A Reassessment of Stock Market Integration in SADC: the determinants of liquidity and price discovery in Namibia

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Abstract: The New Economic Partnership for Africa's Development focuses on the benefits to integration of many smaller African markets with South Africa as the central hub motivated by a wish to attract foreign investment and increase liquidity. However, little attention has been paid to issues regarding migration of liquidity and loss of the price discovery mechanism in a integrated union where one market dominates. This paper reviews this policy using the example of Namibia, which is the first market to be fully integrated with South Africa. Several established liquidity constructs are compared to determine their ability to explain the bid-ask spread plus a newly introduced measure of the proportion of daily zero returns which captures the dynamics of the price discovery process and traders' ability to trade on informational grounds that is found to be more appropriate in highly illiquid frontier markets such as Namibia. Finally there is evidence that liquidity (and illiquidity) is closely linked to the rule of law and control of corruption institutional quality measures, while the price-discovery process and hence trader participation in markets is highly sensitive to the control of corruption, political stability and regulatory quality.

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1. INTRODUCTION

The rapid proliferation of stock exchanges across Africa since 1990 has been driven by two policy objectives: to increase efficiency through privatization (Irving, 2005) and to achieve economic growth through financial development (Mosley, 2009). This has often been accompanied by structural adjustment programmes proposed by the international financial institutions that emphasise economic liberalisation and a reduction of state control over the economy. These policies may be implemented by intervention in product and factor markets, or by external activity, such as trade and foreign investment (Mosley, 2009). Much modern development strategy emphasises the central role of market institutions. These are considered necessary to facilitate the free movement of capital from savings and investment to projects where it is most needed with little attention paid to the role of transactions costs. However there has been less attention paid in the literature to issues regarding migration of liquidity and loss of price discovery mechanism, two pivotal functions of formal stock exchanges, to the dominant market within an integrated union (O'Hara, 2003),

Current initiatives developed by The New Economic Partnership for Africa's Development (NEPAD), the African Union (AU) and the Southern African Development Community (SACD) focus on the benefits to integration of many of the smaller African markets with South Africa as the central hub (NEPAD website (2010); Hearn and Piesse (2002, 2005)). The motivation for this integrated pan-African exchange is to attract foreign investment, increase liquidity and supplement the very low domestic investment rates, reflecting the requirements for financial liberalisation proposed in the early literature by McKinnon (1973) and Shaw (1973) and more recently by Wachtel (2001)). Thus, the first contribution of this paper is to review this policy using the example of Namibia, which is the first market to be fully integrated with South Africa. This builds upon earlier research that

questions the benefits from establishing very small stock exchanges in Swaziland and Mozambique (Hearn and Piesse, 2010a, b) and the effects of the local political economy in the integrated Francophone West African bourse in Cote d'Ivoire (Lavelle, 2001). It also extends research on the role of institutions in shaping the commercial and regulatory contracting environment (Joireman, 2001, 2005).

During the last decade there has been a proliferation of liquidity measures and the second contribution of the paper is to test the ability of three major estimators, the price-impact measure of Amihud (2002), the multidimensional trading speed construct of Liu (2006) and the turnover ratio to explain the bid-ask spread. In addition, a newly introduced measure of the proportion of daily zero returns which captures the dynamics of the price discovery process and traders' ability to trade on informational grounds will be examined. This new measure is both simple to construct and intuitive and is rooted in two underlying theories. The first is the proposition of Lesmond et al (1999) that traders at the margin will only trade when the combined value of their private and publicly available information exceeds the value of transactions costs in the market. This is then shown in a price movement that is reflects the incorporation of new information into prices. The second is based on a "freezing" principle where smaller, narrow markets are seen to freeze through a lack of participation which reflects' traders inability to rank trading opportunities during periods of extreme uncertainty thus leading to a total lack of participation in forming a market (O'Hara, 2003).

The advanced level of financial market integration between Namibia and South Africa is largely due to the closely related legal, political, commercial and government institutions that are a legacy of the past colonial era. This has been strengthened by the shared macroeconomic arrangements that follow from their joint membership of the Common Monetary Area (CMA). However, significant barriers remain. Firstly, there are transactions costs associated with asymmetric information between investors and issuers. Secondly

significant concerns have been raised regarding the loss of sovereignty of national assets with firms switching their primary listings to the South African market and thereby exacerbating the loss of liquidity and much needed investment alongside the price discovery process. These issues effectively relegate the smaller exchange to the role of being a satellite. In Namibia, the highly concentrated nature of financial activity in the area around Windhoek and the high transactions costs related to information search, verification, monitoring and surveillance in the rural areas means that investors tend to require considerable risk premiums if they are to invest in more distantly located projects. In particular, developing countries such as Namibia face considerable constraints in maintaining the necessary institutions and commercial innovation to compete with the better capitalized and more developed markets in South Africa. Thus, the third contribution of the paper is to investigate the institutional determinants of both liquidity and price discovery.

The paper is structured as follows. The next section briefly reviews the theoretical basis for the construction of the four liquidity measures. Section 3 outlines the characteristics and market microstructure of Africa's integrated markets, namely Egypt and the West African Francophone region. Section 4 outlines the data and empirical methodology. Section 5 discusses the findings and the final section concludes.

2. LIQUIDITY MEASUREMENT

There has been considerable evolution in liquidity measures during the last decade with these fitting into four principle classes of estimator. The first is the bid-ask spread (Jain, 2002) although a serious limitation arises when closing prices deviate from the official bid and ask price quotes given that trades take place at different prices or even outside the quotes (Lesmond, 2005).

The second class of estimator are volume based measures, commonly either the turnover ratio or the price-impact measures of Amihud (2002). The turnover ratio is one of the most established liquidity constructs with an array of applications in the literature and is a measure of trading frequently (see for example Rouwenhorst (1999), Bekaert et al. (2003), and Levine and Schmukler (2003). It relates traded volume to the total number of shares outstanding in the market for a single firm, but despite its common use it fails to capture any information relating to trading costs per trade which vary considerably between stocks. Given is narrow focus on volume alone this measure is likely to increase during periods of financial distress such as the Asian financial crisis or localised political instability affecting markets rather than decrease to reflect the decline in market activity and increased costs (Froot et al., 2001). However, this construct it has intuitive appeal due to its simple construction and the general availability of data. Given the turnover ratio is more a measure of liquidity or activity it is hypothesized to be inversely related with the bid-ask spread, which represents illiquidity.

The price impact construct of Amihud (2002) is defined as the daily absolute return to the US$ denominated with trading value and is useful where zero price changes exist and is especially common in African emerging markets where there is price rigidity. However, a significant disadvantage is that on zero volume days it is cannot be estimated, which limits its usefulness. Lesmond (2005) cites that the theory behind this measure relate to the price impact of order flow documented by Kyle (1985), which again reduces its usefulness in highly illiquid emerging and frontier markets with minimal order flow. However, given the price impact suggests illiquidity then this measure is positively associated with bid-ask spread.

