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SAUDI ARABIA & KUWAIT: A STUDY OF STOCK MARKET BEHAVIOR AND ITS POLICY IMPLICATIONS.

BY

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ABSTRACT

SAUDI ARABIA & KUWAIT: A STUDY OF STOCK MARKET BEHAVIOR AND ITS POLICY IMPLICATIONS.

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This study examines the behavior of the stock markets in Saudi Arabia and Kuwait. Despite similar economic, cultural, and political environments, the Saudi and Kuwaiti stock markets have evolved in different directions, partly in response to the "Al-manakh" stock market crisis in Kuwait in 1982. Kuwait has developed a centralized auction-based (written) stock exchange. Saudi Arabia has granted a brokerage monopoly to 12 banks in an over-the-counter market. These banks are not allowed to own stocks and there are no official market makers.

Daily stock prices and volume data, dividends, splits, and rights offerings of individual stocks were collected for the period June 14th 1986 to October 3rd 1989 for the Saudi market and October 2nd 1985 to December 30th 1988 for the Kuwaiti market. Both the Saudi and Kuwaiti equity markets were examined for weak-form market efficiency. Individual stock returns were examined for distributional characteristics. Tests of serial correlation and runs were performed on individual stock returns. The day of the week effect and day of the month effect were also investigated and found not to be present in each

market. Intra-day and inter-day return volatility were also assessed in each market.

Because of the severe thinness of trade on the Kuwait and Saudi stock exchanges (many stocks do not trade for days at a time), we use the holding period return series to examine observable daily returns and to test for one-day lag return dependence. One day holding period returns reduce measurement errors due to non-observed trades in thin stocks. Trade-to-trade returns are used for comparison with other studies.

According to the tests of serial return independence, the Kuwaiti stock market is similar to other thinly traded markets in the proportion of stocks not conforming to the random walk. In contrast, because of institutional factors, all the Saudi stocks show a significant departure from the random walk.
Autocorrelations, runs tests, and intraday volatility measures indicate significant operational and/or informational inefficiencies in the Saudi exchange system.

Finally, based on the empirical results and assessment of the trading systems in Saudi Arabia and Kuwait, policy implications were drawn for each market.

To My Parents
To My Wife

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CHAPTER I: INTRODUCTION

This study examines the behavior of the developing stock markets in Saudi Arabia and Kuwait. The Saudi and Kuwaiti stock markets are similar in their economic and cultural environment. However, they have evolved in different directions in response to political and economic forces. Kuwait has adopted an aggressive set of regulatory policies following the Al-manakh (unofficial market) stock market crisis in 1982.[1] They have also invested heavily in developing a new securities exchange based on a written auction system. Saudi Arabia has adopted a different set of regulatory policies and a decentralized financial market in response to the Al-manakh crisis in Kuwait.

This study is unique in several respects. The study constructs a computer-readable data base for the Saudi and Kuwaiti stock markets that is not known to be available on any existing computer file. It is also believed to be the first comprehensive study on the behavior of security prices in these markets. The study adds to the limited body of literature on the stock price behavior and efficiency of capital markets in developing economies. After assessing the extent of capital market inefficiency, this study develops regulatory and policy recommendations for securities trading in the Kuwaiti and the Saudi financial markets.

Although numerous articles investigate the desirable effects of efficient financial markets and test the existence of efficiency in

developed capital markets, they generally give little consideration to the means by which market efficiency can be enhanced. The nature of both markets demands an analysis of factors that will promote market efficiency in these developing capital markets. Neither the Saudi nor the Kuwaiti governments were inclined to regulate or directly intervene in the operation of stock trading in their markets before the collapse of the Al-manakh market in Kuwait. The policies undertaken by both countries in the era since the Al-manakh crisis provide us with an opportunity to test the relative effectiveness of policies and regulations in enhancing efficiency in capital markets. Regulations, institutional structures, and government policies that enhance capital market efficiency are examined in this study. As a pioneering study of market efficiency in the Saudi and Kuwaiti capital markets, my goal is to identify policies and actions which would promote the smooth and efficient operation of these markets.

In Chapter II, the characteristics of the financial markets in Saudi Arabia and Kuwait are discussed. The chapter then presents a brief history of stock trading in each country followed by a review of the stock market conditions.

The underlying theory of the efficient market hypothesis is presented in Chapter III along with the empirical evidence of market efficiency in various developed and developing markets. Most market efficiency research has been performed on the developed financial markets in the U.S. Chapter IV develops empirical tests of market efficiency applied

to the Saudi and Kuwaiti markets. The results are discussed and summarized.

Policy implications are drawn in Chapter V . The process by which efficient capital markets are achieved is discussed. An understanding of the factors that enhance such efficiencies is developed. Then, based on the results and analysis of the KSE and the SSE, major policy implications are drawn.[2]

1. The Al-Manakh is a name for the unofficial and unregulated market that is believed to be the cause of a major financial crisis in Kuwait starting August, 1982. For more information on the Al-manakh crisis, see Chapter II.

2. Henceforth, KSE and SSE refer to the Kuwaiti and Saudi Stock Exchanges, respectively.

CHAPTER II: CHARACTERISTICS OF FINANCIAL MARKETS IN KUWAIT AND SAUDI ARABIA.

This chapter provides an overview of the financial and economic environments in Saudi Arabia and Kuwait. There are major similarities in the political and economic structures of both countries. Both countries are monarchies, and have economies that are dependent on oil production. Both have a high per capita income, high financial and liquid reserves, and similar cultural, ethnic, and religious backgrounds.

Stock markets in both countries are recent developments compared to the industrialized countries. The two stock markets are of similar size. Only Kuwaiti nationals are allowed to trade in Kuwaiti public companies and only Saudi nationals are allowed to trade in Saudi public companies. Recently the Gulf Cooperation Council (GCC) countries (Saudi Arabia, Kuwait, Qatar, UAE, Bahrain, and Oman) have proposed a law allowing their nationals to trade in publicly traded companies in the GCC countries. However, this law is not yet in effect.

Both countries have a common mechanism for offering stock to the public. The current policy is to fix Initial Public Offerings (IPO's) at par value. Initial price is determined not by the market but by par value. Governmental committees determine the number of shares to be offered.

Most companies that go public in Saudi Arabia and Kuwait are newly established corporations with no operating history and large capital requirements. A group of principal shareholders (sometimes other business firms) establish the company with specific objectives based on market and feasibility studies. The principal shareholders are responsible for all the initial planning requirements of feasibility and market studies, financial forecasts, and procuring necessary technical support for operations. Based on these plans, the principal shareholders approach the Ministry of Commerce in Saudi Arabia (and the Ministry of Commerce and Industry in Kuwait) to secure licensing as a stock company. A committee is formed by the Ministry of Commerce to evaluate the principal shareholders' efforts. If approval is granted, the committee approves capital requirements and the number of shares to be sold at par value. Par value is usually 100 Saudi Riyals (SR) in Saudi Arabia or 0.1 Kuwaiti Dinars (KD) in Kuwait.

Share subscriptions are usually open to the public over a period of several weeks through local banks. Banks act as intermediaries in selling the stock without holding any position in it. This IPO process is based on "all or nothing", where the selling company and the intermediaries (banks) need not sell any of the offering unless all the stock offered can be sold at the established price.[1] In Saudi Arabia, the principal shareholders are prohibited from selling their shares until the company is operational and two years of financial statements are reported to the public to protect the public

from insider abuses. This policy has favorable distributional effects in that many of these newly established companies operate with government subsidies, import tariffs, and/or monopolies. This process insures the widest participation by the public. It also protects the public from speculating on companies that have no performance history.

If an established private firm wishes to become public the procedures are similar. One difference is that in Saudi Arabia the committee formed by the Ministry of Commerce evaluates the net worth (value) of the firm. Reasoning and experience of the committee members are the only criteria by which a value is set.

In Kuwait, financial information is made available on the stock exchange floor by ticker tape or by a circular as soon as they are reported to the stock exchange directorate and later through local media. In Saudi Arabia, the information is made available through local press and/or by direct distribution from the stock company to its shareholders. In Saudi Arabia, seven Arabic-language daily newspapers and two English-language newspapers report financial information. Stock companies are required by law to announce their audited annual statements in at least one of the local newspapers. Annual statements are also reported to the Share Control Administration Department and the Ministry of Commerce. There are no financial newspapers in either country. At least one major newspaper in Saudi Arabia (Riyadh) and one in Kuwait (Al-Raii Al-aam) report daily trading information for all stocks on a regular basis.

A. KUWAIT

1. A BRIEF HISTORY OF STOCK TRADING IN KUWAIT[2]

Three Kuwaiti public shareholding companies were incorporated before 1960; the National Bank of Kuwait in 1952, the Kuwait National Cinema Company in 1954, and Kuwait National Airways in 1956. Stock trading has existed in Kuwait since shortly after its independence from British protection in 1960 following the introduction of laws and regulations governing publicly traded companies under the commercial companies law. Between 1960 and 1962, fourteen new public shareholding companies were incorporated in Kuwait. Primary markets (IPO's) were the concern of these regulations. Secondary markets were not regulated until 1970 when the Ministry of Commerce and Industry issued regulations pertaining to stock trading activities. The Kuwaiti Securities Exchange Department under the Ministry of Commerce and Industry was established in 1970 with the following objectives:

- Preparation of statistical analysis of publicly traded Kuwaiti companies including their earnings and stock trading activities.
- Issue an official daily summary of stock prices.
- Increase public awareness of financing and investments in publicly traded companies.

The Ministry of Commerce and Industry also established several guidelines for the registration of securities brokers. Trading remained through individual brokers (over-the-counter style) until the official stock exchange was established in April 1977.

By 1976, stock trading activity had grown rapidly in Kuwait. The total market capitalization increased from KD 895.7 million (approx U.S $ 3.2 Billion) in 1974 to KD 2.325 Billion (U.S $ 8.4 Billion) in 1976.[3] By the end of the fourth quarter in 1976, the total annual value of stock market transactions in Kuwait was KD 952 million (more than U.S $ 3 billion). The average P/E ratio reached 22 while it was at 14.1 on the NYSE.

The stock price index prepared by the Ministry of Commerce and Industry fell by 18.5% during 1977. Uncontrolled speculative activity was the main cause for the market rally and subsequent collapse, as speculators were caught up in forward deals and faced the prospect of settling agreements made 12 months previous in which they had to pay a 25% premium on peak share prices. Government intervention prevented a further collapse in the market. The government banned forward trading and released a set of regulations concerning forward and margin trading which was believed to be the major cause of the market crisis. The government also intervened directly by buying shares in the market to prevent a further price decline. Total government purchases of stocks between December 1977 to April 1978 were about KD 150 million.

The market regained stability by the end of 1978 and normal trading activity resumed in the newly established stock exchange. By 1982, market activity was not confined to the official market in which 40 Kuwaiti companies and a few other Gulf-based companies were traded. The souk Al-manakh (also called the "parallel stock exchange") developed as a totally unregulated market in (non-Kuwaiti) Gulf-based companies that did not meet the official exchange listing requirements.

One more time a wave of speculative activity stirred the markets. In 1979, about $6.9 billion worth of shares changed hands in the official market ranking it among the 15 largest securities markets in the world. In 1981, stock prices increased 56% on average and annual trading volume reached $7.0 billion (refer to Table 2.1). More volatile was the Al-manakh market in which some of the companies had little earnings record yet their share prices rose by as much as 500% during 1981. Unfortunately, no reliable figures are available on trading in the Al-manakh market. In August 1981, the Kuwaiti Stock Exchange authorities lifted the ban on forward trading and accepted 50% as the highest premium to be charged over spot value. Again, as in 1977, the market was operating on a mountain of credit including forward deals of 6, 12, and 24 months based on illegal post-dated cheques. According to the Kuwait regulations on post-dated cheques, the holder of a post-dated cheque can cash it at any time regardless of the date on the cheque. The issuer is responsible for immediate settlement; otherwise he would be subject to two years in prison.

Despite these regulations, the practice continued between traders based on trust. The market continued to climb (share prices rose 23.5% on average in just six weeks during March and April of 1982) until mid-May 1982. By that time, open forward positions in the official market showed an aggregate of about $15 billion with settlement dates stretching up to three years. To cover these positions, spot prices needed to double by December 1982 and double again by May 1983. The size of the positions and the premiums in the unofficial market (souk Al-manakh) were even greater, where P/E ratios ranged from 60-100. Slowly, realization dawned on the less committed speculators that a market advance at the rate required by the forward deals was not sustainable.

The market index fell from 603 in early May 1982 to just below 500 by mid-August (see Table 2.2). Again, the souk Al-manakh moved sharply as actively traded stocks fell in value by 60% or more. As forward positions came due, the crisis started taking another dimension. Market speculators were expecting a government intervention (as in 1977) to save the market. However, Monday, August 23, a government statement forbade further forward trading and called on investors in the market to seek compromise with their creditors. The speculative bubble burst and prices collapsed.

On September 20th 1982, the government suspended the right of citizens to sue for debt resulting from unsettled forward securities transactions and it called for the registration within thirty days of all post-dated cheques used in forward transactions. The gross value

of all post-dated cheques registered after the collapse was $93 billion. Sixty five individuals were responsible for 53% of the total market debt. About $17 billion were related to forward trading in the official market and the rest were related to forward trading in the Al-manakh market. The value of these post-dated cheques was six times greater than Kuwait's entire money supply of $15 billion, and three times the market value of all stocks of Kuwaiti public shareholding companies traded on the official market at the end of 1982 of KD 8.48 billion (U.S $ 30 billion). These numbers are staggering compared to Kuwait's population. According to Kuwait's official national census, there were 566,000 Kuwaiti citizens in 1980, of which more than 50% were below the age of 19.[4] The crisis came to be known as the Al-manakh crisis. Kuwait suffered economically, politically, and financially for a number of years. The crisis was acerbated in subsequent years by the decline in oil revenues and government spending.

Kuwait's government took several measures to resolve the crisis. On October 6th 1982, the government intervened by directly buying shares of Kuwaiti companies in the market. The government, through organizations established to dismantle the Al-manakh crisis, spent KD 700 million on direct stock purchases, and KD 885 million on compensations to smaller investors. The government established a price support level for stocks and the market index stabilized around 470 until April 19th of 1984 when the government withdrew its support operations from the market. Subsequently, stock prices declined by

about 50%. By the end of 1984, the official market index was at 238.6.

Table 2.2 presents a review of the official stock market index during 1982. Unfortunately, no accurate figures are available on Al-manakh trading activity at that time. However, it is estimated that the Al-manakh stocks lost more than 60% of value during the crisis.

2. CURRENT CONDITIONS IN KUWAIT'S STOCK MARKET

A new securities exchange opened in September 1984. It is officially known as the "Financial Papers Market" because it trades bonds and bank deposits as well as equities. Initially the market enlisted Kuwaiti companies, however, in 1986 an official parallel market was created on the main floor that enlisted Gulf-based companies. The trading system is based on a writt n auction procedure. The market is regulated by an 11-man committee under the Ministry of Commerce and Industry. The Kuwaiti government introduced an extensive set of laws since 1983 to regulate the market's operations. The laws are similar to those of developed stock markets including regulations covering information disclosure, securities registration, brokerage requirements and registration. Since 1988, corporations are required to report semi-annual financial statements. Before 1988, Kuwaiti corporations were required to report annually. Since 1986, the stock exchange authorities were given the right to examine the financial position of the companies listed. Brokerage

firms were licensed with strict capital and credential requirements.[5] Trades are conducted by floor brokers on instructions from outside (retail) brokers. This separation of function is intended to protect the integrity of the market by ensuring that traders do not know the identity of their clients. Brokers are responsible for settlement of the deals in order to prevent another Al-manakh style crisis. There are an extensive and restrictive set of rules on margin trading and short selling. Two forms of market makers supply a measure of liquidity to the market.

The Kuwaiti Financial Papers Market (KSE) performs financial analysis on all listed stocks and produces semi-annual and annual statistical summary reports that include world, regional, and local economic outlooks. Annual directories (by industry) and other publications of historical performance are prepared for investors. Daily, weekly, monthly, quarterly, and annual stock price and trading summaries are produced and promptly reported to the local news media. Adherence to information disclosure requirements by corporations has improved. However, quarterly financial disclosures are not common among corporations and insider trading regulations have not been developed. Brokerage commissions are fixed according to the number of shares traded and their prices. The system's expenses are subsidized by the government, although 30% of commissions are collected by the market administration and listed companies on the exchange pay an annual fee of KD 10,000 plus a 0.001% of their capital.

This study utilizes post-crisis data after the opening of the official Security Exchange and withdrawal of the government price support operations in 1984. Securities trading in the newly established market did not gain volume and stability until the end of 1985.

B. SAUDI ARABIA

1. A BRIEF HISTORY OF STOCK TRADING IN SAUDI ARABIA[6]

The first company to go public in Saudi Arabia was the Arabian Automobile Company in 1935. It was later liquidated. At present (June 1990), there are 69 joint stock companies in Saudi Arabia.[7] Ten of these are closed-joint-stock companies whose shares are not publicly traded. Another four issues were recently offered to the public and are not yet publicly traded. The rest are publicly traded companies. The oldest company currently trading is the Arab Cement Company which went public in 1954. The earliest publicly traded companies were in the cement and regional electricity industries reflecting the phase of development in the infrastructure in Saudi Arabia.

The biggest jump in the number of publicly traded companies was in the period 1976-1980 corresponding to a period of economic prosperity in the country. During that period, 19 new companies were offered to the public. An important feature of these IPO's was the fact that

the government insisted these shares be offered at par value (far below the actual value of these shares) as a form of distributing to the Saudi public the newly acquired economic gains of the country. These flotations resulted in tremendous shareholder interest in the Saudi stock market and resulted in a large segment of the population becoming involved in buying and selling shares. Several more IPO's were released in the market starting in 1981. Fifteen new companies in a variety of businesses and with total paid-in-capital of Saudi Riyals SR 22 billion (SR 3.75 = $1 U.S as of January 1990) were offered to the public (Al-Dukheil, 1988).

Prior to December 23, 1984 stock trading was not regulated by the government. About 80 stockbrokers were informally putting buyers and sellers of stocks in touch. These brokers had no license, capital or credential requirements.

After the Al-manakh crisis in Kuwait, the lack of regulations to organize and monitor trading activities drove the Saudi government to take regulatory action. The regulations came as part of the government's desire to avoid the kind of speculation rampant in Kuwaiti's unofficial stock market, the souk Al-manakh. Rather than structure their stock market as had the Kuwaiti's, the Saudi authorities left trading in the hands of the Saudi banks. A joint committee was formed under a royal decree in April 1983. The committee members were delegates from the Ministry of Commerce, Ministry of Finance & National Economy, and Saudi Arabian Monetary Agency (SAMA). Based on this committee's deliberations, SAMA issued

a circular to all banks in the Kingdom of Saudi Arabia in June of 1984 laying the groundwork for a new system of regulated stock trading.

The system established the following:

- An independent supervisory body for all securities trading.
- A Shares Control Administration Division (SCAD) under the jurisdiction of SAMA to handle day-to-day securities trade monitoring and control.
- The formation of a securities trading company by the 12 banks in Saudi Arabia.

In 1985, the banks jointly formed the Saudi Shares Registration Company (SSRC). All brokerage activities were confined to the new company which created a central unit to coordinate buy and sell orders between bank branches. The maximum commission was fixed at 1% for all size dealings and was shared equally by the buyer and seller.

2. CURRENT CONDITIONS IN SAUDI ARABIA'S STOCK MARKET

At present, there are 52 publicly traded companies in Saudi Arabia (excluding 3 public companies whose shares are not traded) which may be categorized as follows:

	PRIMARY FLOTATIONS	CAPITAL EXPANSION	# OF SHARES	PAID-IN CAPITAL (SR MILLION)
FINANCIAL	11	8	24,225,000	2,377.50
INDUSTRIAL	17	20	87,110,000	11,191.00
SERVICES & UTILITIES	17	4	306,876,623	28,718.81
AGRICULTURE	7	-	18,457,769	1,248.77
TOTAL	52	32	436,669,392	43,536.08

Currently, the SSE is an over-the-counter trading system. All brokerage activities are confined to banks comprising the Saudi Share Registration Company (SSRC). Banks are not allowed to take positions in stocks. The SSRC has a central unit coordinating market orders that flow through the individual banks and also serving as a clearing system after trades are executed. Commissions are set at a maximum rate of 1% of the value of the transaction and are equally divided between the buyer and seller. Only cash settlements are allowed; margin trading and forward deals are strictly prohibited. Figure 2.2 presents the types of transaction between buyers and sellers and the trade reporting system.

A securities trading supervisory committee is composed of members from the Ministry of Commerce, the Ministry of Finance and National Economy, and the Saudi Arabian Monetary Agency (SAMA). This committee meets periodically (at least monthly) to review market conditions. The supervisory committee reports to a ministerial

committee which was formed by royal decree in April of 1983. Only the ministerial committee has the authority to impose new regulations on the market. The Share Control Administration Division (SCAD) under the jurisdiction of SAMA handles day-to-day securities trade monitoring and control. SCAD reports a daily and a weekly financial summary to the local media. Figure 2.1 presents a schematic of regulatory decision- making in Saudi Arabia.

Information disclosure laws for corporations are found in laws covering business firms and not in securities laws or regulations. Any violations of these laws are handled by the Ministry of Commerce. Under these laws, corporations are required to report their audited annual balance sheets and income statements to the public. SCAD issued a circular on stock trading procedures which also specifies that corporations should report their quarterly financial statements within two month from the end of each quarter. The circular states that the ministerial committee has the right to suspend share trading for corporations that do not comply with the quarterly disclosure requirements and are subject to penalties specified under the laws of incorporation. However, the laws of incorporation require firms to report only annually. Also, apart from suspending trading in shares no other penalties are specified. Suspension of trading has never been enforced on companies that do not comply with quarterly disclosures. Individual buyers and sellers can trade directly through the share registration departments of the corporate stock transacted.[8] Some firms have complied with the quarterly disclosure requirements while the majority have not. As for insider trading,

the laws only state that members of corporations' Board of Directors are not allowed to release inside information to anyone or to the public except at the time of the annual shareholders' assembly. To our knowledge, there are no laws that prohibit insiders from buying and selling the company shares based on inside information.

TABLE 2.1: KUWAIT'S STOCK MARKET ACTIVITY 1976-1984

Year	Volume of trades (Million shares)	Total Value of trades (Million KD)[a]	Market Value Index[b]	Money Supply[d]
1976	19.8	952.0	235.2	N/A
1977	13.7	346.0	191.8	N/A
1978	164.8[c]	1424.8	258.9	1950.4
1979	169.1	1864.8	311.4	2289.8
1980	143.7	1325.4	313.3	2857.5
1981	246.7	1953.8	489.6	3883.5
1982	162.3	1862.2	509.4	4200.0
1983	74.5	519.3	460.5	4267.8
1984	70.2	116.9	238.6	4496.9

a. The Kuwaiti Dinar / U.S $ exchange rates fluctuated between a low of 3.4 and a high of 3.75 during 1978 to 1982. An average rate of 3.6 is used in deriving figures in U.S $.
b. Official market index based on 100 on January 1976.
c. The total number of shares increased in 1978 due to the decrease in share nominal value of individual stocks from 7.5-10 KD to 1 KD.
d. Money supply at the end of each year defined as money (currency in circulation + Demand deposit) and quasi money (savings deposits + time deposits + Deposits in foreign currencies + Certificates of Deposits).

