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Determinants of Stock Market Liquidity: Auto-Regressive Distributed Lag Based Evidence from the Emerging Equity Market

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ABSTRACT

Purpose: This research examines the impact of oil prices, exchange rate, stock market index, market volatility and inflation on the stock market liquidity.

Design/Methodology/Approach: The sample period is 20 years from 2000 to 2019 on monthly basis. We employ the auto-regressive distributed lag (ARDL) approach for analyzing long run and short run nature of relationship among variables. We also apply diagnostics including, normality check, serial correlation test, heteroscedasticity test and CUSM models for the stability of the models.

Findings: We finds that exchange rate and inflation have a long-term negative relationship, but oil prices, stock returns, and stock market volatility have a long-term positive relationship with stock market liquidity. Furthermore, these findings are robust under three different proxies of stock market liquidity for three sectors: text composite, textile weaving, and textile spinning.

Implications/Originality/Value: This study extends the existing debate on the relationship between macroeconomic variables and stock market liquidity in developed world to the emerging equity market. It also contributes by examining the impact of macroeconomic variables on the sectorial levels in equity market by using three proxies for stock market liquidity including, Amihud liquidity, average trading and trading volume.

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Introduction

The capital market is critical in ensuring that economic growth is maintained. The more stable the capital market is, the more appealing it will be for investors to place their money in the capital market in the first place (Narayan et al., 2014). Additionally, when depositing their capital, investors anticipate that the money they have invested will provide a benefit for them in the long run. Stock liquidity is defined as the ability to purchase and sell shares in large quantities without affecting prices or increasing transaction costs (Zheng & Su, 2015). Financial industry is a critical growth-enhancing route for any country, and the stock exchange is a critical component of any financial sector's infrastructure. Stock markets have the potential to serve as a major stimulus for a country's economic development. A well-functioning stock market is critical for economic development. The development of Pakistan's stock markets has a substantial impact on the country's economic progress. In the long run, a well-developed stock market can contribute to increased economic growth.

The ease with which stocks can be traded is referred to as liquidity in the stock market (Amihud et al., 2006). Since the global financial crisis, an immense amount of work has been devoted to the study of liquidity in financial markets, with a particular emphasis on the determinants and consequences of liquidity. As a matter of theory, the aggregate discount factor that is based on a certain set of state variables should contribute to the determination of stock liquidity (Zheng & Su, 2015). The liquidity of a stock can be measured by the frequency with which it is traded, the number of transactions it generates, and the value of transactions it generates. Because there is no stock movement and no financial reporting, one reason for suspension or termination of trade is that the trade is not profitable. Prior to doing stock analysis from both the technical and fundamental perspectives, investors should take into consideration the stock's liquidity as one of the most important factors to consider (Utami et al., 2017). Generally speaking, the efficient market theory (EMT) asserts that the stock market's price, volume, and frequency of trading are all a reflection of the information and conditions that exist at the time of the trade. Due to the rapid response of investors to fresh information, they are able to decide to enter the market and invest their capital, causing the adjustment effect of stock prices to occur almost instantaneously (Nofsinger, 2001). Ball and Brown (1968), and Fama (1968), and others have argued otherwise (1969). A study conducted by Lai and colleagues (2009) found that the price of stocks will fluctuate when new and beneficial information enters the market.

Liquidity is vital in trading and stock exchanges. Liquidity attracts order flow and listings. A market is considered liquid if traders may purchase and sell huge amounts of stock without affecting the price. Liquidity of the stock market shows its efficiency. Market illiquidity indicates poor market functioning, which can lead to a financial crisis. Liquidity measurement is an essential question. In this regard, four dimensions matter; (1) trading time – the capacity to transact at the current price, (2) tightness – simultaneous purchase and sale of an asset, (3) depth – the capacity to acquire and sell an asset without affecting the listed price, (4) resiliency – the ability to acquire and sell an item with minimal impact on the quoted price. Political, economic, and legal considerations influence Pakistan's financial markets. Central bank policies affect stock market liquidity. Macroeconomic policies may impact Pakistani stock exchanges. Studies imply macroeconomic indicators impact the stock market.