The third class of construct is the recently developed trading speed indicator of Liu (2006) that captures the multidimensional nature of liquidity. This measure captures the continuity of trading and the potential delay or difficulty in executing an order. A shortcoming of this construct is that while its multidimensional nature facilitates its

performance in more illiquid markets Liu (2006) reports optimal results when using this measure over longer time periods in excess of a month, such as six or twelve months. This measure has is based on the theory of solvency or price as noted by Holmstrom and Tirole (2001). Their model focuses on the corporate demand for liquidity, as well as solvency constraints arguments promoted by Lustig (2001) and the view that leveraged investors facing solvency constraints will require higher expected returns for holding assets that are difficult to sell when aggregate liquidity is low (Pastor and Stambaugh, 2003). Thus, the Liu (2006) measure is an extension of this theoretical perspective in terms of the ease of execution by traders facing solvency constraints in their portfolios. As such the hypothesized relationship between the Liu (2006) measure and bid-ask spread is positive.

The final fourth class of estimator focuses on price discovery. A typical example is Roll (1984) who's model reconstructing an effective bid-ask spread from the auto-covariance properties of stock prices and the Lesmond, Ogden and Trzcinka (LOT) zero returns measure by Lesmond et al (1999) and the newly proposed proportion of daily zero returns construct introduced in this paper. A major issue reducing the effectiveness of the Roll (1984) auto covariance method and a limiting factor in its use is the reliance on informational efficiency of stock prices, particularly as there is considerable evidence that this is lacking in emerging and frontier markets (Ghysels and Cherkaoui, 2003). Lesmond et al (1999) and Lesmond (2005) argue the LOT measure is a more robust indicator of liquidity. However, its shortfalls are that in practice it is inestimable when the proportion of daily zero returns over a given period exceeds 80% (this is especially common to emerging and frontier markets – see Table 4) and its reliance on the CAPM as its theoretical base. Following O'Hara (2003) who argues that where a world characterised by finite numbers of assets and market participants who are subject to differential, rather than asymmetric, information the marginal informed trader will only trade when the intrinsic value of information exceeds the marginal costs of trading.

Should trading be costs be large, and these are common in frontier markets, then zero return days are more likely as new information must accumulate for longer periods before informed trade has an impact on price (Lesmond et al, 1999). Lesmond et al (1999, 2005) points out that shortfalls in their theoretical arguments are that a one-to-one mapping is implied between zero return and level of informed trade and the types of traders present in the market. More recently O'Hara and Easley (2010) cite that a lack of participation occurs in markets that are characterized by such high levels of uncertainty that renders a state of incompleteness in traders preferences that inhibit their ability to rank opportunity sets in terms of expected utility and thus when to trade. This uncertainty infers a lack of participation that is represented by prolonged price-rigidity. In practice the proportion of daily zero returns is a measure of price-rigidity and thus illiquidity and is hypothesized to be positively associated with bid-ask spread.

2.1 The Bid Ask spread

Data on the daily closing bid and ask quotes for each listed stock are from the Namibian Stock Exchange. The period is 1st January 1998 to 30th June 2009 and the sample considers all locally registered Namibian firms including those that have delisted during the period to mitigate possible survival bias. Two samples of listed firms were considered, the first with a primary listing in Namibia and the second with a primary listing in Johannesburg and a secondary listing in Namibia. The bid-ask spread is calculated using the average of the available monthly quotes with a minimum of a single month's quote for that month and the average used for the spread. This minimizes outliers and averages out highs or lows in quotes that result from monthly sampling. Finally, following Lesmond (2005) negative bid-ask spreads and those that exceed 80% are removed. The monthly quoted spread is defined as:

$$Quoted\ \ spread_M = 1/2\left[\left(\frac{(Ask_M - Bid_M)}{(Ask_M + Bid_M)/2}\right) + \left(\frac{(Ask_{M-1} - Bid_{M-1})}{(Ask_{M-1} + Bid_{M-1})/2}\right)\right] \quad (1)$$

2.2 Turnover

Data on daily trading volume and shares outstanding are from the Namibian stock exchange. Any turnover statistics that exceed 100% of the shares outstanding in any month were removed. Shares outstanding values are as of the year and remain constant for 12 months. The daily turnover measure is defined as:

$$1/D_M \sum_{t=1}^{M} (volume_t / \text{shares - outstanding}) \quad (2)$$

where D_M is the number of days in the month, M.

2.3 Amihud (2002) measure

Daily price and volume data are from the Namibian stock exchange. Following Lesmond (2005) the prices are used calculate daily returns. To control for outliers, a data error filter eliminates daily prices that are +/- 50% of the prior day's price and that day's price as well as previous day's price were removed. Equally if zero volume occurs on day t, then that day is not included in the average. Finally, the measure is multiplied by 10^6 following Amihud (2002) to provide a common representation of measures and facilitate comparison. The Amihud measure is defined as:

$$1/D_M \sum_{t=1}^{M} (|R_t| / Price_t \times Volume_t) \quad (3)$$

2.4 Liu (2006) measure

This follows Liu (2006) and is defined as LM_x which is the standardized turnover-adjusted number of zero daily trading volumes over the prior x months (x = 1, 6, 12), that is:

$$LM_x = (\text{Number of daily volumes in prior x - months}) + \left(\frac{1/x \text{ month turnover}}{Deflator}\right) \times (21x/NoTD) \quad (4)$$

where x_month_turnover is the sum of the daily turnover over the prior x months, daily turnover is the ratio of shares traded on a day to the number of shares outstanding at the end of the day, NoTD is the total number of trading days in the market over the prior x months, and Deflator is chosen such that,

$$0 < \frac{1/(x\ month\ turnover)}{Deflator} < 1 \qquad (5)$$

for all sample stocks[1]. Given the turnover adjustment (the second term in brackets in (5)), two stocks with the same integer number of zero daily trading volumes can be distinguished: the one with the larger turnover is more liquid. Thus the turnover adjustment acts as a tie-breaker when sorting stocks based on the number of zero daily trading volumes over the prior x months. Because the number of trading days can vary from 15 to 23, multiplication by the factor (21x/ NoTD) standardizes the number of trading days in a month to 21, which makes the liquidity measure comparable over time. LM1 can be interpreted as the turnover-adjusted number of zero daily trading volumes over the prior month. The liquidity measure, LM_x is calculated at the end of each month for each individual stock based on daily data.

