

## **Speculative Activities, Efficiency and Normative Stock Exchange**

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**ABSTRACT.** This study reviews Tag el-Din's (1996) paper and raises the possibilities that his organizational models may create other kinds of inefficiency. Furthermore, using Canadian stock data we extended his study and found that excess speculative activities (bubbles) do not add any information to the stock markets. Consequently, according to our empirical evidence, in light of Tag el-Din's view, to achieve an efficient and stable stock market, a highly regulatory normative stock exchange is needed. In this regard this study proposes that the central bank and the government ensure that the investors in the stock markets have comprehensive knowledge of the stock market mechanism. Furthermore, the study proposes that government levies a tax on short-term horizon investment returns.

### **I. Introduction**

A drastic fall in stock prices, when not justified by fundamentals, concerns monetary policy makers because it can create a sudden need to add liquidity to the financial system. This need for liquidity can complicate policy makers' efforts to pursue other objectives, especially if it conflicts with a need for anti-inflationary policy. Furthermore, price movements that exceed what can be justified by changes of fundamentals have the potential to result in resource misallocation. Therefore, any event which could influence stock prices without affecting fundamentals is a concern of monetary policy makers.

Furthermore, instability in equity markets can undermine the stability of financial institutions that are directly or indirectly exposed to equity markets. Modest movements and/or movements in stock prices which last only for a very short period of time (one or two days) do little if any harm to financial markets, but larger and lasting

movements in stock values have a disproportionately greater potential to do harm to the financial system or do real economic damage.

Moreover, the increasing integration of capital markets has made institutions in the financial sector more interdependent and has brought to force the issue of systemic risk. Furthermore, in a zero-interest rate environment the success of the central bank policy is highly related to healthy, stable and efficient stock markets. Consequently, the main and the most important task of the central bank and/or government is to ensure healthy, stable and efficient stock markets. This requires the elimination of or at least the reduction in excessive speculation activities in the stock markets. Such an action will guarantee a stock price which fully and correctly incorporates all available information.

However, because uncertainty is a fact of life there is not any kind of price except a speculative one. A successful investor is a speculator while a speculator is merely an investor who has lost his money (**Samuelson**, 1972). To **Keynes** (1976), speculative markets are mere casinos where the wealth is transferred from unlucky to lucky and from slow to quick individuals. "It is usually agreed that casinos should, in the public interest, be inaccessible and expensive. And perhaps the same is true of stock exchanges.", (**Keynes**, 1976, p. 159). Consequently, **Keynes** (1976, p. 160) suggests "The introduction of a substantial government transfer tax on all transactions might prove the most serviceable reform available, with a view to mitigating the predominance of speculation over enterprise in the United States."

In a recent paper, **Tag el-Din** (1996) discusses the traditional concept of market efficiency in light of the theories of Keynes-Hicks-Samuelson. He proposes three conditions and asserts that under these conditions both operational efficiency and informational efficiency can be achieved. The purpose of this study is to (i) carefully review Tag el-Din's paper, (ii) provide empirical evidence in light of our review and (iii) propose some policy recommendations based on the overall results.

This study finds that excessive speculative activities do create wasteful information from the efficiency point of view. Consequently, the empirical evidence in this paper confirms **Tag el-Din's** view that a highly regulatory normative stock exchange is needed in a competitive market in order to achieve an efficient stock market. This paper also shows that the application of Islamic law automatically guarantees stable and efficient stock markets. The next section provides comments on **Tag el-Din** (1996) and will follow with a section on theoretical analysis of asset pricing and speculative bubbles. Section IV is devoted to the empirical methodology and results, and the final section provides some concluding remarks as well as some policy recommendations.

## II. A Careful Review of Tag el-Din (1996)

The paper addresses the theoretical issues in the process of setting up an Islamic stock exchange. Given the Islamic law, a comprehensive definition of corporations and corporate shares is given. Furthermore, the Islamically accepted companies are explained and classified into financial (or properties), works, credit and *Mudaraba* companies<sup>1</sup>.

### II.1 *Market Efficiency and Random Walk*

If stock prices follow a random walk process then the returns are white noise. Namely, they cannot be forecasted, and markets are efficient. Tag el-Din states that, even if stock prices behave as a random walk, due to the existence of excessive trading (excessive speculative activities) by massive naïve investors who overreact mostly to irrelevant information, and undetectable churning (i.e., the repetitive buying and selling of securities when such activity has a minimal effect on the market, but generates additional commissions to a stockbroker), the market price can not reflect all available information. Namely, efficiency cannot be achieved in the current stock exchange markets. Furthermore, to cover the huge cost of brokerage houses, brokers and investment analysts fuel up the exchange velocity through undetectable churning which victimizes naïve investors<sup>2</sup>.

Speculators and churning create as much noise in the observed prices that they could not reflect all available information. These two factors also create a high velocity of circulation for outstanding shares. This high velocity results in inefficient managerial decisions since shareholders of a given corporation cannot exercise their legal right of closely cross-checking the performance of inefficient management. Namely, under the above circumstances if a share of a corporation has a high price, it is not due to the high profitability of the corporation as a result of high performance of the managers, but it may be only due to a speculative bubble in the share price. In sum, there are two factors behind the inefficiency of current conventional stock exchange markets: destabilizing excess speculative activities and non-ethical practice.

