Voluntary disclosure and stock market liquidity: Evidence from Jordanian capital market

Abstract: The objectives of this study are to measure the level of voluntary disclosure provided in the annual reports of Jordanian companies and to examine the impact of disclosure level on the stock market liquidity using Jordanian data. To achieve the first objective, a self-constructed disclosure index consisting of 62 items was applied to the annual reports of 60 Jordanian non-financial companies listed at the Amman Stock Exchange (ASE) for the year 2004. It was found that there is a considerable variation in the extent of voluntary disclosure among companies. On average, a company disclosed 28% of the items of information included in the disclosure index. To achieve the second objective of this study, the relative bid-ask spread was used as a proxy for stock market liquidity. The results of regressing the bid-ask spread on disclosure level, after controlling for other variables, show that the higher voluntarily disclosed information provided in the Jordanian annual reports reduces the spread between bids and asks, and thereby increases the stock market liquidity.

Keywords: voluntary disclosure; financial reporting, stock market liquidity, Arab financial markets.

1 Introduction

This paper investigates the extent of voluntary accounting disclosure practice and its impact on the stock market liquidity for a sample of Jordanian companies listed at the Amman Stock Exchange (ASE) for the year 2004. To date, the empirical evidence into the impact of disclosure level on the stock market liquidity is limited and focused on developed capital markets, whose disclosure environment is rich (Hail, 2002). This study contributes to the disclosure literature by providing further empirical evidence of the association between disclosure level and stock market liquidity in the case of Arab financial markets (the case of ASE), whose disclosure environment is low. However, the objectives of this study are two-fold:

• to evaluate the level of voluntary disclosure provided in the annual reports of Jordanian non-financial companies listed at the ASE.
• to examine the impact of voluntary disclosure level on the stock market liquidity of companies listed at the ASE. The association between disclosure and liquidity is suggested by signaling theory indicating that firms’ increased disclosure serve to reduce the information asymmetry between firms and investors, and thus increase the stock market liquidity to firms.
ASE is the only party authorised market for trading securities in the country, established in 1976 with the cooperation of the Central Bank of Jordan and the International Finance Corporation (IFC). ASE is a non-profit private legal entity, with financial and administrative autonomy subject to Jordanian Securities Commission (JSC) supervision. Since 1997, ASE has witnessed a qualitative transition that began with the issuance of the Securities Law No. 23 of 1997. This Law aims at reforming the financial market, and improving disclosure standards. Moreover, for the first time the Jordanian companies listed at the ASE are required to adhere with specific disclosure requirements according to new disclosure regulation known as Directives of Disclosure and Accounting and Auditing Standards No. 1. This creates a good reason to study the behavior of voluntary disclosure level and its economic consequences in the Jordanian capital market.

The rest of this paper is organized as follows. Section 2 presents a review of the relevant literature and presents the main hypothesis of the study. Section 3 presents corporate financial reporting in Jordan. Section 4 explains the disclosure index and its measurement. Section 5 describes the sample of the study. Section 6 reports the empirical results of the study. Section 7 presents sensitivity analyses. Finally, Section 8 provides the main conclusions of the study.

2 Review of literature

There is a great wealth of disclosure literature that has investigated various determinants of disclosure practice in annual reports in developed capital markets (e.g. Singhvi and Desai, 1971; Malone et al., 1993; McNally et al., 1982; Hossain et al., 1995; Inchausti, 1997). However, a few disclosure studies addressing the extent of voluntary disclosure have been conducted in developing capital markets (e.g. Chow and Wong-Boren, 1987; Hossain et al., 1994; Ahmed, 1996). In Jordan, Naser et al. (2002) investigate the relationship between corporate disclosure after the implementation of International Accounting Standards (IASs) and company's firm characteristics. Using a disclosure index of 86 unweighted items of information, Naser et al. showed that the level of compliance with the IASs is related with corporate liquidity ratio, audit firm status, profitability, gearing, and size. Suwaidan et al. (2004) evaluated the level of social responsibility disclosure practices of 65 industrial Jordanian firms using 37 items of information. The results of the study identified that social disclosure is associated with corporate size, profitability, and risk.
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Other studies have analyzed the impacts of increased disclosure on the stock market liquidity. Theoretical support for a negative association between the level of voluntary disclosure and bid-ask spread as a measure of stock market liquidity suggests that disclosure enhances the future liquidity of a firm’s stocks by reducing information asymmetries in stock market.

Empirical work on bid-ask spreads has shown that bid-ask spread is an important component of total transaction cost (Stoll, 1989). Financial theory and empirical findings suggest the bid-ask spread consists of three components: order processing cost, inventory-holding cost, and adverse selection cost (Glosten and Harris, 1988). These studies have found that the adverse selection is a significant proportion of bid-ask spread in both quote-driven and order-driven markets (Handa et al., 1998; Brockman and Chung, 1999; George et al., 1991; Zhou, 2007).

In quote-driven markets, the adverse selection cost is based on the assumption that the market maker faces two types of traders; informed traders who have superior information that is not reflected in market prices; and uninformed traders who do not have such information. The market maker in such markets is expected to gain from trading to uninformed dealers and to lose from trading to informed traders and he or she thus sets a spread between the bid and ask price in order to compensate for losses resulting from dealing with informed traders (Kim and Verrecchia, 1994; Callahan et al., 1997; Zhou, 2007).

In order-driven markets, there is no market maker involved in the trading process. However, traders in such markets behave in the same manner as that of market-makers as long as these markets have informed and uninformed traders (Brockman and Chung, 2000). Prior studies in order-driven markets show that limit order trader faces adverse selection costs that increase with asymmetric information. For instance, Handa et al. (1998) show that limit order trader always loses from trading with informed trader.

Information plays a key role in the trading process and thus in the bid-ask spread. Its role is to reduce the information asymmetries among traders, and hence decreasing bid-ask spread in stock market (increasing in stock market liquidity). Different theoretical models have shown how disclosure level affects information asymmetry and hence increases stock market liquidity. For instance, Amihud and Mendelson (1986) used the spread between bidding and asking prices to examine the impact of liquidity on assets pricing. They claimed that the cost of equity capital is greater for securities with wider bid-ask spreads because investors demand a higher
return to compensate for added transactions costs. Amihud and Mendelson also suggested that by disclosing private information, firms could reduce the adverse selection of the bid-ask spread and thereby increase their stock liquidity. Diamond and Verrecchia (1991) and Kim and Verrecchia (1994) constructed a model in which disclosure improves the future liquidity of a firm’s securities by attracting increased demand from large investors, and this in turn reduces the firm’s costs, with large firms benefiting the most. Bloomfield and Wilks (2000) showed that higher-quality disclosures ensure investors pay a high price for shares that provide a greater degree of stock liquidity.

A number of recent empirical studies suggest an association between the disclosure level and stock market liquidity through reducing the information asymmetry among traders in the financial markets. For example, Welker (1995) investigated the cross-sectional relationship between analysts’ rating of firms’ disclosures for a sample of U.S. firms provided by the Association for Investment Management and Research (AIMR) and liquidity of the market as measured by the size of proportional bid-ask spread for the years 1983 to 1990. The findings of his study demonstrated that higher disclosure policy reduces information asymmetry and hence increases liquidity in equity markets. Controlling for other variables, Welker reported that the relative bid-ask spreads for firms with disclosure ranking in the bottom third were approximately 50 percent higher than spreads for firms with disclosure rankings in the top third.