Source: compiled from information supplied by Kuwait's Financial Papers Market.

TABLE 2.2: KUWAIT'S OFFICIAL MARKET INDEX CHANGES AT THE END OF SELECTED MONTHS IN 1982 AND 1984

Year	Index	% Change from previous month
1982		
- February	488.1	
- April	602.6	23.5%
- October	476.0	-21.0
1984		
- March	476.0	
- December	238.6	-49.8

FIGURE 2.1: REGULATORY STRUCTURE OF THE SAUDI MARKET

Hierarchy in decision making and supervision from top to bottom. All banks have their head offices and central stock trading unit in the capital city of Riyadh where all the regulatory bodies are located.

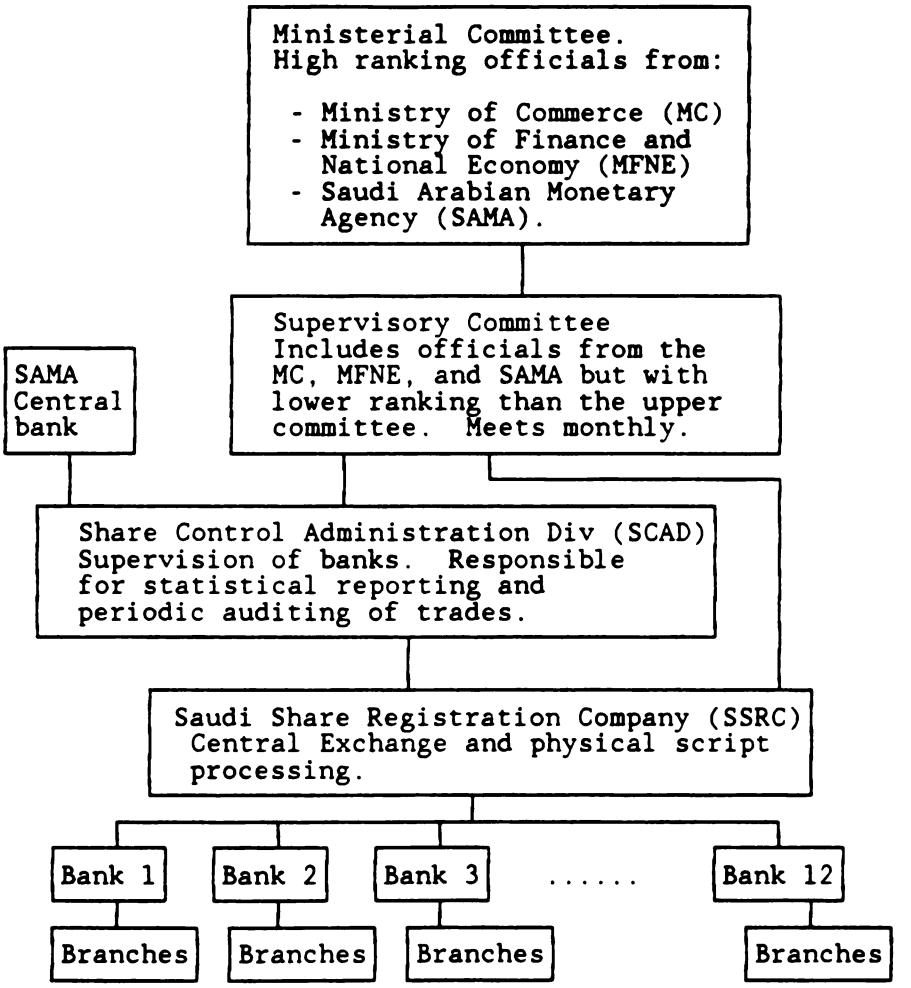
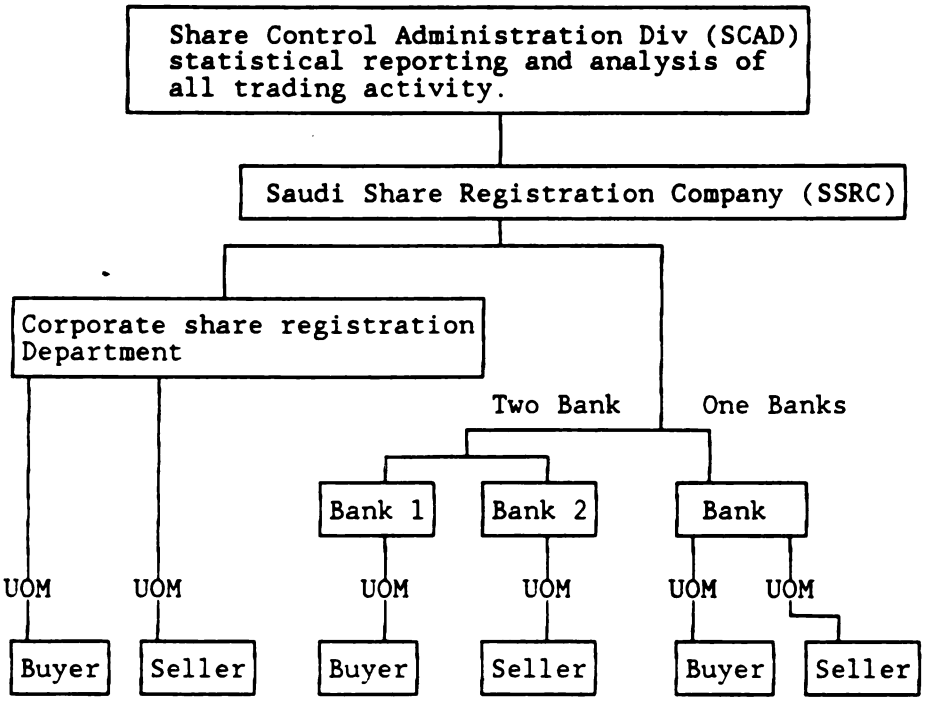


FIGURE 2.2: STOCK TRANSACTIONS AND TRADE REPORTING

Shares are traded either through the banks or directly through the corporations' share registration department. Both types of trades are reported to the SSRC and SCAD on a daily basis. Buyers and sellers may or may not use one of the unofficial market makers to search for the best price.



Note: UOM is used to denote an "Unofficial Market Maker" who may or may not be involved in the trade.

1. Forms of underwriting that exist in the U.S capital markets include (1) best efforts whereby the underwriter agrees to sell as much as he can at the offering price; and (2) firm commitment in which the underwriter guarantees the entire offering at an established price.

2. In addition to interviews with officials in Kuwait's Financial Papers Market, several references were used in writing this section. These include: the proceedings of the conference on Development of the Stock Market (Arabic) in Kuwait held in Kuwait on 14-16 November, 1981 and published by Kuwait's Chamber of Commerce and Industry; Salameh (1986); and Al-Rekaibi (1983).

3. The Kuwaiti Dinar (KD) / U.S $ exchange rates have fluctuated between a low of 3.4 and a high of 3.75 during 1978 to 1982. An average rate of 3.6 is used in deriving figures in U.S $.

4. Kuwait had a total population of 1.358 million in 1980, of which 792,339 were foreigners. Other statistical figures may be found in the " Annual Statistical Abstract" published by the Ministry of Planning's Central Statistical Office in Kuwait.

5. Brokerage firms are not allowed to be in the form of proprietorships, must have a minimum capital of KD 100,000, and provide a deposit of KD 250,000 as a security deposit against malpractice. Employees are required to undertake 16 weeks of training sessions on trading and financial knowledge.

6. In addition to interviews with officials in the Saudi stock market, several references were used in writing this section. These include Al-Dukheil (1988) and Filimban (1986).

7. A joint stock company is defined as a company that has capital of at least 10 Million SR and more than 5 shareholders.

8. Refer to Figure 2.2 for types of stock transactions in Saudi Arabia. It is believed that the majority of trades are facilitated by the active traders (unofficial market makers). If a company is suspended from trading its shares through the SSRC, then active traders can always resort to direct trading with individual buyers and sellers and reporting trades directly to the share registration departments of the individual companies being traded. Aside from convenience, traders have little incentive to transact through the official market (SSRC).

CHAPTER III: CAPITAL MARKET EFFICIENCY.

A. INTRODUCTION

One difficulty in discussing the appropriate role of capital markets lies in the ambiguous and multiple ways in which the expression "capital markets" is used. In the broadest definition, capital markets refer to the entire organized financial system, including all financial institutions, and to short term (money) as well as long term (capital) markets. An intermediate definition of capital markets, usually referred to as financial markets, includes all organized markets and institutions dealing in long term financial instruments (conventionally defined as having a maturity in excess of one year) including stocks (equities), bonds, term loans, mortgages, and savings deposits. The narrowest definition of a capital market, and the one used in this dissertation, is the locus of the organized market where securities (stocks and bonds) are sold using the services of brokers, dealers, and underwriters (Wai and Patrick, 1973). The emphasis is on the activity of market transactions (buying and selling) through a securities exchange system. Because the KSE and SSE are primarily equity markets, our empirical emphasis will be on their stock exchange system.

An economy which hopes to make efficient use of its resources must ensure that capital flows freely to its most productive uses. Financial markets provide the clearinghouse in which funds are allocated between

borrowers and savers. Efficient allocation of capital into investment projects promotes economic growth. Economic growth will be less than optimal if the most attractive projects do not receive the necessary funds.

The issue of stock market efficiency has significant consequences for the economy. Stock price movements affect the cost of capital expansion and give managers of firms a direct evaluation of their performance. Stock prices are also an important scorecard of the effectiveness of managers' activity. Since the allocation of a country's savings is influenced by stock prices, it is important to define and identify the major characteristics of efficiency in capital markets. In the next section, we describe several concepts of efficiency.

1. MARKET EFFICIENCY DEFINED

The term "efficiency" in capital markets has been used to describe several distinct but interrelated concepts. These include allocational, operational, and informational efficiency. a) Allocational efficiency: Funds are allocated efficiently between savers (investors) and borrowers (producers). b) Operational (exchange) efficiency: The degree to which participants are not motivated to create exchange arrangements not already provided by the market (Rubinstein, 1975). An operationally efficient market is one in which there is no cost to transferring funds and hence no incentive to create alternative exchange arrangements. c) Informational efficiency: The degree to which stock prices reflect

information that is available about the future performance of firms. When new information becomes available in an informationally efficient market, stock prices adjust rapidly and without bias to their new equilibrium level. Investors cannot make excess returns relative to the risk they bear based on available information. Fama (1970) has done a great deal to operationalize the notion of capital market efficiency.

a. Allocational Efficiency

The purpose of capital markets is to transfer funds between investors (savers) and borrowers (producers) efficiently. Individuals and firms may have excess productive investment opportunities that exceed the market determined rate at which they can borrow but not enough funds to take advantage of all these opportunities. Capital markets can provide access to the needed funds. Investors, on the other hand, may have surplus funds after exhausting all their profitable productive opportunities. These investors will be willing to lend their surplus funds if the rate of return the market will pay exceeds their opportunity cost of capital. Both investors and borrowers gain by this fund transfer mechanism. The market is said to be allocationally efficient when prices are determined in a way that equates the marginal rates of return (adjusted for risk) for all investors and producers.

Friend (1972) characterizes the process of allocational efficiency in capital markets:

" by the extent to which there are variations in market returns and

by the extent to which this variation can be explained by differential risk".

He further proceeds,

" That affects the functioning of the economy in two principal ways. First, market developments may affect the national income through its influence on the aggregate propensity to consume, to save and invest. Second, even with the given level of saving and investment, market arrangements can result in more or less efficient allocation of investment. In addition to the economic roles of the stock market, a well performing market might provide for equitable arrangements among its participants."

Mahdavi (1976) points out that allocational efficiency is of vital importance, particularly in a situation where capital markets are in their earliest stages of development. By increasing opportunities in the market and potential investors' awareness of these opportunities, the number of market participants increases. To the extent that these market opportunities enhance or mobilize new savings that otherwise would have been consumed, these opportunities may influence the aggregate propensity to save and, hence, to consume. Another consequence of this type of efficiency would be to expand the investment opportunity set available to individual investors and, hence, the propensity to invest.

b. Operational Efficiency

Operational efficiency deals with the cost of transferring funds between investors and producers. This concept of efficiency concerns the efficiency of the exchange itself. Rubinstein (1975) uses the term "Exchange efficiency". He defines it by "the degree to which participants are not motivated to create exchange arrangements not already provided by the market."

This concept of efficiency deals with the degree to which a capital market mechanism is frictionless. Stigler (1964) discusses operational efficiency under the term "technical efficiency". Stigler contends that the criterion of operational efficiency is the cost of consummating a transaction. The lower this cost, the higher is the operational efficiency of the market.

In this framework, operational efficiency cannot be separated from allocational efficiency. If the market is not operationally efficient (that is, if a firm with highly efficient investment opportunities was deprived by the market because of excessive transaction costs), the market's allocational efficiency would decline to the degree of these transaction costs. For this reason, an investor might not participate in the market due to prohibitive transaction costs.

c. Informational Efficiency

According to the efficient market hypothesis, in an informationally efficient capital market prices fully and instantaneously reflect all available relevant information. This means that the prices of publicly traded stocks are accurate signals for capital allocation. There can be imperfect competition in product markets and we still can have efficient capital markets. For example, an efficient capital market will correctly value a monopolistic firm as the present value of its future monopolistic cash flows. By the same token, an efficient market will determine an equilibrium price for firms that implement less than value-maximizing decisions. Hence, product markets can be allocationally inefficient and yet capital markets can be informationally efficient.

In an efficient market, information which is relevant in pricing securities is rapidly reflected in the price of those securities. In such a market, market price is a good estimate of the intrinsic value of a security. Professional or detailed security analysis should not produce any excess returns over a buy and hold strategy after adjusting for information costs. Other than by the laws of chance, investors are not expected to continuously over or under-perform the market on a risk adjusted basis.

Fama (1970, 1976) defines three types of informational efficiency based on the information which is available in the phrase "all prices fully reflect all available information". There are three levels of market efficiency depending on the type of information used by the

investors.

i. Weak-form efficiency: In a weak-form efficient market, knowledge of past price movements do not provide information about future prices. In other words, no investor can earn excess returns from trading rules based on historical price or return information.

ii. Semistrong-form efficiency: No investors can earn excess returns from trading rules using publicly available information. Trading based on earnings announcements, annual reports, dividend decisions, or information in the financial press is unlikely to lead to excess returns.

iii. Strong-form efficiency: Market security prices reflect all information public and non-public. No investor can earn excess returns using any information.

Rubinstein (1975) proposes a stronger form of efficiency than Fama's strong-form efficiency. The market is said to be efficient with regards to information if new information causes no portfolio change. In Rubinstein's definition, the number of transactions could be used as a proxy for market efficiency. That is, the more heterogeneous the beliefs of investors about future security prices, the less efficient the market.

The efficient market hypothesis of Fama provides us with certain testable implications. Studies on developed markets such as the New

York Stock Exchange reject market efficiency in the strong form. Therefore, it is of little use to study strong-form efficiency in less developed capital markets. Also, data required for strong-form efficiency tests (i.e., insider trading) are often not available in the less developed markets. We apply weak-form efficiency tests to the KSE and SSE markets.

The process by which market efficiency is achieved and the factors that may enhance market efficiency are discussed in Chapter V.

B. THEORY OF THE BEHAVIOR OF STOCK PRICES

1. INTRODUCTION

In 1826, R. Brown observed the random movement of microscopic particles in liquid. The process has come to be known as Brownian motion. Bachelier (1900) observed the similarity of price change behavior to that of the particle observed by Brown and developed a mathematical model for that behavior. Bachelier proposed that the law of probability governs a securities market. He used French commodity prices to test his hypothesis by constructing a time series of security price changes. Bachelier's work was pioneering and he is credited with inspiring similar applications of his work in other areas of science.

Bachelier's work went unnoticed in economics for many years. In fact, his model was independently derived by Osborne (1959) more than

fifty years later. The basis of the Bachelier-Osborne model, which is an application of Brownian motion theory, is that changes in security prices from one instant to another are identically and independently distributed random variables with a finite-variance distribution. If the number of price changes in a security is very large, the central-limit theorem permits us to use the normal distribution to represent the distribution of price changes. The following is a summary of theoretical models describing the behavior of security prices.

2. EXPECTED RETURN OR "FAIR GAME" MODELS

The equilibrium price of security j at time t+1 is a function of its price at time t plus the one period expected return on that security with information Φ_t reflected in the price. The market is said to be efficient if prices reflect all available information. Mathematically, this may be written as

$$E(\tilde{P}_{j,t+1}|\Phi_t) = [\ 1 + E(\tilde{R}_{j,t+1}|\Phi_t)]P_{jt}, \qquad (1)$$

where

$P_{j,t}$ = price of security j at time t.

$\sim$ = random.

Φ_t = Information set assumed to be fully reflected in the price at time t.

$R_{j,t+1} = (P_{j,t+1} - P_{j,t})/P_{j,t}$ = one period total return including dividend.

The major assumption of the fair game model is that the conditions of market equilibrium can be stated in the form of expectations that fully reflect the set of all available information to the market at the time the expectations are formed. No systematic gains or profits would be possible in such a world.

If $X_{j,t+1}$ is excess profit on security j at time t+1 (i.e., the difference between observed price and expectations) then;

$$X_{j,t+1} = P_{j,t+1} - E(P_{j,t+1}|\Phi_t), \qquad (2)$$

and

$$E(\tilde{X}_{j,t+1}|\Phi_t) = 0. \qquad (3)$$

meaning the sequence of expected returns is a "fair game" with respect to the information sequence.

The fair game model is based on the assumption that conditions of market equilibrium can be stated in terms of market returns. Equivalently, equation (2) and (3) can be written as

$$Y_{j,t+1} = R_{j,t+1} - E(R_{j,t+1}|\Phi_t), \qquad (4)$$

and

$$E(\ Y_{j,t+1}|\Phi_t) = 0, \qquad (5)$$

where

Y_j = excess return on security j,

and

R_j = the return on security j.

A fair game means that, on average, across a large number of samples the expected return on an asset equals its actual return. A fair game does not imply that you will earn a positive return; only that expectations are not biased.

Two special cases of the "fair game" model, the random walk and the submartingale, are presented next.

3. THE MARTINGALE AND SUB-MARTINGALE MODELS

Given the definition of a fair game in Equation (4) and (5), a submartingale is a special case of the fair game model where tomorrow's price is expected to be greater than today's price. Mathematically, a submartingale is

$$E(\tilde{P}_{j,t+1}|\Phi_t) > P_{j,t}, \qquad (6)$$

In returns form this implies that expected returns are positive.

Mathematically, this is

$$E(\tilde{R}_{j,t+1}|\Phi_t) > 0. \tag{7}$$

A martingale is also a fair game. With a martingale, however, tomorrow's price is expected to be the same as today's price. With a martingale, equation (7) can be written as

$$E(\tilde{R}_{j,t+1}|\Phi_t) = 0 \tag{8}$$

The process is called a supermartingale if

$$E(\tilde{R}_{j,t+1}|\Phi_t) < 0. \tag{9}$$

In practice, a negative expected return is seldom found, because cash would be held instead of securities. Therefore, only the martingale and submartingale processes are used in this context.

4. THE RANDOM WALK (RW) MODEL

According to Fama, the Random Walk (RW) model is best regarded as an extension of the "fair game" model. A price series is said to follow the RW process if successive price changes in the series are independent and identically distributed according to some probability distribution.

An alternative definition of the RW focusing on security price changes is

$$P_{j,t} - P_{j,t-1} = \epsilon_t, \qquad (10)$$

where

ϵ_t is a series of uncorrelated numbers.

$E(\epsilon_t) = 0$, $E(\epsilon_t, \epsilon_K) = 0$ for t not equal to k.

Whereas the fair game model only assumes that deviations from expected return are independent over time, the RW model assumes identically distributed returns as well. A RW with a drift means that the distribution of changes in price doesn't have a zero mean. A RW with a positive drift is a special case of the submartingale model. The RW model implies that short run price movements are not predictable and that these movements are randomly distributed around the intrinsic value of the security.

The efficient market model assumes that prices change when the market receives new information regarding the company or general economy. The new information causes a change in investors' perceptions about the prospects of their investments. New information arrives in a random fashion. Thus, the next price change is random with respect to available information now. The random walk model implies that the distribution of price changes is stationary over time and that future price changes are independent of past information; that is,

$$f(R_{j,t+1}/\Phi_t) = f(R_{j,t+1}) \qquad (11)$$

Equation (11) implies that future expectations do not depend upon past information (Φ_t). Past information is already captured in today's price and hence is irrelevant for predicting future price changes.

In the next section, we review and discuss the empirical evidence on market efficiency in two parts. The first part is concerned with empirical evidence from the large capital markets, mainly the NYSE and the London Stock Exchange. The second is concerned with empirical evidence from the less developed exchanges. Empirical tests of market efficiency are discussed in Chapter IV.

C. REVIEW OF THE EMPIRICAL EVIDENCE

1. THE DISTRIBUTION OF STOCK PRICE CHANGES

The form of the distribution of price changes provides descriptive information concerning the nature of the process generating the price changes. For example, if the price changes are large and vary frequently, it may lead us to infer that the economic structure that is the source of the price changes is itself subject to frequent and sudden shocks over time. The shape of the distribution of price changes and its behavior over time are also important in determining the riskiness of investments in common stocks.

In the previous section we discussed the Bachelier-Osborne model under which the distribution of daily, weekly, and monthly price changes

are assumed to be normally distributed. Normality of the distribution was addressed by Fama (1965) and Mandelbrot (1963) who were able to reject it and suggested its replacement by the family of stable paretian distributions.

Fama (1965) analyzed the distribution of the log of daily price changes for the 30 largest NYSE stocks comprising the Dow Jones Industrial Index. He demonstrated that first differences of stock prices seem to follow a stable paretian distribution with characteristic exponent α less than 2. In fact, each of the NYSE stocks showed some degree of leptokurtosis. Leptokurtotic distributions are more peaked in the center and have fatter tails than the normal distribution.

Studies of security price changes in other stock markets also show leptokurtosis. Solnik (1973) analyzed the distribution of price changes in eight European stock markets (France, U.K, Germany, Italy, the Netherlands, Belgium, Switzerland, and Sweden). He found that the price change distributions are more leptokurtotic than the 30 large NYSE stocks examined by Fama. Laurence (1986) shows different results for the Kuala Lumpur and Singapore stock markets. The distributions are more leptokurtotic than in Fama's sample. In a study by Jennergren & Korsvold (1975), Norwegian and Swedish samples were similar to those of Laurence. Interestingly, when the Swedish sample was broken into actively traded and inactively traded stocks, the actively trading stocks had a price change distribution similar to Fama's while the inactive sample had a more extreme leptokurtosis. Conard and Juttner (1973), in a study of German stock prices, find distributional results

similar to Fama's.

