



## STOCK LIQUIDITY DETERMINATION EVIDENCE FROM AMMAN STOCK EXCHANGE

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### ABSTRACT

*This study aims to investigate and examine the factors affecting stocks liquidity by using data of 100 share holding companies that represent Amman Stock Exchange (ASE) index in the recent period from 2011 to 2013. The result of fixed effects regression model indicates that firm's size and earnings per share (EPS) have a significant positive impact on stock liquidity proxies. While firm's profitability have a significant negative impact. On the other hand, the results indicate a non significant statistical effect of stock dividends and firm's leverage ratio. Based on the study's results we recommend that it is better for investors and stock market authority to consider these variables in stock liquidity forecasts.*

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**Keywords:** Stock liquidity, Amman stock exchange, Market microstructure theories, fixed effects regression model, Hausman test, Multicollinearity tests, Jordan.

### Contribution/ Originality

This study is one of the very few studies which have investigated the determination of stock liquidity in emerging markets. Most of the previous empirical studies focuses on the market liquidity as a whole. Therefore this study attempts to fill this gap by providing an empirical evidence and stimulating discussion about this issue. Thus we expect that this paper will contribute to the stock liquidity literature in Jordan, and we expect that its results will be helpful and useful for investors and market management.

## 1. INTRODUCTION

The stock market plays an important role in promoting and spurring the growth of an economy through a large volume of daily trading of stocks by investors in developed and developing countries. One of the most important issues that an investor takes in to consideration when he

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deciding whether to invest in a certain stock or not is stock liquidity, which refers to the ease of selling stock immediately after purchasing it, without lowering the price or incurring transaction costs, because “investors will come if they can leave” (Levine, 1996).

In this context, the big question that this paper aims to answer, is that, what are the factors that affect stock liquidity? In particular: Does a firm's size, firm's profitability, earnings per share, stock dividends, and firm's leverage ratio effect stock liquidity?

However, very little studies are conducted on this topic in developing countries and previous studies have mainly focused on market liquidity as a whole. Therefore this study -to the best of our knowledge- is the first empirical study to investigate the factors that affect a stock's liquidity on 100 share holding companies that represent (ASE) index in the recent period from 2011 to 2013.

This paper will contribute to the stock liquidity literature in Jordan, and stimulate discussion about this issue. We expect that its results will be useful for investors, researchers and market management.

The remainder of this paper is organized as follows: Section 2 briefly overview of ASE, reviews the relevant literature, previous studies and hypotheses development in Section 3; Section 4 presents the research methodology and the estimation techniques; the empirical results and discussion in Section 5; lastly, section 6 provides conclusions and recommendations.

## 2. AN OVERVIEW OF (ASE)

The ASE was established in March 1999 as a non-profit, private institution with administrative and financial autonomy. It is authorized to function as an exchange for the trading of securities. In March 2000, the ASE completed the transition to an electronic trading system (for more details; ase.jo.com).

Table (1) presents the Key Statistics of the ASE, it indicates that the ASE has developed quickly in volume and value. The trading value has quickly increased from 16.871.00 million in 2005, to 3.027.26 million in 2013.

Number of listed companies increased from 201 companies in 2005 to 277 companies in 2010 but fell down to 240 companies in 2013.

Average daily trading had decreased from 69.1 (JD million) in 2005 to 12.35614 (JD million) in 2013.

At the end of 2005, a market capitalization closes to 26.667.10 million JD, representing a market capitalization to GDP close to 326.6 per cent, and 83.00991 in 2013.

No. of traded shares had increased from 2.582.60 million in 2005 to 2.705.80 million in 2013.

During the period from 2005-2013, the market capitalization has been rising from 26,667.10 JD million in 2005 to 18233.49 JD million in 2013.

