066 |
| | | (0.139) |
| 10 | CAD(-2) | 0.729 |
| | | (1.496) |
| 11 | USD | 3.989 |
| | | (0.327) |
| 12 | USD(-1) | 5.168 |
| | | (0.372) |
| 13 | USD(-2) | -10.739 |
| | | (-0.882) |
| 14 | FRF | -1.258 |
| | | (-0.949) |
| 15 | FRF(-1) | 0.481 |
| | | (0.373) |
| 16 | FRF(-2) | -1.688 |
| | | (-1.220) |
| 17 | DEM | 1.116 |
| | | (0.855) |
| 18 | DEM(-1) | -0.687 |
| | | (-0.542) |
| 19 | DEM(-2) | 1.544 |
| | | (1.157) |
| 20 | SAUDI | -6.294 |
| | | (-0.505) |
| 21 | SAUDI(-1) | -4.375 |
| | | (-0.307) |
| 22 | SAUDI(-2) | 10.589 |
| | | (0.848) |

❖ **Table 6(b):**

| $R^2$ | *S.E. of Regression* | *D.W.* | *F-Stat.* |
|---|---|---|---|
| 0.109 | 0.026 | 1.314 | 0.607 |

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**All tables were produced using the E-Views Program.**

**Source: The Capital Market Authority , The Economist Magazine (January 1996-June 1998), And Internet-Pacific Exchange Rate Service (http://pacific.commerce.ubc.ca).**

❖ **Table 7(a): Ordinary Least Square after correcting for Autocorrelation**

| *No.* | *Variables* | $\hat{\beta}$ |
|---|---|---|
| 1 | C | 0.008 |
| | | (1.869) |
| 2 | WPI | -0.292 |
| | | (-1.757) |
| 3 | WPI(-1) | -0.008 |
| | | (-0.047) |
| 4 | WPI(-2) | -0.292 |
| | | (-1.792) |
| 5 | GBP | 0.022 |
| | | (0.086) |
| 6 | GBP(-1) | 0.147 |
| | | (0.512) |
| 7 | GBP(-2) | -0.126 |
| | | (-0.477) |
| 8 | CAD | 0.854 |
| | | (1.716) |
| 9 | CAD(-1) | -0.080 |
| | | (-0.163) |
| 10 | CAD(-2) | 0.346 |
| | | (0.739) |
| 11 | USD | -6.651 |
| | | (-0.613) |
| 12 | USD(-1) | -6.189 |
| | | (-0.451) |
| 13 | USD(-2) | -17.388 |
| | | (-1.591) |
| 14 | FRF | -0.563 |
| | | (-0.447) |
| 15 | FRF(-1) | 0.602 |
| | | (0.454) |
| 16 | FRF(-2) | -2.118 |
| | | (-1.633) |
| 17 | DEM | 0.557 |
| | | (0.452) |
| 18 | DEM(-1) | -0.737 |
| | | (-0.567) |
| 19 | DEM(-2) | 2.059 |
| | | (1.646) |
| 20 | SAUDI | 3.110 |
| | | (0.281) |
| 21 | SAUDI(-1) | 6.485 |
| | | (0.460) |
| 22 | SAUDI(-2) | 17.338 |
| | | (1.545) |
| 23 | AR(1) | 0.414 |
| | | (4.327) |

❖ **Table 7(b):**

| $R^2$ | *S.E. of Regression* | *D.W.* | *F-Stat.* |
|---|---|---|---|
| 0.237 | 0.024 | 2.133 | 1.444 |

All the tables were produced using the E-Views Program.

Source: The Capital Market Authority , The Economist magazine (January 1996-June 1998), and Internet-Pacific Exchange Rate Service (http://pacific.commerce.ubc.ca).

earlier in the background to this paper. Therefore, it was expected that the changes in foreign exchange rates would have significant effect especially on the Stock Market. One reason is that many foreign companies were greatly interested in the Egyptian Capital Market after the revival of the Stock market in 1992. This is due to the low price-earning ratio that the Egyptian Stock market offers which is at an average of 13. Consequently in the first three quarters of 1997, foreign investment reached about 4.5 Egyptian Billion Pounds or 31% of the total market trading value of listed securities(Egypt's Economic Profile. Capital Market Overview,1997, Internet). **So, why isn't the Egyptian Stock price Index reacting to the foreign exchange variability ? The answer simply lies in the exchange rate policy that Egypt follows**. During the last few years, the Central Bank of Egypt depended mostly on the Stability of the Egyptian Pound exchange rate as the main tool to avoid inflation. One of the successful strategies is the use of fixed exchange rate. This fixed exchange rate system has motivated the Central Bank and the Government to concentrate on deficit reduction, higher interest rates and structural adjustment measures to combat inflation. This policy has also encouraged large inflows of capital and higher foreign exchange reserves. As a result, the Central Bank was able to stabilize the exchange rate. Consequently, the variation of the Egyptian exchange rate with the U.S. Dollar didn't exceed 0.2% over the past years (Exchange Rate Policy and Local Currency Investments, 1995, Internet). This is the same number produced by the results of the Standard Deviation of the exchange rate with the U.S. Dollar in table 4(b). As of the other currencies, they don't have any significant impact because the volume of trade between them and Egypt is very small.

# CHAPTER IV

# THE RELATION BETWEEN LONDON STOCK EXCHANGE AND THE EGYPTIAN STOCK EXCHANGE

**4.1 An Overview about London Stock Exchange:** "The origins of the London Stock Exchange go back to the coffee houses of 17th century where those who wished to invest or raise money bought and sold shares in joint stock companies." (About the exchange, 1999, Internet). It is considered one of the oldest Stock Exchanges in the world. The Exchange then developed over time as the demand for new capital increases and the number of brokers expanded. During the 19th century about 20 stock exchanges were established in London. These exchanges were grouped in 1965 to form the federation of Stock Exchanges. In 1973 this federation joined the Dublin and London Stock Exchanges to form what was known as the International Stock Exchange of the United Kingdom and the Republic of Ireland. This unified body split in 1995 into two separate stock exchanges, one for the UK and the other for Ireland (About the exchange, 1999, Internet). "The purpose of the London Stock Exchange is to provide attractive and well regulated markets where companies and other organizations (e.g. governments) can raise finance cost-effectively and have their shares publicly traded, and where investors are able to buy and sell shares efficiently, and with access to the fullest possible information." (About the exchange, 1999, Internet).

The reason of why I chose London Stock Exchange to test its relation to the Egyptian Stock Exchange is that London Stock Exchange is the only exchange where Egyptian issued shares are traded. They are called Global Depositary Receipts or GDRs. The issue of these shares will be addressed in the next chapter.

**4.2 Methodology:** I am going to test the relation between the Egyptian Stock Exchange and London Stock Exchange using the Stock Price Index also. The method is OLS, a simple regression where the dependant variable is the EPI and the independent variable is the London Stock Price Index .[5] The equation is as follows;

$$Y_t = \alpha + \beta X_t + \varepsilon_t \qquad (4.1)$$

Where $Y_t$ is the % change in the EPI, $X_t$ is the percentage change in the FTI, $\varepsilon_t$ is a disturbance term, and $\alpha$ is a constant.

- The null hypothesis to be tested is;

$$H_\circ : \alpha = 0$$
$$H_1 : \alpha \neq 0$$
$$H\circ : \beta = 0$$
$$H_1 : \beta \neq 0$$

Also, I used OLS procedure to estimate the parameters in the equation. I used the t-statistics to test the significance of the beta. Also, I used the tests of autocorrelation and normality.

