

PROFITABILITY OF EXPECTATION BASED ON TRADING RULES: A STUDY ON KUWAIT STOCK MARKET

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ABSTRACT

This paper provides empirical evidence on the profitability of the alternative expectation formation mechanisms in the case of Kuwait Stock Exchange as an example of an emerging market. The results indicate that both extrapolative and adaptive expectations are profitable while regressive expectations are not. In addition, the results imply that extrapolative expectations are more profitable than adaptive. An important conclusion of this paper is that the market suffers from inefficiency since future trend of the market can be predicted from its past performance, a phenomenon shared by emerging markets.

I. INTRODUCTION

Most of the studies dealing with expectation formation, one of the issues that have preoccupied financial economists, have generally revealed that expectations tend to be extrapolative in the short run and regressive in the long run. If a stock price is rising, it would be expected to keep on rising in the short run, and then to fall further in the long run, and that what so-called "twist" in expectation. Even though, there are different opinions on how short the short run is, or how long the long run is, the "twist" phenomenon is normally assumed to take place within six months. That what available survey evidence has indicated what happens in the stock market.

Accordingly, this paper is an attempt to apply expectation formation mechanisms to an emerging market by taking Kuwait Stock Exchange (KSE) as an example using daily data covering the period from January to December 2006 for Indices of the market as a whole and its sub-sectors. There are two objectives behind this paper. The first is to find out if profit can be generated by adopting expectation-based trading rules, while the second is to explore which expectation formation mechanism is the most profitable. Accordingly, the paper is divided into five main sections, the first is an empirical evidence on expectation formation in stock markets, the second is a literature review on expectation formation mechanisms, the third is an over view of the Kuwait Stock Exchange, the fourth is an application of expectation formation

mechanisms to Kuwait stock exchange indices, and the last is a conclusion.

II. EXPECTATION FORMATION MECHANISMS

Different models of expectation formation have been developed, among them the widely used are extrapolative expectations, regressive expectations and adaptive expectations. The expectation formation mechanisms illustrated in this section are specified in terms of the percentage change in the price, \dot{P} , which can be approximated by the first logarithmic difference, “ Δp ” (where a lower case letter represents the logarithm of the underlying variable). Let “ t ” be the present time, when the expectation is formed, and “ $t+1$ ” the future when the actual price is realized. Thus $E(\dot{P}_{t+1})$ is the expected value of the percentage change in the price between “ t ” and “ $t+1$ ”, such that the expectation is formed at time “ t ” on the basis of the information available then.

1. Extrapolative Expectations

Extrapolative expectations imply that an increase in the price is followed by another increase and vice versa, which means that expected change in the price is a function of current as well as previous changes. Pilbeam (1995) has suggested the following alternative simple specification of the extrapolative expectations mechanism:

$$\left. \begin{matrix} E(\dot{P}_{t+1}) > 0 \\ E(\dot{P}_{t+1}) < 0 \end{matrix} \right\} \text{ if } \left. \begin{matrix} \dot{P}_t > 0 \\ \dot{P}_t < 0 \end{matrix} \right\} \quad (1)$$

Accordingly, the trading rule in this case is to buy when the price change is positive and sell when it is negative.

2. Regressive Expectations

This type of expectation is the opposite of the previous one, in that an increase in the price is followed by a decrease and vice versa, indicating that expected change in the price is an inverse function of current change. Pilbeam (1995), proposed the following specification for this mechanism

$$\left. \begin{matrix} E(\dot{P}_{t+1}) > 0 \\ E(\dot{P}_{t+1}) < 0 \end{matrix} \right\} \text{ if } \left. \begin{matrix} \dot{P}_t > 0 \\ \dot{P}_t < 0 \end{matrix} \right\} \quad (2)$$

Therefore, the trading rule here is to buy when the price change is negative, and sell when it is positive.

3. Adaptive Expectations

This expectation mechanism implies that, if the price increases, in at least two of the latest three periods, then it should be expected to increase in the coming period and vice versa.

The adaptive expectations hypothesis as specified by Pilbeam (1995) is:

$$\left. \begin{matrix} E(\dot{P}_{t+1}) > 0 \\ E(\dot{P}_{t+1}) < 0 \end{matrix} \right\} \text{ if } \left. \begin{matrix} \dot{P}_{t-i} > 0 \\ \dot{P}_{t-i} < 0 \end{matrix} \right\} \quad (3)$$

For at least two values of ($i = 0, 1, 2$). Thus, the trading rule in this case is to buy when two out of three consecutive changes in the price are positive, and sell when two out of three consecutive changes in the price are negative, regardless of whether the third is positive or negative.