Table-1.Key Statistics of the ASE

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Value Traded (JD million)	16871.00	14209.90	12348.10	20318.00	9665.30	6690	2850.2	1978.80	3027.26
Number of Listed Companies	201	227	245	262	272	277	247	243	240
Average daily trading (JD million)	69.1	58.7	50	82.9	38.8	26.75	11.5	7.9	12.35614
Market capitalization / GDP (%)	326.6	233.9	289	216.7	149.6	122.7	102.7	93.5	83.009

Source: www.ase.com.jo

### 3. LITERATURE REVIEW, PREVIOUS STUDIES AND HYPOTHESES DEVELOPMENT

Stock liquidity has been an important issue in financial market. Amihud and Mendelson (1986) first presented a model for the relationship between liquidity and stock return, this model has become a cornerstone in the field of liquidity and stock return (Dalgaard, 2009).

Several theoretical models proved that rational investors would demand a higher rate of return for stocks that are less than perfectly liquid. It has also been established that, if liquidity is important for returns, then sensitivity towards liquidity is a risk that should be priced by investors. Thus, illiquidity and liquidity risk should attract premiums in equity markets (Dalgaard, 2009).

As noted in the theories by Dow and Gorton (1997) and Subrahmanyam and Titman (2001), a more liquid stock is attractive to informed traders because informed traders can hide their trading activity more easily in liquid markets.

#### 3.1. The Factors that Affect Stock Liquidity

By reviewing Market microstructure theories and previous literature we can assume that the following factors may affect stock liquidity:

##### 3.1.1. Firm's Size

From a theoretical standpoint there is a positive relationship between firm's size and stock liquidity, as the firm's size increase, the liquidity of its stock will increase; a large firm is followed by analysts and attracts investors. In addition, its size allows it to disclose a lot of information thereby reducing information asymmetry and improving liquidity (Omri *et al.*, 2004).

This proposition had been empirically supported in various studies such as (Stoll, 2000) who found that the securities of small companies are less liquid than the securities of large companies. In this context, we expect a positive relationship between stock liquidity and firm's size; therefore we can derive the following hypotheses:

**H1: There is a Positive Effect of Firm's Size on Stock Liquidity.**

##### 3.1.2. Firm's Profitability

Theoretical literature suggests that investors and potential investors prefer a stock of a profitable firm which has high return on asset, the literature also suggests a positive effect of stock liquidity on firm's valuation. In addition, liquid stocks may facilitate the sales of large shares by

blocking shareholders who are potentially activists. The loss of intervention by those shareholders may reduce firm value. This argument had been empirically supported in several studies such as Fang *et al.* (2009) and Huang *et al.* (NA). So we expect that liquidity is positively correlated with firm's profitability.

**H2: There is a Positive Effect of Firm's Profitability on Stock Liquidity.**

### 3.1.3. Earnings per Share

A rational investor would be expected to demand a return premium in compensation for holding assets that are less than perfectly liquid. Thus, intuitively, there should be a positive relationship between illiquidity and stock returns. Conversely, the relationship between liquidity and stock returns should be negative (Dalgaard, 2009).

Amihud and Mendelson (1986) and Dalgaard (2009) argued that stock with returns that are sensitive to changes in liquidity should yield a higher return to compensate the investors for this additional risk. The investors are expected to require a higher return for less liquid stock (Dalgaard, 2009).

Many empirical studies such as; Narayan and Xinwei (2011) who examined the impact of liquidity on returns on the Shanghai stock exchange and the Shenzhen stock exchange; Brennan and Subrahmanyam (1996) for both NYSE and NASDAQ stocks; Omri *et al.* (2004) in Salehi *et al.* (2011) in Tehran Stock Exchange found a negative relationship between liquidity and returns. So we expect that liquidity is negatively correlated with earning per share.