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1. Briefly, a financial company is defined when two or more partners come together in a joint contract to contribute specific shares of capital for trade purposes. A work company exists when two or more skilled workers combine their efforts to offer their services at market price to the public. A credit company is defined when partners carry out trade using the capital of an inactive partner. The *Mudaraba* company is defined when one party puts up capital and another party puts up entrepreneurship and/or labor on trade on a predetermined profit-sharing basis. A financial loss will be borne by the owner of capital.
  2. It should be mentioned that there seems to be some confusion in **Tag el-Din** (1996) between Eugene F. Fama and Paul H. Cootner when he discusses random walk. In fact, the article quoted in the reference of Tag el-Din's paper should be **Fama's** (1965) and not Cootner's.

In this regard Tag el-Din suggests a highly regulatory normative stock exchange within two alternative organizational models:

(a) To encourage the utilization of the services of various professional equity-risk ratings. Namely, in order for shares of a company to be listed on an organized stock exchange, the company must hire professional services to measure the risk contained in its shares and make such information accessible to shareholders. Such information should be available daily. Furthermore, there should be restrictions on two groups of participants: large number of individual shareholders, and investors with large available funds, like mutual fund companies, security dealers, etc.

Then, with professionally determined prices as benchmark, competition among participants determines the final equilibrium prices. It is also suggested that the large mass of ignorant investors be only allowed to transact equities through the easy entry and exit from an open-ended intermediary. In this way, according to Tag el-Din, mass-psychology cannot influence stock prices, since the large ignorant masses are already held back from the valuation prices in stock exchanges.

(b) In a less restrictive way, it was suggested that the current open system be maintained, but with the provision that all registered companies have to hire the services of trustworthy professionals to produce and publicize estimates of companies' shares.

However, the implication of the organizational models, introduced by Tag el-Din (1996), may create two inefficiency problems as follows:

(a) In both organizational models, the transaction costs of listing a share would be so high that small firms would simply not be able to finance their investments by equities. These investors will probably resort to debt financing. And if debt markets are not developed and small firms cannot use a black market to finance their capital they will simply be eliminated from the market. One may argue that small-cap companies can sell their shares in over-the-counter markets. However, in Tag el-Din's organizational model settings, where listed stocks bear relatively little risk, the stocks available over-the-counter markets are considered relatively very high risk.

Consequently, investors will demand high-risk premiums that impose further restrictions on small-cap companies to finance their investment by equities. It should be noted that even in non-Islamic countries where developed debt markets exist, small-cap companies' issued bonds, under Tag el-Din's organizational model settings, would have to pay high coupons in order to compete with large-cap companies' issued bonds in debt markets. Furthermore, because of the risk associated with small-cap companies' debt, small-cap issued bonds would be sold at low prices.

(b) Since investors with large available funds, like mutual fund companies, security dealers, etc., are not allowed, according to the first organizational model, to allocate the society savings to equity markets, a further inefficiency would be created. Namely, the funds of ultimate savers will not be allocated to equity markets.

## **II.2 Stock Market Efficiency and Preemptive Right**

It is widely believed among Muslims that the implementation of Islamic law (*shariah*) should result in a higher efficiency, both operational and informational. Common stocks (ordinary shares) are permitted in an Islamic economy while preferred shares are considered like interest-bearing bonds and are not allowed. However, according to Tag el-Din, it was suggested by Al-Khayat that a clause of “preemptive right (*shuf'a*)”, which would give existing shareholders priority over potential shareholders whenever new shares are issued, is to be adopted. Tag el-Din argues that the option of preemptive right will reduce significantly the velocity of shares circulation, thus deviating from the the pure model of free exchange on which the traditional stock exchange is based. However, he suggests that preemptive right can be adopted in the case of new issues in equity financing with the option that shareholders are free to adopt it or waive it. It should be noted that, as it was also mentioned by Tag el-Din (1996), there is no direct reference to preemptive right in *The Holy Qur-an* and this right is based on the Prophet’s tradition.

Two important points should be made. (i) The tradition of *shuf'a* is related to undivided plots and not shares or stocks which are completely different from a piece of land. Consequently, the application of preemptive right to stocks may not be relevant. (ii) The preemptive right on stocks, if adopted by shareholders, will reduce liquidity of the shares and, consequently, shareholders will demand high liquidity premiums. Furthermore, since firms cannot list their new shares on stock exchanges, the application of preemptive right on stock exchanges would create another difficulty for companies to finance their investments by issuing equities. This completely contradicts the spirit of this Islamic law since, in fact, the immediate implication of preemptive right is that God wants to remove difficulties from our affairs. For instance, indirect references to preemptive right in *The Holy Qur-an* can be seen in Ch. 2, Verse 185 (“... God intends every facility for you; He does not want to put you to difficulties. ...”) and Verse 220 (“... if God had wished, He could have put you into difficulties ...”). Consequently, if the application of preemptive right for shares causes any difficulty in equity financing for firms, it creates inefficiencies and, therefore, should not be applied to equity financing.

## **II.3 Uncertainty on Stock Prices and Gharar**

*Gharar* in an Islamic sense means “uncertainty about any one of the objects of exchange; either amount of *price* to be paid for a specific commodity, or nature of *commodity* to be bought at a given price.” (Tag el-Din, 1996, p. 36). In general,

transactions are *accepted* from an Islamic point of view if the qualities and flaws of the commodity (including stocks) transacted were known to the buyer(s) and seller(s). Furthermore, the true price of the commodity should be declared by transacting participants, (Al-Ghazzali, 1992, pp. 350-354). For example, if the purchaser, based on the knowledge of some information, believes the share is undervalued, then he/she should provide the information to the seller(s), otherwise, some kind of gambling or *gharar* has occurred.