Table 4.1 summarizes the price change distribution results relative to the normal distribution in different stock markets. It seems that the less active the market the more leptokurtotic the return distribution. We should expect the same results for the KSE & SSE.

2. WEAK-FORM EFFICIENCY

a. Early work on weak-form efficiency

The market efficiency issue evolved from the possibility that an investor might consistently accumulate excess gains or profits from the application of trading rules in the transactions of financial securities. Tests of the Efficient Market Hypothesis (EMH) were preceded by investigations that lacked scientific rigor but shared certain intuitive tenets and often quite similar conclusions.

Bachelier's observation that security prices move randomly through time went largely ignored until the introduction of computers in the 1950's. In fact, similar studies of non-rigorous forms of the random walk model were independently researched by Slutsky (1937) and Working (1934). Osborne (1959 & 1962) adapted the theory of Brownian motion to the movement of share prices. He suggested market conditions, similar to those assumed by Bachelier, would lead to a random walk. He also introduced the use of the logarithm of price change to represent

instantaneous or continuously compounded percentage returns.

The earliest studies of the EMH utilize two approaches or models. Samuelson (1965) and Mandelbrot (1966) examine the "fair game" expected return model. The evidence in support of fair game market efficiency is convincing. Empirical studies of the random walk model, in which expected returns are stationary and not dependent on information available in the previous period, have not unanimously upheld the RW model.

Support of the RW model can be found in several studies. Kendall (1953) found that the serial correlation coefficients for the first differences of weekly London share price indices are not significantly different from zero. Granger and Morgenstern (1963) and Godfrey, Granger and Morgenstern (1964) used spectral analysis on a set of U.S stocks and found support for the RW hypothesis. Fama (1965) runs a comprehensive set of weak-form efficiency tests on the 30 largest NYSE stocks. The results from serial correlation and run tests on individual stocks show some dependence in the form of small correlations which were consistently positive and close to zero. The observed runs were less in number than expected from a random process. Fama reports that there are indeed slight dependencies but concluded that these do not violate the conditions of market efficiency.

Alexander (1961) considered investment strategies involving filter rules and rejected the random walk. However, his results were later found biased because he did not adjust prices for dividends. This was

also reported by Fama (1965). Fama & Blume (1970) find that one cannot make profits from filter rules and so further support the RW hypothesis.

Some studies, like Levy (1966), claim to have found evidence contrary to the random walk hypothesis but which in fact are concerned only with relative strength as shown by Jensen (1967).

This review of market efficiency tests is not exhaustive and the reader is referred to more exhaustive reviews in Paretz (1969), Fama (1970), and Granger (1972).

b. Market seasonalities

Predictable patterns in asset returns may be exploitable and therefore judged as evidence against weak-form market efficiency. Even if the pattern does not directly result in excess profits because of prohibitive transaction costs, it may enable investors who are going to trade anyway to increase their portfolio returns. In recent years, several statistically significant patterns in stock market returns have been identified. These include a day of the week effect (DOW), a day of the month effect (DOM), a turn of the year effect, and even an hour of the day effect.

Cross (1973) was the first to document cyclical movement in stock prices by showing that the market index rose more on Fridays than Mondays. Friday returns were consistently higher and Monday returns

were consistently lower than average over the 18 years of the study. French (1980) examined the day of the week (DOW) effect with a more scholarly approach and confirmed the highly significant returns on Monday. He disputed Cross' hypothesis that bad news is often released on Friday to allow the market to absorb its effect because the market must be systematically surprised by such news for the week-end effect to hold. Gibbons and Hess (1981) extend French's work using sophisticated econometric techniques and document its presence in the T-bill market. Lakonishok and Levi (1982) offer a partial explanation of the DOW effect based on delays between trading and settlement in stocks and clearing checks. Keim (1983) shows that the DOW effect is present over 55 years of stock market data.

Harris (1986) documents intraday patterns in stock market returns. Intraday cyclicalities have also been noted by McInish and Wood (1985) using transaction data on NYSE stocks. This may be called the hour of the day effect.

Another pattern in stock prices is the so-called year-end effect documented in Keim (1983), Reinganum (1983) and Roll (1983). On average, stock returns decline in December of each year, especially for small firms and for firms whose prices have already declined during the year. Prices typically increase during the subsequent January. The most likely cause of the year-end effect seems to be tax selling, although Constantinides (1983) reports that the tax effect is too small to explain the year-end-effect. Evidence of such stock market seasonality was found by Gultekin and Gultekin (1983) and Corhay,

Hawawini, and Michel (1987) in other capital markets around the world. Further, a year-end effect was found in Australia by Gultekin and Gultekin even though the Australian calendar and tax year do not coincide.

Ariel (1987) found that returns over the period 1963-1981 are higher in the first half of calendar months than in the second half. This may be called a day of the month (DOM) effect. He also finds evidence for a within-quarter effect. Mean returns in the first half months following the second, third, and fourth quarters are higher than all other half months. Further, this within-quarter effect does not explain the DOM effect and the DOM effect is still evident after removing the month of January. Penman (1987) studied the DOM effect and reports that it is not due to the small firm effect because results on differences between returns on Equally Weighted and Value Weighted market indexes indicate no significant differences across half-month periods. He excludes the months at the beginning of every quarter and shows that the DOM effect is still evident. Also, he calculates betas for firms reporting earnings during the first half and during the second half of the month and finds no significant difference. Both Penman and Ariel find a DOM effect across various sub-periods.

At present, there is no satisfactory explanation for these cyclical patterns in stock prices. Such phenomena may be a form of market inefficiency. However, tests of market efficiency are simultaneously tests of a particular asset pricing model. Whether such patterns are a result of modeling misspecification or actual market inefficiencies may

be unknowable. Research in this area is currently in progress and no final conclusion can yet be made.

3. SEMI-STRONG FORM EFFICIENCY

Under this form of market efficiency the empirical work is primarily concerned with the speed and accuracy of stock price adjustments to new public information. Researchers have studied the effects of several types of public information disclosure on stock prices including the effect of earnings and dividend announcements, accounting procedure changes, and other events. Most of the research in this area is on large and sophisticated capital markets. Most studies indicate that these markets are efficient in the semi-strong form.

Ball & Brown (1968, 1972) conclude that there is a correlation between the announcement of a firm's self-reported earnings forecast and its stock return but that this information is quickly assimilated into security prices in an unbiased manner. This result is consistent with the Pettit (1972) and Watts (1973) studies which measured market reaction to dividend disclosures by firms. The results of both studies are consistent with the semi-strong EMH hypothesis.

Most of the other research in this area is concerned with measuring the surprise element of information and return. Testing the EMH requires forecasting earnings or dividends using either time series analysis or analyst expectations. Because of the different

methodologies used in forecasting earnings and the different time intervals used in these studies (e.g. daily vs. monthly return data) the results reported by these papers are inconclusive. Joy, Litzenberger, and McEnally (1977) took explicit cognizance of possible biases in prior studies and conclude that "price adjustments to the information contained in unexpected 'highly favorable' quarterly earnings reports are gradual over time and not instantaneous". Ball (1978) surveyed the literature and found that it reveals "consistent excess returns after announcements of firms' earnings". Watts (1978) reports "significant abnormal returns are observed after the earnings announcement". These results appear inconsistent with semistrong form efficiency.

The Standardized Unexpected Earnings (SUE) measure developed by Latane, and Jones (1977, 1979) and Latane, Jones and Reike (1974) reveals a statistically and economically significant relationship between unexpected quarterly earnings and subsequent excess holding period returns from common stocks. Reinganum (1981) raised concern over the effectiveness of Standardized Unexpected Earnings as a measure of abnormal returns. Rendleman, et al. (1982) disputed Reinganum's findings. They found little difference in results using various risk adjustments. They reported that "one-half of the total excess return from stocks, when measured over the total period 20 days prior to 90 days after the earnings announcements, occur over the 90 day period starting the day after the day of the announcement", with only 18% on the day of the announcement. They conclude that abnormal returns could have been earned in the 1970's using earnings announcements reported by firms during the period of the study.

Pattel and Wolfson (1984) study the intraday speed of stock price adjustments to earnings and dividend announcements. They use Value Line forecasts as a surrogate for expected earnings. They find that the market assimilates earnings and dividend information within a few minutes of announcement. A similar result was achieved by Dann, Mayers and Raab (1977). However, negative serial correlation in the daily sequential price changes was present. Disturbances persist for several hours after public disclosure and extend into the following day. Further, they find that dividend announcements induce a weaker effect than earnings announcements.

Sunder (1973, 1975) collected a sample of 110 firms which switched from LIFO to FIFO and 22 firms which switched from FIFO to LIFO over the period 1946-1966. He then examined the firms' share price response upon the announcement of the accounting change. The empirical findings support the notion of "relevant market information". Individuals value actual cash flows and not earnings per share figures. The same conclusions are found in a study by Kaplan and Roll (1972) on the effect of changes in accounting for investment credit and in depreciation methods. Numerous other event studies examine the information content of accounting information.

Fama, Fisher, Jensen and Roll (1969) study the effect of stock splits on shareholders' wealth. Using the market model they calculate cumulative average monthly residuals before and after announcement of a stock split. Positive abnormal returns are observed prior to the split

but not afterward. They conclude that this is due to an ex post selection bias effect. They subdivided their sample into stocks that subsequently increased dividends and stocks that subsequently decreased dividends. It was found that investors tend to bid up the price of stocks that subsequently split in anticipation of an increase in dividends.

Black (1971) uses Jensen's abnormal performance measure, $\alpha_{jt} = (R_{jt} - R_{ft}) - [B_j (R_{mt} - R_{ft})]$, to test if abnormal returns could be earned from Value Line recommendations. He reports abnormal returns even after accounting for transaction costs. Copeland and Mayers (1982) criticize Black's results based on Roll's (1977, 1978) critique of the CAPM. They use a future benchmark technique and the market model to fit the data and report positive abnormal returns which are lower than those reported by Black.

The review here is not exhaustive. The evidence for semi-strong form market efficiency seems to outweigh the evidence against it. For most investors, the major U.S markets are relatively efficient most of the time. In recent years, much attention has been paid to developing capital markets were the necessary conditions for market efficiency are less likely to be met.

4. STRONG-FORM EFFICIENCY

The strongest form of informational efficiency contends that all information, including private available, is reflected in security prices. It precludes any trader from consistently gaining abnormal profits based on any information. Markets under this hypothesis fully aggregate all available information even though it is not known to all market participants. In such markets, for example, an insider should not be able to make abnormal returns because his trading activity would reveal his information to the market.

The studies of strong-form efficiency are limited by the availability of data on traders with monopolistic information. A direct test of this form of efficiency is whether or not insiders with monopolistic access to inside information can outperform the market. Jaffe (1974) collected data on insider trading from the SEC's Official Summary of Security Transactions and Holdings. Using the empirical market line, Jaffe then examined the cumulative average residuals from portfolios of stock that involved active insider trading over two sample periods, 1950's and 1960's. His results suggest that insiders do earn abnormal profits and that the strong-form hypothesis of market efficiency does not hold.

Finnerty (1976) tested the entire insider population using a sample of more than 30,000 insider trading observations from 1969 to 1972. Using an empirical analysis of the "average" insider returns, his findings corroborate Jaffe's conclusions. Insiders are able to "beat the market" on a risk-adjusted basis, both when buying and selling.

The evidence on insider trading in U.S. stocks suggests that strong-form efficiency does not hold. However, government regulators and policymakers are less concerned with the validity of the strong-form efficiency than with abuses by insiders. The distinction between legal and illegal trades based on public information is highly subjective. Consequently, corporate insiders have little deterrent from transacting on private information.

The Security and Exchange Commission (SEC) Act of 1933-1934 requires corporate officers, directors, and owners of ten percent of any type of security to report transactions in their own stock to the SEC no later than ten days after the end of the month of trading. These transactions are not usually published in the official summary until a few weeks after the end of the month. Such lags in reporting insider transactions to the public make it very difficult to preclude the possibility of abnormal profits to some traders who possess private information.

The SEC laws require that all "short-term" profits by insiders must be returned to the corporation. Short-term profits are those that result from a purchase and a subsequent sale within six months. An insider who holds the securities for more than six months is not liable to return short-term profits no matter how much proof is adduced of unfair resort to nonpublic information (Jaffe, 1974).

Regulators are aware of the high costs involved in preventing the use of insider information. Such costs make it prohibitive to preclude all

insider information abuses. Historically, the most significant changes in insider trading laws have occurred through a few important decisions in case law. For example, in 1961 the SEC extended insider trading liabilities to persons other than corporate officers, directors, and beneficial owners. Jaffe (1974) examined the changes in the volume and profitability of insider trading after three important legal decisions concerning insiders. He concluded that the null hypothesis that changes in regulation had no effect on the trading of insiders cannot be rejected.

SEC efforts in the last few years were been geared toward detecting and prosecuting major cases of insider information abuses. Such efforts have led to the prosecution of some major market financiers such as Ivan Boesky and Michael Milken. The Drexel Burnham Lambert scandal, involving its junk bond chief Milken, has led to the collapse and bankruptcy of the company. Milken has been fined $600 million and is facing a 28 year sentence. This case demonstrates the consequences of insider abuses when investment bankers like Drexel Burnham Lambert hold huge positions in securities.

5. EMPIRICAL EVIDENCE OF EFFICIENCY FROM THE LESS DEVELOPED CAPITAL MARKETS

As the above review indicates, evidence from the larger stock markets has been overwhelmingly convincing that these markets are efficient in the weak-form and usually in the semistrong form. Evidence from other

less developed capital markets is less clear cut. This section reviews the empirical evidence from the developing capital markets.

Studies of the less developed capital markets include Europe (Solnik, 1973; Pogue and Solnik, 1974; Bertoneche, 1978), Norway and Sweden (Jennergren, 1975; Jennergren and Korsvold, 1975), Sweden (Forsgardh, Hetrzen, 1975), Finland (Berglund, Liljeblom 1988), Germany (Conard and Juttner, 1973; Guy, 1977), Holland (Theil and Leenders, 1965), Spain (Palacios, 1973, 1975), India (Shamra, 1976; Shamra and Kennedy, 1977), Iran (Mahdavi, 1976), Israel (Silber, 1975), Far Eastern countries (Ang and Pohlman, 1978a; Hong 1978b), Singapore (Hong, 1978; D'Amboriso, 1980; Laurence, 1986), Hong Kong (Dawson 1982, 1984), Kuala Lumpur (Dawson, 1981; Laurence, 1986; Barnes, 1986), Korea (Jiho, 1980), Australia (Brown and Walker, 1982; Pratez, 1969, 1973; Juttner and Mchugh 1970), New Zealand (Emanuel, 1980), Brazil (Errunza, 1979), Mexico (Haugen, Ortiz and Arjona, 1985), Johannesburg (Roux and Gilbertson, 1978), and Canada (Rorke, Wills, Hagerman and Richmond 1976; Fowler, Rorke and Jog, 1979). Studies of Over-The-Counter (OTC) market in the U.S include Lease and Lewellan (1982) and Hagerman and Richmond (1973). The evidence from these studies is mixed. Some reject market efficiency while others do not. The evidence from these studies suggests that weak-form efficiency tests are the most appropriate for developing markets because of the increasing evidence of market inefficiencies in those markets. Summaries of serial correlation and runs tests reported by these studies are found in Tables 3.1 and 3.2 at the end of this chapter.

Pratez (1969, 1973) used monthly data from the Sydney (Australia) Exchange and reports an economically and statistically high serial correlation coefficient. Pratez rejected the RW hypothesis for the Sydney exchange based on serial correlation, runs, and spectral analysis tests. His tests reveal that neither the distribution of price change nor the parameters of the distribution are stable over time. He concludes that the Australian markets exhibit inefficiencies as compared to the NYSE. However, Pratez' results are suspect because he used price-weighted indexes.

Jennergren and Korsvold (1975) examine Norwegian and Swedish share prices using serial correlations and runs tests to test the intertemporal independence assumption of the RW model. They conclude that price formation in both markets is inconsistent with the model. They state that the results are inconclusive and do not perform further analyses to see whether abnormal profits could be realized from such price dependencies. Jennergren (1975), in another study of Swedish stock prices, utilizes trading rules to show that profitable filtering rules do exist. However, he raises an important issue; whether the stock prices in smaller (thin) markets are affected by trading rules. Forsgardh and Hertzen (1975) test the Swedish stock market for semistrong efficiency by testing stock price responses to earnings announcements. They conclude that the Swedish market is efficient in the semistrong form. The results on Swedish stock price behavior are interesting because it suggests that, despite the deviation of smaller markets from the RW assumptions, investors may not be able to gain excess profits based on previous price information or even publicly

available information.

Solnik (1973) tests the RW model on eight European countries' stock prices. He reports serial correlation coefficients that are quite small and shows that most of the European markets deviate only slightly from the RW hypothesis. U.K stock prices are the most efficient and exhibit return behavior over time similar to the New York market. Solnik finds results for the Swedish market that are contradictory to Jennergren and Korsvold.

Conard and Juttner (1973) test German stock price behavior using a sample of 54 stocks and conclude that the German stock market is not efficient based on the independence tests of the RW model. Solnik's serial correlations on the German stocks are statistically significant but much lower than the ones reported by Conard and Juttner. Guy (1977) studies the price behavior of 90 German companies. He reports high monthly serial correlations which are also consistent over the subperiods. The three studies suggest inefficiencies in the German stock market.

Theil and Leenders (1965) test the RW hypothesis on a sample of Dutch stocks. They report some intertemporal dependencies in Dutch stock prices. Fama (1966) used the same technique on the NYSE stocks and found no significant dependence.

The RW model was found by Shamra (1976) to be consistent with the price change behavior of Indian stocks using serial correlation, runs,

and spectral analysis tests. In a later comparative study on stock indices from India, the U.K, and the NYSE, Shamra and Kennedy (1977) confirm Shamra's findings that Bombay Stock Exchange prices follow a random walk. Another interesting finding was the conformity of the Indian stock price change distribution to the assumption of normality. This is not the only peculiar case in terms of the normality of the price change distribution. Errunza (1979), using monthly returns from a sample of 38 Brazilian companies, shows that the distribution of price changes is close to normal despite the departure from independence as shown by serial correlation and runs tests.

The informational efficiency of the Kuala Lumpur Stock Exchange (KLSE) and of the Singapore Stock Exchanges (SISE) was investigated by several researchers. Dawson (1981) showed that the KLSE was not efficient in the semistrong form by measuring excess returns as indicated by published stock recommendations. Barnes (1986), using monthly share prices for 30 companies and 6 indices on the KLSE, shows that KLSE share price formation conforms to the RW model using correlation, runs, and spectral analysis tests of independence. Laurence (1986) used daily prices for the KLSE and SISE stocks. He confirmed Barnes' results for the KLSE but reports slight deviation of the SISE sample from the RW hypothesis.

Ang and Pohlman (1978) use serial correlations to test for deviation from the RW hypothesis on share prices from Australia, Japan, Hong Kong, Philippines, and Singapore. They report serial correlation coefficients which are similar to the ones found by Solnik for the eight European

countries. Except for Japan, the serial correlation coefficients of individual stocks were close to those reported by Fama for the NYSE.

Dawson (1982), using published stock recommendations in Hong Kong's four stock exchanges, rejects semistrong form efficiency for the Hong Kong stock markets. In a later study by Dawson (1984) using the same testing procedures he argues that the Hong Kong markets exhibit a trend toward efficiency in the semistrong form.

Roux and Gilbertson (1978), in a study of the Johannesburg (South Africa) stock market, report deviations from the RW model by the existence of serial dependence and trends in the price change series.

In a comparative study of American and Mexican stock prices, Haugen, Ortiz, and Arjona (1985) show that Mexican stocks exhibit a more gradual adjustment in stock prices to earnings announcements than their U.S counterparts.

6. SUMMARY

Studies of the developed exchanges (e.g. NYSE) indicate that in general prices conform to the RW model. However, there are some unexplained seasonalities in otherwise relatively efficient markets. In the less developed exchanges, evidence of market inefficiency is not conclusive. It could be that the price behavior in thin markets follows different assumptions than the RW model or that some of these exchanges

are indeed inefficient. It is also very difficult to accurately measure daily return in thinly traded markets. Studies that report inefficiencies based on the violation of the RW model either indicate that transaction costs make excess profits prohibitive based on trading rules or perform no further analysis on whether abnormal gains could be realized from such inefficiencies. The effectiveness of trading rules in small and thin markets remains unresolved.

The serial correlation measures in Table 3.1 are sensitive to the manner in which return series are constructed. Consequently, it is difficult to compare the results across indices. The next chapter develops several measures of return for individual stocks and for stock market averages and discusses when each is appropriate or inappropriate.

There are fewer studies that report on the semistrong efficiency of the less developed capital markets. The evidence so far suggests semi-strong form inefficiencies in less developed capital markets. The most probable cause seems to be infrequent trading and less stringent information dissemination requirements in these markets. We discuss these issues in more detail in Chapter V.

TABLE 3.1: AUTOCORRELATIONS AS REPORTED BY VARIOUS STUDIES.

Studies of serial correlation in various markets are reported in this table. The number of companies or indices is indicated beneath each study followed by the time period and the country in the study. Next, the intervals studied (whether, monthly (MON), weekly, daily) followed by the average serial correlation and the number of stocks that show statistically significant serial correlations at the 5% confidence level / the total number of stocks in each study.