**H3: There is a Negative Effect of Earning per Share on Stock Liquidity.**

### 3.1.4. Stock Dividend

The basic idea behind the dividend based stock valuation is that the value of a stock is the present value of all future dividends:

$$P_{i0} = \sum (d_{it} / (1+r)^t)$$

The above formula is a realization of the fact that a project should be priced at the present value of its future cash flows. In a perfect capital market, the price of a stock with a dividend payout of 100%, will be exactly equal to the present value of the expected future dividends (Dalgaard, 2009). We expect that stock dividends may increase the demand of this stock; therefore we can assume the following hypothesis:

**H4: There is a Positive Effect of Stock Dividend on Stock Liquidity.**

### 3.1.5. Financial Leverage Ratio

Theoretical finance regards leverage as one of the sources of risk, and thus claims that the more levered a firm is the higher the risk for equity holders. As the risk-averse equity holders are exposed to more uncertain cash flows, they will demand a higher rate of return on their investment (Penman *et al.*, 2007). Cai and Zhang (2011) noted that when a firm has high leverage, a further

increase in its leverage ratio can materially increase the likelihood of default and its expected cost (Acheampong and Shibu, 2014).

If the default risk is priced, a significant increase in the leverage should lead to a higher expected future return.

The presence of debt in a firm's capital structure that reduces free cash flow to managers and imposes discipline, as well as encourages monitoring by creditors. Financial leverage should therefore reduce agency problems and have a positive impact on profitability.

So we expect a positive relationship between stock liquidity and leverage

**H5: There is a Positive Effect of Leverage Ratio on Stock Liquidity.**

## 4. RESEARCH METHODOLOGY

In this section, we describe our sample, variables and the model used in determining the association between the independent variables and stock liquidity.

### 4.1. The Sample

The sample of study consists of all the companies that are included in ASE Market Capitalization Weighted Index. ASE indices are composed of the most liquid and largest 100 companies listed at the First and Second Markets from all sectors. In other words, our final sample consists of 300 firm-year observations), the selection of these companies is based on companies' Market capitalization and number of traded days.

### 4.2. The Data

The data set consists of pooled time -series and cross- sectional observations of 100 firms spanning the 2011-2013fiscal years, which has been collected from annual financial reports of firm's and the official web site of ASE ([www.ase.com.jo](http://www.ase.com.jo)).

### 4.3. Variables Definitions

#### 4.3.1. Dependent Variable

The dependent variable used in the empirical analysis is stock liquidity. Following several studies such as; Chordia *et al.* (2001), this study employ's two proxies of this variable: Value Traded (JD) and No. of Traded Shares.

**Stock's Value Traded (SVT):** is defined as the logarithm of the total yearly value of trading in a stock.

**No. of Shares Traded (NST):** is defined as the natural log of the total number of shares traded during the year.

#### 4.3.2. Independent Variables

The independent variables that are assumed to determine the stock liquidity includes: firm's size, firm's profitability, firm leverage ratio, earning per share and stock dividend.

**Firm’s size (MC):** The size of firm is measured by the natural logarithm of firm’s Market Capitalization (JD) at the end of December of each year. This measurement was also used by Chung *et al.* (2010).

**Firm’s profitability (ROA):** is measured by the Return on assets (ROA), ROA is defined as the net profit divided by total assets (Alper and Anbar, 2011) and (Bashir, 2000).

**Earnings per share (EPS):** it is the portion of a company's profit allocated to each outstanding share of a common stock, and calculated by dividing after-tax net income by the total number of shares outstanding (www.ase.jo.com).

**Dividend per share (DPS):** is distribution of earnings to shareholders, usually paid in the form of money or stock and calculated by dividing dividends by the total number of shares outstanding (www.ase.jo.com).

**Firm’s leverage ratio (LEV):** is measured by the ratio of total debt to total assets. Table 2 below presents the summary of definition and proxies of the variables used in the regression analysis.

Table - 2. Definition and proxies of the variables:

Variable	proxy	Notation
Dependent variables		
Stock liquidity	Natural logarithm of Value Traded (JD) Natural logarithm of No. of Traded Shares	SVT NTS
Independent variables		
Firm’s size	Natural logarithm of Market Capitalization (JD)	MC
Firm’s profitability	Return on assets= Net Profit / Total Assets	ROA
Earnings Per Share	After- tax net income / total number of shares outstanding.	EPS
Stock Dividend	Dividend per share= Dividend / No. of share outstanding.	DPS
Leverage Ratio	Total debt / Total Assets	LEV

**4.4. The Econometric Models**

The empirical results based on a cross-sectional, time-series panel data; A cross-sectional multiple regression analysis will be carried out for each of stock liquidity measures; Value Traded (JD) and No. of Traded Shares in model A and model B respectively, with independent variables (i.e. firm’s size, firm’s profitability, leverage ratio, earning per share and stock dividend).