Healy et al. (1999) also used AIMR disclosure rankings and found that the increases in disclosure level are accompanied by increases in firms’ stock returns, institutional ownership, analyst following, and stock liquidity. Leuz and Verrecchia (2000) studied German firms that have switched from German GAAP to international accounting regime with a greater disclosure requirement (IAS or US-GAAP) in consolidated financial statements. They claimed that these firms were thereby committing themselves to increased levels of disclosure. Leuz and Verrecchia showed that firms adopting international reporting (more disclosure) were associated with lower bid-ask spreads and higher trading volume than the ones keeping to the German reporting regime. Coller and Yohn (1997) used a sample of 278 quarterly earnings forecast to investigate whether the manager’s decision to issue management earnings forecast reduces information asymmetry. They found that forecasting firms have wider bid-ask spreads than a matched sample of non-forecasting firms prior to the forecast release. Espinosa et al. (2005) examined the relationship between disclosure and liquidity using a sample of Spanish listed firms. They
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found a positive relationship between disclosure and liquidity using Amihud (2002) illiquidity model.

Marquardt and Wiedman (1998) and Lang and Lundholm (2000) examined corporate disclosure activity around seasoned equity offerings and its relationship to stock prices. They found evidence that firms increase their disclosure activity over an extended period of time (six to nine months) in advance of seasoned equity offerings, consistent with managers using disclosure to decrease information asymmetry and increase offering proceeds. However, Frankel et al. (1995) found contrary results. They documented that firms do not increase their disclosure level in the period shortly preceding offerings. Frankel et al. attributed this finding to certain forces (e.g. legal liability and reputation) that deter management from issuing optimistic forecasts. Hefflin et al. (2002) obtained the measure of a firm’s disclosure for 1998 from AIMR and measured the stock market liquidity using two measures of liquidity; bid-ask spread and depth. They found that a firm with high quality of accounting disclosure enhanced its market liquidity through reducing information asymmetries across traders. Recently, Zhang and Ding (2006) examined the relationship between increased disclosures and bid-ask spread in the Chinese capital market and found that disclosure level is negatively related to bid-ask spread as a measure of stock market liquidity.

However, most of the empirical studies apply event study methodology to examine the impact of firm's publicly available information around the day of information releases on stock market liquidity (e.g. Healy et al., 1999; Coller and Yohn, 1997; Marquardt and Wiedman, 1998). This may suggest that released information has an impact on stock liquidity on a given or around the day of firm's particular event.¹ These studies are also applied mainly on quoted-driven markets where the bid-ask spread are expected to be narrower than that of order-driven markets (Lakhal, 2004). Furthermore, most of the empirical evidence on the impact of increased disclosure on stock market liquidity has used financial analysts' scores of firm disclosure (e.g. AIMR). However, these scores are based on sell-side analysts' perceptions of overall disclosure policy, including both voluntary and mandatory disclosure. Therefore, there is a potential bias by analysts'.

¹ Compared to event study methodology, Leuz and Verrecchia (2000) argued that the cross-sectional regression analysis is “less prone to the confusion between the ‘news’ and the ‘information asymmetry’ effect” (P. 100). While the news effect of disclosure is temporary (occurs around the day of information releases), the information asymmetry effect of increased disclosure is permanent. This suggests that the cross-sectional regression analysis is much more effective in capturing the information asymmetry effect rather than the news effect (Zhou, 2007).
perceptions and the inclusion of mandatory disclosure (e.g. Lang and Lundholm, 1993; Luo et al., 2006). However, the current study examines the association between voluntary disclosure and stock market liquidity in an order-driven market (the case of the ASE) by applying a cross-sectional regression analysis rather than focusing on the time of an announcement. Moreover, this study develops a self-constructed disclosure index that eliminates the potential bias of analysts' perceptions of voluntary disclosure (Luo et al., 2006).

In summary, the theoretical and empirical research suggests that increasing disclosure level may reduce information asymmetries in the stock market and thus increase the stock market liquidity. While prior studies examine the association between disclosure level and stock market liquidity in the context of developed capital markets, this study examines the association between disclosure and liquidity in the context of Arab financial markets; the case of ASE. It can also be argued that Jordanian companies do not disclose additional information due to cultural and social environment. Jordanian society, as in other Arab countries, tends to have a large power distance, low future orientation, have high degree of collectivism and high uncertainty avoidance (Hofstede, 1984; Beard and Al-Rai, 1999; Kabasakal and Bodur, 2002). These factors may suggest that people in such countries are expected to be relatively more secretive, conservative and based on statutory control, with little professional judgment compared to their counterparts of developed countries, indicating a lower level of voluntary disclosure (e.g. Gray and Vint, 1995; Zarsekei, 1996; Askary, 2006). Further, ASE is less liquid when compared to developed capital markets (e.g. Maghyreh, 2003). Therefore, it could be argued that the impact of voluntary disclosure level on the stock market liquidity is not the same as that reported in more sophisticated markets (e.g. USA, Germany).

The results of empirical studies have shown a negative association between corporate disclosure and bid-ask spread in the market (e.g. Welker, 1995; Leuz and Verrecchia, 2000). These results are consistent with early theoretical models (e.g. Diamond and Verrecchia 1991; Kim and Verrecchia, 1994). Therefore, the following hypothesis is formulated:

\[ H_a: \text{There is a negative relationship between bid-ask spread as a measure of stock market liquidity and the extent of voluntary disclosure found in the annual reports of non-financial companies listed at the ASE.} \]
3 Corporate Financial Reporting in Jordan

In Jordan, there are three major sources of regulation of corporate financial reporting. The first is the Companies Law 1964, 1989, 1997 amended by the Law No.35 of 2002. The Law requires that listed companies prepare and publish the balance sheet, and the profit and loss accounts. The financial statements must give a “true and fair” view of the state of the company's affairs during the fiscal year. The Law asks the auditors of any public shareholding company to audit its account in accordance with approved audit rules, auditing profession principles and scientific and technical parties. The Law also lays down penalties for any person who prepares the balance sheet of any firm and its profit and loss account in a manner that does not reflect the true financial position of the firm.

The second source of regulation in Jordan is the accounting profession. Before 1985, entry into the accounting profession was “loosely” regulated by the Auditing Law 1961 and 1964. The Auditing Profession Practice Law 1985 amended by the Law no. 73 of 2003 regulated the audit profession in the country and made membership of the association compulsory. This Law provided for the establishment of the Jordanian Association of Certified Public Accountants (JACPA). JACPA aims at developing the competence and independence of its members, developing accounting standards and auditing standards that could best meet the needs of the country, and publishing accounting principles for training and awareness of its member. However, the JACPA has not developed any national standards or even define Generally Accepted Accounting Principles (GAAP). In 1989, JACPA adopted the International Accounting Standards (IAS) in the hope that such standards would be adopted as national standards. However, JACPA failed to force the companies or its members to comply with IAS because there was no legal or professional implementation until 1997, when the Securities Law No. 23 for the year 1997 amended by the Law No.35 of 2002 gave consideration, authority and more power to JACPA. The Securities Law of 2002 provides that listed companies should apply the International Financial Reporting Standards (IFRS). In addition, the Securities Law has given more power to JACPA concerning auditing financial statements. For example, auditors of any entity subject to the Jordan Securities Commission's monitoring are required to have a valid license from the Council of the Auditing Profession (CAP), and to be a member of the JACPA.