To avoid *gharar* in stock exchanges, and based on the above Islamic fact, Tag el-Din (1996, p. 36) asserts that two main conditions should be satisfied: *First: Making accessible all relevant information and financial indicators for the use of participants in the stock exchange. Second: Participants must acquire (or somehow seek the service of) the analytical ability to carefully process such information to obtain consistent estimates for the true expected exchange values of the shares.*

However, as also mentioned by Tag el-Din, only one of the conditions in contemporary stock exchanges is known. The second condition, which, in our view, by no means should be related to the Islamic *shariah* (law), imposes a specific discriminatory condition for the investors, i.e., only those who have acquired the analytical ability or can purchase such services, in order to estimate the *true* expected exchange values of the shares, are allowed to purchase/sell shares. In fact, if one carefully looks at the above-mentioned Islamic conditions for an *acceptable* transaction, he/she will realize that the second condition, suggested by Tag el-Din, is redundant, since if a participant has any information which can be used to assess the price, he/she should declare it. Namely, the implementation of the Islamic law automatically guarantees true efficiency in the market without imposition of Tag el-Din's second condition.

It should, of course, be mentioned that, according to the Islamic law, it is highly recommended to have knowledge of the rules and regulations of the market as well as the knowledge of the market mechanism before engaging in any transaction, (Al-Ghazzali, 1992, p. 328). This Islamic recommendation enhances efficiency instead of imposing any restriction on investors as it speeds up the transaction process. Moreover, it should be further emphasized that many well-informed investors, like financial institutions, large investment firms, etc., because of the scale of their investment, can and do employ highly skilled finance-oriented econometricians to provide a consistent estimate of future prices of stocks. However, since none of these highly skilled specialists could claim to provide a consistent estimate of the *true* expected exchange values of shares, these investors can end up with a low-performed portfolio and in some cases incur a complete loss as a result of a poor investment strategy.

Furthermore, as history proves many financial intermediaries who used a consistent estimate of the future prices of shares, held as collateral in their lending process, found

those loans were “bad”, since the value of the collateral was not what they had estimated. In many cases, they went bankrupt. A recent example is the situation of Japanese banks which was a cause for a recession in Japan and the Asian crisis. In fact, it should be noted that using the same technique of estimation and the same information, investors usually come up with different opinions about the expected prices and so get involved in speculative trades among themselves. Consequently, these issues further verify our view that Tag el-Din’s second condition may be too restrictive. Therefore, it definitely does not comply at all with the Islamic Law.

In an Islamic system, transactions in stock markets occur, not because of different opinions about the future prices of the shares being transacted (excessive-speculative activities), but because of the investors’ utility maximization process. In this way, since markets are more often in equilibrium there is no room for excessive speculative activities.

Tag el-Din (1996, p. 38) states that “the criterion of market efficiency in a genuine Islamic perspective does not rely on the speed of liquid capital’s flow from *less* profitable projects to *more* profitable ones.” The reason, according to Tag el-Din, is that most socially profitable projects in the short-run are less profitable or are not profitable at all. Therefore, “... the purely profit-oriented concept of market efficiency cannot be defended on social grounds due to the adverse consequences it may have on the real investment motive over the long term, and the strong temptation it provides for making high profit in the short-run - or indeed the very short run.” Hence, he suggests a new condition to be added to the previously stated conditions, i.e., “socio-ethical investment motives”. As it was carefully mentioned by Tag el-Din, the second condition as well as the extra “socio-ethical investment motives” condition would control the velocity of shares’ circulation.

Furthermore, two important points should be mentioned:

(i) It is well known that the value of a common share does not depend on the holding period. Namely, for both short and long horizon investments, the price of a share depends on the expected, discounted present value of its real dividend stream, conditioned on current related available information on the share. Consequently, if the first condition introduced by Tag el-Din is met, the market price, in the absence of excess speculative activities (bubbles) should incorporate all future stream of income. In such a situation, prices of those projects that have a stable expected future stream of income should be higher than otherwise. Consequently, even investors with short-term investment horizon can make profits by keeping in their portfolios the shares issued to finance the most socially desirable projects.

(ii) There are, of course, public projects/investments that do not produce any financial profits, e.g., building public hospitals, parks, roads, etc. These investment projects are not, in general, financed by issuing equities. They are financed by issuing debt or tax

revenues in a nonIslamic system of government and by tax revenues as well as *zakat* funds in an Islamic system of government.

In sum, Tag el-Din (1996) provides convincing arguments against growing excessive speculative activities and inefficiency created by these activities in stock markets. He discusses a need for an optimum (maximum) level of speculative activities which is needed for liquidity and efficiency in stock markets. However, he questions whether or not it is possible to determine such a level of speculative activity. Consequently, Tag el-Din successfully stresses the need for a normative Islamic stock exchange to cope with wasteful excess speculative activities which have caused and will cause many financial crises, e.g., the October 1987 stock crisis and the current Asian crisis (the latter example is mine).

Tag el-Din (1996) provides two organizational models to cope with the ever-growing speculative problems. However, I raised the possibilities that these models may create other kinds of inefficiency. Tag el-Din's paper should be a good and basic start for future research in this area. I will extend Tag el-Din's study in this paper by testing, using Canadian stock data, the following hypotheses: excessive speculative activities destabilize stock markets and these activities do create wasteful information from an efficiency point of view.