Thus, five explanatory variables are included in the regression analysis. The empirical model takes the following form:

$$\text{Panel A: } \log \text{SVT}_i = \beta_0 + \beta_1 \text{MC}_i + \beta_2 \text{ROA}_i + \beta_3 \text{EPS}_i + \beta_4 \text{DPS}_i + \beta_5 \text{LEV}_i + \epsilon_i \dots(1)$$

$$\text{Panel B: } \log \text{NST}_i = \beta_0 + \beta_1 \text{MC}_i + \beta_2 \text{ROA}_i + \beta_3 \text{EPS}_i + \beta_4 \text{DPS}_i + \beta_5 \text{LEV}_i + \epsilon_i \dots(2)$$

Where; Log SVT: is the natural logarithm volume of trade; MC is the natural logarithm of market value; ROA is the ratio of net profit to total assets, EPS is after- tax net income / total number of shares outstanding, DPS is Dividend per share which is the ratio of dividend to No. of

share outstanding and Lev: Leverage is the total liabilities divided by total assets. In the above model,  $\beta_i$ 's are the parameters and  $\varepsilon_i$  is the error term.

**4.4.1. Hausman Test**

Panel data models are usually estimated using either pooled ordinary least squares (OLS), fixed effects or random effects model. Therefore we must conduct Hausman test to determine which model is the most appropriate to our data.

Hausman test hypotheses:

Ho: Random effect model is appropriate.

Ha: Fixed effect model is appropriate.

Table 3 represents the Result of Hausman test

**Table-3.** Result of Hausman test

Chi test (2)	12.508 (0.02)
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The results of Hausman test shows that ( $\chi^2$ : 12.508 p-value: 0.02 < 0.05 which indicates that we do not accept Ho, and accept Ha, which states that a fixed effect model is the more suitable to our data. Then, at the second stage we must determine whether fixed or pooled regression model is appropriate to our data. We test the following hypotheses:

Ho: all dummy variables are equal to zero.

Ha: fixed effect model.

The results of Hausman test indicate that we must turn towards a fixed effect modeling.

**4.4.2. Multicollinearity Tests**

Furthermore, the above specification could potentially suffer from a real issue related to the correlation between the independent variables (Kleinbaum *et al.*, 1988), Variance Inflation Factor (VIF) and Tolerance test were employed to examine the existence of multi-collinearity. Table (4) shows that all (VIF) values range from (1.5 to 4.73), thus they were far lower than the cut-off value of 10. Tolerance test results indicate that all values range from 0.211 to 0.63. These results indicate that a collinearity problem does not seem to be an issue here among independent variables (Gujarati, 2003) and Brooks (2008).

**Table-4.** Multicollinearity Tests.

Variables	VIF	Tolerance test
MC	2.13	0.468
ROA	1.81	0.55
EPS	4.73	0.211
DPS	3.55	0.282
LEV	1.59	.626

## 5. EMPIRICAL RESULTS AND DISCUSSION

### 5.1. Descriptive Statistics

Table (5) presents the results of the descriptive statistics of both the dependent and the independent variables for the panel data analysis of the study.

From the results in Table (4), the analysis indicates that the SVT mean is 18.8 Million JD while the median is 4.3 million JD, and varies between 370.5 and 0.079, while NST on the other hand amounts to 14.6 million stocks, ranging between (194.7 and 0.0313) stocks as a maximum and a minimum value respectively.

Market capitalization ranges from 1.47 M.JD to 53,293 million JD and the average /median are 182.2, 24.4 million JD respectively.