The third source of corporate financial reporting in Jordan is the ASE regulation. Since 1997, Jordanian companies are required for the first time to adhere with specific items of information subject to the “Instructions for
Disclosure, Accounting and Auditing Standards of Issuing Companies” issued according ASE regulation. These Instructions aimed at providing investors with important and material information that is related to investment decision making, at maintaining fair dealing in securities, at enhancing the trust of investors and at achieving transparency in the market in line with international standards. Prior to the implementation of these Instructions, Jordanian disclosure requirements were very low (Suwaidan and El-Khoury, 2000), so that the major part of the content of the annual reports could be considered as voluntarily disclosed.

4 The Voluntary Disclosure Index

4.1 Definition of Voluntary disclosure
This study uses a self-constructed index to measure the disclosure of voluntarily information in the annual reports of Jordanian non-financial companies listed at ASE. A voluntary disclosure applied in this study is defined as those items of information that are not stipulated by the Jordanian statutory regulations mentioned earlier in Section 3. Such a definition was adopted by many previous researchers (e.g. Marston and Shrives, 1991; Bradbury, 1992). In fact, finding a direct way to measure the disclosure level is difficult since the financial disclosure is an abstract concept that cannot be measured directly (Cooke and Wallace, 1989). However, the process of measuring firm disclosure level cannot be carried out in a precise scientific way, since researchers’ subjectivity cannot be completely removed (Marston and Shrives, 1991, p.208).

4.2 List of Disclosure Items
One important issue in the construction of an index of voluntary disclosure is to select the items of information that may be disclosed by the companies included in the study. Four-step approach has been applied in this study to select items of voluntary information. Firstly, an extensive review of the disclosure literature applied in developed and developing capital market was undertaken (e.g. Chandra, 1974; Barrett, 1975; Firth, 1979a, b; Chow and Wong-Boren, 1987; Cooke, 1989; Raffournier, 1995; Hossain et al., 1995; Abu-Nassar and Rutherford, 1995; Meek et al., 1995; Gray et al., 1995; Botosan, 1997; Healy et al., 1999; Depoers, 2000; Haniffa and Cooke, 2002). This step provided preliminary checklist consisting of 143 items. Secondly, a comparison of these items with

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\[2\] It can be argued that firm’s management would simply provide misleading information in the company’s annual report (i.e. lack of credibility). However, it is not easy to verify the factuality of the information released via annual report (Naser et al., 2002). This study evaluates the extent of voluntary disclosure assuming that information included in the annual reports is factual since verifying the credibility of the information is outside the scope of this study.
Jordanian financial reporting regulation forces was made to exclude the items that appeared mandatory. As a result, 55 items were excluded. Thirdly, the list from the second step was pilot-tested on a sample of 15 annual reports issued by Jordanian industrial and services companies listed at the ASE for 2003. This step served the purpose of refining the index and excluding the items of information irrelevant to disclosure practice in Jordan. Consequently, 17 items were excluded from the disclosure list. Finally, voluntary items of information (from step 3) then validated by discussions with disclosure experts; two auditors from Big-4 auditing firms and the Head of Issuance and Disclosure Division in the ASE. The experts were interviewed, and were requested to indicate those items of information included in the disclosure index that are considered as voluntarily disclosed and to add any disclosure item of information that is not required of public companies listed on the ASE but not included in the disclosure index. The comments from disclosure experts were taken into account and led to the exclusion of 9 items from the checklist.

The final disclosure list consists of nine categories: background information (12 individual items), future and projected information (6 individual items), management discussion and analysis (8 individual items), historical information (5 individual items), financial ratios (8 individual items), capital market data (3 individual items), acquisition and disposal information (4 individual items), key of non-financial information (9 individual items), and employee information (7 individual items). Therefore, our disclosure index covered a wide range of voluntary information that could appear in the annual financial reports. The index included both financial and non-financial items of information, qualitative and quantitative items, and historical and future items of information. Appendix (A) provides a list of the items included in the disclosure index.

Another important issue in an index construction is the problem of applicable/non-applicable of some items. That is, to decide whether a certain item is applicable to a given firm. To reduce the subjectivity of this problem, a meticulous reading of the whole contents of the annual reports was taken place first to make a judgment as whether a particular item was relevant. This methodology was used by prior disclosure studies (e.g. Cooke, 1989; Haniffa and Cooke, 2002; Ahmed and Nicholls, 1994; Hossain et al., 1995; Meek et al., 1995; Inchausti, 1997; Abd-ElSalam and Weetman, 2003). As a result, the researchers did not penalise the firm under investigation for not disclosing an item if the item was not relevant to its activities.
4.3 Scoring of Corporate Annual Report

The unweighted approach is applied in this study through using a dichotomous scale as follows:

- A score of one (1) is awarded to the firm if an item of information is disclosed within the annual report.
- A score of zero (0) is awarded if such an item is not disclosed and the item is applicable to that firm.
- Not applicable (-) is assigned if an item was not applicable to the firm in order to avoid penalising the firm for not disclosing the item.

The extent level of disclosure is measured as the ratio of the actual total score awarded to a particular firm to the maximum number of applicable items of information. This methodology was used by prior disclosure studies (e.g. Cooke, 1989, 1998; Ahmed and Nicholls, 1994; Raffournier, 1995; Hossain et al., 1995; Wallace and Naser, 1995; Depoers, 2000; Suwaidan and El-Khoury, 2000; Suwaidan et al., 2004; Hassan et al., 2006; Leventis and Weetman, 2004). Therefore, the minimum score for a company is 0%, if the company did not disclose any item and the maximum is 100%, if the company disclosed all the items applicable to it.

5 Sample of companies and data collection

5.1 The Sample of the Study

The sample of the study includes the industrial and service sector companies listed at the ASE for the year 2004. The total of companies listed at the ASE was 192 for the year 2004, thirty-one more than in the year 2003. However, in order to establish the homogeneity of the sample, five criteria were imposed. Firstly; financial and insurance companies listed at the ASE were excluded because they are strongly influenced by specific disclosure requirements, so that the content of their annual reports cannot be considered as voluntarily determined (e.g. Wallace et al., 1994; Wallace and Naser 1995, Raffournier, 1995; Depoers, 2000; Abd-Elsalam and Weetman, 2003). Secondly, companies listed for the first time in 2004 were excluded because newly listed companies may still be developing.

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3 While this study investigates the extent of disclosure practice based on whether the item is disclosed or not, other disclosure studies investigate the extent of disclosure based on the quality of content. For instance, Wallace et al. (1994) based the measurement of disclosure on the depth of information considering whether the item of information improves a user's understanding of financial statements. Wallace and Naser (1995) considered that the quality of disclosure would be expected to increase if more details are given in respect of each item on information included in their disclosure checklist.