2.5 Proportion of zero daily returns measure

The proportion of daily zero returns over a period of a month is the difference between daily closing stock prices, in local currency. The monthly proportion of daily zero returns is calculated on a stock-by-stock basis as:

$$\frac{1}{D_M}\sum_{D=1}^{n}(ZeroDaily\ \mathrm{Re}turn) \qquad (6)$$

where D_M is the number of days in month M. This simple construct is appealing compared with the LOT zero returns measure introduced by Lesmond et al (1999). Lesmond (2005)

[1] In line with Liu (2006) a deflator of 11,000 is used in constructing estimates for LM1

selected the MSCI world index of the largest 50 stocks from each of 23. However, in the case of the African frontier markets there are no suitable benchmarks (Hearn, 2012).

3. INTEGRATION AND THE NAMIBIAN STOCK EXCHANGE

3.1 Market microstructure characteristics of integrated African markets

The New Partnership for Africa's Development (NEPAD) development policy focuses on the integration of smaller fragmented stock exchanges into regional trading platforms (NEPAD, 2012) but neglects to take account of asymmetric information. Thus, issues such as common accounting standards, regulation related to information disclosure and conduct of trading and the legal and governance codes to provide protection of minority investor property rights has not been considered. To date only three markets in Africa have successfully adopted integrated trading platforms: Egypt between Cairo and Alexandria (Hearn, 2011), South Africa and Namibia (Piesse and Hearn (2002, 2012) and the West African Francophone regional bourse (BRVM) located in Cote d'Ivoire (Hearn and Piesse, 2010). All three examples have shared macroeconomic and governance arrangements through membership of currency unions. However, evidence from all three indicates that the smaller exchanges tend to become subordinate to the dominant one in terms of trading activity and order, which has also been observed in developed markets such as Germany (Klagge and Martin, 2005) and Japan (Hearn, 2011). Data for the Egyptian market in panel 1 of Table 1 confirms this where the daily average order flow in Alexandria is less than 6% annually with remainder to the dominant Cairo exchange.

Table 1

The Bourse Regionale des Valeurs Mobilieres (BRVM)[2], was established in 1998 to upgrade the former Bourse d'Abidjan to provide a regional focus across the Francophone Union Monétaire et Économique de l'Afrique de l'Ouest (UMEAO) community. Panel 2 of Table 1 shows that despite Sonatel, the Senegalese telecommunications company, being the single largest stock in terms of traded value and volume (Hearn and Piesse, 2010), the average monthly bid-ask spread is notably higher than either of the two other (non-Cote d'Ivoire) regional listings, the Niger and Benin Bank of Africa affiliates, and the mean spread across the Cote d'Ivoire listed firms. In contrast the proportion of daily zero returns is below the average for the aggregate BRVM for the two Bank of Africa entities, suggesting that despite an effective price discovery mechanism for this stock the liquidity in terms of solvency costs faced by market makers is high. Similarly, in panel 3, Table 1 the average bid-ask spread is generally higher for local firms listed in Namibia than those with a primary listing in Johannesburg while the proportion of daily zero returns is higher in Namibia. This also suggests that price discovery is better in South Africa, which is a function of an improved institutional environment and innovative market microstructure and that transactions costs are higher for Namibian.

3.2. The Namibian Stock Market

The Namibian stock exchange (NSX) was established on 30 September 1992 following independence in 1990. It was developed with funds contributed by Namibian firms with an interest in attracting capital market finance (NSX website, 2010). Initially, there was a single local stock broker and a dual listing of a Namibian firm already listed on the (JSE). Trading was by a simple automated system that was expanded with the growth in local stock broking

[2] The BRVM, or Bourse Regionale des Valeurs Mobilieres, as a regional stock exchange comprised of a central trading floor in Abidjan, Cote d'Ivoire and a network of licensed brokers, or Societe de Gestion et d'Intermédiation (SGI), spread throughout the Francophone West African Economic and Monetary Union, namely Union Monétaire et Économique de l'Afrique de l'Ouest (UMEAO), countries including Cote d'Ivoire, Benin, Togo, Burkina Faso, Mali, Niger, Senegal and Guinea-Bissau.

firms. The exchange was upgraded to the technical requirements of the Johannesburg Equities Trading (JET) system (Hearn and Piesse, 2002) and has since been replaced with the JSE-SETS system. However, despite the shared integrated trading link, settlement in South African primary listed securities is through the South African Central Securities Depository (CSD), which uses modern settlement reporting technology SAFIRES and SWIFT international communications and payments software (STRATE website, 2010). Namibia does not have a national CSD and settlement is by physical delivery of share certificates between brokers or their agents with payment through the domestic clearing system (Steynberg, 2010).

3.3 Primary Market

Regulation for primary market listings reflects that of the JSE, in common with all SADC exchanges. Listing is by three principle routes: a placing, an initial primary offering (IPO) and dual listing. A minimum of 30% of issued shares must be offered by the sponsoring broker to other Namibian brokers who allocate tranches of shares to private clients and institutions. As the offers are non-renounceable, that is, they are rights issues that cannot be bought and sold, these differ from straightforward offers to the public and do not require a detailed prospectus, thus reducing the cost (NSX Regulations, 2002). In comparison, the listing requirements for IPOs include a minimum of 150 shareholders with a minimum issued share capital of N$1,000,000, an issued share base of 1,000,000 shares and three previous years of audited financial statements, making this the most costly of the listing alternatives. Dual or cross listed shares are the least expensive for firms although they are required to adhere to the regulatory laws of the foreign jurisdiction (NSX Regulations, 2002).

Ownership of locally listed Namibian firms is in Table 2. The free-float market capitalization percentages, that is, the proportions of issued shares not held by block-

shareholders and thus freely available for trading, are generally between 20 and 30%, with the exception of Namibia Breweries and Namibia Harvest Investments. While these free-floats are not as low as on the Swazi and Mozambique markets, which are under 10% (Hearn and Piesse, 2009), they are still considerably lower than in South Africa (Bloomberg (2009); NSX (2006)). While all listed NSX firms have shareholders well in excess of the minimum 150 requirement the vast majority have a fractional holding only. Thus, despite the dispersed shareholding, controlling ownership is highly concentrated with these tending to be either insiders, corporate block-holders or financial institutions whose investments are restricted by the domestic asset retention requirements (Regulation 28) (Steynberg, 2010).

Table 2

3.4 Secondary Market

Table 4 shows that since inception listings on the NSX have been dominated by dual-listings. A significant proportion is Namibian firms cross-listing on the JSE to gain a cheaper source of external finance while retaining a presence in the domestic market. Others such as Anglo American and Old Mutual are major multinationals seeking to indigenize their operations while being listed in London. While the number of local listings is a third of the total overall market it is less than 3% of the overall market. Similarly, capitalization on the local market is less than 1% of the overall market, so clearly the NSX is not a source of external funds. The DevX market is more recent and while all entities are dual listed the capitalization in 2008 was more than double that of the local market although traded value was less than 7%.