On average, the overall firm's return on asset is 2.43% and varies greatly across firms; while the maximum and the minimum values are 35.5% and -39.7% respectively. The EPS stands at 0.15 on average, with a range between 3.6 and -0.6. While the mean for stock dividend is 10%, ranging between 3% of maximum and 0 of minimum value.

Final, the mean of firm leverage ratio average is 36.88% while median is 29.88% and ranging between 93.2% as a maximum and 0.4% as a minimum value.

**Table-5.** Descriptive Statistics for the Variables

	SVT	NTS	MC	ROA	EPS	DPS	LEV
Mean	18809912	14580803	182175122	2.43	0.15	0.10	36.8
Median	4295129	3365020	24391500	1.82	0.05	0.00	29.8
Maximum	370527745	194703807	5329320000	35.5	3.6	3.00	93.3
Minimum	7866	3126	1470000	-39.7	-0.69	000	0.42
Std. ev.	185.69	22.78	0.66	8.07	0.45	0.29	27.4
Jarque-Bera	30137.1	43.78	55.16	513.	8669.9	30012.	33.0
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	288	2888	288	288	288	288	288

The Jarque-Bera statistic indicates that all series are normally distributed, were probability values of its statistic value series are significantly different from zero at 1% significant level. In any case, evaluating normality indicates that the acceptable range of (- 1.0 to + 1.0) was satisfied for all the variables.

In addition, Jarque- Bera test also cannot reject that the residuals are normally distributed, were its value is (3.427) and p. value (0.18), in addition, skewness and kurtosis value (-0.245 and 3.21) respectively. [Gujarati \(2003\)](#) argued that data are said to be normal if standard kurtosis is within  $\pm 3$  and standard skewness is within  $\pm 1.96$ . Therefore, all the variables of the study can be described as approximately distributed

### 5.2. Empirical Results

Table 6 below presents the regression results obtained from the fixed effects model using stock liquidity proxies (SVT and NT ) in Model A and model B respectively, as the dependent variable.



Table-6. Results of the Fixed Effects Regression

Variable	Model: A (SVT)		Model: B (NTS)	
	Coeff.	T-stat.	Coeff.	T-stat.
CONC	-4.275271	(-2.87863)*	0.924	0.279
MC	1.4534	(7.562)*	1.873	(4.37)*
ROA	-0.014	(-2.682)*	-0.0248	(-2.07)**
EPS	0.2658	(3.686)*	0.563	(3.602)*
SDV	-0.324	-1.2488	-0.810	0.163
LEV	0.001	0.270	0.009	0.227
D.W	2.1		2.3	
R <sup>2</sup>	89.4		91.2	
F	15.5	0.000	19.04	0.000

The numbers in brackets are t- value, \*,\*\*, and \*\*\* indicates that coefficients are significant at the 0.01, 0.05, and 0.10 level respectively.

According to Fischer's results in model A and model B, in Table 5 the statistic F (15.5 and 19.04 respectively) are statistically significant at ( $\alpha \leq 0.01$ ) level. This means that the overall significance of the model result is valid. In other words independent variables are important factors in determining the stock liquidity of the firms in Jordan.

Moreover, the Co-efficient of multiple determination R<sup>2</sup> which indicates the quality of fitness of the model are satisfactory and statistically accepted for all models, it indicates that 89.4 % and 91.2% of the variation of value traded and number of traded shares respectively, this can be explained by the jointly explanatory variables chosen. The remaining 10.6% and 8.8% of variations are explained by other factors not included in model A and model B respectively.

The Durbin Watson Statistics of (2.1 and 2.3) indicates insignificant autocorrelation in the models represented above, which makes the models more reliable.

The results of model A and model B in Table 5 shows that the (MC), (EPS) and (ROA) are significantly related to each stock liquidity proxies (SVT and NTS), while (SDV) and (LEV) were not significantly related to the dependent variables.

The coefficients of (MC) are positive and statistically significant in model A and model B were ( $\beta = 1.4534$ ,  $p < 0.01$ ) and ( $\beta = 1.873$   $p < 0.01$ ) respectively. The associated t-statistics are greater than two (i.e. 7.6 and 4.4). These results imply that for every 1% rise in (MC), stock liquidity proxies; i.e (SVT and NTS) will increase by 145% and 187% respectively.

