ERF WORKING PAPER SERIES

THE COST OF TRANSACTING IN THE JORDANIAN CAPITAL MARKET

Ghassan Omet

Working Paper 0101

The ERF Working Paper Series disseminates the findings of research working progress to promote the exchange of ideas and encourage discussion and comment among researchers for timely revision by the authors.

The Working Papers are intended to make preliminary research results available with the least possible delay. They have therefore not been made subject to formal review and ERF accepts no responsibility for errors.

As of August 1998, financial support towards the ERF Working Papers Series from the Commission of the European Communities (through the FEMISE Program) is gratefully acknowledged. The views expressed in the Working Papers are those of the authors and do not necessarily reflect the views of the European Commission.

ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية
FOR THE ARAB COUNTRIES, IRAN & TURKEY

7 Boulos Hanna St. Dokki, Cairo, Egypt
Tel: (202) 3370810 – (202) 7485553 – (202) 7602882
Fax: (202) 7616042. Email: erf@idsc.net.eg. Website: http://www.erf.org.eg

THE COST OF TRANSACTING IN THE JORDANIAN CAPITAL MARKET

Ghassan Omet

Working paper 0101

Abstract

This paper provides a measure of transaction costs in the Amman Stock Exchange (ASE) and examines its determinants. After discussing the economic importance of financial systems in general and stock markets in particular, this paper argues that transaction costs are an essential prerequisite for stock markets in fulfilling their economic roles. Based on the statistical analysis, it is concluded that transaction costs in ASE are relatively high and that trading volume and price volatility are major determinant factors of this cost.

1. Introduction

The last few years have seen a tremendous interest in the link between financial development and economic growth. Following the early research by Goldsmith (1969), McKinnon (1973), and Shaw (1973), a comprehensive research paper was published by King and Levine (1993). Based on four measures of financial development related to the development of the banking sector, they conclude that "government policies toward financial systems may have an important causal effect on long-run growth", (King and Levine, 1993, p. 540).

More recently, a number of empirical papers considered the impact of stock market development and bank development on economic growth. These include, among others, Atje and Jovanovic (1989), Jappelli and Pagano (1994), Bekaert and Harvey (1997), and Levine and Zervos (1998). This empirical literature supports the hypothesis that there is a relationship between financial development and economic growth. As far as stock markets are concerned, "it is even more surprising that more countries are not developing their stock markets as quickly as they can as a means of speeding up their economic development", (Atje and Jovanovic, 1989, p.363).

In the context of stock markets, prominent financial economists have developed a number of concepts which are known to be essential prerequisites for fulfilling their economic roles. These concepts include pricing efficiency, operational efficiency and allocational efficiency.

A stock market is said to be efficient (pricing) if current securities prices reflect all available information (Fama, 1970). A market that is operationally efficient allows investors to get their orders executed as quickly and as cheaply as possible. By immediacy it is meant that buyers and sellers expect to trade immediately rather than wait for the arrival of sufficient orders on the other side of the trade. In this case, the price is expected to be closer to the price of the last known transaction. An allocationally efficient market optimizes the allocation of economic resources by channeling funds to their most productive units.

Based on the above definitions, we can see that the three concepts of efficiency are interrelated. For example, a stock price in an efficient (price) market provides investors with a good measure of any firm's performance and its value. In other words, an efficient market can discipline managers and consequently improve the allocational efficiency of capital. Moreover, an allocationally efficient market must be operationally efficient as well. Indeed if transaction costs are high, this tends to inhibit capital movements and hence discourage the efficient allocation of resources even if the market is pricing its securities in an efficient manner.

Given the importance of stock markets in general and operational efficiency in particular, the "microstructure" of securities markets has been attracting a great deal of attention. This work is basically concerned with "moment – to – moment aggregate exchange behavior as an important aspect of such markets", (Garman, 1976, p.257). Specifically, this work examines various stock markets' trading mechanisms, actions of market participants and the behavior of price changes. A number of papers review a number of important elements of the market microstructure literature. These include, Cohen et al. (1986), Kiem and Madhavan (1998), Choughenour and Shastri (1999) and Madhavan (2000).