Table-1: Summary of Buy and Sell Signals Generated by Expectations-Based Rules

Rule	Sell Signal	Buy Signal
Extrapolative Expectations	$\dot{P}_t < 0$	$\dot{P}_t > 0$
Regressive Expectations	$\dot{P}_t > 0$	$\dot{P}_t < 0$
Adaptive Expectations	$\dot{P}_{t-i} < 0$ for at least two of $i=0,1,2$	$\dot{P}_{t-i} > 0$ for at least two of $i=0,1,2$

III. EMPIRICAL EVIDENCE ON EXPECTATION FORMATION IN STOCK MARKETS

In this section we will present a brief survey of the empirical evidence on expectation formation in financial markets. A group of evidence shows that real-world expectations are often less than fully-rational. In theory, a stock's price represents a consensus forecast of the discounted stream of future dividends that will accrue to the stock's owner. Shiller (1981) and LeRoy and Porter (1981) observed that prices are much more variable than the discounted stream of ex post realized dividends.

Arbarbanell and Bernard (1992) and Easterwood and Nutt (1999) find that when the information is positive in nature, security analysts' earnings forecasts tend to exaggerate the new information. Chan, et al. (2003) find that the long-term earnings growth rates analysts' forecasts are consistently exhibit low predictive power for the actual earnings growth rates subsequently achieved.

Chow (1989) finds that an asset pricing model with adaptive expectations outperforms one

with rational expectations in accounting for observed movements in U.S. stock prices and interest rates. Campbell and Vuolteenaho (2004) and Ritter and War (2002) support the hypothesis of Modigliani and Cohn (1979) that investors are prone to inflation-induced valuation errors. Roberts (1997), Carroll (2003), Mankiw, Reis, and Wolfers (2004), and Branch (2004) all find evidence that survey-based measures of inflation expectations do not make efficient use of available information.

Hong and Stein (2003) find that individual traders tend to gravitate toward simple models when making decisions or forecasts. Vissing-Jorgenson (2004) finds that traders who have experienced high portfolio returns in the past expect higher returns in the future. DeBondt (1993) finds that the non-professional traders' forecasts tend to be optimistic in bull markets and pessimistic in bear markets. Lansing (2005) finds that an individual agent can become locked-in to the use of a suboptimal, extrapolative forecast if other agents are following the same approach.

Durell (2001), Fisher and Statman (2000), and Qiu and Welch (2004) find that the mean subjective forecast of the aggregate

stock market return is positively correlated with recent returns. Even though Fama and French (1988) find that actual market returns exhibit no positive serial correlation. In fact, Durell (2001) finds that average trader optimism about the stock market negatively predicts future returns. De Bondt (1991), Shiller (2000), and Clarke and Statman (1998) find evidence that these extrapolative beliefs are mistaken comes from the return forecasts of more sophisticated market observers—such as professional economists, institutional investors, and investment newsletter editors—which are contrarian. On the other hand Qiu and Welch (2004) show that the incidence of extrapolative beliefs does not diminish swiftly with wealth. They report a 97% correlation between the returns expectations of the wealthy and poor.

Some recent studies found mixed results, depending on the currency and frequency. Schulmeister (2006) examines the mutually reinforcing interactions between exchange rate dynamics and technical trading strategies. He found that technical trading systems have been quite profitable during the floating rate period. This profitability stems from the successful exploitation of exchange-rate trends and not from taking