STUDY COUNTRY	TIME PERIOD	INTERVAL	AVG SERIAL CORRELATION[a]	SIGNIFICANT STOCKS/ TOTAL
FAMA (1970)	12/57-9/62	1 DAY	0.026	8/30
30 COMPANIES	U.S.A	4 DAY	-0.039	5/30
		16 DAY	0.070	1/30
RICHMOND and HAGERMAN (1973)	1/63-12/67	1 MON	-0.184	31/253
253 COMPANIES	O.T.C[b]			
SOLNIK (1973)	3/66-4/71			
	FRANCE	1 DAY	-0.019	41/65
		1 WEEK	-0.049	17/65
		2 "	-0.050	6/65
	ITALY	1 DAY	-0.023	9/30
		1 WEEK	0.001	5/30
		2 "	0.050	3/30
	U.K	1 DAY	0.072	21/40
		1 WEEK	-0.055	7/40
		2 "	0.005	3/40
	GERMANY	1 DAY	0.078	23/35
		1 WEEK	0.056	8/35
		2 WEEK	0.038	4/35
	NETHERLANDS	1 DAY	0.031	9/24
		1 WEEK	0.002	3/24
		2 WEEK	0.052	3/24
	BELGIUM	1 DAY	-0.018	5/17
		1 WEEK	-0.088	5/17
		2 WEEK	0.019	1/17

Table 3.1 (cont'd)

	SWITZERLAND	1 DAY	0.012	4/17
		1 WEEK	-0.022	1/17
		2 WEEK	-0.063	1/17
	SWEDEN	1 DAY	0.056	1/6
		1 WEEK	0.024	1/6
		2 WEEK	0.070	0/6
CONARD and JUTTNER (1973) 54 COMPANIES	1/2/68-4/22/71 GERMANY	1 DAY	-0.142 0.217*	39/54
GUY (1977) 90 COMPANIES	12/59-9/71 GERMANY	1 MONTH	0.071	12/90
JENNERGREN and KORSVOLD (1975) 15 COMPANIES	1967-1971 NORWAY	1 DAY	0.083* 0.068	8/15
30 "	SWEDEN	1 DAY	0.109* 0.098	26/30
RORKE, ET AL. (1976) 153 COMPANIES	1/58-12/67 CANADA	1 MONTH	0.1022* -0.0488	14/133
ERRUNZA (1979) 38 COMPANIES	9/71-4/75 BRAZIL	1 MONTH	-0.184	4/38
PRATEZ (1969) 20 COMPANIES 16 INDICES	1958-1966 AUSTRALIA	1 WEEK	0.000 -0.118	9/20[c] 5/16[c]
ROUX and GILBERTSON (1978) 24 COMPANIES	2/22/71-2/22/76 JOHANNESBURG	1 DAY	EACH STOCK < 0.1 IN ABSOLUTE VALUE. EXCEPT 1 > 0.2.	
ANG & POHLMAN (1978) 45 COMPANIES EACH (FAR EASTERN COUNTRIES)		1 WEEK		
	5/70-11/74	AUSTRALIA	-0.1653	5/10
	9/67-11/74	HONG KONG	0.0305	2/9
	5/70-11/74	JAPAN	-0.0648	1/13
	9/73-11/74	PHILIPPINES	-0.05547	1/19
	5/72-11/74	SINGAPORE	-0.049	2/13
BARNES (1986) 30 COMPANIES 6 INDICES	7/74-6/80 KUALA LUMPUR	1 MONTH RANGE RANGE	(-0.3) TO 0.3 (-0.34)TO 0.12	5/30

Table 3.1 (cont'd)

D'AMBROSIO	1/2/73-12/31/75	1 DAY	0.051	N/A
(1980)	SINGAPORE	1 WEEK	0.089	N/A
6 INDICES		2 WEEK	0.162	N/A
LAURENCE(1986)	1/1/73-2/12/79			
16 COMPANIES	KUALA LUMPUR	1 DAY	0.041*	5/16
24 " "	SINGAPORE	1 DAY	0.078*	19/24
JIHO (1980)	1/74-11/78	1 MONTH	-0.1808	N/A
30 COMPANIES	KOREA		0.2063*	

a. Average serial correlation across the sample of stocks or indices reported in each study. Average absolute serial correlations are followed by an asterisk (*).
b. Over-The-Counter market in the U.S..
c. Only the number of stocks significant at the 1% level are reported.

TABLE 3.2: RUNS TESTS COMPARISON SUMMARY

A comparison summary of run analysis results, based on **daily** trade-to-trade return data, reported by other studies. Column (1) gives the standardized variable along with its standard error in parentheses. Column (2) gives the percentage difference between the actual (R) and expected (M) number of runs. Finally, Column (3) gives the number of stocks that exhibit a statistically significant number of runs at the 5% confidence level over the total number of stocks in each study.

	(1)	(2)	(3)
STUDY	AVG K	(R-M)/M	Significant runs/Total
FAMA (1970)	-1.44	-0.033	8/30
- U.S	(1.527)	(0.035)	
JENNERGREN, ET AL(1975)			
- NORWAY	-4.690	N/A	14/15
	(4.690)		
- SWEDEN (ACTIVE)	-4.645	N/A	27/30
	(4.645)		
ROUX ET AL (1978)			
- JOHANNESBURG	11.14	0.185	24/24
	(11.14)	(0.185)	
LAURENCE (1986)			
- KUALA LUMPUR	-1.725	N/A	7/16
	(1.7215)		
- SINGAPORE	-2.667	N/A	17/24
	(2.667)		
CONARD and JUTTNER(1973)			
- GERMANY	-3.775	N/A	48/54
	(3.8)		

CHAPTER IV: EMPIRICAL TESTS AND RESULTS

A. DATA DESCRIPTION

Daily stock prices were collected for the period from June 14th 1986 to Oct 3rd 1989 for the Saudi market (SSE) and for October 2nd 1985 through December 30th 1988 for the Kuwaiti market (KSE). Selection of the time period is constrained by the nature and historical development in each market. The Saudi daily stock trading figures were obtained in printed form through Saudi Arabia's Share Control Administration Department (SCAD). Kuwaiti daily share trading data were prepared on microfiche for this study by the Technical Affairs Department of the Kuwait Financial Papers Market. A threshold on trading activity is developed later in this chapter after the trading frequency and distributional characteristics of the stocks are presented. Dividend payments, stock splits, and rights offerings were made available with the data set, as well as the transaction frequencies and the number of shares traded for each company. Closing bid/ask prices were unavailable.

The stock trading data was translated and manually entered on computer files. Then they were extensively checked for errors by filtering abrupt changes. Missing trading days were identified and double checked for entry errors. All per share data were adjusted for stock splits, right offerings, and stock dividends.

The total number of trading days (observations) were 949 and 810 for the Saudi and Kuwaiti samples, respectively. There were a total of 55 stocks listed on the SSE and 59 on the KSE over the study period. The KSE lists 54 firms and the SSE lists 55 firms as of the end of the respective sample periods. Selecting stocks that traded on more than 10% of the trading days and stocks that were continuously listed resulted in samples of 35 stocks from the SSE and 36 from the KSE. The 35 SSE stocks traded an average of 520 out of the 949 trading days (55%) in the sample period. Casual observation suggests that trading frequency was increasing over the sample period (see Table 4.1). The average trading frequency for the Kuwaiti stocks was 45%.

B. METHODOLOGY AND EMPIRICAL TESTS

This section examines weak-form market efficiency. Market efficiency in the developing Kuwaiti and Saudi equity markets is compared to the theoretical standard of perfect efficiency and the extent, if any, of inefficiency identified. The relative efficiency of the two markets is then compared.

Tests of weak-form efficiency concentrate on the information contained in past prices. Prices in an efficient market fully reflect relevant information. This means that prices instantaneously and unbiasedly adjust to new information. If there is serial correlation in stock price changes, then investors may be able to gain excess profits

by buying and selling securities based on such patterns. For instance, stock returns might be positively serially correlated if news is only slowly reflected in prices. Positive (negative) news would cause prices to rise (fall) over several days so that a rise (fall) today would be more likely followed by a rise (fall) tomorrow. Stock returns would be negatively serially correlated if stock prices overreact to news so that a rise (fall) in price today would likely be followed by a fall (rise) tomorrow. Roll (1984) shows that negative serial correlation may also be induced by bid/ask spreads in informationally efficient markets.

The RW model provides several tests of weak-form efficiency. According to the RW model the movements of stock prices over time are a random series. Let

$$X_{i,t} = P_{i,t} - P_{i,t-1} \qquad t = 1,2,... \qquad (1)$$

where $P_{i,t}$ and $P_{i,t-1}$ are the closing prices of security j at times t and t-1. The RW model requires that successive price changes $X_{i,t}$ be independently and identically distributed over time. If a market conforms to the random walk model, it must be weak-form efficient (although not vice versa).

Following Fama (1965), let

$$Y_{i,t} = P_{i,t} / P_{i,t-1} \qquad t = 1,2,... \qquad (2)$$

so that

$$\text{Ln } Y_{i,t} = \text{Ln } (P_{i,t} / P_{i,t-1}),$$

and

$$\text{Ln } Y_{i,t} = \text{Ln } P_{i,t} - \text{Ln } P_{i,t-1} \qquad (3)$$

where the natural logarithm Ln ($Y_{i,t}$) forms continuously compounded returns. Adjusted for dividends, equation (3) becomes

$$\text{Ln } Y_{i,t} = \text{Ln } (P_{i,t} + d_{i,t}) - \text{Ln } P_{i,t-1} \qquad (4)$$

where $d_{i,t}$ is the dividend per share paid on stock i at time t. Dividends are assumed to be paid on the ex-dividend day.[1] Prices are adjusted for stock splits and stock dividends so that Ln $Y_{i,t}$ represents a continuously compounded holding period return.

We use two measures of return to include the effects of thin trading in this study.

1. Returns are calculated on the basis of closing prices from days in which trades occur. We call this the trade-to-trade return series (TTRS). Trade-to-trade return measures are commonly used in the academic literature for run tests and for serial correlation tests.

2. One day holding period returns are measured only if a stock trades on two consecutive days. These return series are referred to as one day holding period return series (ODHPRS). This measure departs from the convention in the finance literature. These return series only report daily return observations over days when trades actually occur. Rather than average returns over non-trading periods, this measure only includes observed daily returns. Even so, periodic returns are still measured with error since not all trades occur at market close.

Because of the severe thinness of trade on the KSE and the SSE (many stocks do not trade for days at a time), we use the holding period return series to examine observable daily returns and to test for one-day lag return dependence. The ODHPRS series reduces measurement errors due to non-observed trades in thin stocks. The TTRS are used for comparison with other studies.

If the true underlying return distribution for a particular security is unrelated to frequency of trade, return distributions constructed from the ODHPRS should be more accurate than distributions constructed from trade-to-trade data. If the true return distribution for a particular security is related to frequency of trade, then ODHPRS's measure return accurately only over periods of frequent trade. Return distributions over non-trading days are then unobservable. The trade-to-trade measure averages daily return between trades when no trades occur.

The thin trading problem can be thought of as an exaggerated version of the nonsynchronous security trading problem identified and analyzed by Scholes and Williams (1977) and Cohen, Hawawini, Maier, Schwartz, and Whitcomb (1983). In a thinly traded market, periodic returns are measured with error because the final trade each period does not occur at market close.

1. DISTRIBUTIONAL CHARACTERISTICS AND FREQUENCY OF TRADE

Before testing for intertemporal independence (randomness), the distributional characteristics of stock price changes in both samples are analyzed. Mean, variance, skewness and kurtosis measures are computed for individual stocks and the market portfolio in both samples based on the TTRS and the ODHPRS. The relationship between firm size and trading frequency is also examined. Having examined the distributional characteristics of price changes, we turn to tests of independence (randomness). We use parametric (serial correlation) and non-parametric (run tests) tests of intertemporal independence.

Empirical studies on capital markets indicate that log stock price differences may not have finite variance. This may invalidate the serial correlation as a test of independence. However, Fama (1965) argues that serial correlations would be useful even in infinite-variance situations. Most empirical studies on the RW use serial correlation analysis despite departure from normality and possibly from finite-variance assumptions.

The distributions of the first difference of the log of the price changes for each return series were aggregated across all individual stocks. Table 4.1 contrasts the results with those from other studies in comparison to the normal distribution. The results for the SSE and the KSE are similar to those reported in other studies of developing capital markets.

Thin markets, defined in terms of trading frequency, generally show a higher degree of leptokurtosis. The TTRS distributions of the SSE and the KSE return series are leptokurtic with the KSE showing more leptokurtosis. We repeated the distribution measurements using the ODHPRS. Normal probability graphs for the return series have been constructed for each of the stocks using both the TTRS and ODHPRS. All individual stocks show some evidence of leptokurtosis. Graphs are not shown due to space limitations. The distributional results for the more active stocks are not drastically different from the less active ones. However, as expected, they are in general less leptokurtic. Leptokurtosis in the ODHPRS is less in both samples than reported by the TTRS, with the KSE exhibiting substantially lower leptokurtosis in its ODHPRS.

The relationship between firm size (market value) and frequency of trade for the SSE is examined in Table 4.2. We expect a positive relationship between frequency of trading and market value. Regression analysis reveals a significantly positive relationship between the market value (size) of the firm and the average number of trades

(transactions) per day. The larger the market value of a firm the larger the trading frequency.

2. SERIAL CORRELATION TESTS

Suppose $u_1, u_2, \ldots, u_n$ is a time series of returns. The theoretical relationship between intertemporal changes in security prices, ϵ_t, can be expressed as follows:

$$u_t = r_k u_{t-k} + \epsilon_t. \qquad (5)$$

where r_k is a constant, u_t is the continuously compounded return on day t, and ϵ_t is a random series (white noise) such that $E(\epsilon_t)=0$ and $E(\epsilon_t, \epsilon_{t-k})=0$ for all k.

The serial correlation coefficient r_k of lag k is defined as

$$r_k = E(u_t , u_{t-k})/[\, VAR(u_t)\, VAR(u_{t-k})\,]^{1/2}. \qquad (6)$$

If stationarity holds, then $VAR(u_t) = VAR(u_{t-k})$ and

$$r_k = E(u_t , u_{t-k})/\, VAR(u_t). \qquad (7)$$

An estimate of intertemporal autocorrelation can be achieved through a first order auto-regressive AR(1) scheme in equation (5) or through

Ordinary Least Square (OLS) regression with the original and a lagged return series.

Another method to estimate r_k is by using the rank correlation coefficient (Kendall, 1953) where equation (6) is alternatively written

$$r_k = \frac{1/(n-k)\ \Sigma(u_i - 1/n\text{-}k\ \Sigma\ u_i)\ (u_{i+k} - 1/n\text{-}k\ \Sigma\ u_{i+k})}{[1/n\text{-}k\ \Sigma(u_i - 1/n\text{-}k\ \Sigma\ u_i)^2\ 1/n\text{-}k\ \Sigma(u_{i+k} - 1/n\text{-}k\ \Sigma u_{i+k})^2]^{1/2}} \quad . \quad (8)$$

If the distribution of u_t has finite variance, then for large samples the standard error of r_k may be written (Kendall (1953))

$$SE(r_k) = (\ 1/(n-k)\ )^{1/2}. \qquad (9)$$

We calculate serial correlations for the trade-to-trade return series (TTRS) for lags of 1 through 15 days and for the one day holding period return series (ODHPRS) for 1-day lags. The TTRS results are reported in Table 4.3 for lags 1-6, 10, and 12 and the ODHPRS results in Table 4.4 for the Saudi sample. The TTRS correlation results for lags 1-5, 10, and 15 are reported in Table 4.8 for the Kuwaiti sample. The 1-day lag ODHPRS correlation results are reported in Table 4.9 for the Kuwaiti sample.

- SSE

For the SSE, the serial correlations for lag 1 are highly negative across all stocks for the trade-to-trade series. All the serial correlations in absolute value are more than three times their standard

error. The same is generally true for the ODHPRS, but the number of observations for the ODHPRS for some of the most thinly traded stocks is small. All 28 stocks with more than 40 observations have significantly negative serial correlations for lag 1. The serial correlation results for lag 1 are high when compared to those reported from other stock markets in Table 3.1. However, very slight dependence is observed in weekly TTRS and beyond lag 1 in daily returns, the serial correlations for lag 2 through lag 15 do not show any consistent sign nor are they significantly high in magnitude. The number of significantly correlated stocks (α=5%) in the KSE at various lags are:

LAG	2	3	4	5	6	12
NUMBER OF SIGNIFICANT CORRELATIONS	5	2	2	3	0	1

- KSE

The serial correlation results for the Kuwaiti sample show much less dependence than the Saudi sample for lag 1 for both the TTRS and the ODHPRS. The average serial correlation for the TTRS is 0.053 and the average absolute value is 0.098. The serial correlations results for ODHPRS are different from the TTRS. The ODHPRS average serial correlation is 0.088 and the average absolute value is 0.109. The ODHPRS results are in line with our expectation that using the TTRS in thinly traded stocks induces a measurement error in the serial correlations of daily returns. Thirteen of the Kuwaiti stocks have serial correlations in absolute value greater than twice the standard error in the TTRS versus nine stocks using the ODHPRS. All other lags

in the TTRS show few significant correlations at the 5% level. The number of significantly correlated stocks (α=5%) in the KSE at various lags are:

LAG	2	3	4	5	10	15
NUMBER OF SIGNIFICANT CORRELATIONS	5	6	5	6	2	2

Examining the most active and the least active stocks in the KSE reveals some important results. Fourteen stocks traded on more than 50% of the trading days (i.e more than 405 observations). The fourteen most active stocks have absolute average serial correlations of 0.069, and 0.070 using the TTRS and the ODHPRS, respectively. The remaining 22 least active stocks in the TTRS have absolute average serial correlations of 0.117, and the remaining 15 least active stocks in the ODHPRS have absolute average serial correlations of 0.145. This suggests that actively traded stock on the KSE are less prone to serial dependence. Examining other lags in the TTRS indicates similar results; the more active stocks show less dependence.

The higher serial correlation measures for more thinly traded securities may result from a larger measurement error in reported or observed returns because not all trades occur at market close. However, this error-in-variable should result in negative serial correlation in observed returns for thinly traded stocks, ceteris paribus. Consequently, the observed serial correlations for thinly traded stocks must be larger than those for active stocks. This is consistent with

Goldman and Sosin's (1979) statement that the frequency of transactions influences market efficiency.

3. RUNS TESTS

A non-parametric test of independence which depends only on return stationarity and not on finite-variance or normality assumptions may be preferable for tests of intertemporal independence. Define a run as a sequence of price changes of the same sign. For example, the series

PRICE CHANGE	++/---/0/----/+++
RUN	1 2 3 4 5

consists of 5 runs. It is assumed that the sample proportions of positive, negative, and zero price changes are good estimates of the population proportions. Hence, under the hypothesis of independence, the expected number of runs M can be computed (Wallis and Roberts, 1956) as

$$M = [\, N(N+1) - \sum_{i=1}^{3} n_i^2]/N, \qquad (10)$$

where $N = n_1+n_2+n_3$ is the total number of price changes and n_i is the number of positive, negative, and zero price changes, respectively. The standard error of M is

$$\sigma_M=\left(\sum_{i=1}^{3} n_i^2 \left[\sum_{i=1}^{3} n_i^2+N(N+1)\right] - 2N\sum_{i=1}^{3} n_i^3 - N^3\right)/N^2(N-1))^{1/2}. \quad (11)$$

For large samples the distribution of the total number of runs of each type is approximately normal with mean M and standard error σ_M. The difference between the actual number of runs, R, and the expected number of runs can be expressed in terms of a standardized variable

$$K = ((R + 1/2) - M)/ \sigma_M \quad (12)$$

where the 1/2 in the numerator is a discontinuity adjustment. For large samples, K will be approximately normal N (0,1).

Runs tests were performed on the SSE and the KSE stocks. Table 4.5 shows the results for the trade-to-trade return series for the Saudi sample and Table 4.10 shows the results for the TTRS for the KSE sample.[2] The actual and expected number of runs are in the first and second columns, respectively. The standard error is reported in column 3 and the standardized variable (K) is reported in column 4. Column 5 gives the percentage differences between the actual and expected number of runs.

For the SSE sample, the high proportion of negative serial correlation coefficients found earlier agrees with the positive standardized variables (K) reported for the trade-to-trade return series in Table 4.5. Consistent with the significant negative serial correlation results, all 35 stocks exhibit a significant number of runs.

All 35 stocks had more actual runs than expected causing significantly negative serial correlations. All the 35 stocks had a standardized variable (K) greater than positive two. The same results were found using the Wald-Wolfowitz runs test.[3] For the KSE sample, the positive serial correlations found earlier agree with the negative standardized variables, reported for the TTRS in Table 4.10.[4] Fourteen stocks exhibit a significant number of runs by having a standardized variable (K) less than negative two. Six of these have significant positive serial correlations in the TTRS. Table 4.13 presents a comparison summary of the runs tests and serial correlation results found for the SSE and KSE.

4. MARKET SEASONALITIES

In order to test for the presence of market seasonalities we had to construct a market index. We constructed a value weighted index and an equally weighted index using the trade-to-trade return series. The ODHPRS is best suited for statistical tests of 1-day lag serial independence at the single security level. For a detailed discussion of market index construction in thin markets the reader is referred to the Appendix at the end of this chapter.

The weekend (day of the week) effect and the day of the month effect are discussed next. Unfortunately, we couldn't test for a year-end effect because of the limited number of years available. This would

have been interesting to look at since both markets are tax free on personal as well as corporate incomes.

a. Day of the Week Effect (DOW)

Tables 4.6 and 4.11 summarize the results for the day of the week effect for the SSE and KSE samples, respectively. It is important to note that the national weekend in both Saudi Arabia and Kuwait is on Thursdays and Fridays. Also, until February of 1989 the SSE operated on Thursdays making it a six-day trading week.

- SSE

Surprisingly, average returns on Mondays are the lowest for both the equally and the value weighted trade-to-trade return indices. However, the differences between Monday returns and the other days of the week are not statistically significant. Saturday (the first day of the week) returns are positive and statistically significant at the 5% level for the equally-weighted index. This is different than the weekend effect documented on the NYSE by French (1980). End of the week mean returns are positive but not statistically significant. There is no statistically significant evidence of a weekend effect in the SSE sample over the study period.

- KSE

The results reported in Table 4.11 similarly show no statistically significant weekend effect. Mean returns on Sundays and Mondays were negative but not statistically significant.

b. Day of the Month Effect (DOM)

- SSE

There is no apparent day of the month effect to be seen in the SSE for the time period under study (Table 4.7). The last half monthly returns are higher than the first half monthly returns. This is opposite to what Ariel (1987) documented for the U.S market. However, the difference between the first and second half monthly returns is not statistically significant. Seven companies on the SSE use the Arabic lunar calendar as a basis for their fiscal year.

- KSE

The KSE sample similarly exhibits a DOM effect opposite in sign to that found by Ariel (Table 4.12). The mean returns for the first and second half months are negative and positive, respectively, though they are not statistically significant. The two tail probability values were 0.13 and 0.10 for the EWR and VWR indices, respectively.

The absence of statistically significant seasonalities may be a result of the low "signal-to-noise" ratio in these markets. Factors which make it difficult to identify seasonalities in the data samples

include i) the small number of stocks in each market, ii) the short time horizon examined, and iii) the difficulty of measuring periodic returns in thin markets.5 The existence of market seasonalities on the KSE and SSE remains an unresolved issue.

5. MARKET ACTIVITY

The results indicate that the KSE stocks exhibit much less serial dependence than the SSE stocks. Yet an average stock is traded on 45% of the trading days on the KSE versus 55% on the SSE. The results are contrary to the thinness-dependence relationship expected and calls for some further investigation into the trading activity in both markets.