As far as Middle Eastern stock markets are concerned, it is well known that they are much less integrated with international capital markets than Asian and Latin American markets. This observation might be due to good reasons like foreign ownership restrictions, availability of information, accounting standards, investor protection, economic risk, political risk, and others. In addition to these factors, it can be argued that high trading costs can be important in the international competition for capital flows. Indeed trading costs might shed some light on the relative merits of different market-making designs. Moreover, cost considerations in emerging markets are relevant from the perspective of public policy. For example, in emerging markets, like the ASE and other Arab stock markets, "large orders often result in substantial price movements raising concerns that foreign capital flows ("hot money") might destabilize domestic markets. Large costs in emerging markets may also induce corporations to cross-list their stock in more liquid, developed markets, thereby hindering domestic market development" (Domowitz et al., 2000, p. 1).

On 15 June 2000, the ASE started the implementation of the new Electronic Trading System (ETS). This event can be considered a qualitative leap for the Jordanian capital market because it meant the end of the manual trading system. This movement should provide more transparency and safety for

traders and investors by entering all the selling and buying orders into the computers, matching supply and demand for securities, and electronically setting and applying prices.

Relative to the above, the primary objective of this paper is to examine the Jordanian capital market (ASE) in terms of its operational efficiency. Specifically, the focus of this paper is on answering the following questions.

1. What is the cost of immediacy (transacting cost) in the Jordanian stock exchange?
2. Are the factors that affect the cost of immediacy in developed stock markets and in the Jordanian market similar?
3. Has the introduction of the electronic trading system led to a reduction in the cost of immediacy?

The rest of the paper is organized as follows. Section II provides some descriptive statistics about the Jordanian stock market. In addition, this section contains a brief outline of the market's trading mechanism. Section III provides a brief review of the literature on liquidity cost and its determinants. Section IV discusses the data and methodology. Section V reports and discusses the empirical results. Finally, section VI summarizes and concludes the paper.

2. The Jordanian Stock Exchange: Some Descriptive Statistics and Information

The Amman Stock Exchange (ASE) was formed on 1 January 1978. Since its formation, the market has experienced some growth in a number of aspects. Table (1) reports the number of listed companies and the ratios of market capitalization and size of new issues to GDP.

When judged by the ratio of market capitalization to GDP, the increase from 37 percent in 1978 to about 79 percent in 1998 indicates the importance of the market in the national economy. Moreover, the relative size of new issues (stocks and bonds) to GDP is also an indication of the importance of the primary market.

The performance of the ASE is less impressive if we consider the market value of traded shares. As Table (2) indicates, the market experienced sharp fluctuations (falls) in 1994-1996. Moreover, it must also be pointed out that only 10 companies in each year account for a large proportion of the total trading volume. In other words, most listed shares are thinly traded on the secondary market.

The fact that in 1999 only 10 companies accounted for about 61 percent of the total market trading volume and the market value of these companies' shares account for about 72 percent of the capitalization of all listed companies, we can state that the Jordanian stock exchange is highly concentrated in both market value of companies and trading volume.

Regardless of the differences in their mechanisms, all securities markets have one thing in common and that is to bring buyers and sellers together. In ASE any investor who wants to buy or sell a security must do so through the agency of a stockbroker. The trading mechanism is continuous and strict price and time priority rules are followed. For example, for any two or more buy (sell) orders on the trading board, the order with the higher (lower) price has priority in execution. Similarly, if two orders of the same type have similar prices, the one noted on the board first has the priority in execution. As stated above, the ASE launched the electronic trading system on 15 June 2000. However, it must be noted that the market-making mechanism has not changed. In other words, the "old" manual system has simply been replaced by an electronic one.