**4.3 Data Sources and Description:** The data of the EPI were taken from the Egyptian Capital Market Authority and the data concerning FTI were taken from "The Economist" magazine. They are weekly data from the the 9th of January 1996 till the 10th of June 1998. They are 127 observations. All the observations in the equation were taken as a percentage change, as in the previous chapter, in order to see the trend.

[5] For Simplicity, I will use the symbol FTI to account for the Financial Times Index.

## 4.4 Empirical Results:

**A) Testing the Significance of the Parameters:** The results of the regression of equation **(4.1)** are shown in table 8(a). At 5% level of significance and 125 degrees of freedom $t_{tab} = 1.96$, while the $t_{cal}$ =-0.350 in the case of the estimated beta. So, we can't reject the null hypothesis that $\beta = 0$ in the case of the FTI. The parameter of FTI is not significant. On the other hand, we reject the null hypothesis that $\alpha = 0$ in the case of the constant. The coefficient of determination $R^2$ is very small (0.1%) which means that the explanatory variable is not able to explain the variation in the dependant variable except by 0.1%. There are other explanatory variables omitted from the equation that are the cause of the variation and their effect goes to the error term.

As for the F-stat., the tabulated value of 3.84 shows that the whole regression is not significant since the calculated F (0.123) is smaller than the tabulated one. Moreover, the D.W.(1.36) indicates very serious autocorrelation since it's lower than $d_l$ (1.65).[6]

**B) Correction for Autocorrelation:** As table 8(b) shows, the parameters of the equation remain insignificant after correcting for autocorrelation. Even the constant has insignificant coefficient. The AR(1) has a significant coefficient. $R^2$ increased after the correction to become 10.5%. Also, the D.W. became 2.15.

**C) ML-ARCH:** As can be seen from the coefficient of ARCH(1) and GARCH(1) in the Variance Equation (supplement of table 9(a)), they are positively signed. This means that the variance is not constant and it's changing from time to time, and that the variance of the error is serially correlated (Davidson and Mackinnon, 1993). The parameters of the equation are insignificant as can be seen from table 10(a). This leads us to conclude that there's a dynamic structure in the second moment. This means also that the EPI is affected by the past period.

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[6] Corresponding to K=1, the $d_l = 1.65$ and the $d_u = 1.69$.

❖ **Table 8(a): The EPI and the FTI Regression**

| *Independent variables* | | $\alpha$ | $\hat{\beta}$ | $R^2$ | *S.E. of Regr.* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|
| C | FTI | 0.005 (2.178) | -0.047 (-0.350) | 0.001 | 0.025 | 1.36 | 0.123 |

❖ **Table 8(b): After correcting for Autocorrelation**

| *Independent Variable* | | | $\alpha$ | $\hat{\beta}$ | $\hat{\rho}$ | $R^2$ | *S.E.of Reg.* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|---|
| C | FTI | AR (1) | 0.006 (1.739) | -0.122 (-1.018) | 0.327 (3.787) | 0.105 | 0.024 | 2.15 | 7.104 |

❖ **Table 9(a): The ML-ARCH**

| *Independant Variable* | | $\alpha$ | $\hat{\beta}$ | $R^2$ | *S.E. of Regression* | *D.W* |
|---|---|---|---|---|---|---|
| C | FTI | -0.002 (-1.415) | -0.019 (-0.339) | -0.084 | 0.026 | 1.26 |

❖ **The Variance Equation:**

| *Variance Equation* | | | $\alpha$ | $\hat{\rho}_1$ | $\hat{\rho}_2$ |
|---|---|---|---|---|---|
| C | ARCH(1) | GARCH(1) | 5.05E-05 (2.014) | 1.237 (4.953) | 0.229 (3.905) |

❖ **Table 9(b): The EPI and FTI Regression with Lags**

| *IndependantVariables* | | | $\alpha$ | $\hat{\beta}_1$ | $\hat{\beta}_2$ | $R^2$ | *S.E. of Reg* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|---|
| C | FTI | FTI (-1) | 0.005 (1.889) | -0.040 (-0.296) | 0.125 (0.922) | 0.01 | 0.03 | 1.350 | 0.49 |

❖ **Table 9(c): After correcting for Autocorrelation**

| *IndependantVariable* | | | | $\alpha$ | $\hat{\beta}_1$ | $\hat{\beta}_2$ | $\hat{\rho}$ | $R^2$ | *S.E.of Reg.* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| c | FTI | FTI (-1) | AR (1) | 0.005 (1.444) | -0.071 (-0.539) | 0.132 (1.008) | 0.325 (3.734) | 0.112 | 0.024 | 2.14 | 5.01 |

**All tables were produced using the E-Views Program.**

**Source: The Capital Market Authority and The Economist magazine (January 1996-June 1998).**

**D) The FTI Regression with Lags:** Another regression of the EPI was performed on the FTI and its lag as shown in table 9(b). Still the coefficient of determination $R^2$ is very low (o.8%). And the D.W. at k=2 has a $d_l$ of 1.63 and $d_u$ of 1.72, so this means that we have serious autocorrelation as indicated by the D.W. of 1.35.

**E) The Lag Equation after correcting for Autocorrelation:** An autoregressive process of order one was performed on the lag equation in table 9(b) and produced the results in table 9(c). The insignificant betas are still prevailing as table 9(c) shows in the numbers between parentheses. Only the coefficient of AR(1) is significant. The $R^2$ is higher (11.2%) due to the autoregressive process.

❖ **A General Comment:** It is evident from the regressions that we made that the Financial Times Index has no significant effect on the Egyptian Stock Price Index. This seems strange because the London Stock Exchange is the only exchange where Egyptian issued shares are traded. The only explaination is that these Egyptian issued shares represent a very small percentage of the total market capitalization of the London Stock Exchange. There are of course more active securities than the GDRs in London Stock Exchange that are highly demanded. Yet, there is one more question to be asked. **What is the extent of relation between the Egyptian Stock Exchange and the other World Stock Exchanges?** The answer to this question is available in the next section.

❖ **The Relation between the Egyptian Stock Exchange and the other World Stock Exchanges:** A study made in the American University in Cairo under the name of "An Application of the Capital Asset Pricing Model to the Egyptian Stock Market" addressed this question. The results of the study are as follows: there is insignificant relation between the Egyptian Stock Market and all other countries' leading Stock

markets except Denmark.[7] Also, there is positive correlation between the other countries' price indices except Egypt that has a low correlation coefficient. This low correlation between Egypt and other countries' price indices was attributed to the weak participation of foreigners in the Egyptian stock market, and the weak involvement of Egyptians in the foreign stock markets, which is only represented by the GDRs in London (Azzam, 1998).

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[7] The countries are: Australia, Austria, Belgium, Britain, Canada, Denmark, France, Germany, Italy, Japan, Spain, Sweden, Switzerland, USA.

# CHAPTER V

# GDRs AND THE EGYPTIAN STOCK EXCHANGE

**5.1 What are GDRs?** GDRs or Global Depositary Receipts are certificates that are issued by one of the international banks, while depositing instead of them certain assets in the same bank that issues the certificates. The GDRs are transacted in global financial markets. These GDR certificates give its owner the right to exchange these certificates with its alternative assets and trade them in the local stock exchange. At the same time, the bank that issues these certificates is obliged to accept the investors demands to exchange the assets with the GDRs and trade them in the international stock exchanges (Hassan,1998).

The main advantages for the issuers of GDRs are: these certificates can be part of a private or public offering, the issuer in this case has access to the global financial markets, and there is no restrictions concerning selling to foreign investors like the local market (Global Depositary Receipts, 1999, Internet).