4 This study selects the year 2004 because it was recent enough to ensure that the data for the variables included in this study, especially companies' annual reports, are available from the sources of information.
their disclosure policy (e.g. Leventis and Weetman, 2004). Thirdly, companies that ceased operations in 2004 were excluded from the sample. Further, companies provided an incomplete annual report were excluded. Finally, companies with rarely traded shares were also excluded. As a result, the sample of the study suffers from a survivorship bias since only companies which have been more actively traded in the financial market can be included in the study.

Taking the data description stated above, the final sample of the study consists of 60 companies from the industrial and service sectors (38 companies listed in the First market and 22 companies listed in the Second market). The sample size represents 31.25% of the total listed companies on the ASE at the end of 2004.\(^5\)

There are many different routes by which company information is communicated (e.g. newspapers, magazines, interviews, letters to shareholders and debt holders, personal visits to the company, telephone conversations). Disclosure literature has found that the annual reports are considered to be the most important mechanism for the companies to disseminate information to the public (Hines, 1982; Chang and Most, 1981). Lang and Lundholm (1993) found evidence of a high and significantly positive correlation between the amount of disclosure provided by annual reports and the amount of disclosure provided by other sources of information. Moreover, they found much of what firms disclosed by means of other sources of information appeared later in the audited annual report.

In Jordan, El-Essa (1991) studied the importance of annual reports for a sample of 33 investors in making their decisions in the ASE. The study revealed that 88% of the respondents considered published annual reports in making their decision. Abu-Nassar and Rutherford (1996) examined the perception of five Jordanian user groups as to the importance given to different sources of information. The five users were institutional shareholders, bank loan officers, stockbrokers, academics and individual shareholders. The majority of groups ranked the annual reports as their primary source of information for decision-making.

Therefore, the companies’ annual reports are examined in this study to decide whether the item of information is disclosed voluntarily by the company. These reports were collected through both the ASE library and

\(^5\) Lang and Lundholm (1993, p. 267) observed firms’ disclosure policies and practices and pointed out that these practices tend to remain relatively constant from year to year. They added that this might be because reporting firms are seeking to enhance the year-to-year comparability of the financial statements in their corporate annual reports.
personal visits to companies. Other information about other variables included in the study was collected from Jordanian Shareholding Companies Guide (2005).

5.2 The Descriptive Statistics of the Sample Study

The descriptive statistics of the sample study are provided in Table 1. \( MC \) is the market value of equity at the end of 2004 in millions of Jordanian Dinars (JD). \( ASSETS \) is total assets, \( SALES \) is total sales (Revenues), \( PROFIT \) is net income, all at the end of 2004, and all in million JD. \( SHARE \) is the number of shareholders at the end of 2004. \( DEBT \) is the financial leverage measured as long-term debt-to-equity ratio. \( DISC \) is the firm’s overall voluntary disclosure. \( BETA \) is market beta and estimated via the market model by regressing the return of firm's stock on the return of market index with a minimum of 30 monthly return observations over the five-year period (January, 2001–December, 2005). \( SPREAD \) is the relative bid-ask spread for the year 2004. \( PRICE \) is share price computed as the average daily closing prices for the year 2004. \( LIST \) is a dummy variable for listing status and used in this study in order to assess for the validity of \( DISC \) (discussed later). Finally, industry type is included in this study as prior disclosure studies suggested a relationship between \( DISC \) and industry types (e.g. Cooke, 1989) as well as between \( SPREAD \) and industry type (e.g. Claus and Thomas, 2001). Industry type consists of \( MIN \) for companies operate in mining, oil and construction sector; \( INDUS \) for other industrial companies; and \( SER \) for companies operate in service sector (discussed later).

As seen, there is a wide range of firm size with market values of JD .568 million at the minimum compared to 742.862 JD million at the maximum with a mean (median) of JD 43.662 million (JD 12.690 million). The average (median) sample total assets is JD 37.695 million (14.490 million) with a minimum value of JD 1.539 million and a maximum value of 368.831 millions. \( SALES \) and \( PROFIT \) also have a wide range of variation in size. \( SHARE \) ranges from 41 for SLCA Company to 33974 for Jordan Cement Factories. \( DEBT \) as a measure of financial leverage has a mean of JD 29.154%. The securities included in the sample have a mean

\[^{6}\text{All continuous variables included in Table 1 are assessed for normality. The results of histogram and Kolmogorov-Smirnov test of normality revealed that all variables, with the exceptions of DISC; BETA; and SPREAD, are not normally distributed. To reduce the effect of non-normality, a log-transformation was applied to these variables. After the transformation, histograms and the Kolmogorov-Smirnov test of normality indicated that these variables did not deviate significantly from normality. However, further specification testing has been performed in Section 7.}\]
share price ($PRICE$) of around JD 3 and share prices represented in the sample range between JD .339 and JD 17.393.

Table 1: Descriptive Statistics of the Sample of the Study

<table>
<thead>
<tr>
<th>Variables</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Median</th>
<th>Mean</th>
<th>Std. Dev.</th>
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<td>MC*</td>
<td>.568</td>
<td>742.862</td>
<td>12.690</td>
<td>43.662</td>
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<td>ASSETS*</td>
<td>1.539</td>
<td>368.831</td>
<td>14.490</td>
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<td>.203</td>
<td>277.556</td>
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<td>.617</td>
<td>2.930</td>
<td>7.658</td>
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<td>33974</td>
<td>1533</td>
<td>3771</td>
<td>6642</td>
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<tr>
<td>DEBT (%)</td>
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<td>93.770</td>
<td>22.585</td>
<td>29.154</td>
<td>20.445</td>
</tr>
<tr>
<td>DISC (%)</td>
<td>3.225</td>
<td>67.741</td>
<td>26.785</td>
<td>28.136</td>
<td>12.911</td>
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<tr>
<td>BETA</td>
<td>-.676</td>
<td>1.414</td>
<td>.102</td>
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<td>.478</td>
</tr>
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<td>SPREAD</td>
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<td>.252</td>
<td>.035</td>
<td>.050</td>
<td>.046</td>
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<tr>
<td>PRICE</td>
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<td>17.393</td>
<td>2.130</td>
<td>3.111</td>
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<tr>
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<td>.00</td>
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<td>.00</td>
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<tr>
<td>SER</td>
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<td>.00</td>
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<td>.469</td>
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<td>LIST</td>
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<td>1.00</td>
<td>1.00</td>
<td>.667</td>
<td>.475</td>
</tr>
</tbody>
</table>

* In JD million

Variable definitions:
- $MC$ = Market value of equity at the end of 2004 in JD millions
- $ASSETS$ = Total asset at the end of 2004 in JD millions
- $SALES$ = Total sales (Revenues) at the end of 2004 in JD millions
- $PROFIT$ = Net income at the end of 2004 in JD millions
- $SHARE$ = Number of shareholders at the end of 2004
- $DEBT$ = Long-term debt-to-equity ratio
- $DISC$ = Voluntary disclosure index
- $SPREAD$ = Relative bid-ask spread for the year 2004
- $PRICE$ = Average daily closing prices for the year 2004
- $MIN$ = Mining, oil, and construction company ($MIN=1, 0 otherwise$)
- $INDUS$ = Other industrial companies ($INDUS=1, 0 otherwise$)
- $SER$ = Service company ($SER=1, 0 otherwise$)
- $LIST$ = Listing status ($LIST=1$ if the company is listed on the first market, 0 otherwise)