### **III. Asset Pricing Model, Measurement of Fundamental Price and Bubbles**

In an exchange-economy asset-pricing model, Lucas (1978) finds that the equilibrium price of an asset is the expected, discounted, present value of its real dividend stream, conditional on current information. A close approximation of the model, which has been used extensively in the literature, is

$$P_t = (1+r)^{-1} E(P_{t+1} + D_{t+1}), \quad (1)$$

where  $P_t$  is the real stock price at time  $t$ ,  $D_{t+1}$  is the real dividend paid to the shareholders between  $t$  and  $t+1$ ,  $0 < (1+r)^{-1} < 1$  is the discount factor and  $E$  denotes the mathematical expectation operator for information at time  $t$ . If the transversality condition  $\lim_{n \rightarrow \infty} (1+r)^{-n} E_t(P_{t+n}) = 0$  holds, then the unique solution to Equation (1) is  $P_t = PF_t$ , where  $PF_t$  (the real fundamental value of the stock price at time  $t$ ) is

$$PF_t = \sum_{i=1}^{\infty} (1+r)^{-i} E(D_{t+i}). \quad (2)$$

Future dividends are not observable. One way to express the fundamental price in terms of observable dividends is to make an assumption about the stochastic process for dividends. Following Van Norden and Schaller (1996), we assume the log dividends are a random walk with constant drift. This leads to a simple solution in which the



fundamental price is a multiple of current dividends, i.e.,  $PF_t = \alpha D_t$ .<sup>3</sup> Under the hypothesis that the actual price corresponds to the fundamental price in **Lucas** (1978) model,  $\alpha$  is equal to the mathematical expectation of  $P_t/D_t$  (**Van Norden** and **Schaller**, 1996).

However, if the transversality condition is not satisfied, then  $P_t = PF_t$  is not the unique solution to Equation (1). One solution, from potentially infinite solutions, is given by

$$P_t = PF_t + B_t, \quad (3)$$

where  $B_t$  is the bubble term which must satisfy

$$B_t = (1+r)^{-1}E_t(B_{t+1}). \quad (4)$$

If market and fundamental values diverge, but beyond some range the differences are eliminated by speculative forces, then stock prices will revert to their mean. This implies that the stock returns must be negatively serially correlated at some frequencies if erroneous market moves are eventually corrected<sup>4</sup>. This kind of negative serial correlation is not a cogent refutation of a random walk process in price levels. However, it indicates that the price level will perform a *Brownian*-like vibration around the fundamental value and there will be an ergodic probability, i.e.,

$$\text{Prob. } \{P_{t+1} \leq X | P_t\} = \Pi_t(X, P_t), \text{ and } \lim_{t \rightarrow \infty} \Pi_t(X, P_t) = \Pi_t(X),$$

which means the probability of  $P_{t+1} \leq X$  is independent of  $P_t$ , where  $X$  is a constant value, (**Samuelson**, 1972)<sup>5</sup>.

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3. For example, **Cutler, et al.** (1991) assume the fundamental price is a constant proportion of real dividends in their estimation.
  4. There is extensive empirical literature on mean reverting equity rate of return. The results of these studies are mixed and mostly depend on the investment horizon, see, among many, **Poterba and Summers** (1988), **Kim, et al.** (1991), **Cutler et al.** (1991), **Coggin** (1998), and the literature quoted in these studies.
  5. Suppose  $P_t$  follows a random walk process, where  $P_t - P_{t-1} = e_t$  and  $e_t$  is the disturbance term which has an identical and independent normal distribution with zero mean and unit variance. Suppose we view  $e_t$  as the sum of  $m$  independent Gaussian variables each being identically, independently and normally distributed with zero mean and variance  $1/m$ . In addition, the process between  $m$  variable is defined at the noninteger dates  $\{t, 1/m\}_{t=0}^{\infty}$  and retains the property for both integer and noninteger dates that  $P_s - P_t$  is normally distributed with zero mean and variance  $s - t$  and  $P_s - P_t$  is independent of any change over any other nonoverlapping interval. This process as  $m \rightarrow \infty$  is a continuous-time process known as *standard Brownian motion*. For more on *Brownian motion*, see **Hamilton** (1994).

It should, of course, be noted that stochastic speculative bubbles could create deviations between market prices and fundamental values without negative serial correlation in returns. However, in the presence of any limits on valuation error set by speculators or real investment opportunities, such bubbles could not exist and speculative activities are not destabilizing. Then, one would expect the bubbles on average to be zero. However, if there are noise traders among speculators who dominate the market, then bubbles exist in the price.<sup>6</sup> Then we can say that (a) prices are dominated by irrational destabilizing noise traders (De Bondt and Thaler, 1989), and (b) excessive speculative activities by irrational noise traders deviate stock markets from fundamental values.