Although KSE stocks trade less frequently than SSE stocks, the average number of shares traded per day (and per transaction) and the market value of shares trades are higher on the KSE. Table 4.14 shows a comparison of the two market trading activities over the study period. Table 4.15 presents a comparison of the returns in each market over the study period. We find that KSE stocks trade an average of 11.7 times per day versus 7.6 for the SSE over their study periods. The KSE exhibits more active larger trades although it is a smaller market in terms of market value and is confined to a smaller population. The market capitalization of the KSE is about 40% of the SSE, yet over the 1986-1988 period the total dollar volume of trading in the KSE is more than 6 times that of the SSE. The total number of transactions in the KSE is more than twice that of the SSE.

The market trading activity results contrasting the SSE with the KSE are consistent with the hypothesis that sparse trading in the SSE contributes to the relatively large serial dependence results in the SSE price return series. However, the serial dependence results in the SSE price return series may be too large compared to those of the KSE to be explained by the thinness hypothesis alone. In the next section, we investigate several other market peculiarities that may be the cause of the high serial dependence results reported on the SSE.

6. FURTHER ANALYSIS OF THE SSE

The high serial correlations and consistent serial dependence results in the SSE may be related to several characteristics of the SSE.

a. Cash dividends are assumed to be paid on the ex-dividend date. However, not all stockholders cash their dividends on the ex-dividend day. Dividends are usually collected by the stockholders through a bank that the corporation assigns and maintains an account with. The stockholder is paid in cash upon presenting the stock certificates to the bank. Some stockholders do not collect their dividends for some time. If they sell their shares they forgo their rights to the uncollected dividends and are then compensated by the buyer. In such cases, the buyer becomes the recipient of the uncollected dividends. This may lead to artificial stock price fluctuations which may induce measurement errors in prices. However, dividends are only paid once

every year and the average dividend yield for 1988 was 3.3% for the stocks in the SSE sample. Using stocks that paid no dividends versus stocks that paid dividends, we find no significant difference in the average serial correlations across either the trade-to-trade return series or the ODHPRS. Given the low average dividend yield on the SSE, this is probably not an important difference.

b. Non-synchronous trading is another commonly-mentioned cause of serial correlation in stock price returns. Most of the SSE stocks are thinly traded and quite often are only traded once in a single trading day. Trading in such cases is most likely occurring at different times in a trading day (e.g. in the morning on one trading day and in the evening on another trading day). Scholes and Williams (1976) show that if returns are measured with error over one-day holding periods then, because trades do not occur at market close, security variances are overestimated and individual securities exhibit slight negative autocorrelations in the absence of autocorrelations in true returns.

The signs and magnitude of individual security autocorrelation levels in this study seem to be inconsistent with the Scholes and Williams' model. In Kuwait, the average individual security autocorrelation is 0.053 and 0.088 using the trade-to-trade and one day holding period return series, respectively. The Scholes and Williams model predicts slight negative autocorrelation. In Saudi Arabia, the average autocorrelations are -0.47 and -0.46 for the two return series, respectively. Frictions other than nonsynchronous trading are present in both markets. While nonsynchronous trading may cause serial

correlation in the price returns in both markets, there are reasons to believe it is more pronounced in the SSE because of its trading system. The trading system in the KSE operates in two sessions with limited hours of trading so that trades are consolidated within a few hours of trade. The SSE system allows trading whenever the banks are open. However, the negative serial dependence results in the Saudi data seem to be too high to be explained by non-synchronous trading alone.

c. Even in an informationally efficient market, bid/ask spreads can induce observed serial correlations (Roll [1984]) as trades "bounce" between bid and ask prices. The observed market price changes are not independent because recorded transactions occur at either the bid or the ask and not at the bid/ask average.[6] In Saudi Arabia banks match buy and sell orders at a single price and maintain no bid/ask spreads. Consequently, we don't have closing prices classified by bid/ask. Only the last transaction in a trading day is reported. In Chapter V, we suggest that about 50 active investors are serving as market makers. The high negative serial correlations may be a result of these investors large bid/ask spreads.

d. Define intraday volatility as (high - low)/close. This intraday volatility measure was aggregated over all the stocks in each sample. The intraday volatility measure in the SSE is more than three times that on the KSE.

Intraday volatility measure results:

SSE		KSE	
AVG	STD.DEV	AVG	STD.DEV
5.4%	7.6%	1.5%	2.0%

The large observed intraday volatility of the SSE may be due to market fragmentation.[7] In the SSE there are 12 banks in the Saudi Share Registration Company in addition to the unofficial market makers (active traders) who have there own bid/ask spreads. Banks often trade within their bank branches rather than through the central exchange of the SSRC. Market fragmentation in such a thin market may result in banks reporting trades to the Share Control Administration Division of SAMA at slightly different prices.

The SSE trading system suffers from several inefficiencies including market fragmentation, the absence of licensed market markers, and inefficiency in the preservation of price priority. In the policy implications chapter we develop some recommendations to resolve these inefficiencies.

C. CONCLUSION

Empirical tests of informational efficiency were initially run on developed stock markets where stocks are traded nearly continuously. The price return series constructed from such markets are nearly random. When some stocks are not traded at the end of a trading day, the problem

of non-synchronous trading arises and spurious serial correlations may be observed in the price return series. Thinner markets exhibit an exaggerated version of the non-synchronous trading problem in which stocks do not trade for several consecutive trading days. This problem may be called "non-continuity of trading".

Studies of informational efficiency in less developed (i.e. thinly traded stock markets) generally base the return series on trade-to-trade observations with no adjustments for the "non-continuity of trading". The use of holding period returns (e.g. ODHPRS) is a better measure of daily return in thin markets and for 1-day lag serial dependence tests since it is based on observable daily returns. The empirical findings suggest that previous studies of less developed and thin markets have over-estimated daily return leptokurtosis and serial correlation. The error is a result of using the trade-to-trade returns rather than observable daily (or periodic) returns.

Our results show that the use of one day holding period returns reduces observed dependence in the return measurements as reported by serial correlations tests. The distribution of the trade-to-trade and one day holding period return series in both markets is leptokurtic agreeing with the empirical results in other thin markets. Consistent with the presence of measurement error in the TTRS in thin markets, the distributions of the ODHPRS are less leptokurtic than the TTRS. The ODHPRS results suggest that the KSE is more informationally efficient with respect to past prices than the SSE. When the KSE stocks are dichotomized into actively and less actively traded stocks, the most

active stocks' observed serial dependence is small, while the least active stocks exhibit significant serial dependence. When the SSE stocks were dichotomized into actively and less actively traded stocks, there were no significant differences in the dependence measures.

There were no statistically significant market seasonalities observed in either market. The KSE shows a trend for a day of the month effect close to being statistically significant but opposite in sign to that reported by Ariel (1987). However, several factors make it difficult to identify seasonalities in the data samples including the short time horizon examined, the small number of sample stocks, and the difficulty of measuring returns in thin markets. Calendar effects may become more visible as the KSE market grows and more data becomes available. The existence of market seasonalities in the KSE and the SSE remains an unresolved issue.

Further analysis of the SSE market indicated that the SSE has less trading activity and shows higher intraday volatility. These results are relevant to several hypotheses developed in the policy and regulations chapter. In the next chapter, we develop policy and regulatory implications for each market. Such policies may promote the efficiency of these developing markets.

APPENDIX

APPENDIX

SECURITY RETURNS AND INDEX MEASUREMENT IN THIN MARKETS

Measurement of individual security and market index returns in thinly traded capital markets is an important and difficult issue. Since trades seldom occur at market close, daily security returns are measured with error even when at least one trade occurs per day. Large bid/ask spreads in thin markets can further confound return measurement. Even more serious is the fact that securities seldom trade every day in thinly traded markets. This appendix discusses individual security return measurement and index construction in the presence of non-trading securities.

A. USES OF MARKET INDEX SERIES

Market portfolio index construction should be dictated by the manner in which the index is to be used. Market indexes are used for market reporting and market research. Each of the uses imposes its own set of demands and constraints on market index construction.

1. MARKET REPORTING

The investment community has several reasons for demanding timely measures of market portfolio index return from the exchange authorities

and the media. A primary purpose is to measure total market return and as a benchmark in judging portfolio performance. The market index is an indicator of general stock price movements for individual investors.

Another important use is in the computation of systematic risk for individual securities. An asset's systematic risk is determined by the relation of the asset's return with the rates of return on a market portfolio of risky assets. Portfolios composed of a large number of stocks tend to have average market risk. An aggregate stock index is commonly used as a proxy for the risky asset portfolio.

Professional investors and security analysts use the market index series to examine the factors that influence market movements. "Technical analysts" and "market timers" also use past and current market returns in their asset allocation decisions.

Another important use, especially in large developed markets, is in the development of index portfolios. If it is difficult for the majority of money managers to consistently outperform the market on a risk-adjusted basis, an obvious alternative is to invest in a portfolio that emulates the market portfolio.

These market reporting uses of market index returns share two requirements. First, the reported return on a given day should never be changed at a later date. This precludes "back-adjusting" returns based on later information. Second, the total market index return over long periods must equal the sum of the continuously compounded daily returns

over the period. That is, value weighted indexes must reflect changes in total market value and equally weighted indexes must reflect changes in the equally weighted returns on individual securities. This precludes simply omitting stocks from the index on days when they do not trade. A closing price must be estimated for every stock in the index.

2. EMPIRICAL RESEARCH

Although some of the applications discussed under the market reporting section overlap with empirical applications (e.g. portfolio theory and performance evaluation of professional managers), empirical research has different needs than market reporting.

Studies of asset pricing models as well as event studies require the use of a market index return series. Studies of market efficiency include testing for the presence of seasonalities in a market index return series. Another area is the relationship between different markets which involves measuring the correlation of market indices across different markets, across different countries, and over different periods. In contrast to market reporting, empirical research may occasionally find a need to back-adjust returns over non-trading periods based on subsequent trading information.

B. MARKET PORTFOLIO INDEX CONSTRUCTION

Ideally, a market index return series should represent the movement of all (marketable and nonmarketable) assets in an economy. Since not all assets can be included in a market index, proxy indexes must be constructed from a representative sample of traded securities. We follow the convention in developed capital markets and construct market indexes from equity securities.

The first concern is the weight given to each equity security in the index. There are three principal weighting schemes:

1) A price-weighted return series weights stocks according to price. The most famous market index, the Dow Jones Industrial Average, is based on this method. This method has been widely criticized because index movements are primarily affected by price differentials between securities.

2) In an equally weighted return series (EWR), all stocks carry the same weight regardless of their price or/and value. This index would be of interest to an individual with equal dollar amounts invested in all firms in the index.

3) Value weighted return series (VWR) represent changes in value of the market as a whole. Stocks are weighted in the index according to their market value. This index would be of interest to an individual or

institution holding a portfolio weighted according to each stock's value in the market.

C. ESTIMATION OF SECURITY RETURNS IN THIN MARKETS

Construction of market index returns entails assumptions about the prices of securities which are not always observable in thin markets. A daily return is observed for a stock when it has a closing price on two successive trading days. In large active markets most stocks trade every day and the most widely held stocks trade almost continuously. In smaller markets many stocks do not trade every day causing a problem of missing or unobserved returns in the market index. Two alternatives may be used to overcome this problem.

1. BID/ASK SPREAD

If the bid/ask spread is observed, then using an average of the latest observed (close) bid/ask information on nontrading stocks is the most desirable alternative. This is the convention adopted on the University of Chicago's CRSP return files. Unfortunately, bid/ask prices are not reported in many markets including the KSE and the SSE. And in very thin markets, closing bid and ask prices may not reflect current information.

2. IMPUTING MISSING PRICES OR RETURNS

Let $P_{j,t}$ denote the closing price of stock j on trading day t. Suppose we observe $P_{j,t}$ and $P_{j,t+n}$ (n=2,3,...) but not P_{t+1} through P_{t+n-1}. One alternative for estimating true returns is to use ex-post data to interpolate between observed prices. For instance, the n-day return implied by $P_{j,t}$ and $P_{j,t+n}$ could be apportioned as daily returns for days t+1,.....,t+n-1 in some manner. Because this procedure entails back-adjusting security returns, it is unacceptable for market reporting. However, it could be used in empirical research such as event studies.

A more attractive alternative for both market reporting and empirical research purposes is to extrapolate past prices based on what is known about current prices. The simplest assumption regarding true returns over nontrading periods is that if no trade occurs then no new information has arrived and the true price has not changed. Imputing zero return over nontrading days allows value and equally weighted market indexes to be updated on a daily basis. If closing bid and ask prices are not available, assuming no price change over nontrading periods is an alternative.

Heinkel and Kraus (1988) suggest an appealing alternative to the assumption of zero return over nontrading periods. They dichotomize unobserved returns into systematic and idiosyncratic returns. Systematic returns on nontrading days are estimated by

$$R_{j,t} = a_j + b_j R_{V,t} + u_{j,t} \qquad (A.1)$$

where

$R_{j,t}$ = the estimated return for stock j on nontrading day t.

$R_{V,t}$ = an index return on a group of similar stocks trading on day t.

a_j = an intercept term for stock j.

b_j = the sensitivity of stock j to movements in the portfolio V.

$u_{j,t}$ = the idiosyncratic return of stock j on day t.

Because the components of $R_{V,t}$ vary across time an iterative approach is used until convergence is achieved for the model parameters of all stocks. The index portfolio is based on either an industry or a market portfolio of observed (i.e., traded security) returns. Heinkel and Kraus update the prices of nontrading stocks according to the systematic return component. When a nontrading stock finally trades, the accumulated idiosyncratic return from the nontrading period is lumped onto the last day's return.

Heinkel and Kraus then derive the properties of this return measure for event studies. The measure could also be used for parameter estimation in factor models. If all trading stocks are included in $R_{V,t}$ and all nontrading stocks are assumed to have b_j=1, then value and equally weighted index returns equal the weighted average returns of trading securities.

Heinkel and Kraus' approach is appropriate for event studies and, if investors understand the construction of the index, for market reporting purposes. This research focuses on the distribution of daily returns

and on weak-form market efficiency. For these purposes it is critical that daily returns are measured with as little error as possible. Omitting nontrading days as in the one day holding period return series reduces the number of return observations. However, returns which are omitted represent longer than one-day holding periods. Focusing on one-day holding periods provides better estimates of the daily return distribution and yields lag 1 autocorrelation coefficients which represent one day lags.

Omitting nontrading days for individual securities raises two issues. First, there is no guarantee that the return generating process over nontrading days is the same as that over traded days. Second, daily returns are still measured with error if trades do not occur at market close. Scholes and Williams (1976) show that if returns are measured with error over one-day holding periods then, because trades do not occur at market close, security variances are overestimated and individual securities exhibit slight negative autocorrelations in the absence of autocorrelations in true returns.

The signs and magnitude of individual security autocorrelation levels in this study seem to be inconsistent with the Scholes and Williams' model. In Kuwait, the average individual security autocorrelation is 0.053 and 0.088 using the trade-to-trade and one day holding period return series, respectively. The Scholes and Williams model predicts slight negative autocorrelation. In Saudi Arabia, the average autocorrelations are -0.47 and -0.46 for the two return series, respectively. Frictions other than nonsynchronous trading are present

in both markets. In Saudi Arabia, operational inefficiencies result in large bid/ask spreads and other frictions. The large negative autocorrelation levels of individual securities in Saudi Arabia probably do not arise from nonsynchronous trading alone. Daily autocorrelations in Saudi Arabia are -0.286 and in Kuwait are 0.318 for the equal weighted market indexes.

1. The owner of the stock on the ex-dividend day is the recipient of the dividend. However, in the SSE, in some cases when the recipient does not receive the dividend before selling his shares he would forgo the dividend to the buyer.

2. Only the TTRS were used in the runs analysis. Runs tests were not performed with the ODHPRS because of the large number of missing observations.

3. The Wald-Wolfowitz runs test uses two return categories. Zero returns were arbitrarily grouped with the negative returns for this test.

4. Four stocks have a positive standardized variable (K) which also agrees with their negative serial correlations found earlier in the TTRS.

5. For a discussion of index measurements in thin markets refer to Appendix A at the end of the chapter.

6. The bid/ask spread measures part of the cost of a transaction to a market maker. The higher that cost the lower the operational efficiency in a market.

7. The dividend argument may also contribute to intraday volatility.

TABLE 4.1: RETURN DISTRIBUTIONS COMPARED TO OTHER STUDIES

Distribution of returns given by the probability of returns within + and - (x) standard deviations from the mean for Saudi Arabia and Kuwait compared with several other studies and the normal distribution.

	NUMBER OF STOCKS	% OF DAYS TRADED	±0.5 σ	±1 σ	± 1.5 σ	±2 σ	±2.5 σ	±3 σ	±3.5 σ	±4 σ	±5 σ
NORMAL			0.3830	0.6826	0.8664	0.9545	0.9876	0.9973		0.9999	0.9999
U.S FAMA (1969)	30	100%	0.4667	0.7469	0.8847	0.9478	0.9756	0.9886		0.9970	0.9988
JENNERGREN ET AL(1975)											
- NORWAY	15	48.3%	0.5534	0.8038	0.8895	0.9447	0.9681	0.9815		0.9921	0.9963
- SWEDEN (ACTIVE)	17	99.3%	0.4624	0.7487	0.8833	0.9451	0.9750	0.9877		0.9966	0.9990
- SWEDEN (INACTIVE)	13	71.4%	0.5332	0.7685	0.8870	0.9460	0.9739	0.9845		0.9955	0.9980
ROUX ET AL (1978)											
- JOHANNESBURG	24	N/A	0.5316	0.7733	0.8903	0.9436		0.9834		0.9948	
LAURENCE (1986)											
- KUALA LUMPUR	16	84.5%	0.5609	0.7967	0.8895	0.9462		0.9833		0.9943	0.9970
- SINGAPORE	24	81.3%	0.5814	0.8085	0.9056	0.9487		0.9820		0.9926	0.9963
SAUDI ARABIA											
- TTRS	35	55.0%	0.5035	0.7662	0.8860	0.9440	0.9712	0.9852	0.9917	0.9955	0.9983
- ACTIVE TTRS	17	79.0%	0.5010	0.7647	0.8853	0.9440	0.9713	0.9846	0.9915	0.9953	0.9984
- INACTIVE TTRS	18	32.0%	0.5086	0.7693	0.8875	0.9440	0.9709	0.9865	0.9925	0.9959	0.9982
- ODHPRS[a]	35		0.4943	0.7596	0.8845	0.9421	0.9712	0.9851	0.9928	0.9963	0.9987
KUWAIT											
- TTRS	36	45%	0.5516	0.8257	0.9125	0.9518	0.9726	0.9823	0.9877	0.9916	0.9952
- ACTIVE TTRS	13	75%	0.5544	0.8375	0.9117	0.9500	0.9714	0.9814	0.9871	0.9917	0.9955
- ODHPRS[a]	35		0.5094	0.7998	0.8993	0.9504	0.9743	0.9860	0.9916	0.9947	0.9965

a. One Day Holding Period Return Series.

TABLE 4.2: REGRESSION RESULTS FOR MARKET SIZE AND FREQUENCY OF TRADE FOR THE SAUDI SAMPLE.

Regression of firm market value on average number of transactions per day.

Market Value = Intercept + Slope*(Average transactions/day) + Error

DEPENDENT VARIABLE: MARKET VALUE OF FIRM
INDEPENDENT VARIABLE: AVERAGE NUMBER OF TRANSACTIONS PER DAY

MULTIPLE R=.504 SQUARED MULTIPLE R=.254
SAMPLE SIZE (N)=35
STANDARD ERROR OF ESTIMATE=.188031E+10

	COEFF	STD ERROR	STD COEF	T	P(2 TAIL)
INTERCEPT	.258E+09	.406E+09	0.000	0.635	0.530
SLOPE	.161E+09	.480E+08	0.504	3.352	0.002

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE
REGRESSION	.397277E+20	1	.397277E+20
RESIDUAL	.116673E+21	33	.353556E+19

F-RATIO	P
11.237	0.002

TABLE 4.3: SERIAL CORRELATION RESULTS (TTRS, SSE)

Autocorrelation coefficients and standard errors of the Trade-to-Trade Return Series for the Saudi sample for lags 1,2,3,4,5,6, and 12. The first column stands for the firm number followed by the number of observations in the firm's return series.