In Egypt, there are five companies that have GDR listings in the London Stock Exchange. These companies are: Commercial International Bank(CIB), Suez Cement, ElAhram Beverage Company, Misr International Bank(MIBANK), and Paints and Chemicals Industries(PACHIN) (CMA,1998).

**5.2 Methodology:** A simple regression was used to test the effect of GDR prices traded in London on their equivalent asset prices in the Egyptian Stock Exchange. There is one point here I want to elaborate in treating the data. Each one of the five companies has what is called "The rate of exchange". What I mean here is that each GDR corresponds to a certain number of its equivalent local assets. So the CIB has a rate of exchange one to one, which means that each GDR issued by the CIB and traded in London can be converted into one of its equivalent local assets. PACHIN has a rate of exchange of three

to one, which means that one local asset is equivalent to three GDRs. Suez Cement has a rate of exchange of one to one. El Ahram Beverage Company has a rate of exchange of two to one and the MIBANK has a rate of exchange two to one (Egyptian Stock Exchange,1999).[8] I converted the GDRs into their equivalent local assets, and then multiplied by 3.4 in order to convert them to Egyptian Pounds.[9] So, the regression equation becomes as follows:

$$Y_t = \alpha + \beta X_t + \varepsilon_t \qquad \textbf{(5.1)}$$

Where $Y_t$ is the daily local % change in the asset price for each company, $X_t$ is the daily % change in the GDR price for each company, and $\varepsilon_t$ is a disturbance term.

A single Ordinary Least Square (OLS) regression is performed for each of the five companies. The null hypothesis to be tested is:

$$H_\circ : \alpha = 0$$
$$H_1 : \alpha \neq 0$$
$$H_\circ : \beta = 0$$
$$H_1 : \beta \neq 0$$

All I want to reach is to test the effect of the GDR prices on their equivalent local prices in Egypt. I used the Ordinary Least Square (OLS) procedure to estimate the parameters of the equation. I used the t-statistics to test the significance of the betas. Also, I used an F-test, test of autocorrelation, heteroskedasticity and normality.

**5.3 Data Sources and Description:** All the data are taken from the Capital market Authority in Egypt and the Egyptian Stock Exchange. I used daily data for all my regressions. Every Regression for each company has different number of observations.

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[8] For Simplicity, I will use the following abbreviations for my variables: CIB for the Commercial International Bank, ABC for ElAhram Beverage Company, MIBANK for Misr International Bank, PACHIN for Paints and Chemicals Industries, and SC for Suez Cement.

[9] GDRs in London are denominated in U.S. Dollar.

For the CIB regression, I used daily data from the 12nd of February 1997 till the 29th of October 1998. For the ABC regression, the period is from the 20th of October 1997 till the 29th of October 1998. For the PACHIN regression, the period is from the 20th of October 1997 till the 22nd of October 1998. For the MIBANK regression, the period is from the 20th of October 1997 till the 20th of October 1998. And finally, for the SC regression the period is from the 2nd of January 1997 till the 29th of October 1998.We have 333, 122, 180, 192 and 347 observations for the CIB, ABC, PACHIN, MIBANK and SC respectively. All the variables included in the equation were calculated as a percentage change in order to get a trend.

## 5.4 Empirical Results:

**A)Testing the Significance of the Parameters:** Table 10(a) shows the significance of the estimated parameters denoted by $\hat{\beta}$ for the five regressions of the five companies. The values between parentheses show the value of the t-statistics. Using 5% level of significance, for all the five equations the $t_{tab}$ =1.96 and the $t_{cal}$ =13.193, 7.235, 2.357, 8.163,and8.179 respectively. This means that our estimated betas are significant. The Constant on the other hand is insignificant for all equations. Therefore, we can't reject the null hypothesis that $\alpha_i$ =0, but we reject the null hypothesis that $\beta_i$ =0.The $R^2$ is moderate ranging between 16% for Suez Cement and 34.5% for the CIB. Moreover, the F-stat. for all equations shows that the whole regression is significant. The D.W. for the five regressions has a $d_l$ =1.65 and $d_u$ =1.69. If D.W. is greater than $d_u$ , we can't reject the null hypothesis (Pindyck and Rubinfeld, 1991). Since the D.W. in our equations is greater than1.69, we can't reject the null hypothesis of no serial correlation for the five

❖ **Table 10(a): The GDR Price-Local Asset Price Regression**

| *Dep. Var.* | *Indep. Var.* | | $\alpha$ | $\hat{\beta}_1$ | $R^2$ | *S.E. of Regr* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|
| LCIB | C | GCIB | -0.000<br>(-0.183) | 0.535<br>(13.193) | 0.345 | 0.023 | 1.820 | 174.05 |
| LPACHIN | C | GPACHIN | -0.000<br>(-0.237) | 0.421<br>(7.235) | 0.227 | 0.021 | 2.223 | 52.343 |
| LABC | C | GABC | 0.001<br>(0.627) | 0.148<br>(2.357) | 0.044 | 0.024 | 1.901 | 5.554 |
| LMBANK | C | GMBANK | -0.002<br>(-1.188) | 0.371<br>(8.163) | 0.259 | 0.018 | 2.257 | 66.635 |
| LSC | C | GSC | -5.66E-05<br>(-0.054) | 0.379<br>(8.179) | 0.162 | 0.019 | 2.195 | 66.902 |

❖ **Table 10(b): The GDR Regression-ML-ARCH**

| *Dep. Var.* | *Indep. Var.* | | $\alpha$ | $\hat{\beta}_1$ | $R^2$ | *S.E. of Regression* | *D.W* |
|---|---|---|---|---|---|---|---|
| LCIB | C | GCIB | -0.001<br>(-1.099) | 0.519<br>(21.037) | 0.343 | 0.023 | 1.794 |
| LPACHIN | C | GPACHIN | -0.001<br>(-0.468) | 0.375<br>(7.224) | 0.224 | 0.021 | 2.168 |
| LABC | C | GABC | 0.001<br>(0.592) | 0.199<br>(2.872) | 0.039 | 0.024 | 1.901 |
| LMBANK | C | GMBANK | -0.001<br>(-1.194) | 0.305<br>(7.656) | 0.251 | 0.018 | 2.177 |
| LSC | C | GSC | 2.58E-05<br>(0.030) | 0.417<br>(12.716) | 0.161 | 0.019 | 2.230 |

❖ **The Variance Equation:**

| *Variance Equation* | | | $\alpha$ | $\hat{\rho}_1$ | $\hat{\rho}_2$ |
|---|---|---|---|---|---|
| C | ARCH(1) | GARCH(1) | 2.92E-05<br>(2.810) | 0.135<br>(3.362) | 0.783<br>(14.539) |
| C | ARCH(1) | GARCH(1) | 1.68E-05<br>(2.169) | 0.266<br>(2.588) | 0.719<br>(8.688) |
| C | ARCH(1) | GARCH(1) | 0.000<br>(2.963) | 0.343<br>(2.527) | 0.460<br>(3.585) |
| C | ARCH(1) | GARCH(1) | 0.000<br>(4.979) | 0.318<br>(3.611) | 0.316<br>(2.721) |
| C | ARCH(1) | GARCH(1) | 2.05E-05<br>(3.151) | 0.179<br>(5.846) | 0.782<br>(32.721) |

**All the tables were produced using the E-Views Program.**

**Source:** **The Capital market Authority (Daily data from January 1997-October 1998).**

regressions. That is why we have no reason to correct for autocorrelation.