Let us write Equation (4) as  $E(B_{t+1}) = (1+r)(B_t)$ . By orthogonal decomposition we can write  $B_{t+1} = E(B_{t+1}) + b_{t+1}$ , where  $b_{t+1}$  is the forecast error at time  $t+1$  which has a zero mean. Equation (4) will be

$$B_{t+1} = (1+r)(B_t) + b_{t+1} \quad (5)$$

Let  $B_0$  be the initial bubble. Using Equation (5) we can write

$$B_1 = (1+r)(B_0) + b_1 \quad (5.1)$$

$$B_2 = (1+r)(B_1) + b_2 \quad (5.2)$$

$$\cdot \quad \cdot$$

$$\cdot \quad \cdot$$

$$\cdot \quad \cdot$$

$$B_n = (1+r)(B_{n-1}) + b_n \quad (5.n)$$

Let us substitute (5.1) for  $B_1$  into (5.2) and the resulting equation for  $B_2$  into (5.3) and continue this process repeatedly. We will have

$$B_n = (1+r)^n(B_0) + (1+r)^{n-1}(b_1) + (1+r)^{n-2}(b_2) + \dots + b_n \quad (6)$$

Since the mean of the innovation  $b_t$  is zero, the expected value of  $B_n$ , if the initial bubble exists, will be  $E(B_n) = (1+r)^n(B_0) \neq 0$ , and explosive when  $n \rightarrow \infty$ . This result has an important implication for our empirical test in the following section.

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6. Noise traders are investors whose demands for securities are not the result of maximizing a conventional utility function using rational expectations of return distribution. Consequently, their demands for securities are exogenous, *Cutler, et al.* (1991).

#### IV. Empirical Methodology and Results

As previously mentioned in this paper, one of the important issues, in support of a Normative-Islamic Stock Exchange, raised by Tag el-Din (1996) is that excess speculative activities do not add any information to stock markets. Consequently, stock prices generated by excessive speculative activities do not correctly reflect all available information. We will use Toronto Stock Exchange monthly data on the TSE 300 Composite Index (TSE, hereafter) for the period of 1957:1-1998:6 to test the empirical validity of the above two issues.<sup>7</sup> Our first task is to investigate whether bubbly and fundamental prices are on average the same. If so, then we need to verify whether these bubbles add any information to the market determined stock prices.

##### (a) *Are Bubbles on Average Zero?*

Let us define  $S_t = 100*(B_t/P_t)$  as a measure for excess speculative activities (bubbles) at time  $t$ . It was shown in the previous section that if bubbles exist, they must be expected to grow at the real rate of return, and will be explosive (as the number of observations approaches infinity); therefore, variable  $S_t$  will have a non-zero and large mean. Furthermore, the rejection of the hypothesis that no bubble exists is also the rejection of rational markets (**Flood** and **Hodrick**, 1990).

**Table 1** reports the summary of statistics<sup>8</sup>. See also **figures 1** and **2** for the evolution of market and fundamental values as well as bubbles. As we can see the mean of bubbles is -6.49%.<sup>9</sup> However, because the bubble variable is not stationary (see the unit-root results in **Table 2**), we cannot use the t-test (a parametric test) to verify whether the mean of the bubbles is statistically different from zero. Furthermore, the mean of bubbles approaches to its true value as the number of observations becomes infinity large, and the distribution of  $((E(B_t) - B_t) / \sqrt{n}) = (((1+r)^n B_0 - B_t) / \sqrt{n})$  approaches quickly to the normal, but the variance of the estimator, i.e.,

$E(\sum_{i=1}^n (1+r)^i b_i)^2$ , may explode quite fast as  $n \rightarrow \infty$ . Thus, no matter how large the

7. The source of data is CANSIM data base. The TSE 300 Composite Index (B4237) and stock dividend yields (B4245) are at the closing of the last day of the month and are calculated by taking the indicated dividend to be paid per share of stock over the next 12 months and dividing it by the current price of the stock. The CANSIM number of the monthly consumer price index is P100,000.

8. Following our analysis in the previous section we estimated the fundamental price variable  $PF_t$  to be  $377.523413386*d_t/CPI_t$  where 377.523413386 is the sample mean of monthly price-dividend ratio,  $d_t$  is the monthly dividend per share paid to the shareholder between  $t-1$  and  $t$  and  $CPI_t$  is the Consumer Price Index.

9. This result is not of course surprising, as by definition the bubbles, on average, are negative.

sample is the standard central limit theorem may not apply. In fact, when the Lilliefors (1967) non-parametric normality  $T_1$  test was used, it was found  $T_1=4.25 > 0.0397$  (critical value) rejects the null of normality. See Conover (1980) for a simplified version of this test which was used in this paper.

To cope with this problem let us take the expectation of bubble  $B_t$  in Equation (3) to get

$$E(B_t) = E(P_t) - E(PF_t). \quad (7)$$

We know  $E(B_t) = 0$  implies that  $E(P_t) = E(PF_t)$ . Consequently, to test if bubbles are, on average, zero we can test the following hypothesis:

$$E(P_t) = E(PF_t) \quad (8)$$

The null hypothesis (8) intuitively indicates that the unconditional mean of real speculative or “bubbly” prices is equal to the unconditional mean of real fundamental values. In other words, Equation (8) means that the real stock price, on average, is equal to its real fundamental component. Moreover, the overall implication of Equation (8) is that the speculative price, on average, reverts to its expected fundamental component.

To test the null hypothesis (8) since both variables are non-stationary, we will use a non-parametric Mann-Whitney test to verify if the mean of  $P_t$  (=37.37) is statistically equal to the mean of  $PF_t$  (=38.16).

The Mann-Whitney U test is calculated to be 121,319. Since the U value is less than its critical value (=124,002, at 5%), we can not (with a p-value of 0.7224) reject the null hypothesis (8). Namely, we can not reject the null hypothesis of equality of the unconditional mean of stock prices and their fundamental values. This result also implies that market and fundamental values are, on average, the same and the differences, if they divert, are eliminated by speculative forces. Namely, speculative forces are not destabilizing. Now we need to test whether the excess speculative activities (measured by the bubbles in prices) add any information to stock prices.