As it stands, the trading mechanism in ASE suffers from one major weakness; lack of immediacy. If, for example, there is an imbalance between buy and sell orders during a trading day, successive buy (sell) orders may well get noted on the trading board without counter sell (buy) orders arriving at the market. Furthermore, any imbalances between buy and sell orders would cause the price of a stock to change suddenly (and by a large percentage) from one transaction to the next. This is due to the absence of someone (dealer) who stands ready and willing to buy a stock at the bid and sell a stock at the ask. Indeed Cohen et al. (1983) analyzed the impact of the specialist on the standard deviation of daily price changes. In their simulation study, they showed that the presence of specialists reduces the standard deviation of daily transaction prices from an average of 1.44 percent to about 0.89 percent. In other words, the behavior of price changes on ASE would be more continuous if there were specialists operating in the market. Moreover, investors would be assured of getting their orders executed immediately when they submit market orders. This is perhaps why

the trading volume in the shares of only 10 companies account for more than 50 percent of the trading volume in the shares of all listed companies.

3. Trading Costs

When dealing in financial securities, investors incur two main types of transaction costs: commission fees and marketability (liquidity) cost. In stock markets, commission fees which are paid to brokers, can be either fixed or negotiable. In either case, this cost is unavoidable because all investors can trade only through the agency of a stockbroker.

The more important aspect of the trading costs is the marketability cost. Demsetz (1968) argued that the market-maker provides the service of "predictive immediacy". This is why the spread between the market – maker's bid and ask prices– is used as an operational measure of marketability. Similarly, and in markets like ASE, where specialists do not exist, it can be argued that the difference between the highest bid price and the lowest ask price which are noted on the trading board at any point in time can constitute a measure of marketability. However, the fact that these prices (highest bid and lowest ask) are not published in ASE, it is not possible to note these prices. Nevertheless, the difference between the highest bid price and lowest ask price at the close of each trading day can be a good measure of marketability cost in ASE. Moreover, the fact that investors cannot (by law) get their orders executed at prices between the highest bid and lowest ask prices is another reason why the suggested measure is a good one.

Following Demsetz's (1968) paper, empirical research papers about the determinants of marketability cost have been scanty. Papers by Tinic (1972), Tinic and West (1972), Bekaert et al. (1997), Barclay (1997), Chakravarty and Sarkar (1999) and others have shown that price, risk, and trading volume explain most of the variability in the cost of immediacy. These empirical papers used a variety of cross sectional regression equations. The below equation (1) is typical of these studies:

$$S / P_i = \beta_1 \ln(V_i) + \beta_2 \delta_i + \beta_3 \ln(M_i) + \varepsilon_i \qquad (1)$$

where

S / P_i= average bid-ask spread as a percentage of the average price of stock i.

$\ln(V_i)$= log of trading volume

δ_i = price volatility = $(P_{high} – P_{low}) / P$

$\ln(M_i)$ =log market capitalization (firm size).

The above static analysis has been further supplemented by a number of theoretical studies that explain the variation in bid-ask spreads as part of the intra-day price dynamics. The main papers include Garman (1976), Stoll (1978), Amihud and Mendelson (1980), Zabel (1981), O'Hara and Oldfield (1986), Madhavan and Smidt (1993) and others.

4. The Data and Methodology

The basic data set used in the analysis is obtained from the ASE daily report. This report publishes a variety of information about traded shares including closing prices, trading volumes, highest and lowest transaction prices, the average price of shares during trading days, the highest buy and lowest sell prices (unexecuted) at the close of each trading day among others.

To estimate marketability cost, daily closing highest bid prices and lowest ask prices are collected for a total of 13 listed companies during the time period 18 June 2000 until 28 September 2000. In other words, the time period covers a period of 15 weeks that immediately follows the implementation of the electronic system. Due to the fact that the trading activity in the market is thin, most of the listed companies' shares do not register daily transactions. Moreover, most of the listed shares do not even have highest bid and lowest ask prices just before the end of the trading day. This is why, our sample includes a total of 13 companies only. However, the fact that daily bid-ask spreads are collected for each of the 13 companies and averaged over each week meant that the data is comprised of a total of 195 observations (13 companies multiplied by 15 weeks). In addition, it must be noted that before the transfer to the electronic system, the highest bid and lowest ask prices were not published.

Based on the discussion of the previous section, the following model is estimated:

$$BA_{i,t} = \beta_0 + \beta_1 \ln(V_{i,t}) + \beta_2 \delta_{i,t} + \varepsilon_{i,t} \quad (2)$$

where

$BA_{i,t}$=the proportional bid-ask spread for share i, in week t. This is measured by the following expression: (highest ask – lowest bid) / (highest ask + lowest bid)*0.5.