Table 3

4. DATA AND METHODS

4.1 Data

Daily stock closing, bid and ask prices, total number of shares outstanding and traded volumes in local currency and converted into US$ are from the Namibian stock exchange and construction of the various constructs is described in the earlier section. Exchange rate data are from Bloomberg. Details of the firms with primary listing in Namibia and those with a primary listing in Johannesburg that make up the sample are in Table 4.

Some general observations can be made about the two sub-samples outlined in Table 4. The first confirms the characteristics in Table 1 where liquidity measured by bid-ask spread is notably higher for the primary listings in Namibia compared with the four firms with primary listings in South Africa. The opposite is true of the proportion of zero returns. Trading volumes are more than ten times higher in the local Namibian market than for those stocks with primary listing in South Africa despite their average market capitalization being almost double those in Namibia. Finally price and volatility, as indicators of traders inventory risks (Stoll, 2000) in the four Namibian stocks with South African primary listings are almost double those of the Namibian firms.

Table 4

The Spearman's rank correlations in Table 5 provide further confirmation of the differences between the two sub-samples. In particular ,daily returns volatility is highly correlated with all liquidity indicators in the local Namibian listed sub-sample emphasising the severe price-rigidity in the local market compared to the JSE where there is a no correlation between volatility and any other variables. Similarly there are more correlations between both market capitalization and stock price levels with all liquidity measures in South Africa but these are largely absent Namibia, indicating the depth and breadth of the JSE[i].

4.2 Relationship between liquidity measures and bid-ask spread

The first direct measure of association between the bid-ask spread and various market controls and liquidity measures are three sets of OLS regressions. The first uses the full sample of Namibian listed firms with a dummy variable equal to one if stock has a primary listing in South Africa and zero otherwise and then on the two sub-samples, that is, firms with a primary listing on the NSX and on JSE respectively.

In the first regression total trading costs is the dependent variable and the four liquidity control variables are the natural logarithm of monthly average of daily price, volatility, traded volume and size or market capitalization, following Stoll (2000). These controls are selected on the basis that price controls for "price discreteness" as lower price stocks tend to be more riskier than their higher risk counterparts. Traded volume and firm size represent order processing and inventory and signify the risk involved in locating a trading counterparty. Finally volatility represents the risks of placing a stock into a trading inventory through adverse price changes. In the second set of regressions the dependent and independent variables are the same but with the addition of each of the four liquidity measures added individually in turn. The final regression includes the same dependent and independent variables and all the liquidity measures.

4.3 The determinants of liquidity: institutional factors

To explore the link between liquidity levels and differences in institutional quality the firm level data are transformed into annual averages of monthly values. Then the six annual World Bank Governance indicators (Kaufman et al, 2009) are used to represent: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. These are individually added into the models alongside the controls to assess the impact of each on liquidity, following Lesmond (2005). Finally in line with Lesmond (2005) a random effects

estimator was used in the panel regression as the lack of variation in the institutional variables within each country made a fixed effects estimation inappropriate.

5. RESULTS AND DISCUSSION

5.1 Relationship between liquidity measures and bid-ask spread: An assessment of liquidity measures ability in explaining total costs

The regression results in Table 5 suggest clear differences between the two sub-samples. In the overall sample the South African primary listed dummy coefficient is consistently large, positive and statistically significant confirming empirical support for the higher bid-ask for Namibian firms listing in South Africa compared to those listed in their domestic exchange. In addition the explanatory power of all models of the Namibian sub-sample is one third that of the South African sub-sample. In terms of the market controls it is notable that the relationships between these and the bid-ask spread largely conform to those documented in Stoll (2000) for the South African sub-sample. Thus, the estimated coefficients on price, traded volume and size (market capitalization) are negative while that on volatility is positive. However, sign on the estimated coefficients in the Namibian sub-sample alternate between positive and negative which reflects the ambiguity reported in Lesmond (2005) between size and total trading costs for a sample of 23 emerging markets.

The evidence from both individual models with recursively added liquidity measures as well as from the final regressions indicates that in both sub-samples the explanatory power is higher when the proportion of daily zero returns price-rigidity construct and the turnover liquidity measure are included and the coefficients on these variables are large and significantly different from zero. However, the Amihud (2002) price-impact measure is significant only in the South African sub-sample. The Liu (2006) construct consistently lacks

statistical significance, which suggests it is not appropriate in illiquid markets such as frontier markets like Namibia.

Table 5

5.2 The determinants of liquidity: globalization factors

Random effects tests were conducted on the two liquidity measures exhibiting the highest greatest statistical superiority, that is the proportion of zero returns and turnover and the bid-ask spread construct. The sample was all the firms listed on NSX and the results are in Table 6. In general, the relationships between all the market controls and each of the dependent variables are consistent with the literature. In particular, the price level, traded volume and market capitalization are all negatively related to illiquidity, but the opposite in the case where the dependent variable is turnover. The only exception is the negative coefficient associated with market capitalization, where turnover is actually an indicator of liquidity.

There is a similarly large impact between the institutional quality measures of the control of corruption and rule of law and of transactions costs when the bid-ask spread and turnover ratio are the dependent variables. Control of corruption explains 55.70% of transactions costs, measured by bid-ask spread, and 158.10% of transactions costs, measured by the turnover ratio. Similarly, the rule of law explains 96.50% of transactions costs using bid-ask spread and 193.80% of transactions costs using the turnover ratio. However, an additional relationship exists in the case of the turnover ratio and government effectiveness, which suggests that promoting the private sector enhances policies by central government. This institutional measure alone explains 233.20% of transactions costs in the case of the turnover ratio.

In contrast to the relationships between institutional quality and liquidity-based transactions costs measures, that between institutional quality and price rigidity are

considerably larger and statistically significant. Transactions costs, defined in terms of price-rigidity, are related with a coefficient of 15.272 to control of corruption, but this coefficient is positive suggesting that enhanced corruption control leads to greater price-rigidity. This seems a counter-intuitive result in terms of liquidity but can be explained as a wholesale lack of participation by traders, the "freezing" of activity where there are information asymmetries that could lead to even greater uncertainty and the inability to rank potential trading opportunities. There is also a strong relationship between both political stability (-11.509) and regulatory quality (-78.941) and the proportion of daily zero returns. This provides further evidence of the acute sensitivity between price-rigidity where uncertainties linked to political stability, regulatory capture and corruption are significant.

Table 6

6. CONCLUSIONS

This paper introduces a new measure of liquidity, namely the proportion of zero daily returns in a month that is simple and intuitive. This is compared to a selection of other common liquidity measures from the literature, that is, the price-impact indicator of Amihud (2002), the turnover measure, and the multidimensional trading speed measure of Liu (2006) in their ability to explain the bid-ask spread. Standard OLS regression is used to test this association on the population of local firms listed on the Namibian stock exchange. The sample is then divided into those with primary listing on the NSX and those whose primary listing is on the JSE. Finally the institutional determinants of liquidity are explored by relating liquidity measures to six World Bank institutional quality measures.