$SPREAD$ is measured as the yearly average of daily bid-ask spreads, that is, the yearly average of absolute spread of the daily best asks and bids divided by their mid point. Such a methodology was used by prior studies (e.g. Espinosa et al., 2005; Petersen and Plenborg, 2006). However, Table 1 shows that the mean (median) bid-ask spread across all firms in the
sample is .050 (.035). This suggests that bid-ask spread in the case of the ASE is higher than the mean (median) reported by e.g. Welker (1995) on US companies and Petersen and Plenborg (2006) on Danish companies. This indicates that the liquidity of firms listed on the Arab financial markets (the ASE as an example) is less liquid compared to the developed capital markets.\footnote{The mean (median) bid-ask spread reported by Welker (1995) on US firms is .03 (.01) and that reported by Petersen and Plenborg (2006) on Danish firms is .04 (.03).}

The Capital Asset Pricing Model (CAPM) suggests a stock’s market beta should be positively correlated with its cost of equity capital and, hence expected to be positively associated with the bid-ask spread. Therefore, $BETA$ is included in the analysis to control for systematic risk (Botosan, 1997; Petersen and Plenborg, 2006). However, the mean of $BETA$ is .249 (Table 1) which is less than 1.0, indicating that the sample of the study has risk that is lower than the market as a whole.

Finally, prior research reported a significant association between market value (firm size) and information asymmetry, as well as between market value and disclosure level suggesting that market value would be correlated omitted variable if excluded from the analysis (Botosan, 1997). Therefore, market value is included in the analysis.

6 Empirical Results
6.1 The Level of Overall Voluntary Disclosure
As seen in Table 1, there is a clear variation in the extent of voluntary information disclosed by companies. The Jordanian companies show a low overall level of voluntary disclosure with the mean of 28.14% and that the lowest and the highest scores were 3.23% and 67.74%, respectively.

National Steel Company’s disclosure scored the lowest level of 3.23% while the Arab Potash Company received the highest score of 67.74%. National Steel Company financial report provided no information on historical information, key-of-non-financial information, future and projected information, capital market data and management discussion and analysis. Arab Potash’s financial report provided detailed discussions in all categories.

6.1.1 Validity and Reliability of Disclosure Score
A disclosure index is considered as a useful way of measuring disclosure level when the index satisfies the requirements of reliability and validity (Marston and Shrives, 1991). Realizing the difficulty in measuring the disclosure level and the problem of the researchers' subjective assessment
applying the scoring model, it is important to assess the validity of the resulting measure. Therefore, different set of analyses were used to assess the reliability and validity of a self-constructed disclosure index. These analyses were suggested by Botosan (1997). Firstly, Cronbach’s coefficient alpha (Cronbach, 1951) is the most common estimate of internal consistency that uses repeated measurement to assess the degree to which the correlation among the measurements is attenuated due to random error. The closer the coefficient alpha to one, the more reliable the generated index is. There is no standard test of significance for Cronbach’s coefficient alpha. As a rule of thumb, the agreed lower limit for Cronbach’s alpha coefficient is .70 (e.g. Nunnally, 1978), although it may decrease to .60 in exploratory literature (Robinson et al., 1991). However, the procedure output of the disclosure index revealed that the Cronbach’s coefficient alpha for the entire disclosure index is .72 which indicates that the reliability of the disclosure index has a good internal consistency considering that .70 is the cutoff value for being acceptable.

Secondly, the reliability of the disclosure index was also assessed by requesting three independent academic raters to score 15 annual reports selected randomly. The scores assigned by the independent raters were compared with the researchers’ scores reported in this study. The Pearson’s correlation matrix between these scores were highly correlated with each others (p-value < 0.01) indicating a high degree of reliability.

I also assessed the relationship between DISC and its nine components. Reporting disclosure strategies of a company are expected to be very similar across various avenues (Botosan, 1997). This suggests that a company that is good at disclosing certain types of information is also good at disclosing other types good. However, the pair-wise parametric and non-parametric correlation coefficients between DISC and its components (not reported) are positive and highly correlated to each other ranging from .356 to .849 (p-value ≤ .01), which indicates that the disclosure index may capture different types of information in the annual reports (e.g. Botosan, 1997; Hail, 2002).

Finally, I assessed the validity of DISC through examining the association between DISC and other firm-specific characteristics identified to be associated by disclosure level (e.g. Cooke, 1989; Wallace et al., 1994; Botosan, 1997; Ahmed and Courtis, 1999). These

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8 Furthermore, the internal consistency, measured by Cronbach’s coefficient alpha, was also found to be acceptable for all categories (range .64 -.71).
characteristics are: firm size, financial leverage, listing status (LIST)\(^9\) and industry type.\(^10\) In general, these variables in prior studies have been found to be significantly and positively associated with disclosure level. If the disclosure index applied in this study measures disclosure levels of the Jordanian listed companies, then it should be correlated with these characteristics.

Table 2 presents the Pearson’s and Spearman correlations matrix incorporating all variables included in the study. While Pearson’s correlation matrix is reported above the diagonal, the Spearman correlation is reported below. Consistent with prior studies $MC$ (log form)\(^11\), $LIST$ and $MIN$ are positively and significantly correlated with disclosure level. The results suggest that companies that can be expected to have higher levels of voluntary disclosure are those which are large in size, are listed on the First Market and operate in certain types of business. However, it was found that $DEBT$ (log form) does not show a significant correlation with disclosure level. It seems that Jordanian listed companies with high leverage do not seek to reduce their monitoring costs by disclosing voluntary information in the annual reports. Such result is also found in prior studies (e.g. Chow and Wong-Boren, 1987; Wallace et al., 1994; Hossain et al., 1994; Raffournier, 1995; Depoers, 2000; Hail, 2002).

In summary, the reliability and validity of $DISC$ is supported by different set of techniques: (1) the opinions of disclosure experts on the relevance of the voluntary disclosure items included in the composite index, (2) Cronbach's Coefficient alpha, (3) internal consistencies among the components of $DISC$, (4) the relationship between $DISC$ and firm characteristics identified to be associated with disclosure.

**6.2 Stock Market Liquidity and Overall Disclosure**

**6.2.1 Univariate Analysis**

Table 2 shows that the $SPREAD$ is negatively associated with the level of disclosure, suggesting that higher level of disclosure provided in the

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9 To examine the association between $DISC$ and listing status, we included $LIST$ in the study as a dummy variable. Companies belonging in the First Market are categorised as one while companies belonging in the Second Market is categorised as zero.

10 To examine the association between $DISC$ and industry type, we categorised the companies as (1) Mining, oil, and construction ($MIN$), (2) Other industrial companies ($INDUS$), and (3) Service companies ($SER$).