These results are in line with the researcher's expectation, and consistent with the argument that a large firm is followed by analysts and attracts investors, in addition, its size allows it to disclose a lot of information thereby reducing information asymmetry and improving liquidity, and also in line with some of empirical studies such as [Stoll \(2000\)](#).

These results supports first hypothesis (H1), therefore we accept the H1 that states that: there is a positive relationship between firm's size and stock liquidity.

ROA has a positive and statistically significant relationship with stock liquidity were the coefficient of firm's profitability proxy (ROA) is ( $\beta = -0.014$ ,  $p < 0.01$ ) in model A and ( $\beta = -0.024$ ,  $p < .05$ ) in model B, which means that every 1% increase in ROA decrease the (SVT and NTS) by

1.4% and 2.4% respectively. This result is consistent with our prediction and is in line with previous empirical studies, such as; [Asle et al. \(2013\)](#). Therefore we reject H2: There is a positive effect of firm's profitability on stock liquidity.

The coefficients of (EPS) are ( $\beta = 0.2658$ ,  $p < 0.01$ ) and ( $\beta = 0.563$ ,  $p < 0.1$ ) which means that every 1% increase in (EPS) will increase (STV) and (NTS) by 26.7% and 56% respectively. This means that the more liquid stocks are found to have higher returns.

Our results opposed our expectation and the previous results that liquidity is negatively correlated with stock returns as investors required a premium to compensate for illiquid stocks in developed markets while this results consistent with the results of [Xuan and Jonathan \(2010\)](#) study.

Therefore we reject H3 that states that: there is a negative effect of earnings per share on stock liquidity. And accept that there is a positive relationship between stock liquidity and earnings per share.

The coefficients of (SDV) are ( $\beta = -0.324$ ,  $p > 0.10$ ) and ( $\beta = -0.812$ ,  $p > 0.1$ ). T test value are less than two (-1.249 and 0.163) in models A and B respectively. This means that there is a negative but not significant relationship between stock liquidity and stock dividends.

Therefore we reject H4: there is a negative effect of stock dividend on stock liquidity. Finally, the coefficients of (LEV) are close to zero ( $\beta = 0.001$ ,  $p > 0.10$ ) and ( $\beta = 0.009$ ,  $p > 0.1$ ). T test value are (0.27 and 0.227) are insignificant in models A and B respectively. This means that there is a positive but not significant relationship between stock liquidity and firm leverage ratio. According to these results we reject H5 that states that: there is a positive effect of leverage ratio on stock liquidity.

## 6. CONCLUSION AND RECOMMENDATION

This study aims to investigate and examine the factors affecting stocks liquidity by using data of 100 share holding companies that represent Amman Stock Exchange (ASE) index in the recent period from 2011 to 2013. These variables include firm's size, firm's profitability, earnings per share, stock dividend and firm's leverage ratio.

The econometric model of fixed effects regression was employed for the study, using a panel data (comprising cross sectional and time-series data) of 100 companies in ASE between 2011 and 2013.

Our results of fixed effects regression model indicates that there were a statistically significant positive association between firm's size and stock liquidity proxies. These results can be explained by the fact that a large firm is followed by analysts and attracts investors, in addition, its size allows it to disclose a lot of information thereby reducing information asymmetry and improving liquidity.

The results also indicate that the firm's profitability has significantly negative impact on stock liquidity proxies. However the earnings per share variable have a statistically significant positive impact on stock liquidity proxies. These results opposed our expectation and previous results that

liquidity is negatively correlated with earning per share as investors required a premium to compensate for illiquid stocks in developed markets.

On the other hand, the results indicate a non significant statistical association between stock liquidity proxies and stock dividends and firm's leverage ratio.

Based on the study's results we recommend that the results can be used for future estimations and forecasting .therefore it would be better for investors and stock market authority to consider these variables in stock liquidity forecasts.

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