$\ln(V_{i,t})$= natural logarithm of weekly (average) trading volume in the stock of company i.

$\delta_{i,t}$= average price volatility of share i = (highest transaction price – lowest transaction price) / average daily price.

In his seminal paper on the determinants of marketability cost, Demsetz (1968) argued that the "greater the frequency of transacting, the lower will be the cost of waiting in a trading queue of specified length and therefore the lower will be the spreads that traders are willing to submit to pre-empt positions in the trading queue." The relationship between marketability cost and price volatility is expected to be positive.

5. The Empirical Results

The summary statistics and the pair-wise correlation coefficients of the variables which are included in the regression model are reported in Tables 3 and 4 respectively.

The magnitudes of the correlation coefficients indicate that multicollinearity is not really a problem in the regression model. As far as the summary statistics are concerned, we can make the following observations. First, the mean bid-ask spread as a proportion of the mean daily price of the stock is equal to 1.046 percent. This value has a maximum value of 5 percent and a minimum value of 0.1 percent. In other words, there are some listed shares whose marketability costs are relatively high. Second, there are some shares whose mean daily volatility are relatively high. The mean volatility measure is 3 percent and it fluctuates between a maximum value of 3 percent and a minimum value of 0 percent. When we divide the whole time period into two sub-periods (first 7 weeks and last 8 weeks respectively), the results do not change in any significant manner (Table 3). Indeed neither the t-test nor the Mann Whitney test show that the mean spread values are not equal. This result may imply that the transfer to the electronic system has not really led to a reduction in the transacting cost. This observation is based on the argument that after an initial "trial" period of the electronic system (first few weeks), investors should realize its benefits in terms of, among other things, a reduction in the cost of immediacy.

The estimated coefficients of equation (2) are presented in Table 5. The regression coefficients for both variables have the expected signs and are statistically significant. Moreover, while the value of the adjusted R^2 is reasonable, the F-ratio indicates that the variables as a whole, significantly determine the size of the bid-ask spread. Finally, this Table (5) also reports the results of the regression estimates for the two sub-periods. Again, the results do not reflect any significant differences. In other words, both share price volatility and trading volume are significant determinant factors of transacting costs in the Jordanian capital market.

Based on the above results, we can draw a number of implications. First, it is in the interest of listed companies to have relatively high trading volumes in their shares on the secondary market. This tends to reduce their transacting cost. As a result, these companies (with relatively high trading volume) might find it easier to raise equity funds on the primary market because investors would be more willing to subscribe to the shares whose trading costs are relatively low. Second, based on the discussion in section I, we have stated that high transaction costs tend to inhibit capital movements and hence discourage the efficient allocation of resources (funds).

6. Summary and Conclusions

In the context of stock markets, prominent financial economists have developed a number of testable concepts which are known to be essential prerequisites for fulfilling their economic roles. These include the concept of operational efficiency.

A stock market that is operationally efficient allows investors to get their orders executed as quickly and as cheaply as possible. To allocate scarce economic resources (funds) in an efficient manner, stock markets must be operationally efficient because high transaction (trading) costs tend to inhibit capital movements and hence discourage the efficient allocation of resources even if the market is pricing its listed securities efficiently.

Given the importance of operational efficiency in general and transaction costs in particular, this paper has examined the following questions:

1. What is the cost immediacy in the Jordanian stock Exchange?

2. Are the factors that affect the cost of immediacy in developed stock markets and in the Jordanian market similar?

3. Has the introduction of the electronic trading system led to a reduction in the cost of immediacy?

Based on the empirical findings, it is found that trading cost in ASE is high for some of the listed stocks and that trading volume and price volatility are significant determinant factors of this cost. Moreover, it is interesting to note that the mean transacting costs on the NYSE and the Paris Bourse are 0.26 percent and 0.31 percent respectively (Venkataraman, 2000, p.15). In other words, the results of this research indicate that the mean transacting cost in the Jordanian capital market is relatively high (1.05 percent). Finally, the results are partly similar to those which have analyzed the determinants of trading costs in more advanced stock markets.