**(b) Excessive Speculative Activities Do Not Add any Information to Stock Markets**

To test the above hypothesis we examine whether the changes in proportion deviation between actual prices and fundamental values, i.e., the changes in  $S_t$  (=  $100 \cdot (B_t/P_t)$ ) have any forecasting power for stock returns. We will estimate the following equation for one-month investment horizon and test the hypothesis  $\beta=0$ .

$$NR_t = \alpha + \beta (S_{t-1} - S_{t-2}) + u_t, \quad (9)$$

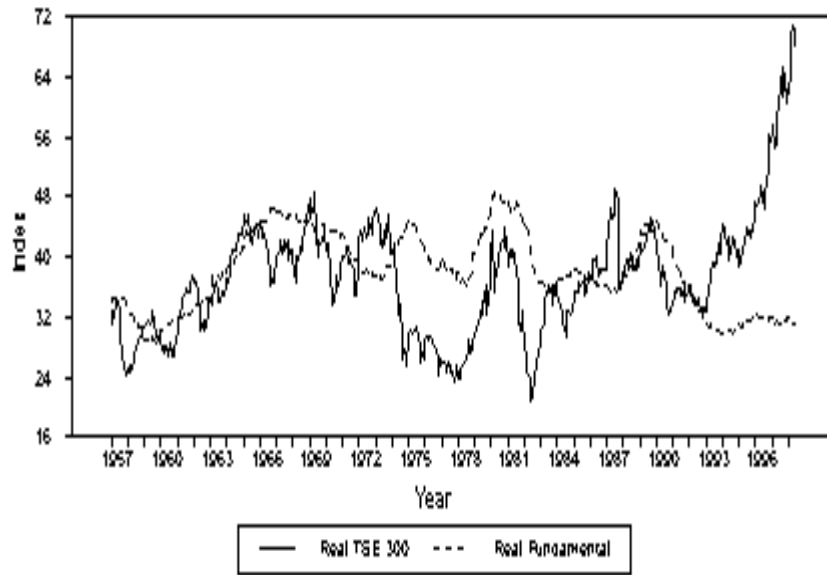


Figure 1: Real TSE 300 and Real Fundamental TSE 300

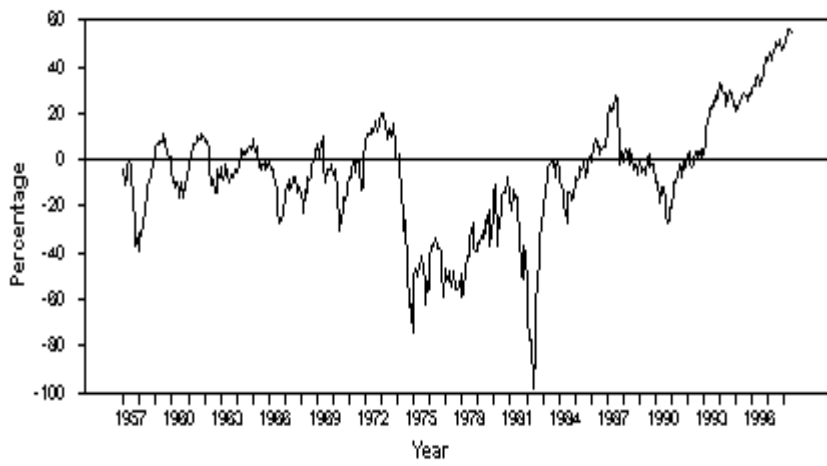


Figure 2: Proportional Speculative Deviation

**Table 1\*: Summary of Statistics: 1957 (Jan.) - 1998 (June)**

	Mean	Standard Deviation	Minimum	Maximum
Real TSE	37.37	8.05	20.83	70.78
Real Fundamental	38.16	5.25	28.62	48.52
Bubbles	-6.49	25.12	-98.51	56.27
One-month TSE Rate of Return	0.89	4.34	-22.43	17.72
One-month Real TSE Rate of Return	0.52	4.38	-22.80	17.42

\* The real TSE is the TSE deflated by monthly Consumer Price Index (CPI). We estimated the real fundamental price variable  $PF_t$  to be  $377.523413386*d_t/CPI_t$ , where 377.523413386 is the sample mean of monthly price-dividend ratio and  $d_t$  is the monthly dividend per share paid to the shareholders between  $t-1$  and  $t$ . The bubble (the percentage of price) is  $100*(B_t/P_t)$ , one-month TSE rate of return is  $100*[(P_t / P_{t-1} - 1) + (d_t / P_{t-1})]$  and one-month real TSE rate of return is  $100*[(P_t / P_{t-1} - 1) + (d_t / P_{t-1}) - (CPI_t / CPI_{t-1} - 1)]$ .