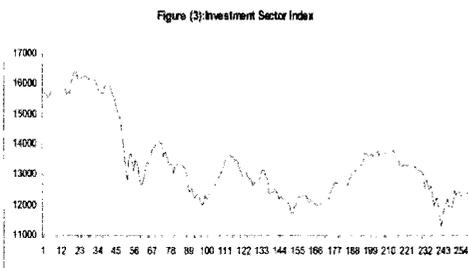
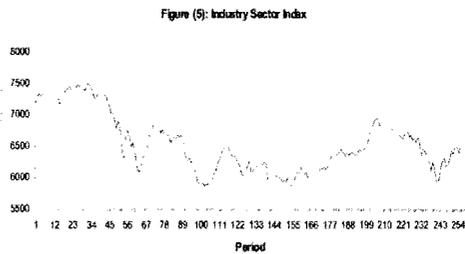
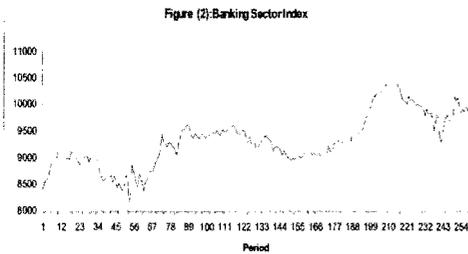
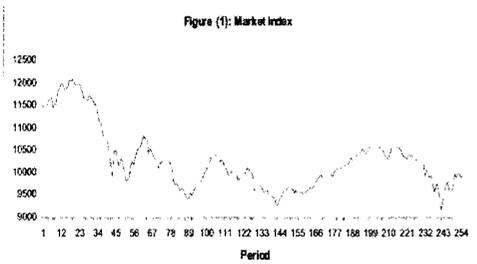
winning positions relatively frequently. Schulmeister (2008) investigates the sources of the profitability of 1024 moving average and momentum models when trading in the German mark (euro)/U.S. dollar market based on daily data. He found that each of these models would have been profitable over the entire sample period and the 25 best performing models in each in-sample period examined were profitable also out of sample in most cases. Qi and Wu (2006) report evidence on the profitability and statistical significance among 2,127 technical trading rules. They show that the best rules are found to be significantly profitable based on standard tests. While Frino et al. (2006) examine the profitability of 7,846 trading rules on four prominent futures price series. They indicate that technical trading is not profitable for interest rate futures.

IV. KUWAIT STOCK EXCHANGE (KSE)

KSE is the oldest in the gulf and one of the most active in the Arab world. During 2006 the market witnessed very turbulent activities, as shown in figures 1 to 6, where cycles of upward and downward movements in the indices have been experienced. After almost a continuous upward trend

Table-2: Basic Statistics of Indices

Index	Average Daily growth	Mean	Standard Deviation	Minimum	Maximum
Market	-0.04	10329	707	9268	12054
Banks	0.07	9242	473	8172	10427
Investment	-0.06	13577	1324	11694	16412
Real Estate	-0.09	5646	601	4796	7003
Industry	-0.02	6561	478	5857	7500
Services	-0.01	18015	951	16331	20026



in the previous years, the market started a fluctuating downward trend since February. The market reached its peak in 25th of January, declining to its trough in the 18th of July then moved upward again. The figures show that Banks have experienced an up word trend opposite to the trend of other sectors. In general, the indices have been declining, except for Banks, with different average daily rate of decline from the highest of 0.09 for Real-Estate to 0.01 for Services. These differences are reflected in the volatility of each index as shown in

table (2) which indicates that real estate is the most volatile followed by investment, industry, services, then Banks.

V. EMIRICAL RESULTS

In this section we present the empirical results of our exercise. Starting with a principal KD100, we simulate trading in the stock market following rules based on extrapolative, regressive, and adaptive expectations.

Table-3: Net Profit (Loss) Generated by the three Rules (in %)

Index	Extrapolative			Regressive			Adaptive		
	Profit	# of Sell	# of losses	Profit	# of Sell	# of losses	Profit	# of Sell	# of losses
Market	19	52	5	(27)	50	43	7	18	7
Banks	18	56	2	(0.01)	56	30	15	21	2
Investment	12	45	1	(36)	50	46	15	21	5
Real Estate	16	49	12	(40)	50	44	4	21	6
Industry	17	55	5	(24)	55	54	11	21	8
Services	25	50	1	(22)	50	48	7	19	7

Table (3) reports the net profit (loss) generated from the three trading rules, calculated as a percentage of the initial investment of KD100. The results indicate that Extrapolative expectations provide a highly profitable trading rule followed by adaptive expectations, while regressive expectations resulted in losses except for banks which shows almost neutral result. In addition, it seems that extrapolative expectations is the dominant in this case, however, in a closer inspection of the results, it may be argued that extrapolative rule can result in a higher profit margin in a relatively stable index

In addition, the results show that both extrapolative and adaptive rules are more affected by upward movements than by downward movements, while on the other hand; regressive rule is more affected by downward movements than by upward movements. Moreover, it appears that adaptive rule is less affected by downward movements than Extrapolative rule.