There is substantial evidence to show that conventional measures such as Amihud (2002) price-impact and multidimensional trading speed measure of Liu (2006) are not effective where conditions of severe illiquidity exist in emerging and frontier markets such as

Namibia. Instead the evidence suggests that simple constructs are more effective, such as the proportion of zero returns, price-rigidity measure, and the turnover volume-based measure. Finally there is evidence that liquidity (and illiquidity) is closely linked to the rule of law and control of corruption institutional quality measures, while the price-discovery process (and hence trader participation in markets) is highly sensitive to the control of corruption, political stability and regulatory quality. These results confirm the importance of the wider institutional environment in maximising the benefits accruing to smaller markets within an integrated union.

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Table 1. Characteristics of Africa's integrated equity markets

		2004	2005	2006	2007	2008	2009
Panel 1: Egypt							
Traded Volume (Daily average, '000)	Cairo: Buy Orders	6,697 [5,994]	15,957 [11,604]	30,281 [27,022]	44,698 [38,474]	86,544 [75,204]	117,919 [99,331]
	Cairo: Sell Orders	6,708 [5,937]	16,025 [11,475]	30,311 [27,160]	44,647 [38,556]	86,852 [75,686]	117,719 [99,079]
	Alexandria: Buy Orders	463 [408]	875 [665]	1,469 [1,427]	1,844 [1,744]	3,290 [3,042]	6,410 [5,646]
	Alexandria: Sell Orders	452 [387]	806 [698]	1,439 [1,339]	1,894 [1,796]	2,983 [2,733]	6,610 [5,604]
	CASE Overall (Matched trades)	7,160 [6,498]	16,832 [12,355]	31,750 [28,544]	46,541 [40,479]	89,834 [78,444]	124,329 [104,415]
Traded Value Daily average, US$m	Cairo: Buy Orders	6.24 [5.04]	29.52 [19.72]	53.69 [41.24]	52.65 [44.21]	91.84 [65.69]	73.25 [63.54]
	Cairo: Sell Orders	6.25 [5.06]	29.60 [19.65]	53.72 [41.15]	52.52 [44.00]	92.00 [65.81]	73.20 [63.78]
	Alexandria: Buy Orders	0.23 [0.20]	1.05 [0.67]	1.70 [1.49]	1.22 [1.15]	1.99 [1.83]	3.38 [2.90]
	Alexandria: Sell Orders	0.23 [0.20]	0.97 [0.71]	1.68 [1.48]	1.35 [1.30]	1.83 [1.72]	3.43 [2.76]
	CASE Overall (Matched trades)	6.48 [5.35]	30.57 [20.28]	55.39 [43.01]	53.87 [45.54]	93.83 [67.38]	76.63 [66.40]

Panel 2: BRVM		**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Bid-Ask spread,	Cote d'Ivoire*	7.34 [7.25]	9.51 [9.38]	7.87 [7.73]	8.84 [8.87]	-- --	-- --
average monthly %	Senegal (Sonatel)	3.86 [3.07]	5.51 [4.83]	5.61 [6.05]	7.57 [6.64]	-- --	-- --
	Niger (Bank of Africa)	-- --	2.47 [1.98]	1.98 [1.98]	3.51 [1.98]	-- --	-- --
	Benin (Bank of Africa)	1.26 [1.33]	1.45 [1.51]	1.70 [1.70]	2.10 [1.70]	-- --	-- --
	Overall	6.97 [6.83]	8.52 [8.46]	7.16 [7.08]	8.18 [8.19]	-- --	-- --
% Daily Zero	Cote d'Ivoire*	93.44 [95.65]	93.72 [100.00]	91.41 [95.35]	90.24 [95.00]	86.95 [90.69]	-- --
Returns, annual	Senegal (Sonatel)	50.70 [52.28]	67.75 [63.64]	57.94 [57.91]	62.98 [64.43]	52.28 [54.55]	-- --
average of monthly	Niger (Bank of Africa)	-- --	84.38 [88.48]	96.55 [95.45]	94.58 [95.35]	93.53 [95.35]	-- --
values	Benin (Bank of Africa)	87.42 [88.51]	91.67 [95.35]	88.45 [88.72]	89.64 [91.11]	86.94 [90.69]	-- --
	Overall	91.85 [95.65]	92.68 [98.81]	90.54 [95.24]	89.59 [93.75]	86.17 [89.56]	-- --
Panel 3: Namibia							
Bid-Ask spread,	Anglo-American (London)	2.55 [1.49]	3.77 [0.40]	0.40 [0.40]	0.40 [0.40]	0.40 [0.40]	0.40 [0.40]
average monthly %	Local firms - NSX	37.16 [21.17]	44.09 [27.13]	47.70 [25.90]	51.85 [39.52]	63.37 [40.00]	52.58 [35.38]
	Local firms - JSE	47.13 [44.44]	32.25 [44.44]	31.56 [44.44]	36.97 [44.44]	38.63 [44.44]	38.63 [44.44]
	Dual listed firms from JSE	21.19 [8.91]	37.18 [15.88]	51.94 [23.78]	49.33 [21.05]	49.42 [26.32]	46.94 [15.79]
	Dev-X**	-- --	-- --	-- --	-- --	-- --	-- --
% Daily Zero	Anglo-American (London)	11.36 [9.09]	14.92 [13.96]	8.10 [4.88]	7.68 [6.85]	6.43 [4.65]	11.41 [9.09]
Returns, annual	Local firms - NSX	99.21 [100.00]	98.78 [100.00]	98.02 [100.00]	99.10 [100.00]	98.50 [100.00]	99.25 [100.00]
average of monthly	Local firms - JSE	89.94 [100.00]	88.46 [100.00]	85.54 [98.91]	89.24 [100.00]	88.97 [100.00]	91.71 [100.00]
values	Dual listed firms from JSE	52.02 [40.02]	57.22 [38.10]	55.42 [33.30]	56.47 [61.39]	61.51 [100.00]	63.61 [100.00]
	Dev-X**	-- --	-- --	-- --	56.78 [37.01]	8.89 [5.84]	11.71 [7.14]

Source: Compiled by authors: data from Cairo and Alexandria Stock Exchange and BRVM (Cote d'Ivoire) and Bloomberg

Notes: (1) *indicates that 33 of the 36 Ivorian listed firms are based in Abidjan. There are insufficient data to report the most recent listings from Burkina Faso (Onatel) and regional cross-listing of Ecobank Transnational Inc. (ETI, domiciled in Lome, Togo)

(2)**indicates all firms listed in Dev-X (development board) have primary listings in Australia, London or Toronto

(2) Square brackets indicate Median values

(3) US$ exchange rates obtained from Bloomberg

Table 2. Ownership and corporate governance in the Namibian local market: 2001 and 2007