NO	# OBS	LAG1	(SE)	LAG2	(SE)	LAG3	(SE)	LAG4	(SE)	LAG5	(SE)	LAG6	(SE)	LAG12	(SE)
1	216	-0.526	0.070	0.160	0.085	-0.210	0.086	0.198	0.089	-0.139	0.091	0.059	0.092	-0.062	0.093
2	124	-0.486	0.090	0.118	0.109	-0.129	0.110	0.022	0.111	-0.097	0.111	0.176	0.112	0.084	0.120
3	206	-0.561	0.070	0.118	0.089	-0.030	0.090	0.023	0.090	-0.009	0.090	-0.049	0.090	-0.063	0.093
4	148	-0.377	0.082	-0.046	0.093	0.147	0.093	-0.105	0.095	0.091	0.096	-0.094	0.096	0.154	0.098
5	419	-0.520	0.049	0.052	0.061	-0.025	0.061	0.007	0.061	-0.037	0.061	0.029	0.061	0.003	0.061
6	279	-0.447	0.061	-0.021	0.072	0.018	0.072	0.037	0.072	-0.029	0.072	0.082	0.072	-0.007	0.074
7	551	-0.539	0.043	0.121	0.054	-0.108	0.054	0.044	0.054	0.025	0.055	-0.026	0.055	0.045	0.055
8	798	-0.430	0.035	-0.123	0.041	0.045	0.042	0.019	0.042	0.029	0.042	-0.022	0.042	-0.014	0.042
9	852	-0.468	0.034	-0.069	0.041	0.077	0.041	-0.002	0.041	-0.056	0.041	0.049	0.041	-0.065	0.042
10	926	-0.432	0.033	-0.029	0.039	0.006	0.039	-0.005	0.039	0.035	0.039	0.035	0.039	0.007	0.039
11	361	-0.492	0.053	-0.008	0.064	0.091	0.064	-0.069	0.065	0.046	0.065	-0.008	0.065	-0.031	0.067
12	158	-0.543	0.080	0.131	0.100	-0.114	0.101	0.029	0.102	0.046	0.102	-0.006	0.102	0.218	0.113
13	799	-0.487	0.035	-0.020	0.043	0.014	0.043	-0.037	0.043	0.066	0.043	-0.064	0.043	-0.016	0.044
14	794	-0.460	0.035	-0.014	0.042	0.019	0.042	-0.044	0.042	0.049	0.042	-0.006	0.042	0.015	0.043
15	391	-0.494	0.051	0.012	0.062	0.005	0.062	-0.052	0.062	0.077	0.062	-0.052	0.062	0.079	0.062
16	465	-0.432	0.046	-0.129	0.054	0.087	0.055	-0.031	0.055	0.029	0.055	0.010	0.055	-0.035	0.055
17	299	-0.454	0.058	-0.035	0.069	-0.062	0.069	0.148	0.069	-0.143	0.070	0.013	0.071	-0.037	0.072
18	389	-0.510	0.051	-0.029	0.062	0.074	0.063	-0.031	0.063	-0.011	0.063	-0.002	0.063	-0.070	0.064
19	569	-0.534	0.042	-0.016	0.053	0.119	0.053	-0.041	0.053	-0.060	0.053	0.059	0.053	0.091	0.054
20	645	-0.506	0.039	-0.002	0.048	0.064	0.048	-0.096	0.049	0.038	0.049	0.037	0.049	-0.035	0.049
21	438	-0.146	0.048	0.038	0.049	0.012	0.049	-0.039	0.049	0.003	0.049	-0.046	0.049	-0.021	0.049
22	181	-0.483	0.074	-0.025	0.090	0.060	0.090	-0.148	0.090	0.204	0.092	-0.143	0.094	-0.131	0.098
23	371	-0.419	0.052	-0.070	0.060	0.001	0.061	-0.025	0.061	0.045	0.061	-0.005	0.061	-0.072	0.062
24	728	-0.535	0.037	0.057	0.046	-0.027	0.047	0.055	0.047	-0.007	0.047	-0.052	0.047	0.036	0.048

Table 4.3 (cont'd)

25	727	-0.493	0.037	-0.016	0.045	0.027	0.045	0.010	0.045	-0.013	0.045	-0.023	0.045	-0.017	0.046
26	801	-0.442	0.035	-0.071	0.042	0.000	0.042	0.009	0.042	0.028	0.042	-0.018	0.042	0.018	0.042
27	823	-0.493	0.035	-0.011	0.043	-0.007	0.043	0.061	0.043	-0.071	0.043	0.028	0.043	0.010	0.043
28	539	-0.454	0.043	0.003	0.051	0.042	0.051	-0.035	0.051	-0.032	0.051	0.034	0.051	-0.120	0.052
29	465	-0.434	0.046	-0.136	0.054	0.090	0.055	-0.029	0.056	0.031	0.056	0.013	0.056	-0.028	0.056
30	208	-0.438	0.069	-0.061	0.082	0.061	0.082	-0.039	0.082	-0.049	0.082	0.145	0.082	-0.025	0.085
31	844	-0.515	0.034	0.031	0.043	0.019	0.043	-0.010	0.043	-0.016	0.043	-0.014	0.043	-0.031	0.043
32	858	-0.540	0.034	0.041	0.043	0.059	0.043	-0.053	0.043	-0.008	0.043	0.003	0.043	-0.027	0.044
33	580	-0.369	0.042	-0.097	0.047	-0.084	0.047	-0.018	0.047	0.103	0.047	0.017	0.048	0.025	0.049
34	884	-0.451	0.034	-0.045	0.041	-0.046	0.041	0.044	0.041	0.051	0.041	-0.046	0.041	-0.037	0.041
35	428	-0.488	0.048	0.045	0.059	-0.084	0.059	0.094	0.059	-0.128	0.059	0.078	0.060	0.009	0.061
AVERAGE		-0.469		-0.005		0.007		-0.005		0.008		0.004		-0.004	

TABLE 4.4: SERIAL CORRELATION RESULTS (ODHPRS, SSE)

Autocorrelation coefficients (lag 1) and standard error of the One Day Holding Period Return Series of the Saudi sample. The first column stands for the firm number followed by the company name and number of observations in the firm's return series. Results for firms with less than 40 observations are reported as "not available" (N/A)

NO	COMPANY	# of OBS	Autocorrelation COEFF	S.E
1	ALJAZIRA BANK	N/A		
2	INVESTMENT BANK	N/A		
3	ALSAUDI ALHOLAND BANK	N/A		
4	ALSAUDI ALFRANSI BANK	N/A		
5	SAUDI BRITISH BANK	161	-0.522*	0.064
6	SAUDI CAIRO BANK	44	-0.504*	0.112
7	ARAB NATIONAL BANK	215	-0.553*	0.058
8	SAUDI AMERICAN BANK	625	-0.391*	0.038
9	UNITED COMM'L BANK	720	-0.485*	0.032
10	SABIC	892	-0.435*	0.030
11	SAFCO	65	-0.414*	0.138
12	SAFOLA	N/A		
13	N.I.C	622	-0.513*	0.034
14	SPIMACO	602	-0.442*	0.036
15	NAT INDUSTRIAL & GAS	75	-0.446*	0.099
16	QASEEM CEMENT	127	-0.420*	0.075
17	SOUTHERN CEMENT	49	-0.382*	0.131
18	YANBU CEMENT	65	-0.625*	0.103
19	SAUDI BAHRAINI C	255	-0.579*	0.050
20	SAUDI KUWAIT CEM	368	-0.508*	0.045
21	S.H.A.R.A	119	-0.410*	0.087
22	AL-AQARIYYA	N/A		
23	NATIONAL SHIPPG (1)	85	-0.502*	0.098
24	NATIONAL SHIPPG (2)	499	-0.588*	0.035
25	PUBLIC TRANSPORT CORP	468	-0.535*	0.040
26	SASCO	636	-0.446*	0.035
27	SAUDI LIVESTOCK	664	-0.451*	0.035
28	CENTERAL ELECTRI	195	-0.441*	0.066
29	WESTERN ELECTRIC	127	-0.420*	0.075
30	EASTERN ELECTRIC	N/A		
31	NADEC	683	-0.530*	0.035
32	QASEEM AGRICULTU	761	-0.542*	0.031
33	HADCO (HAIL)	218	-0.398*	0.058
34	TADCO (TABUK)	696	-0.464*	0.033
35	SAUDI FISHRIES	111	-0.542*	0.083
	AVERAGE	297	-0.464	

*. Significant at the 5% level.

TABLE 4.5: RUNS ANALYSIS (TTRS, SSE)

Runs test for the Trade-to-Trade return series for the Saudi sample. Actual number of runs is given in the first column and the expected number of runs in the second column followed by it's standard error. The standardized variable (K) is reported in column (4). Finally, column (5) gives the percentage difference between the actual (R) and expected (M) number of runs.

	(1)	(2)	(3)	(4)	(5)
COMPANY	ACTUAL	EXPECTED	S.E	K	(R-M)/M
ALJAZIRA BANK	167	127.56	6.87	5.67	0.31
INVESTMENT BANK	96	78.34	5.12	3.35	0.23
ALSAUDI ALHOLANDI BANK	163	120.10	6.70	6.33	0.36
ALSAUDI ALFRANSI BANK	106	88.28	5.66	3.04	0.20
SAUDI BRITISH BANK	307	240.30	9.66	6.85	0.28
SAUDI CAIRO BANK	195	162.83	7.68	4.13	0.20
ARAB NATIONAL BANK	404	310.76	11.07	8.38	0.30
SAUDI AMERICAN BANK	541	424.69	13.72	8.44	0.27
UNITED COMM BANK	589	480.38	13.84	7.81	0.23
SABIC	661	534.18	14.34	8.81	0.24
SAFCO	262	209.04	8.88	5.91	0.25
SAFOLA	120	89.59	5.93	5.05	0.34
N.I.C	621	463.06	13.26	11.87	0.34
SPIMACO	596	461.63	13.25	10.10	0.29
NAT'L INDUSTRIAL & GAS	308	239.99	9.16	7.37	0.28
QASEEM CEMENT	337	286.50	10.03	5.09	0.18
SOUTHERN CEMENT	211	179.35	8.07	3.86	0.18
YANBU CEMENT	298	231.93	9.21	7.12	0.28
SAUDI BAHRAINI CEMENT	427	349.17	11.10	6.96	0.22
SAUDI KUWAIT CEMENT	478	393.43	11.83	7.11	0.21
S.H.A.R.A	331	271.53	9.73	6.06	0.22
AL-AQARIYYA	141	112.28	6.23	4.53	0.26
NATIONAL SHIPG LINES (1)	271	224.88	8.96	5.09	0.21
NATIONAL SHIPG LINES (2)	573	465.04	12.56	8.55	0.23
PUBLIC TRANS CORP	564	444.23	12.55	9.50	0.27
SASCO	590	488.70	13.18	7.65	0.21
SAUDI LIVESTOCK TRANS	611	486.17	13.43	9.26	0.26
CENTERAL ELECTRIC	403	338.42	10.80	6.03	0.19
WESTERN ELECTRIC	338	286.45	10.03	5.19	0.18
EASTERN ELECTRIC (SCECO)	140	120.37	6.73	2.84	0.16
NADEC	627	490.18	13.67	9.97	0.28
QASEEM AGRICULTURAL	654	529.88	13.64	9.07	0.23
HADCO (HAIL)	428	341.47	11.28	7.63	0.25
TADCO (TABUK)	609	481.25	13.74	9.26	0.27
SAUDI FISHRIES	307	239.44	9.85	6.81	0.28
AVERAGE	385	308.33		6.88	0.25

TABLE 4.6: RESULTS FOR DAY OF THE WEEK EFFECT (SSE)

Mean, standard deviation, and other statistical results for each day of the week for the Saudi market. Results are reported for the Equally Weighted Index (EWR) and the Value Weighted Index (VWR), respectively.

	SAT	SUN	MON	TUES	WED	THUR
EQUALLY WEIGHTED INDEX						
MEAN	0.249	-0.014	-0.027	0.089	0.130	0.021
ST.DEV	1.007	1.099	0.991	1.002	1.109	0.984
VARIANCE	1.013	1.207	0.982	1.003	1.230	0.969
SKEWNESS	0.232	0.314	-0.388	0.777	0.768	-0.076
KURTOSIS	0.594	1.497	0.950	3.142	3.044	0.413
OBSERVATIONS	164	164	162	165	165	129
T-STATISTIC	2.357[a]	1.216	1.379	-0.180	-0.739	0.756
Number of days with Negative Return:	65	80	74	74	81	61
Positive Return:	99	84	88	91	84	68
VALUE WEIGHTED INDEX						
MEAN	0.134	0.165	-0.035	0.198	0.162	0.039
ST.DEV	1.323	1.385	1.543	1.372	1.283	1.308
VARIANCE	1.749	1.917	2.381	1.883	1.646	1.411
SKEWNESS	1.148	1.233	-0.394	0.760	-1.079	0.285
KURTOSIS	7.204	7.702	1.821	2.076	5.695	4.977
OBSERVATIONS	164	164	162	165	165	129
T-STATISTIC	0.211	-0.534	1.534	-0.884	-0.504	0.674
Number of days with Negative Return:	72	82	76	76	68	65
Positive Return:	92	82	86	89	97	64

a. significant at the 5% level.

TABLE 4.7: RESULTS FOR DAY OF THE MONTH EFFECT (SSE)

This table reports the Day of the month effect for the Saudi market. The first section gives half monthly cumulative returns and total sample returns. The T-tests are performed on the first half and second half month daily mean returns which are reported next. The second section reports the number of negative and positive daily returns in the first and second halfs of the month. Results reported for the Equally Weighted Index (EWR) and the Value Weighted Index (VWR), respectively.

CUMULATIVE HALF MONTHLY RETURNS FOR SAUDI SAMPLE		
	EWR	VWR
FIRST HALF MONTH RETURNS	36.435 %	55.128 %
LAST HALF MONTH RETURNS	42.273 %	69.005 %
TOTAL SAMPLE RETURNS	94.937 %	169.063 %
FIRST-HALF DAILY MEAN	0.073 %	0.104 %
LAST-HALF DAILY MEAN	0.082 %	0.125 %
T-TEST	-0.125	-0.233
First Half:		
Number of days with		
Negative Returns	213	223
positive Returns	246	236
Second Half:		
Number of days with		
Negative Returns	210	217
Positive Returns	249	242

EWR, denotes equally weighted index for return series.
VWR, denotes value weighted index for return series.

TABLE: 4.8: SERIAL CORRELATION RESULTS (TTRS, KSE)

Autocorrelation coefficients and standard errors of the Trade-to-Trade Return Series for the Kuwaiti sample for lags 1,2,3,4,5,10, and 15. The first column stands for the firm number followed by the number of observations in the firm's return series.

NO	COMPANY	# OBS	LAG1	(SE)	LAG2	(SE)	LAG3	(SE)	LAG4	(SE)	LAG5	(SE)	LAG10	(SE)	LAG15	(SE)
1	NATIONAL KUWAIT	741	0.050	0.037	0.054	0.037	0.082	0.037	0.027	0.037	-0.032	0.037	0.065	0.038	-0.083	0.038
2	GULF BANK	770	0.086	0.036	0.022	0.036	-0.024	0.036	0.035	0.036	0.060	0.036	0.036	0.037	-0.052	0.037
3	COMMERCIAL BANK	754	0.083	0.036	-0.011	0.037	-0.003	0.037	-0.014	0.037	0.024	0.038	0.060	0.038	-0.038	0.038
4	AL-BANK AL-AHLI	504	0.039	0.045	-0.029	0.045	-0.002	0.046	0.152	0.046	0.017	0.046	-0.131	0.046	-0.067	0.047
5	KUWAIT & M.E BAN	272	-0.042	0.061	-0.010	0.061	-0.074	0.061	-0.124	0.061	0.163	0.062	0.067	0.064	0.018	0.067
6	AL-BANK AL-AQARI	341	0.155	0.054	0.047	0.054	0.096	0.056	0.021	0.056	0.006	0.056	0.002	0.057	-0.001	0.057
7	BURQAN BANK	677	0.055	0.038	-0.034	0.038	-0.009	0.038	0.079	0.038	0.046	0.038	0.035	0.038	-0.069	0.038
8	BAYT AL-TAMWEEL	638	0.047	0.040	-0.033	0.040	-0.058	0.040	0.035	0.040	0.116	0.040	0.052	0.041	-0.054	0.041
9	KUWAIT INVESTMEN	380	0.102	0.051	-0.094	0.052	-0.128	0.052	-0.027	0.053	0.128	0.053	-0.064	0.054	-0.058	0.055
10	INT'L INVESTMENT	380	0.126	0.051	-0.078	0.052	0.108	0.052	0.059	0.053	0.021	0.053	-0.040	0.054	-0.022	0.054
11	AL-TASHILAT TRAD	320	0.072	0.056	0.039	0.056	0.050	0.056	0.042	0.056	0.003	0.057	0.075	0.057	0.017	0.058
12	KUWAIT INSURANCE	145	-0.046	0.083	-0.090	0.083	-0.093	0.084	-0.003	0.085	-0.032	0.085	-0.060	0.085	-0.028	0.087
13	GULF INSURANCE	135	0.020	0.086	-0.032	0.086	0.025	0.086	0.127	0.086	-0.135	0.088	0.076	0.093	-0.050	0.093
14	AL-AHLIYYA INSUR	146	-0.013	0.083	0.113	0.083	0.042	0.083	0.005	0.083	-0.070	0.083	-0.028	0.083	0.028	0.085
15	WARBA INSURANCE	179	0.123	0.075	0.038	0.076	0.012	0.076	0.004	0.076	-0.005	0.076	-0.320	0.076	0.037	0.084
16	KUWAIT REAL ESTA	506	0.137	0.044	0.009	0.045	0.068	0.045	0.134	0.045	0.058	0.046	-0.066	0.046	-0.130	0.049
17	UNITED REAL ESTA	614	0.061	0.040	-0.072	0.041	0.125	0.041	-0.009	0.041	-0.154	0.041	-0.010	0.043	-0.016	0.043
18	NATIONAL REAL ES	322	-0.039	0.056	0.207	0.056	0.106	0.058	0.005	0.059	-0.011	0.059	0.004	0.064	-0.005	0.065
19	NATIONAL INDUSTR	122	0.153	0.091	-0.064	0.093	0.176	0.093	0.181	0.096	0.146	0.098	0.032	0.105	0.160	0.108
20	STEEL PIPES INDU	95	0.090	0.103	0.056	0.103	0.158	0.104	0.139	0.106	-0.084	0.108	-0.016	0.114	-0.049	0.115
21	KUWAIT CEMENT	113	-0.190	0.094	0.226	0.097	0.146	0.102	0.014	0.104	-0.020	0.104	0.009	0.107	-0.020	0.110
22	REFRIGERATION IN	149	0.147	0.082	0.424	0.084	0.021	0.097	0.136	0.097	0.065	0.098	-0.046	0.100	-0.001	0.100
23	GULF CABLES	249	-0.114	0.063	-0.015	0.064	0.070	0.064	-0.029	0.065	0.033	0.065	-0.038	0.067	-0.085	0.067
24	PHARMA'L INDUSTR	307	0.207	0.051	0.056	0.053	-0.026	0.053	0.015	0.053	0.045	0.053	0.091	0.053	0.012	0.055
25	LAND TRANSPORT	102	0.447	0.099	0.445	0.117	0.233	0.133	0.113	0.137	0.131	0.138	0.148	0.142	-0.049	0.145

Table 4.8 (cont'd)

26	PUBLIC WAREHOUSI	456	0.130	0.047	-0.021	0.048	0.046	0.048	0.033	0.048	-0.083	0.048	0.035	0.048	-0.045	0.049
27	AL-ASWAQ GROUP	585	0.088	0.041	-0.050	0.042	-0.045	0.042	0.034	0.042	0.114	0.042	0.000	0.042	-0.071	0.043
28	CELLULAR PHONES	760	0.018	0.036	-0.056	0.036	0.052	0.036	0.079	0.036	0.034	0.037	0.042	0.037	-0.058	0.037
29	LIVESTOCK TRANS	342	0.085	0.054	-0.043	0.054	-0.031	0.055	0.003	0.055	0.018	0.055	-0.087	0.055	-0.078	0.058
30	KUWAIT FISHRIES	122	-0.024	0.091	-0.034	0.091	-0.035	0.091	-0.021	0.091	-0.023	0.091	-0.010	0.091	-0.022	0.091
31	UNITED POULTRY	167	-0.177	0.077	0.163	0.080	0.081	0.082	0.014	0.082	0.105	0.082	-0.030	0.085	0.054	0.086
32	KUWAIT FOODS	181	-0.048	0.074	0.047	0.074	-0.027	0.075	-0.137	0.075	-0.058	0.076	-0.058	0.081	-0.063	0.083
33	BAHRAIN INT'L BK	484	-0.094	0.045	0.048	0.045	0.098	0.046	0.088	0.046	-0.086	0.047	0.059	0.047	-0.074	0.048
34	BAHRAIN & M.E BK	315	0.146	0.056	0.089	0.057	-0.048	0.057	-0.100	0.057	-0.151	0.058	0.051	0.060	-0.035	0.061
35	AL-SAHIL DEVELOP	519	0.050	0.044	0.026	0.044	-0.003	0.044	0.001	0.044	0.021	0.044	0.021	0.045	-0.080	0.045
36	ARAB INVESTMENT	472	-0.021	0.046	-0.029	0.046	-0.117	0.046	-0.061	0.047	-0.002	0.047	-0.046	0.048	-0.024	0.049
	AVERAGE		0.053		0.037		0.030		0.029		0.011		-0.003		-0.031	

TABLE: 4.9: SERIAL CORRELATION RESULTS (ODHPRS, KSE)

Autocorrelation coefficients and standard error of the One Day Holding Period Return Series of the Kuwaiti sample for lag 1. The first column stands for the firm number followed by the number of observations in the firm's return series.

NO	COMPANY	# OBS	LAG1	(SE)
1	NATIONAL KUWAIT	680	-0.014	0.038
2	GULF BANK	720	0.056	0.037
3	COMMERCIAL BANK	677	0.055	0.037
4	AL-BANK AL-AHLI	335	0.077	0.052
5	KUWAIT & M.E BANK	95	-0.002	0.101
6	AL-BANK AL-AQARI	162	0.239	0.078*
7	BURQAN BANK	552	0.094	0.041*
8	BAYT AL-TAMWEEL	543	0.021	0.043
9	KUWAIT INVESTMENT	240	0.111	0.061
10	INT'L INVESTMENT	244	0.228	0.065*
11	AL-TASHILAT TRADING	139	0.132	0.079
12	KUWAIT INSURANCE	N/A		
13	GULF INSURANCE	51	-0.003	0.143
14	AL-AHLIYYA INSURANCE	N/A		
15	WARBA INSURANCE	N/A		
16	KUWAIT REAL ESTATE	338	0.094	0.054
17	UNITED REAL ESTATE	500	0.118	0.044*
18	NATIONAL REAL ESTATE	161	0.030	0.079
19	NATIONAL INDUSTRIAL	N/A		
20	STEEL PIPES INDUSTRY	N/A		
21	KUWAIT CEMENT	40	0.331	0.178*
22	REFRIGERATION CO	40	0.058	0.141
23	GULF CABLES	94	-0.006	0.104
24	PHARMA'L INDUSTRY	218	0.265	0.061*
25	LAND TRANSPORT	N/A		
26	PUBLIC WAREHOUSING	333	0.219	0.054*
27	AL-ASWAQ GROUP	439	0.050	0.044
28	CELLULAR PHONES	691	0.031	0.038
29	LIVESTOCK TRANSPORT	138	0.078	0.086
30	KUWAIT FISHRIES	58	0.495	0.109*
31	UNITED POULTRY	44	-0.119	0.143
32	KUWAIT FOODS	N/A		
33	BAHRAIN INT'L BANK	300	-0.017	0.058
34	BAHRAIN & M.E BANK	164	0.038	0.079
35	AL-SAHIL DEVELOP	361	0.019	0.053
36	ARAB INVESTMENT	271	-0.118	0.051*
	AVERAGE		0.088	

*. Significant at the 5% level.

TABLE 4.10: RUNS ANALYSIS (TTRS, KSE)

Runs test for the Trade-to-Trade returns for the Kuwaiti sample. Actual number of runs (M) is given in the first column and the expected number of runs (R) in the second column followed by it's standard error. The standardized variable (k) is reported in column (4) followed by the percentage difference between the actual and expected number of runs in column (5).