VI. CONCLUSION

The purpose of this paper was to test the profitability of the alternative expectation formation mechanisms on Kuwait Stock Exchange as an example of an emerging

market. For this purpose a daily data on market as well as sub-sectors indices are used covering the period from January to December 2006. The results show that both extrapolative and adaptive expectations are profitable while regressive expectations are not. The results also show that extrapolative is more profitable than adaptive, in addition, the volatility of the concerned index play a decisive role in determining the magnitude of profitability of each mechanism. An important conclusion of this paper is that the market suffers form inefficiency since future trend of the market can be predicted from its past performance, a phenomenon shared by emerging markets. However, since the study used one year data its conclusion is of a short-term implication, and since indices rather than individual stock prices are used, this will mask trading strategies of individual traders.

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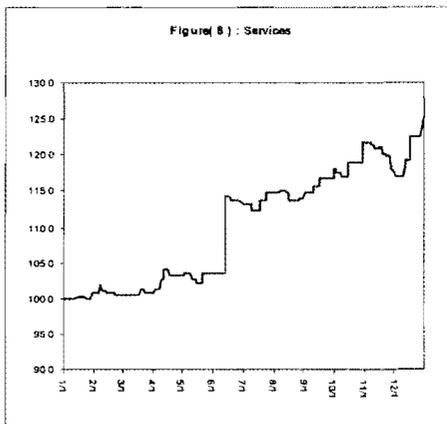
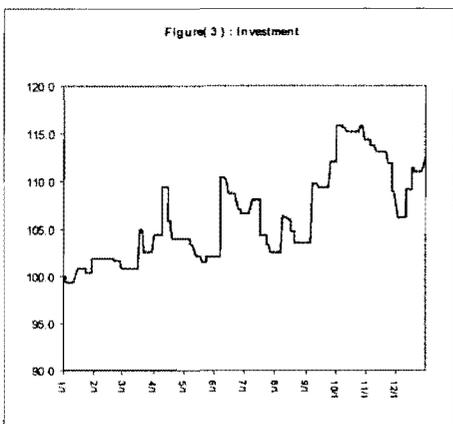
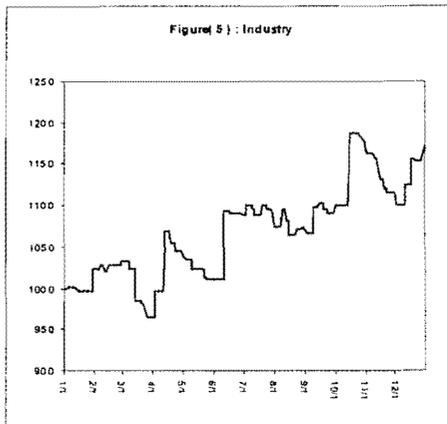
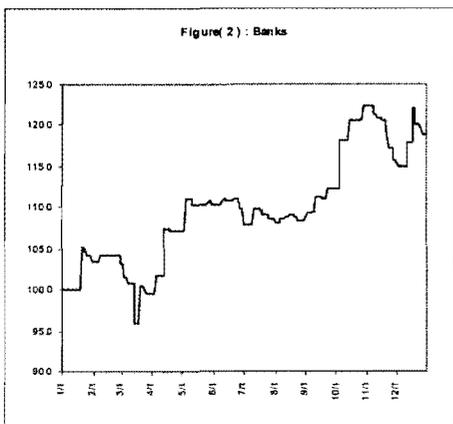
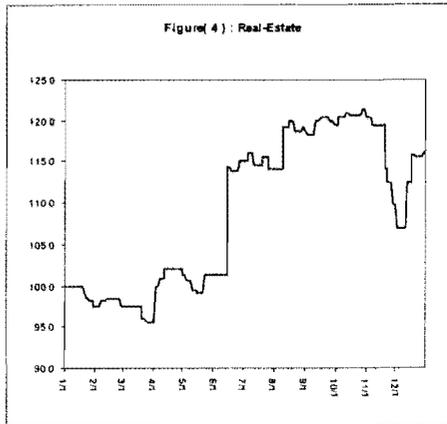
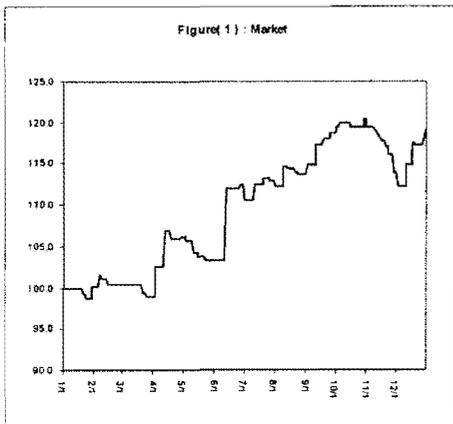
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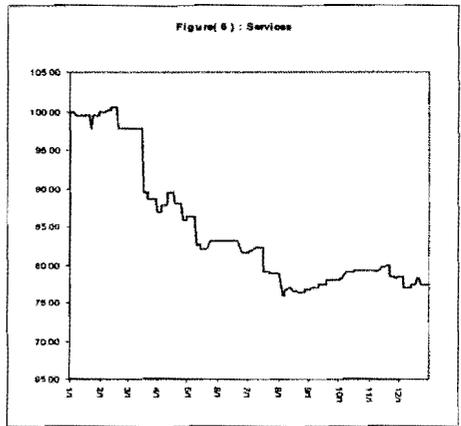
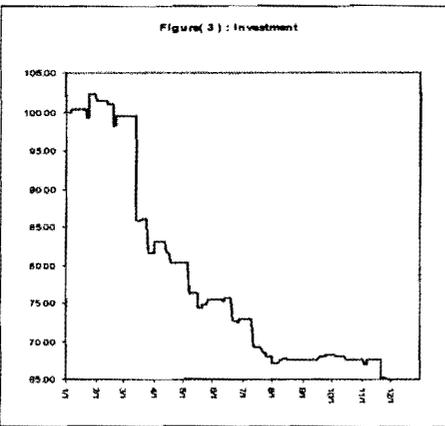
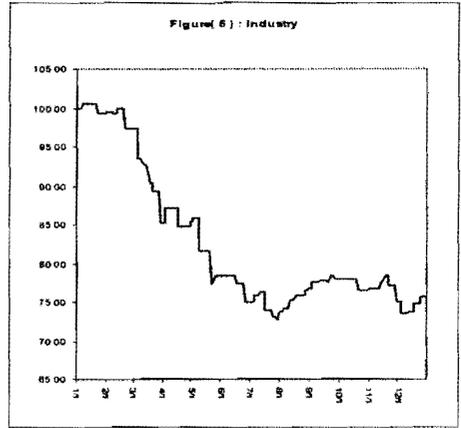
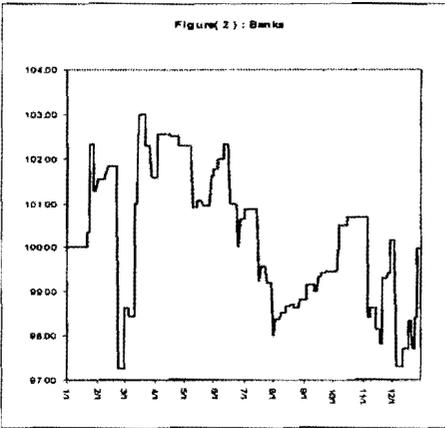
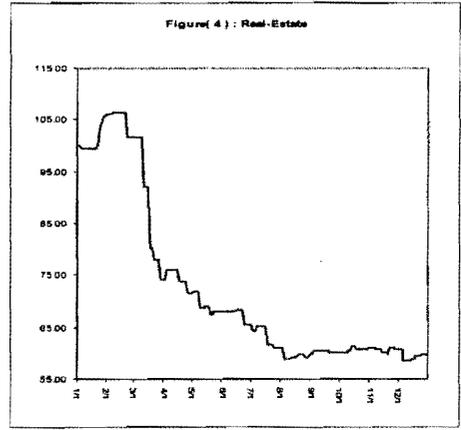
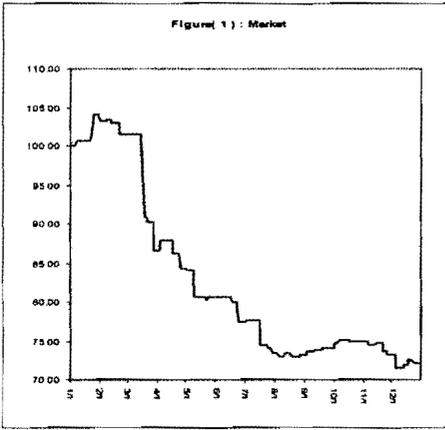
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Appendix: Graphs

A. Profits using Extrapolative Expectations trading rules



B. Profits using Regressive Expectations trading rules



C. Profits using Adaptive Expectations trading rules