Panel 1: Ownership in 2001	African Portland Ind.	CIC Holdings	FNB/ FNK Namibia	Gendor	Nam Harvest Invest	Namibia Breweries	Nam. Sea Products	PEP Namibia
No. Shareholders	133	880	884	224	338	1,302	1,834	683
No. holders >3%	6	7	2	7	7	3	4	3
No. holders <1%	124	863	882	217	331	1,298	1,829	680
Evolution of listing	Delisted: 31/08/2005			Delisted: 04/02/2003			Delisted	Delisted: 15/03/2004
Block holders	34.17%	71.05%	96.37%	74.51%	57.72%	90.18%	85.96%	96.90%
Directors/ Insiders	9.59%	7.23%	-- --	-- --	-- --	-- --	-- --	-- --
Venture Capital	43.59%	-- --	-- --	19.39%	35.10%	-- --	-- --	-- --
Free Float (%)	30.00%	30.00%	30.00%	30.00%	40.00%	50.00%	20.00%	20.00%

Panel 2: Ownership in 2007	CIC Holdings	FNB/ FNK Namibia	Nam Harvest Invest	Namibia Breweries	Oryx Properties	Stimulus Invest	Trustco
No. Shareholders	578	2,484	312	1,197	225	27	2,871
No. holders >3%	5	3	7	4	7	7	4
No. holders <1%	572	2,480	305	1,192	215	20	2,867
Block holders	91.09%	88.72%	70.39%	93.24%	65.08%	89.25%	24.27%
Directors/ Insiders	-- --	-- --	-- --	-- --	-- --	-- --	69.86%
Venture Capital	-- --	-- --	22.60%	-- --	17.36%	8.49%	-- --
Free Float (%)	8.91%	11.28%	7.01%	6.76%	17.56%	2.26%	5.87%

Source: Compiled by authors from Namibian stock exchange Transfer Secretaries (Pty) Ltd

Table 3. Namibian secondary equity market, 1999 to 2009, US$m

	Overall market				Local market				Development Market			
	No. Listings	M. Cap	Trade Value	Volume ('000)	No. Listings	M. Cap	Trade Value	Volume ('000)	No. Listings	M. Cap	Trade Value	Volume ('000)
1999	41	44,461.10	268.25	208,472	14	566.96	19.72	55,370				
2000	36	44,943.30	332.59	221,352	14	313.70	19.86	57,558				
2001	37	68,126.60	270.31	143,468	14	240.34	8.30	25,286				
2002	35	51,478.30	183.78	117,860	12	230.08	1.80	32,357				
2003	35	61,291.20	271.19	121,557	11	273.49	2.44	9,674				
2004	32	76,412.20	379.15	158,857	9	294.53	15.04	39,126				
2005	28	102,471.00	448.32	120,835	9	350.19	4.65	13,767				
2006	28	148,136.00	894.01	234,586	11	508.64	16.22	73,988				
2007	25	1,186,365	1,450.30	242,597	7	636.59	18.69	48,325	2	928.99	0.03	7
2008	26	98,098.20	1,211.19	274,352	10	761.62	18.29	26,711	4	688.26	4.14	72,590
2009	33	136,363.00	1,160.41	338,077	7	948.83	24.52	17,746	7	3,116.12	1.75	4,894

Source: Compiled by authors from Namibian Stock Exchange and Bank of Namibia (BoN)

Table 4 Sample summary statistics of Namibian listed firms with primary listings on JSE and NSX

		Local market					US$ equivalent		
Firm	**Delisting**	**Zero Return (%)**	**Price**	**Volatility**	**Volume ('000)**	**Mkt. Cap. (m)**	**Price**	**Mkt. Cap. (m)**	**Bid-Ask spread (%)**
NSX listed									
African Portland Ind.	31/08/2005	97.60 [100.00]	0.68 [0.30]	0.15 [0.03]	855.95 [190.40]	11.52 [5.24]	0.11 [0.04]	1.83 [0.75]	37.76 [18.18]
African Partnership	03/08/2000	99.53 [100.00]	1.39 [1.21]	0.02 [0.01]	210.75 [116.9]	214.26 [187.55]	0.23 [0.20]	35.13 [31.55]	-- --
CIC Holdings	16/04/2007	92.35 [95.24]	0.60 [0.46]	0.08 [0.03]	1173.63 [72.69]	100.26 [88.96]	0.09 [0.07]	15.01 [12.63]	25.76 [23.72]
Engen	06/11/1998	36.49 [19.52]	20.92 [21.33]	2.09 [0.03]	219.64 [12.55]	-- --	3.91 [4.06]	-- --	23.30 [24.00]
FNB Namibia	-- --	93.40 [100.00]	4.15 [4.46]	0.10 [0.01]	350.67 [62.20]	822.77 [892.00]	0.60 [0.63]	118.68 [126.43]	11.84 [10.65]
Gendor	04/02/2003	96.58 [100.00]	0.59 [0.70]	0.06 [0.02]	1,672.74 [125.00]	155.41 [218.69]	0.09 [0.09]	22.59 [26.38]	29.13 [21.64]
Gold Fields Namibia	21/04/1998	86.56 [100.00]	0.87 [0.70]	0.32 [0.05]	81.43 [40.00]	-- --	0.17 [0.14]	-- --	97.73 [78.03]
McCarthy Retail	10/08/2000	93.74 [100.00]	3.06 [3.02]	0.65 [0.05]	217.79 [141.38]	573.10 [597.43]	0.52 [0.49]	95.68 [93.80]	6.36 [6.30]
Namibia Asset Mgmt.	-- --	99.21 [100.00]	0.26 [0.25]	0.04 [0.03]	12.70 [6.95]	51.05 [50.00]	0.03 [0.03]	6.66 [6.61]	70.25 [60.12]
Namibia Breweries	-- --	84.21 [89.74]	3.13 [2.91]	0.04 [0.01]	657.87 [214.01]	642.67 [601.16]	0.44 [0.45]	90.39 [91.94]	11.30 [7.49]
Namibia Harvest	21/06/2006	93.67 [95.65]	0.34 [0.15]	0.06 [0.03]	773.49 [231.18]	70.21 [30.00]	0.05 [0.02]	10.44 [4.91]	28.56 [19.58]
Oryx Properties Ltd	-- --	96.77 [100.00]	7.88 [7.46]	0.01 [0.00]	205.55 [21.35]	387.64 [306.59]	1.08 [1.11]	52.46 [49.4]	9.48 [3.29]
PEP Namibia Hold.	15/03/2004	93.38 [95.65]	1.27 [0.26]	0.14 [0.02]	99.48 [18.60]	38.17 [8.08]	0.22 [0.03]	6.51 [0.97]	69.23 [43.49]
Sentra Namibia	22/10/2002	97.92 [100.00]	4.97 [4.96]	0.28 [0.00]	108.63 [9.70]	18.41 [18.55]	0.63 [0.59]	2.32 [2.20]	3.73 [1.77]
Stocks & Stocks	21/02/2000	93.31 [100.00]	1.81 [0.54]	1.77 [0.06]	120.90 [68.95]	145.09 [43.45]	0.30 [0.09]	24.09 [7.35]	-- --
Overall (NSX)		94.39 [100.00]	2.71 [1.79]	0.04 [0.02]	651.69 [243.77]	301.13 [262.79]	0.40 [0.29]	44.80 [42.56]	25.45 [13.19]
JSE listed									
Namibian Fishing Ind.	03/02/2005	93.70 [95.65]	0.78 [0.72]	0.04 [0.02]	11.98 [0.00]	57.09 [53.16]	0.11 [0.09]	7.79 [6.20]	34.41 [29.10]
Namibian Sea Products	-- --	87.53 [95.00]	0.23 [0.17]	0.08 [0.07]	82.59 [0.00]	25.59 [19.23]	0.04 [0.03]	3.97 [2.97]	64.47 [56.29]
Nictus	-- --	97.38 [100.00]	0.76 [0.70]	0.12 [0.03]	8.64 [0.00]	27.73 [30.46]	0.11 [0.10]	3.63 [4.30]	35.99 [44.44]
Oceana Group Ltd	-- --	65.74 [59.09]	13.45 [14.87]	0.03 [0.02]	104.55 [6.34]	1,503.87 [1,632.10]	1.82 [2.10]	203.45 [240.22]	8.39 [4.88]
Overall (JSE)		83.85 [92.50]	4.76 [0.78]	0.07 [0.03]	52.36 [12.53]	516.46 [437.17]	0.63 [0.10]	69.19 [5.86]	34.03 [32.65]