It is hoped that the results of this research paper will encourage further research regarding the trading costs in various Arab stock markets as well as their respective determinants. Indeed, it can be argued that if Arab stock markets are to compete for international capital, their respective transacting costs must be measured, understood, and reduced to their minimal levels.

References:

Amihud, Y. and H. Mendelson. 1980. "Dealership Market: Market Making With Inventory." *Journal of Financial Economics*, 8: 31-53.

Atje, R. and B. Jovanovic. 1989. "Stock Markets and Development." *European Economic Review*, 37: 632-640.

Barclay, M. 1997. "Bid–Ask Spreads and the Avoidance of Odd-Eighth Quotes on Nasdaq: An Examination of Exchange Listings." *Journal of Financial Research*, 45: 35-60.

Bekaert, G., C. Erb, C. Harvey and T. Viskanta. 1997. "The Behaviour of Emerging Market Returns" in R. Levich (ed.), *The Future of Emerging Capital Flows*. Boston: Klumar Academic Publications.

Bekaert, G. and C. Harvey. 1997. "Capital Markets: An Engine for Economic Growth." *Brown Journal of World Affairs*, 5: 33-53.

Chakravarty, S. and A. Sarkar. 1999. "Liquidity in US Fixed Income Markets: A Comparison of the Bid-Ask Spread in Corporate, Government and Municipal Bond Markets." Federal Reserve Bank of New York Working Paper, pp.1-24.

Conghenour, J. and K. Shastri. 1999. "Symposium on Market Microstructure: A Review of the Empirical Literature." *Financial Review*.

Cohen, K., S. Mair, R. Schwartz and D. Whitcomb. 1986. *The Microstructure of Securities Markets*. Englewood Cliffs, N.J.: Prentice-Hall.

Demsetz, H. 1968. "The Cost of Transacting." *Quarterly Journal of Economics*, 82: 33-53.

Domowitz, I., J. Glen and A. Madhavan. 2000. "Liquidity, Volatility, and Equity Trading Costs Across Countries and Over Time." Working Paper Number 322, Pennsylvania State University, Smeal College of Business Administration.

Fama, E. 1970. "Efficient Capital Market: A Review of Theory and Empirical Work." *Journal of Finance*, 25: 383-417.

Garman, M. "Market Microstructure." *Journal of Financial Economics,* 3: 257-275.

Goldsmith, R. 1969. *Financial Structures and Development*. Yale University Press.

Jappelli, T. and M. Pagano. 1994. “Savings, Growth and Liquidity Constraints.” *Quarterly Journal of Economics*, 109: 83-109.

Kiem, D. and A. Madhavan. 1998. “The Costs of Institutional Equity Trades: An Overview.” *Financial Analysts Journal*, 54: 50-69.

King, R. and R. Levine. 1993. “Finance and Growth: Schumpeter Might Be Right.” *Quarterly Journal of Economics*, 108: 717-737.

Levine, R. and S. Zervos. 1998. “Stock Markets, Banks and Economic Growth.” *American Economic Review*, 88: 537-568.

Madhavan, A. 2000. “Market Microstructure: A Survey” Marshall School of Business, University of Southern California, Working Paper, pp.1-63.

Madhavan, A. and S. Smidt. 1993. “An Analysis of Changes in Specialist Quotes and Inventories.” *Journal of Finance*, 48: 1595-1628.

McKinnon, R. 1973. *Money and Capital in Economic Development*. Washington, D.C.: Brookings Institution.

O’Hara, M. and G. Goldsmith. 1986. “The Microeconomics of Market Making.” *Journal of Financial and Quantitative Analysis*, 21: 361-376.

Shaw, E. 1973. *Financial Deepening in Economic Development*. New York: Oxford University Press.

Stoll, H. 1978. “The Supply of Dealer Services in Securities Markets.” *Journal of Finance*, 33: 1133-1151.

Tinic, S. 1972. “The Economics of Liquidity Services.” *The Quarterly Journal of Economics*, 86: 79-93.