**B) ML-ARCH:** As can be seen from the Variance Equation under table 10(b), the coefficients of ARCH(1) and GARCH(1) are positively signed. This means that the variance is not constant and it is changing from time to time. There's a dynamic structure in the second moment.

**C) The Lag Equation:** Another regression was performed of the local variables on the GDR variables but with two lags for the explanatory variables as shown in table 11(a). The five regressions have higher coefficient of determination $R^2$ as shown in table 11(b) than the original regression in table 10(a). The betas are still significant for the explanatory variables in the five equations. Only the first lag for the GABC is insignificant. All the GDRs for the second lag are insignificant. The constant still has insignificant coefficient. The F-stat. shows that the whole regression for the five companies is significant. The D.W. with $d_l$ =1.61 and $d_u$ =1.74 indicates that there is no serial correlation except in the case of CIB, but it's not that big.

**D) Breusch-Godfrey Serial Correlation LM Test:** This regression is made on the original equation in table 10(a).The residual is regressed on the explanatory variables and the first and second lag of the residual as seen in table 12(a). Again, we are going to test the null hypothesis of no serial correlation or $\rho$ =0. At 95% level of confidence and 2 degrees of freedom, the critical value distributed as $\chi^2$ is 5.99. As seen from table 12(b), the obs* $R^2$ is smaller than the critical value in the case of the CIB, PACHIN, ABC and SC, while it's higher in the case of MIBANK. So, we accept the null hypothesis of no serial correlation for the four companies, while we reject it for the MIBANK.

❖ **Table 11(a): The GDR Regression with lags**

| *Dep. Var.* | *Independent Variables* | | | | $\alpha$ | $\hat{\beta}_1$ | $\hat{\beta}_2$ | $\hat{\beta}_3$ |
|---|---|---|---|---|---|---|---|---|
| LCIB | C | GCIB | GCIB (-1) | GCIB (-2) | -0.000 | 0.542 | 0.211 | -0.075 |
| | | | | | (-0.124) | (14.038) | (5.459) | (-1.940) |
| LPACHIN | C | GPACHIN | GPACHIN (-1) | GPACHIN (-2) | -0.000 | 0.389 | 0.231 | 0.042 |
| | | | | | (-0.091) | (6.862) | (4.074) | (0.743) |
| LABC | C | GABC | GABC (-1) | GABC (-2) | 0.001 | 0.144 | 0.114 | 0.093 |
| | | | | | (0.568) | (2.277) | (1.793) | (1.466) |
| LMBANK | C | GMBANK | GMBANK (-1) | GMBANK (-2) | -0.001 | 0.388 | 0.204 | 0.036 |
| | | | | | (-0.759) | (8.873) | (4.644) | (0.814) |
| LSC | C | GSC | GSC (-1) | GSC (-2) | -0.000 | 0.373 | 0.227 | 0.064 |
| | | | | | (-0.249) | (8.397) | (5.141) | (1.453) |

❖ **Table 11(b):**

| *No.* | $R^2$ | *S.E.of Reg.* | *D.W* | *F-Stat* |
|---|---|---|---|---|
| 1 | 0.409 | 0.021 | 1.734 | 75.675 |
| 2 | 0.299 | 0.019 | 2.277 | 24.793 |
| 3 | 0.093 | 0.024 | 1.999 | 3.974 |
| 4 | 0.337 | 0.017 | 2.337 | 31.472 |
| 5 | 0.225 | 0.019 | 2.307 | 32.954 |

❖ **Table 12(a): Breusch-Godfrey Serial Correlation LM Test**

| *Dep. Var.* | *Independent Variables* | | | | $\alpha$ | $\hat{\beta}$ | $\hat{\rho}_1$ | $\hat{\rho}_2$ |
|---|---|---|---|---|---|---|---|---|
| RESID | C | GCIB | RESID(-1) | RESID (-2) | -2.35E-05 | -0.015 | 0.085 | 0.028 |
| | | | | | (-0.019) | (-0.355) | (1.487) | (0.515) |
| RESID | C | GPACHIN | RESID(-1) | RESID (-2) | 5.51E-06 | 0.022 | -0.131 | -0.136 |
| | | | | | (0.004) | (0.372) | (-1.734) | (-1.809) |
| RESID | C | GABC | RESID(-1) | RESID (-2) | -9.40E-06 | 0.015 | 0.055 | -0.052 |
| | | | | | (-0.004) | (0.230) | (0.584) | (-0.549) |
| RESID | C | GMBANK | RESID(-1) | RESID (-2) | 5.76E-06 | 0.003 | -0.150 | -0.167 |
| | | | | | (0.005) | (0.065) | (-2.089) | (-2.322) |
| RESID | C | GSC | RESID(-1) | RESID (-2) | -1.68E-06 | 0.015 | -0.122 | -0.056 |
| | | | | | (-0.002) | (0.313) | (-2.243) | (-1.044) |

❖ **Table 12(b):**

| *No.* | *F-Stat.* | *Obs.* $R^2$ | $R^2$ |
|---|---|---|---|
| 1 | 1.324 | 2.659 | 0.008 |
| 2 | 2.798 | 5.547 | 0.031 |
| 3 | 0.294 | 0.606 | 0.005 |
| 4 | 4.331 | 8.456 | 0.044 |
| | 2.836 | 5.646 | 0.016 |

**All the tables were produced using the E-Views Program.**

**Source: The Capital Market Authority (Daily data from January 1996-October 1998).**

**E) ARCH Test:** The sum of residuals is regressed on its lag as shown in table 13(a). The regression for the five companies resulted in a positively significant coefficient of the lag except in the case of ABC. Also, the constant has significant coefficient. This means that we have an autoregressive conditional heteroskedasticity in the disturbance in the case of all companies except the ABC.

**F) Summary Statistics:** As indicated by the mean in table 13(b), whether the local or the GDR prices of the companies have very small average percentage change during the period covered.

As for the standard deviation, it seems from the table that the risk associated with the local prices is lower than that associated with the GDR prices. The lowest risk is evident in the local and GDR prices of Suez Cement.

In testing normality, the null hypothesis of normally distributed disturbances is tested. The critical value of $\chi^2$ at two degrees of freedom and 5% level of significance is 5.99. For all variables, the null hypothesis of normally distributed disturbances is rejected except for the local price of PACHIN (% change) where the error is normally distributed.

**A General Comment:** Egypt has actually entered the stage of economic liberalization, something that demands a kind of openness with the world economy. And since the stock market is the mirror that reflects the economic conditions of the countries, it was something natural to find some way of connection between the capital market in Egypt and the international capital markets. Egypt found that the most suitable way to achieve this is through what we have just studied and that is the GDRs (Hassan, 1998). May be this is the only effect that Egypt witnesses from the outside. As we have seen from the results, the GDR prices in London have very significant effect on its local equivalent assets' prices here in Egypt. Also, the correlation of coefficient of table 13(c) showed that the correlation between GDR prices and local shares prices of the