11 We also examined the correlation between $DISC$ and non-market related measures of firm size: $ASSETS$, $SALES$, $PROFIT$, and $SHARE$. The results (not reported) showed that all non-market related measures of firm size are significantly correlated with $DISC$ at 5% level of significance.
Jordanian annual reports reduces the spread between bids and asks and thereby increases the stock liquidity.

Table 2: Pearson’s and Spearman Correlations Matrix among All Variables Included in the Study

<table>
<thead>
<tr>
<th></th>
<th>DISC</th>
<th>LGMC</th>
<th>LGDEBT</th>
<th>MIN</th>
<th>INDUS</th>
<th>SER</th>
<th>LIST</th>
<th>BETA</th>
<th>SPREAD</th>
<th>LGPRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISC</td>
<td>1</td>
<td>.377**</td>
<td>.014</td>
<td>.295*</td>
<td>-.148</td>
<td>-.073</td>
<td>.382**</td>
<td>-.353**</td>
<td>-.251*</td>
<td>.119</td>
</tr>
<tr>
<td>LGMC</td>
<td>.238*</td>
<td>1</td>
<td>.133</td>
<td>.324**</td>
<td>-.191</td>
<td>-.049</td>
<td>.298*</td>
<td>-.171</td>
<td>-.191</td>
<td>.369**</td>
</tr>
<tr>
<td>LGDEBT</td>
<td>-.072</td>
<td>.120</td>
<td>1</td>
<td>-.470**</td>
<td>-.253*</td>
<td>.198</td>
<td>-.135</td>
<td>-.081</td>
<td>.127</td>
<td></td>
</tr>
<tr>
<td>MIN</td>
<td>.220*</td>
<td>.247*</td>
<td>.125</td>
<td>1</td>
<td>-.497**</td>
<td>-.253*</td>
<td>.198</td>
<td>-.135</td>
<td>-.081</td>
<td>.127</td>
</tr>
<tr>
<td>INDUS</td>
<td>-.103</td>
<td>-.132</td>
<td>-.085</td>
<td>-.497**</td>
<td>1</td>
<td>-.714**</td>
<td>-.096</td>
<td>.261*</td>
<td>.313**</td>
<td>-.159</td>
</tr>
<tr>
<td>SER</td>
<td>-.063</td>
<td>-.052</td>
<td>-.007</td>
<td>-.253*</td>
<td>-.714**</td>
<td>1</td>
<td>-.053</td>
<td>-.160</td>
<td>-.264*</td>
<td>-.026</td>
</tr>
<tr>
<td>LIST</td>
<td>.383**</td>
<td>.314*</td>
<td>.063</td>
<td>.198</td>
<td>-.096</td>
<td>-.053</td>
<td>1</td>
<td>-.272*</td>
<td>-.089</td>
<td>.343**</td>
</tr>
<tr>
<td>BETA</td>
<td>-.319**</td>
<td>.090</td>
<td>-.114</td>
<td>-.125</td>
<td>.243*</td>
<td>-.150</td>
<td>.204</td>
<td>1</td>
<td>.053</td>
<td>.063</td>
</tr>
<tr>
<td>SPREAD</td>
<td>-.241*</td>
<td>-.212*</td>
<td>-.221*</td>
<td>.018</td>
<td>.168</td>
<td>-.215*</td>
<td>.148</td>
<td>-.062</td>
<td>.1</td>
<td>.503**</td>
</tr>
<tr>
<td>LGPRICE</td>
<td>.064</td>
<td>.445**</td>
<td>-.193</td>
<td>.141</td>
<td>-.181</td>
<td>-.065</td>
<td>.355*</td>
<td>.016</td>
<td>.180*</td>
<td>1</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (1-tailed)
*Correlation is significant at the .05 level (1-tailed)

Variable definitions:
DISC = Voluntary disclosure index
LGMC = Market value of equity at the end of 2004 in JD millions (logarithm form)
LGDEBT = Long-term debt-to-equity ratio (logarithm form)
MIN = Mining, oil, and construction company (MIN = 1, 0 otherwise)
INDUS = Other industrial companies (INDUS = 1, 0 otherwise)
SER = Service company (SER = 1, 0 otherwise)
LIST = Listing status (LIST = 1 if the company is listed on the fist market, 0 otherwise)
BETA = Market beta estimated via market model regression using at least 30 monthly return observations over Jan. 2001- Dec. 2005
SPREAD = Relative bid-ask spread for the year 2004
LGPRICE = Share price computed as the average daily closing prices (logarithm form)

Previous empirical studies examined a number of variables that are expected to be associated with stock market liquidity (e.g. Demsetz, 1968; Welker, 1995; Heflin et al., 2002; Glosten and Harris, 1988; Hanley et al., 1993; Espinosa et al., 2005; Petersen and Plenborg, 2006). These studies suggest that share price, market beta and market value (firm size) to be associated with stock market liquidity. The findings of these studies report that bid-ask spread is negatively associated with size of the firm and is positively related with share prices and market beta. Therefore, share price, market beta and firm size are included in the regression model as control variables. Furthermore, we also included industry type as a control variable since different type of industries may exhibit different risk-return profiles (Claus and Thomas, 2001).
Table 2 reveals that MC (firm size) is negatively associated with SPREAD and positively associated with DISC. This suggests the problem of correlated omitted-variable bias if market value is excluded from the analysis. Table 2 also shows that bid-ask spread is positively correlated with the share price as measured by the average daily closing prices (PRICE). As expected, there is a significant difference between SPREAD and industry type. In contrast with prior studies (Botosan, 1997), the results reported in Table 2 show that there is no significant relationship between SPREAD and BETA as a measure of systematic risk. Therefore, beta is not a perfect measure of market risk and hence information risk (Petersen and Plenborg, 2006).

6.2.2 Multivariate Analysis
In this section, we examine the association between DISC and SPREAD after controlling for other variables, since there is evidence that these variables are associated with the stock market liquidity.

Therefore, the multiple regression was conducted according to the following equation:

\[
SPREAD_i = \alpha + \beta_1 DISC_i + \beta_2 BETA_i + \beta_3 LGMC_i + \beta_4 LGPRICE_i + \beta_5 SER_i + \beta_6 MIN_i + e_i
\]

Where:
- \(SPREAD\) = Relative bid-ask spread,
- \(\alpha\) = the intercept,
- \(DISC\) = Disclosure level for a firm,
- \(LGMC\) = Market capitalisation at the end of 2004 (Log form),
- \(LGPRICE\) = Average daily closing price, (Log form)
- \(SER\) = Service companies
- \(MIN\) = Mining, oil, and construction companies,
- \(\beta_1, \ldots, \beta_6\) = Regression coefficient
- \(e_i\) = Error term

We also examined the correlation between SPREAD and non-market related measures of firm size: ASSETS, SALES, PROFIT, and SHARE. The results (not reported) showed that none of the coefficients on the non-market related measures of firm size is significantly correlated with SPREAD at 5% level of significance. This result is consistent with Berk's (1995, 1996) findings.