	(1)	(2)	(3)	(4)	(5)
COMPANY	ACTUAL	EXPECTED	S.E	K	(R-M)/M
NATIONAL KUWAIT BANK	473	494.97	12.81	-1.68	-0.04
GULF BANK	476	508.77	12.99	-2.49[a]	-0.06
COMMERCIAL BANK	485	501.45	12.90	-1.24	-0.03
AL-BANK AL-AHLI	322	327.25	10.41	-0.46	-0.02
KUWAIT & M.E BANK	170	181.73	7.73	-1.45	-0.06
AL-BANK AL-AQARI	186	222.34	8.59	-4.17[ab]	-0.16
BURQAN BANK	431	450.42	12.22	-1.55	-0.04
BAYT AL-TAMWEEL	411	426.29	11.89	-1.24	-0.04
KUWAIT INVESTMENTS	226	244.89	9.06	-2.03[ab]	-0.08
INT'L INVESTMENTS	230	245.68	9.03	-1.68	-0.06
AL-TASHILAT TRADE	197	212.14	8.36	-1.75[b]	-0.07
KUWAIT INSURANCE	86	97.06	5.62	-1.88	-0.11
GULF INSURANCE	84	89.16	5.39	-0.87	-0.06
AL-AHLIYYA INSURANCE	88	97.34	5.63	-1.57	-0.10
WARBA INSURANCE	99	118.35	6.21	-3.04[a]	-0.16
KUWAIT REAL ESTATES	301	335.32	10.53	-3.21[a]	-0.10
UNITED REAL ESTATES	385	405.35	11.58	-1.71[b]	-0.05
NATIONAL REAL ESTATES	208	214.57	8.41	-0.72	-0.03
NATIONAL INDUSTRIES	66	80.52	5.11	-2.74[ab]	-0.18
STEEL PIPES INDUSTRIES	35	61.93	4.48	-5.89[ab]	-0.43
KUWAIT CEMENT	61	72.19	4.91	-2.18[a]	-0.15
REFRIGERATION INDUSTRIES	96	99.78	5.70	-0.58	-0.04
GULF CABLES	168	163.71	7.32	0.65	0.03
PHARMA'L INDUSTRIES	217	249.50	9.13	-3.50[ab]	-0.13
LAND TRANSPORT	50	62.41	4.61	-2.58[ab]	-0.20
PUBLIC WAREHOUSING	275	296.81	9.94	-2.14[ab]	-0.07
AL-ASWAQ GROUP	370	389.24	11.36	-1.65[b]	-0.05
CELLULAR PHONES	492	506.86	12.97	-1.11	-0.03
LIVESTOCK TRANS & TRADE	206	227.22	8.65	-2.39[a]	-0.09
KUWAIT FISHRIES	60	78.92	5.11	-3.60[ab]	-0.24
UNITED POULTRY	110	109.84	6.01	0.11	0.00
KUWAIT FOODS	113	119.13	6.26	-0.90	-0.05
BAHRAIN INT'L BANK	319	313.94	10.15	0.55	0.02
BAHRAIN & M.E BANK	205	210.60	8.33	-0.61	-0.03
AL-SAHIL INVEST	312	344.55	10.67	-3.00[ab]	-0.09
ARAB INVESTMENT	292	291.66	9.71	0.09	0.00
AVERAGE	231	245.89		-1.78	-0.08

a. Stocks with significant runs (> 2 S.E).
b. Significant runs at 5% level using Wald-Wolfowitz test.

TABLE 4.11: RESULTS FOR DAY OF THE WEEK EFFECT (KSE)

Mean, standard deviation, and other statistical results for each day of the week for the Kuwaiti market. Results are reported for the Equally Weighted Index (EWR) and the Value Weighted Index (VWR), respectively.

EQUALLY WEIGHTED INDEX

	SAT	SUN	MON	TUES	WED
MEAN (%)	0.125	-0.001	-0.019	0.036	0.098
ST.DEV	1.011	0.805	0.788	0.780	0.910
SKEWNESS	1.603	0.811	1.703	1.823	4.197
KURTOSIS	5.887	4.146	7.907	6.243	30.51
OBSERVATIONS	158	162	165	162	163
T-STATISTIC	1.265[a]	0.802	1.102	0.185	-0.843
Number of days with					
Negative Return:	83	93	90	101	89
Positive Return:	75	69	75	61	74

VALUE WEIGHTED INDEX

	SAT	SUN	MON	TUES	WED
MEAN	0.114	-0.104	-0.003	0.006	0.038
ST.DEV	1.108	7.772	0.835	0.798	0.983
SKEWNESS	2.232	0.454	1.800	1.629	5.609
KURTOSIS	8.825	2.941	8.110	6.245	49.82
OBSERVATIONS	158	162	165	162	163
T-STATISTIC	1.607	1.785[a]	0.195	0.062	-0.449
Number of days with					
Negative Return:	87	104	89	95	100
Positive Return:	71	58	76	67	63

a. significant at the 5% level.

TABLE 4.12: RESULTS FOR DAY OF THE MONTH EFFECT (KSE)

This table reports the Day of the month effect for the Kuwaiti market. The first section gives half monthly cumulative returns and total sample returns. The T-tests are performed on the first half and second half month daily mean returns which are reported next. The second section reports the number of negative and positive daily returns in the first and second halfs of the month. Results reported for the Equally Weighted Index (EWR) and the Value Weighted Index (VWR), respectively.

CUMULATIVE HALF MONTHLY RETURNS FOR KUWAITI SAMPLE		
	EWR	VWR
FIRST HALF MONTH RETURNS	-1.77%	-17.773%
LAST HALF MONTH RETURNS	142.58%	126.16%
TOTAL SAMPLE RETURNS	142.47%	104.73%
FIRST-HALF DAILY MEAN	-0.0004%	-0.0449%
LAST-HALF DAILY MEAN	0.0936%	0.0624%
T-TEST	-1.517 (.13)	-1.648 (.1)
First Half: Number of days with		
Negative Returns	237	206
Positive Returns	156	187
Second Half: Number of days with		
Negative Returns	236	213
Positive Returns	157	180

EWR, denotes equally weighted index for return series.
VWR, denotes value weighted index for return series.

TABLE 4.13: COMPARISON SUMMARY OF RUNS AND SERIAL CORRELATION TESTS FOR SAUDI ARABIA AND KUWAIT

A comparison summary of runs analysis results of the Saudi and Kuwaiti samples is given in the first section of the table. Column (1) has the number of stocks examined in each sample (2) gives the standardize dvariable along with it's (Standard error). Column (3) gives the percentage difference between the actual (R) and expected (M) number of runs. Finally, Column (4) gives the number of stocks that exhibit significant number of runs in each study. In the second section, summary of serial correlation results are reported for the trade-to-trade and the one-day-holding-period return series for lag 1. Average and absolute averages are reported. The number of stocks/total that exhibited significant dependance at the 5% level is reported in the last column.

Part 1: Runs	(1)	(2)	(3)	(4)
STUDY	#	AVG K	(R-M)/M	Significant runs
SAUDI ARABIA				
- TTRS	35	6.88	0.25	35
KUWAIT				
- TTRS	36	-1.78	-0.08	14
Part 2: Serial correlation	**Average**		**Absolute**	**Significant stocks**
Saudi Arabia				
- TTRS[a]		-0.470	-0.470	35/35
- ODHPRS[a]		-0.464	-0.464	28/28
Kuwait				
- TTRS		0.053	0.098	13/36
Most Active		0.052	0.069	7/14
Least Active		0.054	0.117	6/22
- ODHPRS		0.088	0.109	9/29
Most Active		0.049	0.070	4/14
Least Active		0.124	0.145	5/15

a. There is no significant difference between the most active and least active stocks in the Saudi sample.

TABLE 4.14: COMPARISON OF TRADING ACTIVITY IN THE SAUDI AND KUWAITI MARKETS.

Comparison of annual trading activity in the Saudi and Kuwaiti markets in terms of number of shares traded, total dollar volume, and number of transactions.

YEAR	# shares traded (in millions)		Total volume in ($ million)		# transactions	
	KSE	SSE	KSE	SSE	KSE	SSE
1985	179.3	N/A	384	N/A	11229	N/A
1986	478.5	4.23	1,270	86	25236	9918
1987	3312*	10.52	2,735	398	74526	22847
1988	2798	14.61	2,345	541	63977	42106
1989	N/A	15.71	N/A	903	N/A	109473

	KSE	SSE
Total capitalization (U.S $ Billion)	11.6[a]	27.2[b]

*. Figure represent total shares after splits. Without adjusting for splits, total shares=971 million.
a. Total market capitalization as of the end 1988.
b. Total market capitalization as of the end 1989.

TABLE 4.15: COMPARISON OF RETURNS OVER 1985-89 FOR THE SAUDI AND KUWAITI SAMPLES

Daily mean returns and their standard deviations for the equally weighted indices constructed in this study for the Saudi and Kuwaiti samples. Returns are reported by year along with the number of observations in each period. The equally weighted index (EWI) and the value weighted index (VWI) constructed in this study are given at the end of each year.

	# OBS	Return	Std.Dev	EWI	VWI
a) KUWAIT					
Total	810	0.0474%	0.862%		
1985	64	-0.1361%	0.422%	91.6	87.5
1986	249	0.1531%	0.972%	132.5	113.0
1987	251	0.0906%	0.963%	164.5	117.7
1988	246	-0.056%	0.688%	142.5	104.7
b) SAUDI ARABIA					
Total	949	0.0757%	1.037%		
1986	164	0.0280%	1.176%	103.5	102.8
1987	296	0.1134	1.145	142.0	151.0
1988	301	0.0576	0.889	166.9	225.8
1989	188	0.0870	0.945	192.3	264.3

CHAPTER V: POLICY IMPLICATIONS

A. DISCUSSION OF MARKET EFFICIENCY

In this section, we develop the effects of capital markets on the allocation and transfer of wealth in an economy as a foundation for policy recommendations regarding the Saudi and Kuwaiti capital markets. The role of allocationally efficient capital markets in economic development has important macro-efficiency implications. These include the allocative, developmental, and distributional effects of market efficiency. Micro-efficiency in the capital markets requires that markets be operationally and informationally efficient. Operational efficiency means that transactions are consummated at minimal costs. Operational efficiency tends to increase the number of market participants, enhance market liquidity, and yield the fairest security prices. Informational efficiency is enhanced when accurate and timely information is available to all market participants through effective channels of communication and when a sufficient number of traders develop their expectations through independent financial analysis. Our discussion of macro-efficiency policy deals mainly with primary markets. The discussion of micro-efficiency policy deals with secondary markets.

While attaining macro-efficiency is the ultimate goal of capital markets, it cannot be attained unless sufficient measures are taken on the micro-efficiency level. If the macro- and micro-efficiency

implications of all aspects of regulatory and institutional policy are not carefully considered, stock exchanges can create unfavorable side-effects. The Al-manakh market collapse had far-reaching allocative, developmental, and distributional consequences in Kuwait. In light of these consequences, the reluctance of the Saudi government to establish a central organized exchange is understandable.

A speculative bubble might well develop under the existing market conditions in Saudi Arabia, though it might have less adverse macro-economic consequences than in Kuwait's Al-manakh. The best preventive measure is to establish a market system in Saudi Arabia which ensures fair prices and equitable access to the market and, most importantly, to information. Government regulations should be formulated to achieve this objective while minimizing the risks of abuse seen in other markets.

1. THE ROLE OF CAPITAL MARKETS IN ECONOMIC DEVELOPMENT

We prefer to use the term "macro-efficiency" in our discussion of policy measures at that level because of the macro-economic implications of allocational efficiency in capital markets. The role of capital markets in economic development is mainly viewed as a catalyst in the efficient mobilization of savings to their most productive uses. However, allocational efficiency will not develop unless an environment exists which supports economic and financial development. It does not make sense to rely on capital markets for resource mobilization and

allocation in an economy with low per capita income and weak financial institutions. Saudi Arabia's and Kuwait's economies are well developed with high per capita income. Both countries built sophisticated economic infrastructures during the years of surplus oil revenues. Well developed capital markets can play a vital role in the region's continuing economic development.

a. Allocative effects

The objective of capital markets is to improve efficiency of resource allocation and consequently the growth rates in the economy. Capital markets provide competitive means by which funds are transferred between savers (investors) and producers (borrowers). Financial assets separate individual acts of saving from acts of investment over both time and place due to marketability, liquidity, and divisibility in savings. The mobilization of savings into their most productive uses increases the propensity to invest and hence the level of national income and the propensity to consume. These favorable allocative effects impact on all economic measures of prosperity including employment rates and economic growth rates.

b. Developmental effects

The allocative effects of efficient capital markets result in several developmental benefits. These effects include the development of key industries as well as the development of key skills in individuals in the market. Stock prices are an observable scorecard of the effectiveness of managers' activity. Capital markets force managers to make productive investment and financing decisions. Ineffectively managed firms become candidates for takeovers or acquisitions. Securities markets facilitate mergers and the integration of small, unorganized and developing industries. Securities markets also provide a training and testing ground for the skills and judgement needed for entrepreneurship, risk bearing, portfolio selection and management. These skills are especially valuable to the managers of financial institutions and to brokers, underwriters, and individuals who trade in securities. Finally, the existence of a securities market provides an institutional mechanism for the implementation of monetary and fiscal policy.

c. Distributional effects

Improving parity in the distribution of wealth, income, and economic power over a larger segment of the population can be another desirable effect of allocationally efficient capital markets. However, unless a wide range of producers (borrowers) and savers (investors) are encouraged to participate in the capital market either directly or

indirectly (through mutual funds, pension funds, investment bankers, or insurance companies), the development of capital markets can also lead to inequality of income and wealth distribution. This potential is especially serious in countries like Saudi Arabia and Kuwait where no vigorous program of wealth redistribution (e.g. progressive individual taxation) currently exists.

The positive distributional effects of developing capital markets are predominant when individuals, firms, and financial institutions are given equal access to the market. Equitable access to the markets is especially important when national economic objectives protect particular industries or firms through monopoly positions, import quotas, or government subsidies. These protective policies are often found in developing economies as policy makers try to protect strategic industries from foreign competition and seek a wide industrial base. Protective policies are not necessarily harmful if designed with national economic objectives in mind and if the privileged firms' wealth is shared by all citizens. Policy makers must recognize the possible costs of protectionist policies in the form of reduced allocational efficiency. These costs must be consciously weighed against perceived benefits in the form of national economic and policy objectives.

2. MICRO-EFFICIENCY

We define micro-efficiency in terms of operational and informational efficiency in a trading system. The objective of capital markets at the micro-efficiency level is to have a liquid market in which security prices fully and rapidly reflect all available information (informational efficiency) with minimal transaction costs (operational efficiency). Liquidity refers to the speed with which capital flows to productive uses.

Micro-efficiency is closely related to macro-efficiency. The ultimate goal of capital markets is to promote macro-efficiency (i.e., the allocative, distributional, and developmental effects). Reducing inefficiencies at the micro level directly contributes to that goal. Excess volatility of stock markets over and above the volatility driven by new information can increase the risk to investors and the cost of capital to firms which impinges on the allocational efficiency in the economy. Chapter IV shows that intraday price volatility on the SSE is three times that on the KSE. Further, manipulation of prices, trading volume, monopoly of information, and other forms of abuses of position by professionals and insiders reduce the public trust in financial instruments. Government-imposed regulatory restrictions (a form of operational cost) are desirable to the extent they reduce such abuses. High transaction costs including commissions and bid/ask spreads and the absence of liquidity in securities' markets also retard investment. All these micro-inefficiencies are to be avoided. Markets should be as

informationally and operationally efficient as possible to promote macro-efficiency in the market.

a. Operational efficiency

Operational efficiency deals with the costs of transferring outstanding financial securities from buyers to sellers. These costs include the direct commission charges paid to brokers as well as indirect costs implicit in the bid/ask spread (Roll, 1984). Operational efficiency is maximized when dealer/broker markets are operating at a perfectly competitive level so that commission charges and bid/ask spreads just compensate dealers and brokers for their time, effort and risk. Markets in different countries (e.g. Saudi Arabia and Kuwait) have different regulatory structures and hence different unavoidable or minimum costs in perfectly competitive environments.

Operational inefficiencies may be reduced by increasing the number of market participants. This also increases liquidity in the market. To a lesser extent, increasing the level of competition in the broker/dealer market also reduces operational inefficiencies. When commission structures are fixed as in the Saudi and Kuwaiti markets, observed bid/ask spreads become the primary measure of operational efficiency. Bid/ask spreads are directly affected by the level of liquidity in the market and the degree of competition between brokers\dealers.

Qualitative components of operational costs include the amount of time spent by buyers and sellers in acquiring information, consummating

transactions through the market system, and physically transferring ownership. Other qualitative costs include the length of time until a limit order executes, its probability of being executed, and the preservation of price priority (i.e., the first orders received at a given price are executed first). These costs are also reduced when there are more market participants.

b. Informational efficiency

The concept of informational efficiency is well established in the economics, finance, and accounting literature. The most common conception of informational efficiency is one in which prices fully and rapidly reflect all relevant information. Economists have shown that under some conditions (rational investors in a competitive market and costless and immediate information available to all investors) a firm's output decisions under capital market equilibrium will be optimal for its shareholders. It will also be optimal in the sense that each firm will be operating at minimal average operating and financial costs. Regulations governing security transactions would be unnecessary in such a world. However, information is not costless. With asymmetric information, the potential for abuse of information such as concealment and fraud is increased. Public disclosure rules create a more equitable and informationally efficient market (Stigler, 1976). Communication must exist between savers and producers facilitated by an active financial media. Besides public disclosure rules, two other conditions enhance informational efficiency. First, a sufficient number of traders

must exist with independent thinking. Second, professional security analysts facilitate the development of informational efficiency in developing capital markets such as in Saudi Arabia and Kuwait.

Markets are created by the actions of investors with divergent beliefs (expectations) about the future values of financial securities. The market price of a financial security reflects the cumulative knowledge and beliefs of all participating investors. If the number of individual investors is large and their expectations are developed through independent thinking, individual's forecast errors cancel out (Boldt and Arbit, 1984). The resulting consensus becomes an unbiased predictor of future value. Further, consensus forecast error declines at a decreasing rate as the number of independent expectations reflected in the consensus becomes larger. A critical assumption in this process is the assumption of independent thinking. The effect of large numbers of investors on the efficiency of consensus forecast errors diminishes with increasing dependency between individual investors' expectations. We would argue that even with the presence of such biases in group thinking a greater number of traders still has its own merits. With a greater number of investors, the tendency for market clearing prices to be biased diminishes. The number of independently biased groups increases and this promotes symmetry in the demand to hold shares.

The presence of expert analysts and an active financial media also has a positive influence on informational efficiency. Professional managers of mutual funds, investment analysts, and investment bankers are important in developing independent security analyses. Professional

analysts and the financial media help disseminate information to the public. With more accurate information, prices are less subject to speculative bubbles and insider abuse.

In the absence of information or when only partial information is available on a security, prices become subject to rumors leading to wide price fluctuations as investors trade on noise as well as on information. If such markets are liquid, relatively operationally efficient, and expert analysis is not common, they can become subject to abuses by small groups of investors with biased expectations or insider information. When governments allow an exchange system to operate with relative operational efficiency and without information disclosure requirements and trading regulations such as margin requirements, both developed and developing markets are prone to speculative bubbles and collapses. When such speculative bubbles occur with a large segment of the population participating in the market, adverse distributional effects can result. This condition describes the unofficial Kuwaiti stock market before the Al-manakh crisis in 1982.

In the absence of a centralized and operationally efficient market as in Saudi Arabia, the number of market participants is greatly reduced. This reduces the adverse effects of speculative bubbles on wealth distribution. However, the cost of this hedge against a market collapse is reduced allocational and distributional efficiency. The current Saudi exchange system impedes the flow of capital to its most productive uses.

B. POLICY RECOMMENDATIONS

In this section we develop policy and regulatory recommendations for the Kuwaiti and Saudi securities exchanges. A key issue is the degree to which government policy and regulations should aid in the development of capital markets. We support a positive and comprehensive but gradualistic approach toward capital market development by governmental authorities in developing economies. The level of activity and sophistication of the economic and the financial systems are important factors in supporting the growth and evolution of capital markets. In the free market economies of Saudi Arabia and Kuwait, vigorous resource diversification plans are being implemented (though Kuwait has more limited human and land resources). An advanced economic infrastructure has developed in both countries. An efficient capital market can play an important role in the economic development of Saudi Arabia and Kuwait. This section develops specific policy recommendations for the stock trading systems in Saudi Arabia and Kuwait.

In Chapter IV, autocorrelations, runs tests, and intraday volatility measures indicate significant informational and/or operational inefficiencies in the Saudi exchange system. This is supported both by the empirical results in Chapter IV as well as by the theoretical analysis of market structure. There are some inherent weaknesses in the current Saudi trading system. In particular:

1) The market suffers from fragmentation. Coordination between the banks has not met expectations. Banks try to handle most of the transactions by themselves rather than going through the SSRC exchange system in order to maximize commissions and retain customers.
2) Because there is no centralized market, trading procedures are time consuming and expensive.
3) A substantial proportion of transactions go directly through the share registration offices of the individual companies traded on the exchange or through individual market makers. In 1988, about 10% of all transactions were executed directly through the individual companies' share registration offices.
4) Preservation of price priority is not guaranteed because of the fragmented market.
5) Disclosure requirements do not promote conditions leading to informational efficiency.
6) There are no official market makers. Banks are not allowed to take positions in stocks which reduces liquidity in the market. Currently, some fifty active investors provide the market with liquidity. These active investors play the role of market makers. Their profits are determined by their bid and ask prices and by profit/losses they earn by holding stocks. Transactions that are executed by the market makers are ultimately processed through the banks or through the firm's share registration offices indicating operational inefficiencies in the current trading system. The transactions that go through the market makers are difficult to estimate because they are difficult to track. The only paper trail is when the orders are

processed through the SSRC.

7) There is no organized investment banking industry. Combined with the convention of bringing firms to market at par value, this makes initial public offerings unattractive for privately held companies.

1. RECOMMENDATIONS TO PROMOTE MACRO-EFFICIENCY

The macro-efficiency discussion in the first half of this chapter is general and applicable to both countries. In this section, we limit our recommendations to issues related to the primary markets. No attempt is made to address broader macro-economic policies. Any policies we suggest must be complimentary to each country's fiscal, monetary and financial policies.

An immediate step towards enhancing the "allocative effects" in savings is to begin to trade selected firms from other Gulf countries. Bahrain and Kuwait recently allowed Gulf citizens to hold up to a specific percentage in their national companies. Corporations that are well established and meet disclosure and listing requirements should be encouraged to enlist. The Gulf Cooperation Council (GCC) is ultimately working toward full economic integration of the Gulf countries' economies. As a preliminary step, it is important to unify the listing and financial disclosure requirements in all GCC countries. The economic necessity of this integration parallels that of the European Economic Community.

The government should encourage companies in industries that have large capital requirements to become public. Petrochemical downstream companies, real estate investment, and leasing are industries that fall into this category. Some of these companies could be formed by encouraging smaller firms that are successful to merge and go public. Government invitation to the business community to form certain key industries has been a common procedure in other countries. The following discussion is aimed at increasing the size and the number of publicly traded firms.

Privatization. Several government corporations are prime candidates for privatization. In Saudi Arabia the list includes Petromin, Saudi Airlines, and Sabic. Government holdings in the utility industries could also be sold to the public. In the Gulf countries, new public offers of stock are usually oversubscribed reflecting the par policy which is discussed next. But it also indicates the high demand for investment avenues in these countries. These markets are often called buyer's markets indicating the need to widen the local investment avenues available to the public. Privatization is a characteristic of free market economies which enforces productive efficiencies. England, France, and recently the Eastern European countries are moving vigorously in this direction. If privatization promotes both allocational and productive efficiencies then it is a desirable policy. Again, a gradual approach is warranted that should be complimentary to fiscal and monetary policies.

Initial Public Offerings(IPO's). The current policy of offering shares at par does not allow market-determined prices for IPO's. For start-up firms that have no financial history, this policy has some benefits. However, it strongly discourages established, privately held companies from going public. We recommend two separate policies for IPO's depending on whether the firm is newly established or not.