❖ **Table 13(a): ARCH Test**

| *Company* | *Dep. Var.* | *Indep. Var.* | | $\alpha$ | $\hat{\rho}$ | *F-Stat.* | *Obs* $R^2$ | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| CIB | $RESI\hat{D}2$ | C | $RESI\hat{D}2$ (-1) | 0.000 (5.587) | 0.360 (7.068) | 49.949 | 43.646 | 0.13 |
| PACHIN | $RESI\hat{D}2$ | C | $RESI\hat{D}2$ (-1) | 0.000 (6.199) | 0.204 (2.769) | 7.671 | 7.435 | 0.04 |
| ABC | $RESI\hat{D}2$ | C | $RESI\hat{D}2$ (-1) | 0.001 (4.448) | 0.040 (0.437) | 0.191 | 0.194 | 0.00 |
| MBANK | $RESI\hat{D}2$ | C | $RESI\hat{D}2$ (-1) | 0.000 (4.128) | 0.184 (2.578) | 6.647 | 6.489 | 0.03 |
| SC | $RESI\hat{D}2$ | C | $RESI\hat{D}2$ (-1) | 0.000 (6.016) | 0.150 (2.892) | 8.363 | 8.212 | 0.02 |

❖ **Table 13(b): Group Statistics**

| | *L CIB* | *G CIB* | *L PACHIN* | *G PACHIN* | *L ABC* | *G ABC* | *L MBANK* | *G MBANK* | *L SZ* | *G SZ* |
|---|---|---|---|---|---|---|---|---|---|---|
| MEAN | -0.001 | -0.001 | -0.001 | -0.001 | 0.001 | -0.0.85 | -0.002 | -0.002 | -0.69 | -0.000 |
| MEDIAN | -0.002 | 0.000 | -0.001 | 0.000 | 0.000 | 0.000 | -0.002 | -0.003 | 0.000 | 0.000 |
| MAXIMUM | 0.102 | 0.154 | 0.070 | 0.113 | 0.062 | 0.109 | 0.057 | 0.125 | 0.095 | 0.099 |
| MINIMUM | -0.097 | -0.126 | -0.049 | -0.104 | -0.088 | -0.133 | -0.097 | -0.109 | -0.077 | -0.086 |
| Std.Dev. | 0.028 | 0.030 | 0.023 | 0.026 | 0.024 | 0.034 | 0.021 | 0.028 | 0.021 | 0.023 |
| Skewness | 0.199 | 0.704 | 0.332 | 0.242 | -0.692 | 0.106 | -0.592 | 0.158 | 0.174 | 0.386 |
| Kurtosis | 4.706 | 8.720 | 3.398 | 6.378 | 5.219 | 5.484 | 6.851 | 7.638 | 6.283 | 7.068 |
| Jarque-Bera | 42.581 | 481.54 | 4.496 | 87.359 | 34.772 | 31.584 | 129.896 | 172.573 | 157.5 | 247.89 |
| Probability | 0.000 | 0.000 | 0.106 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Observation | 333 | 333 | 180 | 180 | 122 | 122 | 192 | 192 | 347 | 347 |

❖ **Table 13(c): Correlation Matrix**

| | *LCIB* | *GCIB* |
|---|---|---|
| **LCIB** | 1.000 | 0.587 |
| **GCIB** | 0.587 | 1.000 |
| | LPACHIN | GPACHIN |
| **LPACHIN** | 1.000 | 0.477 |
| **GPACHIN** | 0.477 | 1.000 |
| | LABC | GABC |
| **LABC** | 1.000 | 0.210 |
| **GABC** | 0.210 | 1.000 |
| | LMBANK | GMBANK |
| **LMBANK** | 1.000 | 0.509 |
| **GMBANK** | 0.509 | 1.000 |
| | LSC | GSC |
| **LSC** | 1.000 | 0.403 |
| **GSC** | 0.403 | 1.000 |

**All tables were produced using the E-Views Program.**

**Source:** **The Capital market Authority (Daily data from January 1997-October 1998).**

companies studied is high to some extent except for the El-Ahram Beverage Company. This is very strange result especially because the El-Ahram Beverage Company is the only company where the number of GDR represents a large percentage of its own listed assets in the Egyptian Stock Exchange (70%). While this percentage for the CIB doesn't exceed 1.6%. As for the other companies, the percentages are 15.8, 3.6 and 26.7 for Suez Cement, Misr International Bank and Paints and Chemicals Industries respectively. **So, what is the reason behind the low coefficient of determination and low coefficient of correlation in the case of El-Ahram Beverage Company although the percentage of GDR to its own listed shares is the highest one compared to other companies?** The answer lies in that the GDRs of El-Ahram Beverage Company in London is not active like for example the GDRs of the CIB. That's why although the GDRs represent only 1.6% of the total listed shares of the CIB and 70% of the total listed shares of El-Ahram Beverage Company, their effect on the shares of the CIB in Egypt is higher than their effect on the shares of El-Ahram Beverage Company. A kind of arbitrage happens a lot in the case of CIB, while it rarely happens in the case of El-Ahram (CMA, 1999).

In general, GDRs can be considered the only factor from the outside that affect the local shares prices in the Egyptian Stock Exchange represented in the five companies studied. Yet, their effect remains very limited since they represent very small portion of the total market capitalization of the Egyptian Stock Market (CMA, 1999). The percentage of the GDR shares to the market capitalization in Egypt represented 1.6% in 1996. This percentage decreased to 1.3% in 1997 (Azzam, 1998).

# CHAPTER VI

# FOREIGNERS' INFLOWS-OUTFLOWS AND THE EGYPTIAN STOCK MARKET

The last external factor I am going to test is "Foreigners' Inflows and Outflows", and how they are affecting the Egyptian Stock Market. Looking at a report written by the American Chamber of Commerce in Egypt, foreign investment accounted for 4.5 Billion Egyptian Pounds in the first three quarters of 1997, or 31% of the total market trading value of listed securities (Egypt's Economic Profile. Capital Market Overview, 1997, Internet).

**6.1 Methodology:** Here, I am going to run two regressions. The first regression involves the Net Foreign Inflow[10] (Foreign Inflow-Foreign Outflow) as a dependant variable. While, the independent variable is the Net Return (Egyptian Return-World Return). The equation is as follows:

$$Y_t = \alpha + \beta X_t + \varepsilon_t \qquad (6.1)$$

Where $Y_t$ is the weekly % change in the net foreign inflow, and $X_t$ is the weekly % change in net return.

- The null hypothesis to be tested is;

$$H_\circ : \alpha = 0$$
$$H_1 : \alpha \neq 0$$
$$H_\circ : \beta = 0$$
$$H_1 = \beta \neq 0$$

[10] The number of bid transactions the Foreigners engage on is represented as Foreign Inflow. While, the number of offer transactions the Foreigners engage on is represented as Foreign Outflow.

The second regression involves the EPI[11] as a dependant variable, and net foreign inflow as an independent variable. The equation is as follows:

$$Y_t = \alpha + \beta X_t + \varepsilon_t \qquad (6.2)$$

Where $Y_t$ is the daily EPI, and $X_t$ is the daily net foreign inflow.

- The null hypothesis to be tested is;

$H_\circ : \alpha = 0$

$H_1 : \alpha \neq 0$

$H_\circ : \beta = 0$

$H_1 = \beta \neq 0$

All I want to reach is to test the effect of the net return on the net foreign inflow to Egypt. Also, I want to test the effect of the net foreign inflow on the stock prices in Egypt. In doing these tests, I used simple OLS regression to estimate the parameters of the equation. I used the t-statistics to test the significance of the betas. Also, I used an F-test, autocorrelation, heteroskedasticity and normality.

**6.2 Data sources and Description:** All the data was obtained from the CMA in Egypt. For the first regression, I used weekly data during the period of 2/October/1996 till 24/June/1998. The data are calculated as a percentage change to show the trend. They are about 89 observations. For the second regression, I used daily data during the period of 1/October/1996 till 30/June/1998. The data are in absolute values and the included observations are 435.