The multiple regression above consists of four continuous variables. They are: DISC, BETA, LGMC and LGPRICE. In addition, one variable is categorical; two dummy variables are used for industry type (SER, MIN), omitting one variable (INDUS) to avoid the problem of perfect multicollinearity.
Table 3 presents the results of regressing $SPREAD$ on disclosure level, market beta, firm size, closing prices and industry type. As predicted, $SPREAD$ is inversely associated to disclosure level, market capitalisation, and positively related to share price. The results reported in Table 3 also indicate that companies which belong to service sectors ($SER$) was found to be significantly related with a lower level of bid-ask spread (higher level of stock market liquidity). The coefficient on the disclosure level index equals to -.12% for the regression presented above. The corresponding t-statistics for the coefficient is -1.949 significant at a 5% level of significance. This result suggests that higher voluntary information result in reduced information asymmetry, and hence increased market stock liquidity. The adjusted R-Square of 0.229 suggests that approximately 23% of the variation in the dependent variable ($SPREAD$) can be explained by the right-hand variables included in the model ($DISC$, $BETA$, $LGMC$, $LOGPRICE$, $SER$, and $MIN$).\(^\text{14}\)

**Table 3: Summary of the Results of the Regression Model**

\[
SPREAD_i = \alpha + \beta_1 DISC_i + \beta_2 BETA_i + \beta_3 LGMC_i + \beta_4 LOGPRICE_i + \beta_5 SER_i + \beta_6 MIN_i + \epsilon
\]

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta</th>
<th>t</th>
<th>Sig.*</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>.167</td>
<td></td>
<td>2.702</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>$DISC$</td>
<td>-.0012</td>
<td>-.269</td>
<td>-1.949</td>
<td>.022</td>
<td>1.400</td>
</tr>
<tr>
<td>$BETA$</td>
<td>-.017</td>
<td>-.188</td>
<td>-1.523</td>
<td>.060</td>
<td>1.195</td>
</tr>
<tr>
<td>$LGMC$</td>
<td>-.016</td>
<td>-.262</td>
<td>-1.760</td>
<td>.040</td>
<td>1.649</td>
</tr>
<tr>
<td>$LOGPRICE$</td>
<td>.005</td>
<td>.485</td>
<td>3.398</td>
<td>.001</td>
<td>1.522</td>
</tr>
<tr>
<td>$SER$</td>
<td>-.023</td>
<td>-.287</td>
<td>-2.231</td>
<td>.015</td>
<td>1.239</td>
</tr>
<tr>
<td>$MIN$</td>
<td>-.012</td>
<td>-.138</td>
<td>-1.036</td>
<td>.151</td>
<td>1.327</td>
</tr>
</tbody>
</table>

*One-tail Test

**Variable definitions:**

- $DISC$ = Voluntary disclosure index
- $BETA$ = Market beta estimated via market model regression using at least 30 monthly return observations over Jan. 2001- Dec. 2005
- $LGMC$ = Market value of equity at the end of 2004 in JD millions (logarithm form)
- $LOGPRICE$ = Share price computed as the average daily closing prices (logarithm form)
- $SER$ = Service company ($SER= 1$, 0 otherwise)
- $MIN$ = Mining, oil, and construction company ($MIN= 1$, 0 otherwise)

\[^{14}\] Another regression was performed through eliminating the variable of $DISC$ from the model presented in Table 3. The results of this regression (not reported) show adjusted R-Square of .168, suggesting that the variables of $BETA$, $LGMC$, $LOGPRICE$, $SER$, and $MIN$ was able to explain about 17% of variations of $SPREAD$. However, comparing with the results reported in Table 3 suggests that $DISC$ has a significant impact on $SPREAD$ as the inclusion of $DISC$ in the model improves adjusted R-Square by about 6% (23% - 17%).
However, the results reported in this study showed a lower impact of disclosure on the stock market liquidity when compared with the results reported in the context of developed capital markets. For instance, Espinosa et al. (2005) reported that a one-unit increase in the disclosure level of Spanish firms resulted in a reduction of bid-ask spread of 1.78 point for these firms. However, further specification testing has been performed in the following section.

7 Sensitivity Analysis

The purpose of this section is to assess the sensitivity of the results reported in this study. Firstly, we examine two other specifications of the model presented in Table 3 (Botosan, 1997). The first specification test is to regress fractional rank\textsuperscript{15} of the \textit{SPREAD} on each of the fractional ranks of disclosure level, market beta, market capitalisation, shares’ prices and unranked dummy variables of industry type. The results of rank regression (not reported) confirm the results reported in Table 3. The second specification test is to allow the disclosure level to enter as a categorical variable. \textit{DISC} is set equal to one if the firm’s disclosure score is above the mean and zero otherwise. This specification test allows the level of \textit{SPREAD} to vary with two levels; high versus low disclosure level. The result (not reported) of regressing \textit{SPREAD} on \textit{DISC}, \textit{BETA}, \textit{LGMC}, \textit{LGPRICE} and industry type indicates a negative relationship between disclosure level and the bid-ask spread after controlling for other variables. Therefore, this result confirms the results documented in Table 3.\textsuperscript{16}

The correlation matrix in Table 2 suggests that the multicollinearity is not a problem since all correlations among explanatory variables are less than 0.90. However, the method of Variance Inflation Factor (VIF) was also applied to detect for multicollinearity. A VIF higher than 10 indicates a potential problem of multicollinearity (Kennedy, 1992). This happens when the correlations among variables are extremely high. However, all variance inflation factors (Table 3) are below 1.7 suggesting no evidence of multicollinearity problems in the multiple regression model.

Finally, in measuring the disclosure level for Jordanian listed companies, we assigned equal weights to the items of information included in a self-

\textsuperscript{15} The fractional ranks used in regression model are estimated according to the following equation: Fractional Rank =Rank of the firm/number of companies included in the sample.

\textsuperscript{16} We also divided the distribution according to the median of overall disclosure level without materially changing the main results presented in Table 3.
constructed disclosure index. To assess whether the results of DISC are sensitive to assumption of weights, we perform several alternative calculations of the disclosure scores by assigning different weights to different items/categories included in a self-constructed disclosure index ($DISC_1$, $DISC_2$, $DISC_3$). Botosan (1997) used an unweighted scheme in most parts to measure the firm’s disclosure level but she made exceptions for certain items. Using this approach, we assigned different points for certain items included in a self-constructed disclosure index. Items common to Botosan’s were assigned the same points. For example, we assigned one point if the annual report includes a statement of the corporate goal; two points are awarded to each item in non-financial information and management discussion and analysis; three points to information provided on future sales (two points for quantitative information on sales and one point for qualitative information). If all items included in the disclosure index ($DISC_1$) were applicable and disclosed by any firm, the maximum score awarded to that firm was 98 points.$^{17}$

An alternative calculation of disclosure level ($DISC_2$) was to assign one point to each item included in background information, two points to each item in the historical information category; financial ratios category; and employee information category. Finally, three points are awarded to the items in the remaining categories. If all items are applicable and disclosed by a firm, the maximum score the firm receives is 142 points.