**Table 2\*: Stationary Tests: 1957 (Jan.) - 1998 (June)  
(Absolute Value)**

	Real TSE Index	Real Fundamental	Bubbles	Bubbles: Changes	Monthly Rate of Return
Augmented Dickey-Fuller $\tau$ -Stat.	1.72	0.99	2.65	8.61 <sup>a</sup>	9.00 <sup>a</sup>
Phillips-Perron Z-Stat.	1.48	1.37	2.45	20.48 <sup>a</sup>	20.70 <sup>a</sup>

\* All tests include constant and trend. The critical value for Augmented Dickey-Fuller  $\tau$  test (lag-length = 5) and for Phillips-Perron non-parametric Z test (window size = 4) is 3.42 at 5% and 3.98 at 1%. The number of observations is 498.  
a=Significant at 1%.  
b=Significant at 5%.

where  $\alpha$  similar to  $\beta$  is a constant parameter and  $NR_t$  is the nominal one-month stock rate of return at time  $t$ , defined as

$$NR_t = 100 * [(P_t/P_{t-1} - 1) + (d_t/P_{t-1})]. \quad (10)$$

and  $d_t$  is the monthly dividend paid to the shareholders between  $t-1$  and  $t$ . The disturbance term  $u_t$  is assumed to be independent, identical and normally distributed with a zero mean. Both variables  $NR_t$  and  $(S_t - S_{t-1})$  are stationary (see the unit-root-test results in Table 2). It should be noted that Equation (9) is a modified version of the one used by Cutler, *et al.* (1991). However, since they estimated a non-stationary variable on a stationary variable, their estimation result may be spurious. That is, the dependent variable in Cutler, *et al.* is a premium, i.e., a stationary variable, while their explanatory variable is the log of dividend yield ratio, i.e., a non-stationary variable<sup>10</sup>.

Noting that

$$\begin{aligned} S_{t-1} - S_{t-2} &= 100 * \{ (B_{t-1}/P_{t-1}) - (B_{t-2}/P_{t-2}) \} = 100 * \{ ((P_{t-1} - PF_{t-1})/P_{t-1}) - ((P_{t-2} - PF_{t-2})/P_{t-2}) \} \\ &= 100 * \{ (1 - PF_{t-1}/P_{t-1}) - (1 - PF_{t-2}/P_{t-2}) \} = 100 * (- PF_{t-1}/P_{t-1} + PF_{t-2}/P_{t-2}) \\ &= - 377.523413386 * 100 (d_{t-1}/P_{t-1} - d_{t-2}/P_{t-2}), \end{aligned}$$

the interpretation of  $\beta$  (if positive) in Equation (9) is that for a one percent rise in the dividend yield ratio, the nominal rate will fall by  $377.52 \beta$ . For example, when a stock price falls faster than its dividend, the dividend yield increases. Then, according to one version of the efficient markets hypothesis, a lower stock price relative to dividends means lower future expected dividends and earnings/returns. Consequently, accepting the null hypothesis of  $\beta=0$  may be regarded as bubbly prices do not correctly reflect all available information.

To capture the impact of seasonality I included in Equation (9) eleven monthly dummy variables as well as dummy variables to capture time trend, the October 87 stock market crisis and the Asian crisis. The final equation that was estimated is

$$NR_t = \alpha + \beta (S_{t-1} - S_{t-2}) + \Theta \text{Oct}87_t + \Gamma_i \sum_{i=1}^{11} M_{it} + \Phi \text{AS}97_t + \delta \text{Trend} + u_t, \quad (11)$$

where  $\Theta$ ,  $\Gamma_i$ 's (for all  $i = 1, 2, \dots, 11$ ),  $\Phi$  and  $\delta$  are constant coefficients. Oct87 is a dummy variable used to capture the impact of the October 1987 stock market crisis. It is equal to one in October 1987 and zero otherwise.  $M_{it}$  is a monthly dummy variable

10. The premium in Cutler, *et al.* (1991) is the difference between nominal rate of return and short-term interest rate. I found, for their sample period, the estimated Augmented Dickey-Fuller  $\tau$ -statistics for the premium is  $-3.91$  and the Phillips-Perron Z statistics is  $-10.95$ , where both tests accept the null of stationarity for the premium. Furthermore, the estimated Augmented Dickey-Fuller  $\tau$ -statistics for the log of dividend-yield ratio is  $-2.04$  and the Phillips-Perron Z statistics is  $-2.19$ , where both tests reject the null of stationarity for this variable.

which is equal to one if, e.g.,  $i$  is January, and zero otherwise. AS97 is a dummy variable which is equal to one for the period October-November 1997, and is zero otherwise<sup>11</sup>. Trend is a linear time trend.

The estimation technique is the least squared and to cope with the autocorrelation and heteroskedasticity, similar to Cutler, *et al.*, I corrected the standard errors using Newey-West (1987) standard errors. In the first round of estimation I found, except the estimated coefficient of December seasonal dummy variable and October 1987 dummy variable, none of the estimated coefficient of dummy variables is statistically significant. I, therefore, dropped the insignificant dummy variables from the regression. The final estimation result is the following:

$$NR_t = 0.83 + 0.05 (S_{t-1} - S_{t-2}) - 23.14 \text{ Oct}87_t + 1.41 M_{\text{Deci}} \quad (12)$$

t-statistics (4.20) (1.50) (-5.51) (2.06),  
 RBAR-squared = 0.07 DW = 1.91  
 Significance level: Godfrey = 0.28, White = 0.73, ARCH = 0.00, RESET = 0.32

where Godfrey is Godfrey's (1978) test for five-order serial correlation, White is the general White's (1980) test for heteroskedasticity, ARCH is a test for five-order conditional heteroskedasticity (Engle, 1982) and RESET is the Ramsey's (1969) specification test.