**6.3 Empirical Results: (For the first regression)**

**A) The significance of the Parameters:** Table 14(a) shows the significance of the estimated parameter denoted by $\hat{\beta}$. The value between parentheses shows the value of the t-statistics that turned out to be insignificant (-1.237) as it's lower than the tabulated t

[11] The Egyptian Stock Price Index gives an indication of the Stock Prices as well.

(1.99). The constant also has insignificant coefficient. The $R^2$ is very low (1.7%) which means that the explanatory variable is able to explain only 1.7% of the variation in the dependant variable. The F-Stat. also shows insignificant regression as the calculated F (1.35) is smaller than the tabulated F(3.95). Also, the D.W. shows that there is no serial correlation as indicated by the value 2.14 which is greater than the $d_u$ (1.68). So, there is no reason to correct for autocorrelation.

**B) ML-ARCH:** As can be seen from the coefficient of ARCH(1) and GARCH(1) of the Variance Equation in table 14(b), they are significant. The coefficient of ARCH(1) is negatively significant, while the coefficient of GARCH(1) is positively significant. This means that the variance is not constant and it's varying across time. The conditional variance depends on past squared error. On the other hand, the constant is insignificant. This leads us to conclude that there's a dynamic structure in the second moment.

**C) The Lag Equation:** Another regression was performed but with two lags for the net return as shown in table 15(a). The regression is still insignificant, with insignificant coefficients as shown by the F-stat. and the t-statistics respectively. The regression has somewhat higher coefficient of determination (3.8%) but still it's very low. The D.W. is 1.62 which leaves us with inconclusive results as this value falls between $d_l$=1.59 and $d_u$=1.73 (Pindyck and Rubinfeld, 1991).

**D) The Lag Equation after correcting for Autocorrelation:** An autoregressive process of order one was performed on the lag equation in table 15(a) and produced the results shown in table 15(b). Still, the betas are insignificant. Even the coefficient of AR(1) is insignificant. The $R^2$ is higher due to the autoregressive process but not very high, still it's low (4.8%). Also, the F-stat. shows that the whole regression is still insignificant.

❖ **Table 14(a): The Net Foreign Inflow Regression**

| *Dep. Var.* | *Indep. Var.* | | $\alpha$ | $\hat{\beta}$ | $R^2$ | *S.E. of Regression* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|
| NFI | C | NRET | 4.826 (0.117) | -15.747 (-1.237) | 0.017 | 387.403 | 2.14 | 1.530 |

❖ **Table 14(b): The NFI Regression-ML-ARCH**

| *Dep. Var.* | *Indep. Var.* | | $\alpha$ | $\hat{\beta}$ | $R^2$ | *S.E. of Regression* | *D.W* |
|---|---|---|---|---|---|---|---|
| NFI | C | NRET | 16.651 (0.137) | -19.269 (-0.598) | 0.016 | 394.612 | 2.131 |

❖ **The Variance Equation:**

| *Variance Equation* | | | $\alpha$ | $\hat{\rho}_1$ | $\hat{\rho}_2$ |
|---|---|---|---|---|---|
| C | ARCH(1) | GARCH(1) | 95336.35 (3.095) | -0.027 (-3.873) | 0.425 (4.431) |

❖ **Table 15(a): The NFI Regression with Lags**

| *Indep. Var.* | | | | $\alpha$ | $\hat{\beta}_1$ | $\hat{\beta}_2$ | $\hat{\beta}_3$ | $R^2$ | *S.E. OF REGR.* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | NRET | NRET (-1) | NRET (-2) | 4.007 (0.095) | -14.354 (-1.039) | 9.597 (0.715) | -10.557 (-0.763) | 0.04 | 394.332 | 1.62 | 0.80 |

❖ **Table 15(b): After correcting for Autocorrelation**

| *Indep. Var.* | | | | | $\alpha$ | $\hat{\beta}_1$ | $\hat{\beta}_2$ | $\hat{\beta}_3$ | $\hat{\rho}$ | *D.W* | *F-stat.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | N RET | NRET (-1) | NRET (-2) | AR (1) | 32.06 (1.10) | -12.26 (-1.24) | 4.65 (0.48) | -10.03 (-1.01) | -0.053 (-0.674) | 2.12 | 1.03 |

❖ **Table 16(a): Breusch-Godfrey Serial Correlation LM Test:**

| *Indep. Var.* | | | | $\alpha$ | $\hat{\beta}$ | $\hat{\rho}_1$ | $\hat{\rho}_2$ | *F-Stat* | *Obs.* $R^2$ |
|---|---|---|---|---|---|---|---|---|---|
| C | N RET | RESID (-1) | RESID (-2) | 0.007 (0.000) | 0.293 (0.023) | -0.072 (-0.666) | -0.049 (-0.452) | 0.305 | 0.634 |

All the tables were produced using the E-Views Program.
Source: The Capital Market Authority (Weekly data from 2/October/1996-24/June/1998).

❖ **Table 16(b): Group Statistics**

| | *NFI* | *NRET* |
|---|---|---|
| Mean | 3.395 | 0.091 |
| Median | -4.164 | -0.335 |
| Maximum | 2385.23 | 9.688 |
| Minimum | -2526.17 | -7.124 |
| Std. Dev. | 388.57 | 3.244 |
| Skewness | -0.521 | 0.792 |
| Kurtosis | 36.899 | 4.223 |
| Jarque-Bera | 4265.58 | 14.861 |
| Probability | 0.000 | 0.001 |
| Observations | 89 | 89 |

All the tables were produced using the E-Views Program.
Source: The Capital Market Authority (Weekly data from October 1996-June 1998).

**E) Breusch-Godfrey Serial Correlation LM Test:** Regressing the residual on the explanatory variable and the first and second lag of the residual, we have the following results as shown in table 16(a). At 95% level of confidence and 2 degrees of freedom, the critical value of $nR^2$ distributed as $\chi^2$ is 5.99. On the other side, the obs* $R^2$ is 0.634 which is lower than the critical value. Therefore, we accept the null hypothesis of no serial correlation. The lags of the residual as can be seen have insignificant coefficients.

**F) Summary Statistics:** In table 16(b), the average % change in the NFI as represented by the mean is 3.395. While, the average % change of the NRET is 0.09 which means that the Egyptian return is somehow higher than that of the World.

As for the Standard Deviation, its results reveal that the risk associated with the NFI is very high (388.57) which means that it has very high variance. While the risk associated with the NRET is moderate (3.244), the NRET has somehow low variability.

In testing normality, the Jarque-Bera test with a critical value of 5.99 at 2 degrees of freedom and 5% level of significance rejects the null hypothesis of normally distributed disturbances for both NFT and NRET since the calculated values are greater than the critical value.

## 6.4 Empirical Results: (For the second regression)

**A) The Significance of the Parameters:** Table 17(a) shows that the estimated beta is insignificant for the explanatory variable, while the estimated coefficient of the constant is significant. So we reject the null hypothesis in the case of the constant, while we accept it in the case of the beta. $R^2$ is very low only 0.4% which means that the net foreign inflow does not have any significant effect on the stock prices except by 0.4%, something negligible. The F-stat. shows that the whole regression is insignificant. While, the D.W. reveals very serious autocorrelation (0.013). I run a regression with six lags

and it revealed very insignificant coefficients for the betas. That is why I found it unnecessary to include this regression in this paper.

**B) Correcting for Autocorrelation:** Still the $\hat{\beta}$ is insignificant, while the constant coefficient is significant. The coefficient of AR(1) is very positively significant (299) as shown in table 17(b). The D.W. still shows very serious autocorrelation. While $R^2$ is now high (99%) due to adding the very significant AR(1). The whole regression is significant as shown by the F-stat.