. *Newly established companies and privatization of governmental-owned companies*. The current IPO policy has favorable distributional effects in that many of these newly established companies operate with government subsidies, import tariffs, and/or monopolies. This process insures the widest participation by the public. It also protects the public from speculating on companies that have no performance history. The current IPO pricing policy also works in cases were the government intends to distribute some wealth to the public by selling stock below market value such as in the privatization efforts. When IPO's are oversubscribed, a prorata method is used which gives more weight to smaller subscriptions. However, if the intent is to distribute wealth equally across all citizens, a maximum number of shares assigned to each citizen is a more equitable method of distributing wealth to the public than is a prorata method. Oversubscription in most cases is self generated because individual investors bid up the number of subscribed shares in anticipation to get more shares from the prorata assignment. The policy of setting a maximum number of shares per national would reduce this problem. If the offering is undersubscribed according to the established limits, remaining shares could be allocated to individuals requesting more than the maximum number of shares. However,

we would like to make it clear that this policy is only desirable in privatization efforts were wealth redistribution is desired by the government or in cases were companies are granted special privileges by the government such as subsidies or tariff protection.

. *Private ownerships*. Private ownerships with profitable operating histories have little incentive to resort to public equity financing since the current IPO procedure distributes some of the founding owners' value to new shareholders. Founding owners then have little incentive to go public. It is not a surprise that most of the companies that went public in Saudi Arabia and Kuwait in recent years were either newly established or had to become public because of regulatory policies (e.g. the Al-rajhi group in Saudi Arabia went public in order to be licensed as a bank). A PAR IPO policy encourages private firms with poor prospects to become public as selling stock at par becomes a cheap way to finance expansion. IPO's with poorer prospects would sell at par but without covering the full subscription possibly resulting in an immediate loss for those investors who subscribed.[1] Undersubscribed firms are then underfunded.

The roots of the problem are historic because in the absence of an efficiently organized stock market it is difficult to assign a value to privately held assets. Resorting to the procedurally consistent convention of setting value at PAR is a poor substitute for pricing assets in an informationally efficient market. We recommended that registration and information disclosure requirements be established for business firms with private ownership that wish to go public. Such

firms must provide a public record of audited financial statements in order to be approved for public sale. Minimum requirements to be met by these firms include good financial standing over several years of operation. When informational disclosures are met, a market-determined price is fair to all parties. One method is through best efforts where an initial number of shares is set at some value and the public is left to bid on a competitive basis. In Saudi Arabia, commercial banks can sell stocks through best efforts and still not hold stock for their own account. This would minimize the potential for insider trading abuses ala Drexel Burnham Lambert. A market-determined IPO pricing policy must follow our information disclosure recommendations.

Financial institutions such as venture capitalists or some form of investment companies could play an important role in meeting capital expansion requirements for private firms. We discuss the role of financial institutions next.

Financial Institutions. The number of financial institutions (intermediaries and market participants) is directly related to allocative, distributional and developmental efficiency and to the degree of informational and operational efficiency.

. *Investment companies*. There are many successful firms of various sizes in the private sector in Saudi Arabia and Kuwait. Some of these firms are not able to expand because of limited financial resources. The existence of some form of regulated financial institution that aids in the expansion of private ownerships is important. For instance,

venture capitalists should be encouraged to develop an intermediary role by investing in smaller private ownerships before they become public. Regulations similar to those developed in the U.S in the 1950's and 60's (e.g. Small Business Act) to develop and enhance small businesses should be implemented. An important source of debt and equity financing, especially for small private firms, is investment banking. These institutions may take on entrepreneurial functions in encouraging the development and growth of businesses. Such financial institutions do not necessarily have to play the same role seen in other markets such as the U.S. Their role should be different from commercial banking in that they are investment-oriented firms. Commercial banks have not shown an interest in equity financing historically. The investment companies (bankers) role should not be played by commercial banks since currently they are not allowed to take positions in equity and in order to avoid insider trading abuses. The role of investment bankers will probably evolve over time in other financial areas. Currently, such investment companies might invest equity in aggressive successful companies before making their shares public.

. Mutual funds. Regulations should also allow the formation of mutual funds as a market participant providing liquidity to the market. Publicly held mutual funds would not only promote the distributional benefits of capital markets but would also help smaller investors to diversify their holdings. Current policies in Saudi Arabia channel all investment activities through the commercial banking system. Current regulations in Saudi Arabia allow banks to be brokers but do not allow banks to hold any equity in the stock market. In our opinion, either

mutual funds should be allowed to develop or banks should be allowed to form mutual funds that utilize local stock investment in their portfolios. This increases competition in use of funds, works as a training ground for financial skills, and enhances the distribution of wealth. In Kuwait two types of firms that specialize in market making have been established. Initially, regulators could insist on approving the key personnel in the newly established mutual funds and investment banking operations insuring that they have the necessary training and credentials. Regulations regarding the financial flexibility of these institutions could be relaxed as the institutions and markets evolve.

New financial instruments. Security regulations should be amended to allow creativity in equity financing. Since fixed interest instruments are not publicly accepted, any form of equity financing should be encouraged. There is no limit to creativity in equity financing and it is not necessary to follow examples of financial instruments that exist in developed capital markets.

Examples of creative equity financing could include short-term equity financing and preferred stocks that pay a fixed percentage of earnings rather than fixed payments. Valuation techniques and disclosure requirements could be developed for such instruments. Callability, convertibility, accumulation of earnings when no earnings are achieved, and minimum nominal return rates could be specified in such instruments. Murabaha and Mudaraba deals are popular Islamic investment methods that are not currently regulated.[2]

It is sometimes suggested that there is a need to develop options and index trading instruments in developing capital markets. These instruments are mainly designed as hedging instruments for risk reduction for use by professional investors. Current conditions in the Saudi Arabia and Kuwait do not warrant a need for such instruments. In developing markets they could prove harmful because of their potential for misuse as speculative rather than risk reduction instruments. Further, the assumption that all investors are price takers may not hold in these markets.

Although some of the above policy recommendations may not be immediately justified and may not become widely accepted upon their implementation, the objective should be toward the long-term effects of such policies. A gradual and comprehensive approach is required that includes the recommendations in the next section.

2. POLICY RECOMMENDATIONS FOR MICRO-EFFICIENCY

Because of differences in capital market organization between Saudi Arabia and Kuwait, we develop recommendations separately for each market. Some recommendations overlap both markets.

a. Saudi Arabia

The regulatory steps taken by the Saudi authorities in response to the Al-manakh crisis in Kuwait were designed to avoid a similar crisis in Saudi Arabia. Some critics have blamed the price decline between 1983-86 in Saudi stocks on these regulations. However, general economic conditions and the decline in company earnings (in the aftermath of the oil glut and the gulf war between Iraq and Iran) are the principal causes of the decline. The absence of an organized exchange before 1984 may have been a reason why a crisis like Al-manakh did not take place in Saudi Arabia. The general price decline over 1983-86 had minimum effect on the distribution of wealth in Saudi Arabia for the same reason. The role of the regulations was primarily in eliminating the unofficial over-the-counter market consisting of about 80 unlicensed brokers who were also market makers. The current system has ensured less trading activity in the market because of operational inefficiencies and regulations that require cash settlements only. This has perhaps decreased speculative price trends in the market. In this regard the regulatory steps were successful. But toward the goal of implementing regulations that help create conditions for allocatively and informationally efficient markets, the regulations were counterproductive.

Currently, the market is becoming more active. Trading volume in 1989 is more than ten times 1986 volume.[3] Prices have also increased in value by more than 265% according to the value weighted market index in Chapter IV. The number of unofficial market makers has gradually

increased, although this rise may be due to improving economic and political conditions. These unofficial market makers hold inventories of stocks and advertise, mostly informally, to buy and sell shares. There are currently about fifty unofficial market makers contributing to the increased liquidity in the market.

If most of the active market participants are non-professionals and/or inexperienced traders, conditions may be ripe for a speculative bubble. Although there are operational inefficiencies and margin regulations that would soften the impact of such a bubble on Saudi citizens, the system is relatively more operationally efficient today than when it was first introduced resulting in a wider population segment that would be affected by a market collapse.

In order to resolve the operational inefficiencies in the Saudi Arabian trading system we propose the following:

Fully Automated Computerized Trading System (FACTS). An attractive alternative for reducing operational costs is a fully automated computerized trading system (FACTS). Recently, several automated trading systems have been installed around the world. The next few years will see continued development and refinement of these systems. The current state of hardware and software technology and the increasingly competitive prices in the information industry make computerized trading systems an effective and cost-efficient alternative to established trading systems. These trading systems integrate order entry, price setting, and trade execution. A mainframe matches orders

based on some protocol such as a first-in/first-out (FIFO) basis. Human intervention is minimized and is limited to typing trade orders. Once buy and sell orders are matched, a record of the trade is provided to the participants and the transaction is automatically transferred to the clearing system.

The operational efficiency benefits of a fully computerized trading system for developing stock exchanges in countries such as Saudi Arabia are substantial. Besides reducing direct transaction costs (commissions and bid/ask spreads), a fully automated system has several desirable side-effects. First, the integration of all orders with price priority preserved insures fair trading to all market participants at the best possible prices. Second, an increased number of market participants increases market liquidity. Third, consolidation of all market orders would solve the problem of fragmentation in the market. Commission and bid/ask spreads can be set either by policymakers or by the market based on the increased level of competition and liquidity. Finally, inefficiencies due to the qualitative components discussed above will be reduced.

Immediate creation of a fully automated system might not be desirable given current market conditions. Unless the above steps are taken to enhance the informational efficiency along with the other regulatory measures to provide stability, an operationally efficient trading system might prove harmful. It is our understanding that the Saudi authorities are proposing to implement a FACTS in the near future.

Some criticisms of fully automated trading systems are listed below along with their relevance to the Saudi market.

1) The type of trading for which automation is appropriate. Automated trading systems are appropriate for standardized contracts such as stocks. Only stocks are currently being traded through the SSRC in Saudi Arabia. However, there is no reason automated systems cannot handle other standardized instruments in the future (e.g. bonds and commodities). For instance, spot and future markets for different grades of oil could be traded through the FACTS. Commission fees would depend on the contract being traded.
2) The capacity of telecommunication systems to handle transmissions with a satisfactory error-free level. This is almost surely not a problem as telecommunication systems in Saudi Arabia are among the most advanced in the world.
3) The possible evaporation of liquidity and the potential redundancy of brokers. These criticisms usually come from specialists with a stake in the auction-based systems on the major U.S. exchanges. Markets which have been created since the advent of computers are not always auction-based (i.e., "fixing") markets. Examples of continuous markets include Toronto's and Tokyo's Computer Assisted systems (CATS), the United Kingdom's ARIEL, Bermuda's INTEX, Switzerland's SOFFEX, and the Cincinnati Stock Exchange's NSTS in the U.S.. These concerns are not a major problem for the smaller thinly traded exchanges and any disadvantages of full automation are more than outweighed by its advantages.
4) The feasibility of negotiating large transactions without human

intervention. Large transactions could be broken into smaller orders if it is acceptable to the seller. Alternatively, the system could specify the minimum size of large transactions which could be negotiated off the exchange with market makers or active traders. However, all trades should ultimately be reported through the system. Similarly, special transfers under inheritance should be handled off the exchange and reported through the system.

Central depository system (clearing system). To compliment the operational efficiency of electronic trading, a central depository system should be established to replace the present system of physical scrip deliveries. This would greatly reduce the high transaction costs (documentations and delivery costs) associated with a scrip system. We further recommend that the clearing system ultimately be under supervision of the regulatory organization and not that of the banks. A computerized clearing system would give the regulatory organization immediate information on major shareholders' activities. Such information is valuable in detecting and prosecuting insider information violations and cases of market fraud. Major U.S. exchanges continuously monitor trading to detect trading abuses and fraud.

Next, we develop a set of regulatory policies that with gradual implementation should safely promote informational market efficiency and economic growth.

Regulatory system. Eventually, a completely independent legislative organization should be established by royal decree. A committee that supervises this organization should be composed of key members from the ministerial committee, the SCAD, and the supervisory committee. In addition, it should include members selected from academic and practitioner professionals in the areas of investment and finance. The regulatory organization should be given sufficient power to design and implement regulations governing primary and secondary market securities trading including stocks, bonds, and any other financial securities which may arise. The purpose here is to integrate all regulations concerning securities issue and trading into a single regulatory and supervisory body. This should lead to more effective regulations and supervision and should enhance the power and consistency of regulation. The organization should be complimented with an executory system to enforce market regulations. The system should develop a data bank, a financial analysis division, an information dissemination division, and a legal enforcement division. Possible revenue sources are suggested below under the proposed commission and fee structures.

Information disclosures. A full disclosure system should be developed by which corporations are required to report the following:

. Quarterly financial statements according to some standard format developed for each industry or for the economy as a whole. A corporate audit of the quarterly statements is sufficient (i.e., they needn't necessarily be audited by CPA's) and corporations should be required to report within two months at most. Regulators should call on

the CPA's in the country to hold several meetings in order to design standard accounting reporting procedures. A society for professional accountants should be encouraged to develop. Corporations should be given a grace period to conform to this reporting requirement after which they should be subject to legal penalties. If possible, accounting statements should be coordinated with reporting requirements in other Gulf states in anticipation of market integration.

. All major corporate events should be immediately reported to the regulatory organization and the media. These include all material events including changes in key management personnel, agreements reached on large contracts for or by the corporation, major events, and lawsuits. The regulatory system should have the right to report such information to the public by any means it deems necessary and to decide if any violations were meant to monopolize or abuse information.

. Shareholdings of all corporate staff and the board of directors should be periodically reported as well as any new shares traded by corporate insiders.

. Any details or information requested by the proposed regulatory organization or the current SCAD should be promptly provided. Corporations should appoint a key person (e.g. the public relations officer) responsible for answering such requests.

. The regulatory system should design penalties for violations of the information disclosure regulations. Penalties should be strictly

enforced as a deterrent against abuses of information. Inaccurate or misleading information which might defraud the public or cause unjustified price reactions should be investigated with penalties for the persons responsible.

Regulations should incorporate effective enforcement measures without resorting to lengthy legal procedures. Some primitive measures include delisting until regulations are complied with, releasing reports to the media on repetitive violators to increase public awareness, and a penalty structure according to the level and frequency of information disclosure violations. Shareholders' assistance could also be enlisted in encouraging corporate managements to conform to securities regulations.

Because of the scarcity of professional financial analysts and the absence of periodic financial publications, the SCAD or ultimately the regulatory organization should assume that role.

. Information reported to the public should be expanded to include the last trade of the day and/or the closing bid/ask prices quoted on each stock if not traded. Other useful information might include the current dividend yield and P/E ratio.

. In light of the measurement problem of thin trading, a market index should be designed according to our recommendations in Chapter IV. The average of the closing bid and ask prices should be used in the index return calculation. The index should preferably be value weighted.

However, both equally weighted and value weighted indices may prove valuable to investors.

. Financial analysis of corporate financial reports should be performed by SCAD or the regulatory organization. Summaries of financial positions and financial ratios should be reported to banks and active traders as booklets on a quarterly basis. If the current staffing conditions in the SCAD do not allow such professional analysis, this job could be temporarily sub-contracted to outside professionals. Staff should be recruited and trained for financial analysis.

. Financial publications should be encouraged as well as current newspapers' coverage of financial news. Summary reports of major financial news should be periodically supplied to the media. Public interest in financial information should increase as trading becomes more active.

. A daily bulletin board of all major news (economic, financial, and corporate) should eventually be produced. This could be linked through the electronic trading system proposed in this section. The electronic system should ultimately allow access to the data bank.

In addition to the above we suggest some other regulatory recommendations, as follows.

Commission structure and fees. The current 1% commission ceiling can continue to allow banks to adjust to the proposed system. Under

conditions of market efficiency, competition between the banks and market makers will naturally force them to lower commission rates as volume increases. It is up to the government to decide the manner in which to subsidize the costs of the regulatory organization. For example, a percentage of the commissions accruing to banks and brokers could be retained by the regulatory organization. A minimum fee could be considered for small transactions in addition to the 1% ceiling. Listed corporations could be assessed an annual listing fee to partially cover the expenses of the regulatory organization.

Market stabilization. The most common stabilization method is to set maximum price change limits. Such limits are highly judgmental. Limits from different exchanges around the world range from 5-20%. If prices move beyond these limits, trading is halted for a period of time (e.g for a few minutes or until the next trading day) or until the causes of the price movement are investigated. If the market continues to move in one direction after these measures, trading can be halted. In a fully automated trading system the same procedure is applied with circuit breakers set to automatically halt trading when certain price and/or volume limits are reached.

Another stabilizing policy that the Saudi government could adopt is to have the regulatory organization itself act as a market stabilizer. This is used in Pakistan's stock market. However, it is important to note that such a role is to promote market stability and not to peg prices. This can also be a costly way to promote stability as it

involves buying when the rest of the market is selling and selling when the market is buying.

Splitting stocks 1 to 10. Splitting all stocks 1 to 10 as Kuwait did in 1987 would facilitate trading for smaller investors and reduce the number of odd-lots transacted. The average share price on the Saudi exchange is relatively high compared to Kuwait and to other markets. In 1988 the average share price on the Saudi exchange was U.S $ 103 versus U.S $9.7 in Kuwait.

Cash settlement. The current policy of cash settlement is justified in our view. Margin trading and forward contracts have been widely blamed for speculative bubbles in stock markets around the world. Although margin trading would increase the number of market participants, this benefit outweighs the potential negative consequences. Settlement with post-dated checks, as was common on the Al-manakh in 1982, encourages speculation and courts disaster.

A fund for investor protection. Banks should be encouraged to establish a fund that would be used to protect investors in case of errors or frauds (e.g. forged stock certificates). The banks could equally participate in this fund or contributions from commissions could be allowed to accumulate gradually.

Professional market makers. The role of market makers in providing liquidity and enhancing market stability is well established. Market makers hold inventories of stocks and provide liquidity to the market.

Their profit margins (i.e., bid/ask spreads) compensate them for their costs of inventory and the business risks involved. The current system has some fifty active investors. We call them market makers because they hold inventories of stocks and provide liquidity to the market.

The dangers of increased participation by non-professional investors were discussed earlier in this section. A FACTS system will result in a more operationally efficient exchange which will squeeze the bid/ask spreads of market makers. Eventually their role will diminish as more participants use the new system. The increased number of market participants (perhaps including mutual funds) would eliminate the need for professional licensed market makers. If the current over-the-counter system continues, then licensing these market makers may be one alternative. The other alternative is to provide the market (at least until a FACTS system is established) with a professional organization that provides market making functions. Licensing would ensure that active market makers have at least a minimal level of professional knowledge and conduct themselves according to professional standards. By licensing market makers, more information would be available to regulators on their activities. There is no reason to restrict the number of licensed professional market makers (traders). More market makers will increase the level of competition in bid/ask and price efficiency in the existing system of trading. They should still be required to deal through the bank trading system by establishing links with the SSRC and the current bank trading system by regularly providing with bid/ask quotes. Only licensed traders should be allowed to provide banks with bid/ask quotes. Regulation of active traders develops an

extra channel of communication and allows the trading system to develop under close supervision and control. However, we would like to make it clear that establishing a FACTS system supported by our other recommendations is the best alternative.

Encouragement of corporations to trade their own stocks. A feasible way to increase liquidity to the market is to allow corporations to buy and sell their own shares. However, this should be done through the exchange system and under supervision by the regulatory organization to avoid insider trading abuses. Regulations should specify the maximum limit a corporation can repurchase. Also, transactions should be approved by the regulatory body in advance. When firms believe stocks are undervalued they would repurchase shares and therefore contribute to the price adjustment process.

The above discussion should be complimented by our recommendations on the macro-efficiency effects of financial institutions regarding investment bankers and mutual funds.

b. Kuwait

Our results indicate that the Kuwaiti exchange is relatively operationally efficient. Only the most active stocks may be considered weak-form informationally efficient. This section lists recommendations for reducing the level of operational and informational inefficiencies

and for minimizing the potential for abuses of information by corporate insiders and others with access to inside information.

Information disclosure. Quarterly financial statements should eventually be the norm for corporations. Insider trading rules and penalties need to be developed. The information disclosure requirements should be amended in such a manner to be consistent with what we have proposed for Saudi Arabia. The idea is to unify the rules and regulations of financial disclosures, accounting procedures, and exchange listing in anticipation of future plans for capital market integration between the GCC's. The trading summary should include the latest bid/ask information on all stocks. The market index should be adjusted to reflect the average of the closing bid and ask prices (if available) rather than the previous day's close when stocks do not trade.

Operational efficiency. The Kuwaiti trading system produces relatively more competitive prices and bid/ask spreads than the SSE because of order consolidations and the presence of many market makers brought together in a single organized market. However, our conclusion is that it comes at a high level of government subsidy for the market's operating and overhead expenses. It is still operationally feasible for Kuwait to consider a fully automated trading system. The current stock exchange is a sunk cost. As information technology advances and becomes cheaper a FACTS may become feasible. Eventually FACTS systems will be the norm in other Gulf countries and in most world markets. A link between all markets is a foreseeable step in the financial integration

process. Currently, all brokers and market makers have branch offices inside the stock exchange facility and close to the trading floor. If a computerized trading system is introduced, the expenses incurred by having another level of floor trading (as has been proposed) may be avoided.

Market stabilization. The government still holds about 30% of all shares in the market as a result of the direct intervention to support the market after the Al-manakh collapse. Government holdings have declined since 1985 while the government has played a stabilizing role in the market. The value weighted market index constructed in this study increased a modest 5% over the whole period in the study (about 1.5% per year on average). Small stocks increased in value the most and the equally weighted index increased 43%. The government could dispose of some or all of its holdings. This may have a short term negative effect on prices.4 However, the Al-manakh crisis and the history of speculative bubbles in Kuwait are major considerations in investors and hence regulators' psychology.

Margin requirements. Extensive regulations for margin trading have already been implemented. Whether and in what form margin trading should be allowed requires careful and cautious analysis. Settlement with forward contracts should continue to be prohibited.

Other. Similar to Saudi Arabia, Kuwait would benefit from an insurance fund to protect investors from errors and fraud. Replacing the physical

scrip delivery system with a central depository system is also desirable.

1. In the U.S. markets this is referred to as the "winners curse". The only time you receive your full subscription request is when the rest of the market feels your stock is overvalued.

2. Mudaraba and murabaha are profit sharing interest-free instruments based on Islamic principles. Murabaha is a cost-plus contract in which a client wishing to purchase equipment and goods requests that the Islamic bank purchase the items and sell them to him at cost plus a declared profit. Mudaraba is best described as funds provided by the Islamic bank or investment company to specialize in a profit sharing investment. These include murabaha, commodity and equity trading, partnerships, and leasing. Murabaha could be established in some form of standardized contracts, while mudaraba could be established in tradable investment units.

3. For market activity figures refer to Table 4.14.

4. The large positive serial correlations in a few stocks maybe due to selling pressure by the government.

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