Notes: (1) Sample start date in all cases is January 1998

Source: Compiled by authors from Bloomberg, Datastream and Namibian stock exchange

Table 5 Bid-Ask Spread on liquidity proxies and measures

The results of the panel regression tests are based on a firm-monthly basis using bid-ask spread as the dependent variable. Three liquidity measurement variables are presented. Amihud is the liquidity measure of Amihud (2002), which is defined as the daily ratio of the absolute return on a day to the traded value for that particular day averaged over the past 1 month and provides a measure of the price impact. Liu is the measure of Liu (2006) and represents a standardized turnover-adjusted number of zero returns over the prior month. Turnover is a ratio of the traded volume of shares in relation to total number of shares outstanding and is scaled by the number of trading days in the month of measurement. It provides a measure of trading frequency. The final measure is the Bid Ask spread which is the average daily relative bid ask spread over the prior 1 month, where daily relative spread is the local currency denominated spread divided by average of Bid and Ask prices. Firm size is determined from the first day of each month. Volatility is the average daily stock return variance and price and volume measure the average price (local currency units) and trading volume over an annual trading period. Turnover, price, volume, and market capitalisation are all log scaled in line with Stoll (2000). N is the sample size in firm months. The White cross-section t-statistics are in parentheses.

N	Intercept	Price	Volatility	Volume	Size	Primary Listing in RSA	% Zero Daily Returns	Amihud	Liu	Turnover	Adj-R^2 (%)
Local Namibian Firms Overall											
1,085	1.269	-0.003	0.303	-0.004	-0.055	0.078 [4.19] †					0.1711
	[11.70]	[-1.82]	[3.17]	[-2.24]	[-9.82]						
	1.196	-0.002	0.303	-0.003	-0.054	0.083 [4.38] †	0.001 [1.12]				0.1707
	[9.61]	[-1.16]	[3.15]	[-1.72]	[-9.73]						
	1.272	-0.003	0.304	-0.004	-0.055	0.079 [4.22] †		**-4.04E-05 [-1.74]****			0.1711
	[11.71]	[-1.83]	[3.16]	[-2.14]	[-9.83]						
	1.270	-0.003	0.302	-0.004	-0.055	0.078 [4.20] †			-1.64E-04 [-0.31]		0.1704
	[11.76]	[-1.81]	[3.16]	[-1.96]	[-9.85]						
	1.354	-0.002	0.306	0.005	-0.060	0.074 [3.93] †				**-0.017 [-2.11]****	0.1726
	[11.18]	[-1.05]	[3.24]	[1.23]	[-9.51]						
	1.273	-0.001	0.307	0.008	-0.060	0.083 [4.29] †	**0.001 [1.57]***	**-4.73E-05 [-1.88]****	-0.0003 [-0.73]	**-0.021 [-2.49]** †	0.1724
	[9.77]	[-0.31]	[3.18]	[1.90]	[-9.57]						
Local Namibian Firms NSX											
633	1.205	0.002	0.302	-0.0003	-0.053						0.0830
	[8.81]	[1.09]	[1.49]	[-0.11]	[-7.50]						
	0.626	0.003	0.430	0.004	-0.049	-- --	**0.005 [5.27]** †				0.0939
	[3.83]	[1.44]	[1.97]	[1.45]	[-7.09]						
	1.206	0.002	0.306	-0.0003	-0.053	-- --		-2.80E-05 [-0.23]			0.0815
	[8.73]	[1.07]	[1.49]	[-0.10]	[-7.43]						
	1.204	0.002	0.303	-0.0005	-0.053	-- --			1.41E-04 [0.17]		0.0815
	[8.84]	[1.08]	[1.48]	[-0.18]	[-7.51]						
	1.339	0.004	0.306	0.012	-0.061	-- --				**-0.023 [-1.83]****	0.0856
	[8.16]	[1.65]	[1.58]	[1.91]	[-7.10]						
	0.690	0.005	0.479	0.029	-0.062	-- --	**0.007 [6.72]** †	-5.12E-05 [-0.44]	-0.001 [-1.18]	**-0.040 [-3.25]** †	0.1003
	[4.01]	[2.55]	[2.36]	[4.10]	[-7.36]						

N	Intercept	Price	Volatility	Volume	Size	Primary Listing in RSA	% Zero Daily Returns	Amihud	Liu	Turnover	Adj-R^2 (%)
Local Namibian Firms JSE											
452	1.599	-0.001	0.228	-0.010	-0.067						0.2626
	[5.64]	[-0.36]	[2.44]	[-4.27]	[-4.23]						
	1.884	-0.008	0.217	-0.013	-0.065	-- --	**-0.003 [-4.00]** †				0.2757
	[6.78]	[-1.71]	[2.43]	[-4.92]	[-4.03]						
	1.599	-0.002	0.229	-0.010	-0.067	-- --		**-3.32E-05 [-1.36]***			0.2622
	[5.63]	[-0.39]	[2.44]	[-4.14]	[-4.22]						
	1.601	-0.001	0.227	-0.009	-0.067	-- --			-0.001 [-0.76]		0.2615
	[5.63]	[-0.36]	[2.43]	[-3.9]	[-4.22]						
	1.625	-0.001	0.229	-0.003	-0.069	-- --				**-0.015 [-1.59]***	0.2629
	[5.73]	[-0.32]	[2.45]	[-0.52]	[-4.33]						
	1.918	-0.008	0.218	-0.003	-0.067	-- --	**-0.003 [-4.08]** †	**-3.13E-05 [-1.28]***	-0.001 [-1.21]	**-0.018 [-1.86]****	0.2749
	[6.84]	[-1.68]	[2.42]	[-0.55]	[-4.11]						