Our final measure of disclosure level ($DISC_3$) is to assign two points to each item included in background information and future and projected information; one point to each item in the historical information category, financial ratios category, and employee information category; three points to the key of non-financial information category; four points to capital market data. Finally, five points are awarded to the items of information in remaining categories. If all items are applicable and disclosed by a firm, the maximum score the firm receives is 155 points.

Pearson’s (Spearman) correlations (not reported) among different measures of voluntary disclosure level using different weights ($DISC_1$, $DISC_2$, $DISC_3$) and equally-weighted approach ($DISC$) showed that the correlations coefficients between weighted measures and unweighted measure of disclosure ($DISC$) are highly correlated (more than 0.975) significant at .01 level of significance. This supports the argument that firms that are good in disclosing important items of information are also good in disclosing less important ones.

$^{17}$ The maximum score received in Botosan (1997) is 127 points.
8 Conclusion
This study evaluated the extent of voluntary disclosure of a 60 non-financial corporation listed at the ASE through the application of a self-constructed disclosure index \((DISC)\) to their annual reports. The results revealed that there was a considerable variation in the disclosure level among the listed companies. On average, a firm disclosed about 28.14\% of the items applicable to it. Different sets of analyses were employed for the assessment of the validity of our measure to disclosure level. Firstly, Cronbach’s coefficient alpha was used and the output showed a good internal consistency. Secondly, three independent academic raters were requested to measure disclosure level of a sample of firms included in this study. When the scores of these independent raters were compared with researchers’ scores, the results indicated a high degree of reliability. Thirdly, the correlation matrix between the overall disclosure level and its components was found to be positively and highly coordinated to each other. Fourthly, the content validity of a measuring instrument was also conducted in this study, which required the opinions of disclosure experts on the relevance of the voluntary disclosure items to be considered in the composite index. Finally, the validity of the disclosure instrument was also assessed by investigating the association between the extent of voluntary disclosure and other firm characteristics identified by prior studies to be associated with disclosure. The results of analyses revealed that disclosure level was associated with size of firm, listing status and industry type. Taken together, the validity analyses provided support for the claim that \(DISC\) is a valid measure of disclosure.

This study was also aimed at examining the association between voluntary disclosure and stock market liquidity measured by bid-ask spread \((SPREAD)\) at the ASE. The result of the study was consistent with the hypothesis of the study \((H_0)\) on showing that the higher level of disclosure provided in the Jordanian annual reports reduces the spread between bids and asks and thereby increases the stock market liquidity. This result suggests that disclosure is likely to be an important factor in increasing a company’s stock market liquidity, supporting the applicability of signaling theory in the context of Arab financial markets. Therefore, it is recommended that Jordanian companies listed at the ASE ought to disclose more information via annual report.

A number of different sensitivity analyses were applied in this study to investigate the sensitivity of the results reported on the relationship between \(DISC\) and \(SPREAD\). The results of these analyses showed that the coefficients of disclosure level remained negative at the 5\% level of significance or better. Therefore, the empirical results between annual
Voluntary disclosure and stock market liquidity

disclosure level and the stock market liquidity were not sensitive to these changes in specifications.

This paper is subject to the following limitations. First, the selection of companies is restricted to publicly traded industrial and service companies. Further research is needed to determine whether the results obtained from this study could be generalised to companies in other industries. Second, the number of firms included in the research is small and represents only 31.25% of the whole market restricted by the availability of data. Further research is needed to extend this examination to include more companies over two or more periods. Third, the self-constructed disclosure index was weighted according to the quantity rather than quality of content. It can be argued that measuring the disclosure index based on the quality of information would probably provide more robustness to the empirical results on the relationship between disclosure level and the stock market liquidity. Therefore, further research is needed to address the quality of self-disclosure. Finally, this study examines the impact of disclosure level on stock market liquidity as measured by bid-ask spread. The results of the study suggest that examining the impact of disclosure level on stock market liquidity using various liquidity measures would also provide insight as to whether there is consistency in the significant relationship between the disclosure level and different estimates of stock market liquidity.

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References


Voluntary disclosure and stock market liquidity


Voluntary disclosure and stock market liquidity


Appendix A: Voluntary information index

<table>
<thead>
<tr>
<th>Item of Information:</th>
<th>Background Information Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-A statement of corporate goals</td>
<td></td>
</tr>
<tr>
<td>2-A general statement of corporate strategy</td>
<td></td>
</tr>
<tr>
<td>3-Action taken during the year to achieve the corporate goals</td>
<td></td>
</tr>
<tr>
<td>4-Barriers to entry are discussed</td>
<td></td>
</tr>
<tr>
<td>5-Analysis of products/services</td>
<td></td>
</tr>
<tr>
<td>6-Description of principal markets</td>
<td></td>
</tr>
<tr>
<td>7-The impact of current competition on current profits</td>
<td></td>
</tr>
<tr>
<td>8-The impact of current competition on future profits</td>
<td></td>
</tr>
<tr>
<td>9-Multiple Language presentation</td>
<td></td>
</tr>
</tbody>
</table>
10-Information about the economy  
11-Discussion of major industry trends  
12-General information on the impact of inflation on the company  

**Future and Projected Information Category**  
13-Factors influencing future business  
14-Cash flow projection  
15-Planned research & development for the next year  
16-Information on future sales (revenue) – quantitative  
17-Information on future sales (revenue) – qualitative  
18-Forecast of next year’s profits  

**Management Discussion and Analysis Category**  
19-Discussion of changes in sales  
20-Discussion of changes in net income  
21-Discussion of changes in inventory  
22-Discussion of changes in market share  
23-Discussion of changes in gross profit  
24-Discussion of changes in account receivable  
25-Discussion of changes in selling & administrative expenses  
26-Discussion of changes in the cost of goods sold  

**Historical Information Category**  
27-Sales (Revenue) for last 3-5 years (JD)  
28-Sales (Revenue) for last 6-10 years (JD)  
29-Sales (Revenue) for past years (Quantity)  
30-Summary of net income for more than 5 years  
31-Historical summary of price range of ordinary shares for at least 6 years  

**Financial Ratios Category**  
32-Return on assets  
33-Net profit margin  
34-Liquidity ratios  
35-Gearing ratios  
36-Rate of growth in earnings per share for past years  
37-Ratio of number of units produced compared with previous year  
38-Working Capital  
39-Other ratios  

**Capital Market Data Category**  
40-Market capitalization at the end year  
41-Market share for each product/service produced by the company  
42-Number of outstanding shares compared with previous years  

**Acquisition and Disposal Category**  
43-Reason for disposals  
44-Discussion of future business opportunity of disposals  
45-Reason for acquisitions  
46-Discussion of future business opportunity of acquisitions  

**Key of Non-Financial Information Category**  
47-Units sold  
48-Unit selling price  
49-Growth in units sold
Voluntary disclosure and stock market liquidity

50-Information on input / output ratio
51-Volume of materials consumed
52-Price of materials consumed
53-Number of units produced
54-Breakdown of net income by major product lines, customer classes or geographical location
55-Financial graphics and pictures

**Employee Information Category**

56-Categories of employee by sex
57-Categories of employee by function
58-Number of employees for two or more years
59-Reasons for changes in employee numbers or categories over time
60-Money spent on training
61-Number of employees trained
62- Safety policy