Tinic, S. and R. West. 1972. “Competition and the Pricing of Dealer Service in the Over-the-Counter Stock Market.” *Journal of Financial and Quantitative Analysis,* 3.

Venkararaman, T. 2000. "Automated Versus Floor Trading: An Analysis of Execution Costs on the Paris and New York Exchanges." Working Paper, Edwin Cox School of Business, Southern Methodist University.

Zabel, E. 1981. “Competitive Price Adjustment Without Market Clearing.” *Econometrica*, 49: 1201-1221.

Table 1: Listed Companies and Market Size

Year	No. of Listed Companies	Market Capitalization as a Proportion of GDP	New Issues as a Proportion of GDP
1978	66	0.37	0.03
1980	71	0.42	0.05
1984	103	0.46	0.02
1988	105	0.49	0.01
1992	103	0.65	0.02
1996	97	0.73	0.04
1998	99	0.79	0.02
1999	99	n.a.	n.a.

Source: Various ASE Annual Reports and Central Bank of Jordan Reports

Table 2: Trading Activity on the Secondary Market

Year	Trading Volume as a Proportion of Market Capitalization	Ten Most Active Shares' Trading as a Proportion of Market Trading Volume
1978	0.02	0.75
1980	0.08	0.66
1984	0.06	0.56
1988	0.12	0.50
1992	0.39	0.48
1996	0.07	0.53
1998	0.11	0.68
1999	0.09	0.61

Source: Calculated from Various ASE Annual Reports

Table 3: Summary Statistics of Variables

Variable / Period	Mean	Standard Deviation	Minimum	Maximum	No. of Observations
15 Weeks					
Spread	0.0105	0.0059	0.0000	0.0500	195
Volume	4.0184	0.6274	2.3800	5.9500	195
Volatility	0.0093	0.0066	0.0000	0.0300	195
1st.7 weeks					
Spread	0.0102	0.0055	0.0000	0.0300	91
Volume	3.9578	0.6257	2.3800	5.5200	91
Volatility	0.0097	0.0068	0.0000	0.0300	91
2nd.8 weeks					
Spread	0.0107	0.0063	0.0000	0.0500	104
Volume	4.0713	0.6270	2.7000	5.9500	104
Volatility	0.0089	0.0065	0.0000	0.0300	104

Notes: The summary statistics are based on the 15 weeks following the adoption of the electronic trading system. The total number of observations is 195. The variables are defined as follows: Spread is equal to the highest ask price minus the lowest bid price divided by the average price during the trading period. Volume is equal to the natural logarithm of the trading volume. Volatility is equal to the highest transaction price minus the lowest transaction price divided by the average price during the trading period.

Table 4: Correlation Matrix of Regressors

Variable	Spread	Volume	Volatility
Spread	1.000	-	-
Volume	-0.478*	1.000	-
Volatility	+0.308*	0.138	1.000

Notes: * Significant at the 0.01 level. The pair-wise correlation coefficients are based on the sample of 195 weekly mean observations. Spread is equal to the highest ask price minus the lowest bid price divided by the average price during the trading period. Volume is equal to the natural logarithm of the trading volume. Volatility is equal to the highest transaction price minus the lowest transaction price divided by the average price during the trading period.

Table 5: Determinants of Transacting Cost

Independent Variable	Coefficients: Whole Period	Coefficients: First 7 Weeks	Coefficients: Last 8 Weeks
Constant	0.0269	0.02881	0.0259
	(17.588*)	(13.058*)	(12.389*)
Volume	-0.0048	-0.0055	-0.0044
	(-12.698*)	(-9.755*)	(-8.765*)
Volatility	+0.2400	0.261	0.241
	(6.156*)	(5.018*)	(4.682*)
Adjusted R^2	0.493	0.543	0.475
F-statistic	91.601*	52.076*	45.732*

Notes: * Significant at the 0.01 level. The estimation results are based on the whole time period (195 company-week observations), the first 7 weeks of the whole period (91 company-week observations) and the last 8 weeks of the whole period (104 company-week observations). The dependent variable is the spread. The independent variables are volume and volatility.