Notes: (1) * Denotes significance at the 90% level
(2) ** Denotes significance at the 95% level
(3) † Denotes significance at the 99% level

Table 6 Institutional quality determinants of liquidity and price discovery random effects tests

Country random effects regression coefficients are reported for annual average of monthly liquidity measures on each of the six institutional quality measures for Namibia and South Africa, in the case of those stocks with a primary listing in Johannesburg. Primary Listing RSA is a dummy variable set to one for stocks with primary listings in Johannesburg and is set to zero for those with primary listings in Namibia. The six institutional quality measures are disseminated by World Bank (World Bank Governance website, 2011) and are defined in terms of construction both on website as well as in Kaufman et al (1999). Liquidity measures are the bid ask spread and the proportion of zero daily price returns (see Lee (2011)). The firm liquidity characteristics are price, volume and daily return volatility. These are in line with Stoll (2000) and owing to multicollinearity the additional market capitalization variable is omitted. Price and volume are natural log scaled. These are in line with Stoll (2000). There are 99 observations per regression

	% Zero Returns (Price Discovery)					
Institutional Quality measure	**Corruption Control**	**Government Effectiveness**	**Political Stability and Absence from Terrorism**	**Regulatory Quality**	**Rule of Law**	**Voice & Accountability**
Intercept	107.73 [13.10] ††	115.819 [10.37] ††	120.328 [14.30] ††	168.058 [5.50] ††	121.316 [7.54] ††	125.778 [5.94] ††
Corruption Control	**15.272 [1.62]***					
Government Effectiveness		-1.306 [-0.07]				
Political Stability			**-11.509 [-1.38]***			
Regulatory Quality				**-78.941 [-1.78]****		
Rule of Law					-1.713 [-0.07]	
Voice & Accountability						-9.416 [-0.27]
Primary Listing RSA	-10.419 [-2.59] †	-9.967 [-2.24]**	-11.794 [-2.63] †	-5.299 [-0.79]	-9.801 [-1.61]*	-8.723 [-1.28]*
Market Cap.	-0.606 [-1.49]*	-0.602 [-1.36]*	-0.417 [-1.01]	-0.875 [-2.07]**	-0.902 [-2.07]**	-0.857 [-1.71]**
Traded Volume	-1.406 [-6.71] ††	-1.307 [-7.70] ††	-1.393 [-8.67] ††	-1.279 [-5.60] ††	-1.263 [-5.80] ††	-1.268 [-5.99] ††
Volatility	9.042 [1.44]*	11.050 [1.39]*	9.074 [1.28]*	3.926 [0.56]	6.337 [0.90]	5.543 [0.80]
Price	-0.901 [-2.96] ††	-0.904 [-2.96] ††	-0.866 [-2.97] ††	-0.774 [-2.72] ††	-0.861 [-2.99] ††	-0.865 [-3.01] ††

Institutional Quality measure	**Bid Ask Spread (Illiquidity)**					
	Corruption Control	**Government Effectiveness**	**Political Stability and Absence from Terrorism**	**Regulatory Quality**	**Rule of Law**	**Voice & Accountability**
Intercept	1.884 [2.77] ††	1.842 [2.13]**	1.653 [2.69] ††	1.273 [1.23]	2.108 [3.60] ††	2.096 [2.36] †
Corruption Control	**-0.557 [-1.29]***					
Government Effectiveness		-0.324 [-0.44]				
Political Stability			0.165 [0.58]			
Regulatory Quality				0.713 [0.71]		
Rule of Law					**-0.965 [-2.01]****	
Voice & Accountability						-0.656 [-1.25]
Primary Listing SA	0.026 [0.20]	0.050 [0.34]	0.037 [0.26]	-0.029 [-0.23]	-0.002 [-0.02]	0.085 [0.46]
Market Cap.	-0.067 [-2.06]**	-0.070 [-2.30]**	-0.076 [-2.20]**	-0.072 [-2.18]**	-0.064 [-1.97]**	-0.069 [-2.25]**
Traded Volume	-0.010 [-1.30]*	-0.013 [-1.50]*	-0.013 [-1.54]*	-0.014 [-1.68]**	-0.012 [-1.73]**	-0.014 [-1.73]**
Volatility	0.536 [1.54]*	0.539 [1.60]*	0.518 [1.54]*	0.538 [1.37]*	0.418 [1.28]*	0.440 [1.08]
Price	-0.010 [-1.54]*	-0.009 [-1.47]*	-0.009 [-1.48]*	-0.009 [-1.28]*	-0.008 [-1.20]	-0.009 [-1.36]*
	Turnover (Liquidity)					
Intercept	2.540 [3.11] ††	1.634 [2.11] **	2.485 [3.12] ††	3.012 [2.84] ††	2.300 [3.31] ††	2.769 [4.19] ††
Corruption Control	**1.581 [3.80]** ††					
Government Effectiveness		**2.332 [3.47]** ††				
Political Stability			0.524 [0.75]			
Regulatory Quality				-0.336 [-0.35]		
Rule of Law					**1.938 [2.17]****	
Voice & Accountability						0.096 [0.10]
Primary Listing SA	-0.334 [-1.70]**	-0.573 [-1.96]**	-0.215 [-0.89]	-0.276 [-1.15]	-0.264 [-1.46]*	-0.306 [-0.98]
Market Cap.	-0.178 [-3.58] ††	-0.153 [-3.29] ††	-0.153 [-2.65] †	-0.149 [-3.52] ††	-0.182 [-3.73] ††	-0.151 [-3.26] ††
Traded Volume	0.467 [48.43] ††	0.471 [46.81] ††	0.486 [32.76] ††	0.480 [40.84] ††	0.475 [43.34] ††	0.480 [40.54] ††
Volatility	0.209 [0.46]	0.117 [0.25]	0.372 [0.57]	0.315 [0.55]	0.455 [0.73]	0.338 [0.54]
Price	0.043 [4.42] ††	0.041 [4.13] ††	0.034 [3.21] ††	0.039 [3.86] ††	0.040 [3.95] ††	0.039 [3.68] ††

Notes: (1) * Denotes significance at the 90% level (2) ** Denotes significance at the 95% level (3) † Denotes significance at the 99% level (4) †† Denotes significance at the 99-95% level

[i] Spearman's rank correlation tables are available from the authors upon request and are omitted in order to maintain brevity