**C) Correcting for Autocorrelation using the ARMA process:** As can be seen from table 17(c ), the serious autocorrelation has been corrected using ARMA(2,1). The D.W. is now higher (1.99).

**D) Breusch-Godfrey Serial Correlation LM-Test:** By regressing the residual on the explanatory variables and the first and second lag of the residual, the following results are produced in table 18(a). With critical value of 5.99 and obs* $R^2$ equals to 424.29, we reject the null hypothesis of no serial correlation or $\rho = 0$ since the obs* $R^2$ is greater than the critical value.

**E) ARCH Test:** The regression of the residual on its lag in table 18(b) reveals very positive significant coefficient of the residual (170.19) which means that we have an autoregressive conditional heteroskedasticity in the disturbance.

**F) Summary Statistics:** In table 19, the mean shows that the average NFI during the period covered was 6,645,152 Egyptian Pounds, While the Egyptian Stock Prices were at an average of 349.7 Egyptian Pounds.

As for the Standard Deviation, it reveals very surprising result. Dividing it by the mean, we get very high variability for the NFI equals to 557%. However, the variability is very low regarding the stock prices which is equal to 0.13.

❖ **Table 17(a): The EPI and NFI Regression**

| *Dep. Var.* | *Indep. Var.* | | $\alpha$ | $\hat{\beta}$ | $R^2$ | *S.E. of Regression* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|
| EPI | C | NFI | 350.16 (161.93) | -7.60E-08 (-1.322) | 0.004 | 0.002 | 0.013 | 1.747 |

❖ **Table 17(b): After correcting for Autocorrelation**

| *No* | *Dep. Var.* | *Indep. Var.* | | | $\alpha$ | $\hat{\beta}$ | $\hat{\rho}$ | $R^2$ | *S.E. of Reg.* | *D.W* | *F-Stat* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EPI | C | NFI | AR (1) | 379.239 (21.782) | 1.39E-09 (0.477) | 0.989 (299.2) | 0.99 | 3.062 | 0.897 | 44750 |

❖ **Table 17(c ): Correcting for Autocorrelation using ARMA(2,1)**

| *Indep. Var.* | | | | | $\alpha$ | $\hat{\beta}$ | $\hat{\rho}_1$ | $\hat{\rho}_2$ | $\hat{\rho}_3$ |
|---|---|---|---|---|---|---|---|---|---|
| C | NFI | AR(1) | AR(2) | MA(1) | 370.9 (19.6) | 1.15E-09 (0.72) | 1.33 (17.4) | -0.34 (-4.49) | 0.319 (4.146) |

❖ **Table 18(a): Breusch-Godfrey Serial Correlation LM Test:**

| *Indep. Var.* | | | | $\alpha$ | $\hat{\beta}$ | $\hat{\rho}_1$ | $\hat{\rho}_2$ | *F-Stat* | *Obs.* $R^2$ |
|---|---|---|---|---|---|---|---|---|---|
| C | NFI | RESID (-1) | RESID (-2) | -0.478 (-1.407) | 7.21E-08 (7.954) | 0.952 (21.08) | 0.038 (0.841) | 8539.17 | 424.29 |

❖ **Table 18(b): ARCH Test**

| *Dep. Var.* | *Indep. Var.* | | $\alpha$ | $\hat{\rho}$ | *F-Stat* | *Obs.* $R^2$ | $R^2$ |
|---|---|---|---|---|---|---|---|
| $RESI\hat{D}2$ | C | $RESI\hat{D}2$ (-1) | 6.574 (0.281) | 0.981 (170.19) | 28967.8 | 427.62 | 0.985 |

❖ **Table 19:Group Statistics**

| | *NFI* | *EPI* |
|---|---|---|
| MEAN | 6645152 | 349.657 |
| MEDIAN | 2557413 | 359.890 |
| MAXIMUM | 4.37E+08 | 427.77 |
| MINIMUM | -1.84E+08 | 232.68 |
| Std.Dev. | 37039455 | 44.429 |
| Skewness | 7.985649 | -1.366 |
| Kurtosis | 86.19353 | 4.246 |
| Jarque-Bera | 130069.4 | 163.326 |
| Probability | 0.000 | 0.000 |
| Observations | 435 | 435 |

All the tables were produced using the E-Views Program.

Source: The Capital Market Authority (Daily data from October 1996-June 1998).

In testing Normality, we rejected the hypothesis of normally distributed disturbances since the calculated values are higher than the critical value of 5.99 as shown in table 19.

❖ **A General Comment:** It seems from the results of course that the Foreigners' Inflows and Outflows don't have any significant impact on the Egyptian Stock Market in General. It has been obvious from the first regression that the net return doesn't affect the net foreign inflow to Egypt. This may be due to the lack of information concerning the Egyptian Stock Market. Also, the absence of serial correlation indicated by D.W. in the first regression means that the net foreign inflow doesn't follow a certain pattern. In other words, they aren't affected by the past sequence or behavior. As for the second regression, it reveals very high serial autocorrelation due to the ineffectiveness of net foreign inflow as an explanatory variable. It's obvious also that the Egyptian Stock Price Index is highly affected by its past observations. The ineffectiveness of the net foreign inflow as an independent variable is due to the small number of transactions of the foreigners in the Egyptian market. So during the period from October 1996 till October 1997, the total number of transactions was 8.09% relative to the whole amount of transactions in the Egyptian Stock Market (Azzam, 1998). Moreover as revealed by the Standard Deviation and the Mean, the net foreign inflow has very high variability amounting to 557%. This means that they conduct large number of transactions at specific dates in the year and their activities during the rest of the year remain very low. This explains the high variability in the net foreign inflow, and at the same time explains the insignificance of the net foreign inflow as an independent variable (CMA, 1999).

# CHAPTER VII

# EGYPTIAN STOCK MARKET AND INTEGRATION WITH THE GLOBAL MARKET

The results produced by the tests we have performed revealed an important point. Until now, Egypt's Financial Market is not affected by what happens worldwide. In other words, the Egyptian Financial market especially the Stock market which is the main topic of this study is not yet integrated with the World Financial markets. But why is this the case although Egypt is encouraging foreign investment by all means?

On one hand, following the economic reforms that Egypt began by the end of the 1980s, Egypt took many steps to attract foreign investment. These steps are summarized in the removal of most foreign exchange controls, stabilizing the exchange rate to attract more capital inflows, liberalizing interest rates, lowering tariffs by 30% and the privatization program(Economy,1998, Internet).

On the other hand, President Mubarak has said several times that Egypt is in the way to integrate with the world economy. Besides, the Cairo conference of 1996 "which was a meeting of Middle Eastern and African states" discussed the issue of creating an attractive environment for foreign investors (Economy, 1998, Internet). **So, what are the reasons behind the absence of financial market integration till now between Egypt and the rest of the global financial markets, and why is the percentage of foreigners' transactions in the Stock market still very low amounting to only 8%?**

The reasons are obvious and most of them relates to Egypt as a domestic economy. The domestic conditions in Egypt hinder its efforts of developing and integrating with the other world. The population growth is ruining all the efforts of developing the economy. What makes it even worse is the tendency towards "consumerism". In other words, " the country's economic reforms and infrastructural

development cannot keep pace with the population explosion and inflation". In addition, the huge foreign debt which is double the size of the national budget is considered another factor contributing to Egypt's economic instability (Egypt. The Economy, 1996, Internet).