As the estimation results indicate, the estimated coefficient of the bubbles has a correct sign, but it is statistically insignificant. Bubbles, therefore, have no forecasting power. Namely, according to our t-statistics, we can not reject the null hypothesis of  $\beta=0$ . This result is also similar to the result reported for Canada (1968:8-1988:12 period) in Cutler, *et al.* (1991)<sup>12</sup>. As it would be expected, the estimated coefficient of October 1987 stock market crisis dummy is negative and statistically significant. The estimated coefficient of December dummy is positive and statistically significant as it reflects the usual high performance of the bank issues in December. Note that the Financial Services Sub-index has a relatively heavy weight in

11. The TSE 300 Composite Index hit a record high on October 7, 1997, just 10 days before the crisis. Up to January 12, 1998 the index fell 13.45%. However, the index hit a record high on March 9, 1998 and by the end of March 1998 it hit 10 record highs. Consequently, if the Asian crisis had any impact on Canadian stock markets, the impact would have been completely dissipated by the end of February 1998. However, from the end of September 1997 till the end of November 1997 the TSE 300 Composite Index fell by 7.79% and rebounded after. This implies that for our monthly observations the appropriate dummy variable, which may reflect the Asian Crisis, is a variable that is one for the October-November period and zero, otherwise.

12. It should be noted that Cutler, *et al.* (1991) also tested for the forecasting power of bubbles for one-year and four-year holding periods. I also estimated Equation (11) for one-year and four-year investment horizons. These results (not reported, but available upon request) are not materially different from the reported result for one-month holding period.



the TSE 300 Index. For example, as in February 1998, the relative weight of this sub-index was 23.22%<sup>13</sup>.

To investigate a possible parameter instability, I first used Goldfeld and Quandt (1973) test to verify a possible change in regime. I found the maximum value of the log of likelihood for switch is  $-700.17$  in March 1968. Then based on this information a likelihood ratio test ( $\text{Chi-Squared}(5) = 18.42$  with Significance Level 0.002) rejects the null hypothesis of no switching. Consequently, I re-estimated Equation (11) on the period 1968:March-1998:June. The estimation result (not reported, but available upon request) was not materially different from that of Equation (12).

I then tested for switching breaks for when the bubbles turn from positive to negative. According to the estimation results (not reported, but available upon request) neither of the variables, except the October 1987 dummy, was statistically significant. Furthermore, I estimated Equation (11) for the real monthly stock return (rather than nominal return) being dependent variable. I could not find any materially different result from that of Equation (12). For the sake of brevity these results are not reported, but are available upon request. The overall conclusion in this section is that, while the average of bubbly prices are equal to the average fundamental values, bubbles (excessive speculative activities) do not add any information to stock markets. Namely, in light of Tag el-Din (1996), the wasteful excess speculative activities (bubbles) do not have any forecasting power. Consequently, a highly regulatory Islamic stock exchange is needed in a competitive market in order to achieve a true efficient stock market.

## V. Concluding Remarks and Policy Recommendations

Tag el-Din (1996) provides convincing arguments against growing excessive speculative activities and inefficiency created by these activities in stock markets, and discusses a need for an optimum level of speculative activities which is required for liquidity and efficiency in stock markets. Furthermore, Tag el-Din successfully stresses the need for a normative Islamic stock exchange to cope with wasteful excess speculative activities that have caused and will cause many financial crises. He, consequently, provides two organizational models to cope with ever-growing speculative problems.

In this study I reviewed Tag el-Din's paper and raised the possibilities that his organizational models may create other kinds of inefficiency. Furthermore, using Canadian stock data for the period of 1957:01 to 1998:06, I extended his study by

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13. According to our specification tests the error term does not suffer from autocorrelation, but while White test indicates of no general heteroskedasticity, the ARCH test indicates that the error term suffers from an autoregressive conditional heteroskedasticity. However, as it was mentioned before standard errors are corrected for heteroskedasticity.

testing whether excessive speculative activities create (a) instability in the stock markets and (b) wasteful information from the efficiency point of view. I found that these activities do not, on average, create instability in the Canadian stock markets, i.e., bubbles created by excessive speculative activities on average burst and do not have any forecasting power. Consequently, the test results in this study led us to confirm Tag el-Din's view that a highly regulatory normative stock exchange is needed in a competitive market in order to achieve an efficient stock market.

In light of the results of this paper and the fact that transactions are *accepted* from an Islamic point of view, if the qualities and flaws of the commodity (including stocks) transacted were known to the buyer(s) and seller(s), I propose the following policy rules:

(a) Under an Islamic framework the central bank and the government should ensure that the investors in stock markets have complete knowledge of the stock market mechanism. This also requires that the central bank and the government facilitate the training of the existing as well as new investors in these markets. Such a policy leads participants in stock markets to have or acquire the knowledge of the market mechanism so that they conduct transparent transactions rather than over or under react to any information.

(b) According to this study's empirical results, the excessive speculative activities do not, on average, create instability at least in the Canadian stock markets. However, it was found that these activities create inefficiency in the stock markets. It should be noted that the former finding might not be true for less-developed stock markets in the world. Consequently, to avoid inefficiency as well as instability in the stock markets I propose the levy of a tax on short-horizon investment returns. Since short-horizon (at least up to a month) investment returns could purely be due to windfall gains and not to real investment opportunities - and in most cases these returns are the result of excessive speculative activities - a 20% *Qur-anic* tax (*The Holy Qur-an*, ch. VIII, Verse 41) may be appropriate.

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