Going to the most important factor affecting the level of foreign investment in Egypt, regional or political instability is very effective reason as far as Egypt is concerned. One can't deny that the Extremist Muslim groups with their terrorist attacks against the foreigners led to some way or another to the diminishing level of Foreign capital inflows to Egypt (Egypt. The Economy, 1996, Internet). Militant opposition groups are considered a powerful factor threatening the country's security (EFG, 1998).

One reason according to a study discussing the reasons behind the low foreign investment in Egypt is Infrastructure and one example is the "telecommunications sector". Egypt adds about 250,000 to 300,000 phone lines every year, but the nation still suffers from the inadequacy of the phone lines with the population expected to reach 67 millions by the year 2000. Another example is the " railroad systems". Although the railroad systems have been developed in Egypt, they are still only connecting 75% of all cities in the country (Economy, 1998, Internet).

Another reason for the low foreign investment in Egypt is the volatility of the Egyptian economy itself. The economy is vulnerable to the movement of the world oil prices. Since the end of 1980s, Egypt was extremely and badly affected by the sharp decline in the world oil prices. The effects included: decline in productivity and high inflation which are something outside Egypt's control (Economy, 1998, Internet).

Many other factors could be added to the above reasons. The Egyptian economy in general as I've said at the beginning is not stable due to the instability of the inflation rate which is mainly affected by the oil prices. The market here is considered risky. In general, the Middle East and North African region is not yet seen as an attractive

investment region. The possibility of war between Egypt and Israel is available(Egypt. The rule of Mubarak,1996, Internet). In addition, one possible reason is the beaurcracy found in most governmental institutions here in Egypt which does not encourage investment.

As far as the Stock Market is concerned, as I've said earlier the stock market in Egypt was revived in 1992 with new laws and regulations. The Capital market law in Egypt lifted all restrictions on foreign ownership of assets. There are no specific constraints on the foreigners' transactions in the Egyptian Stock market. There are no transaction costs and no taxes on capital gain (EFG, 1998). Therefore, regarding the Stock market in Egypt, there are no specific regulations discouraging Foreigners' Investment. On the contrary, it's encouraging foreign investment.

Inspite of all what I've mentioned above, it seems that Egypt is following the right path with slow steps towards integration and development. Concerning the Financial sector, Egypt has a strong financial market on the domestic level with stable exchange rate policy. "Its greatest drawback is that its current size does not allow it to absorb as much capital as it could potentially receive in a global reallocation of funds."(EFG, 1998).

The future of the Stock market in Egypt is promising. Compared to other markets, Egypt has the highest yields of 8-12%. Market capitalization increased by 3.4 times from 1992 till 1995. In 1998, market capitalization reached 72.2 billion Egyptian Pounds (EFG, 1998). The number of transactions increased also from 12.5 thousand to 1.7 million in nine months only in 1996. The number of traded securities increased from 30 million in 1992 to 143 million in 1996. Moreover, its inclusion in the IFC as an emerging stock market will increase the foreigners' capital inflows to Egypt (Egypt's Economic Profile. Capital Market Overview, 1997, Internet).

# CHAPTER VIII

# CONCLUSION

Contrary to what is written at the beginning of this study, the results as shown by the tests performed proved that Egypt is not financially globalized.

The four external factors that were assumed to affect the Egyptian Stock Market through the Egyptian stock price index showed insignificant effect except for the GDR prices.

The foreign exchange rate effect tested through the ICAPM was insignificant. All the foreign exchange rates included in the equation as explanatory variables had insignificant coefficients with high serial correlation and conditional heteroskedasticity. Even after correcting for serial correlation, the coefficients remained insignificant. The reason relates to the exchange rate policy that Egypt follows, that's stable exchange rate system.

The second external factor tested is London Stock Exchange represented by the Financial Times Index. This relation (between Egyptian Price Index and Financial Times Index) turned to be insignificant with high serial correlation and conditional heteroskedasticity. The reason was that the GDRs which are the only Egyptian issued stocks traded in London represent a small percentage of the total market capitalization of London Stock Exchange.

As for the Egyptian Stock Market relation with the rest of the other international stock markets, the relation was also insignificant except in the case of Denmark. The correlation coefficient is very low between Egypt and the rest of the world.

The third external factor is the GDR prices. As indicated by the tests performed, it's the only external variable that affected the Egyptian Stock Prices. This had been indicated by the regressions done for the five Egyptian companies that issue GDRs. The GDR prices had a positive significant effect on the equivalent local asset prices of the

five companies. This effect had been high for certain companies like the CIB and low for other companies like El-Ahram Beverage Company inspite of the high percentage of GDRs to the total listed securities in the case of El-Ahram (70%) and its low percentage in the case of CIB (1.6%). The reason was due to the difference in transactions performed on the GDRs of the CIB and that of El-Ahram Beverage Company (higher in the case of the CIB).

The last external factor tested is the Net Foreign Capital Inflow. Two regressions were done to test the effect of this factor. They both resulted in insignificant relationship between the net return (between Egypt and the World) and net foreign inflow. On one hand, the net return seems not to affect the net foreign capital inflow in any way. The coefficient of the net return was insignificant. There was no serial correlation which may be due to the high variability of the net foreign inflow that didn't follow a certain pattern. In other words, the net foreign capital inflow wasn't affected by its lagged values. On the other hand, the net foreign inflow didn't have any significant effect on the Egyptian Stock Prices. The autocorrelation was very serious with very positive significant coefficient for the AR(1). Also, there was an autoregressive conditional heteroskedasticity. Moreover, we had very high coefficient of variation in the case of the net foreign inflow (557%) which means that the net capital foreign inflows have very high variability. They have only high values in specific days of the year, while the other days of the year witness a depression in their transactions. In addition, the percentage of foreigners' transactions to the total stock market transactions is only 8%. This means that in general, the independent variables included in our equations had insignificant effect on the Egyptian Stock Price Index in the linear form except for the GDRs.

Finally, as I've said before there are many reasons behind Egypt's non-integration in the Global Financial Markets. All of them are mainly relating to the domestic economy

of Egypt. The most important factor is the regional or political instability. Other factors include: the population growth, infrastructure, beaurcracy and foreign debt.

On the other side, the Egyptian Stock Market with the new laws and regulations of the Capital Market Authority encourages foreign investment through lifting all the restrictions on foreign ownership of assets.

Actually, there are other factors that really affect the volatility of the Egyptian stock market. Yet, most of these factors are domestic or internal ones. The stock price index in Egypt is greatly affected by the previous periods' observations. Also, the most active companies in the market with the fluctuations in their asset prices have huge effect on the stock price index volatility. About 93% of the reason behind the volatility of the Egyptian stock price index is due to the transactions of these active companies. Moreover, the news and rumors that spread in the market about the adoption of a certain government policy affect to a great extent the stock price index in Egypt (Morsi, 1999). The effect of the internal factors can be studied in more details in further researches.

In conclusion, the results of this study give a whole picture about the Egyptian Stock Market response to the external factors. The insignificance of the relationships studied in this paper doesn't mean that this will be the pattern the coming years. Still, we are an emerging stock market and most foreigners lack information on the Egyptian market. The stock market in Egypt is expanding very fast, and of course this will give an impressive signal to the foreign investors (Egypt's Economic Profile. Capital Market Overview, 1997, Internet). The projections as of the year 1999 points out to growth in the foreign investment in Egypt (Egyptian Economy. Preface, 1998, Internet). That is why the results will evolve through time with more integration with the world economy, and with more market transparency and more information on the Egyptian market. This will be revealed by future studies.

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