This research examines the impact of macroeconomic variables on Pakistani stock exchange liquidity. The sample period for this research is 20 years from 2000 to 2019 on monthly basis. The final sample size for this research is 82 listed non-financial companies from the textile composite, textile spinning and textile weaving sector of Pakistan stock exchange. The oil prices, exchange rate, stock market index, market volatility and inflation are the macro-economic indicators, whereas the stock market liquidity is measured by using three proxies – Amihud liquidity, the value of the share traded and trading volume of the stocks. We employ the auto-

regressive distributed lag (ARDL) approach for analyzing the long run and short run nature of relationship among variables. After applying the ARDL, we apply different diagnostics including, the normality check, serial correlation test, heteroscedasticity test and CUSM models for the stability of the models.

This study contributes in literature with following ways. *Firstly*, existing literature mainly focus stock market returns as a result of macroeconomic variations. This study extend the literature on the relation between macroeconomic variables and stock market liquidity (Park & Ratti, 2008; ONeill et al., 2008; Kilian, 2009; Hassan, 2017). *Secondly*, it also extend the existing debate on the relationship between macroeconomic variables and stock market liquidity in developed world to the emerging equity market (Sklavos, Dam & Scholtens, 2013). Bekaert et al. (2007) argued that improve liquidity conditions can have a significant impact on financial development and economic growth in emerging countries. *Thirdly*, it contributes by examining the impact of macroeconomic variables on the sectorial levels in equity market. *Fourth*ly, it uses three different proxies to measure the stock market liquidity for each sector including, Amihud liquidity, average trading and trading volume. VAR has been simple used in previous studies realted to market liquidity (Fujimoto, 2004; Chordia, Sarkar, & Subrahmanyam, 2005). We employ the auto-regressive distributed lag (ARDL) approach for analyzing the long run and short run nature of relationship among variables.

The literature review is detailed in the next part, which is followed by a discussion of the data and research methodology. The empirical findings of the study are discussed in the next section, which is followed by a discussion of the study's overall conclusion and recommendations.

Literature Review

Numerous researches have been carried earlier on various aspects of stock markets. Pakistani stock liquidity and macroeconomic indicators have been studied in detail (Nishat, Shaheen, & Hijazi, 2004; Ali et al., 2010; Hussain, Rafique, & Nawaz, 2013). These studies also found diverse findings. This study examines the relationship between stock liquidity and macroeconomic indices in Pakistan. Pakistan and Bangladesh's stock market development had an impact on economic growth. They observed that both countries' stock exchanges boost economic growth (Zahid, Khan & Tariq, 2012). Market capitalization also affects Pakistan's economic growth. Stock market growth and economic growth in Nigeria were studied (Ezeabasili & Alajekwe, 2012). The results demonstrated that stock market liquidity boosts economic growth. The studies also showed that market size has little impact on economic growth.

The study of the impact of domestic macroeconomic variables and global stock markets on ASEAN financial markets (Catherine, 2011). The results show that economic growth, interest rates, and currency rates greatly impact these countries' domestic financial markets. Liquidity at the Karachi stock exchange (Kanasro, Junejo & Junejo, 2011). They determined that the stock market was less liquid from 1985 to 2006 based on liquidity analysis, turnover ratio, and market size. The Karachi stock market lacks liquidity and hence is inefficient in attracting investors. There was also a correlation between macroeconomic indicators and stock market prices in the United States, Japan and China (Bellalah & Masood, 2019). Mehwish (2013) examines the macroeconomic factors affecting Pakistani stock market performance. FDI and value-added trade have beneficial effects on stock market performance. The banking sector's growth was marginal. Macroeconomic and institutional factors influence stock markets. The study used a panel of 42 emerging markets (Yartey, 2008). The findings point to law & order, political risk, and bureaucratic quality as major stock market drivers. The impact of macroeconomic variables on the Amman stock exchange discovered positive significant influence of money supply, total traded value, gross capital creation, CPI and private sector credit (El-Nader & Alraimony, 2012). They observed negative effects of nominal GDP and net remittances on stock market growth.

Recently, market liquidity has gained considerable attention (Amihud et al., 2005). There are numerous studies in the literature that examine the impact of oil price variations on stock markets in various economies, such as the United States, the United Kingdom, and European countries.(Al-hajj, Mulali, & Solarin, 2017)**.** Raza et al., (2016) examine the influence of oil on countries' stock markets, and find that price of oil has a detrimental long-term and short-term impact on stock markets (Al-hajj, Mulali, & Solarin, 2017).

Most research indicated a negative link (Chen, 2009; Filis, 2010; Basher et al., 2012), whereas some found a favourable relationship (Basher et al., 2012; Abhyankar et al., 2013). The exchange rate and stock market liquidity relationship represent short-term capital movements. Foreign capital floods into the domestic market when the exchange rate decreases and the native currency appreciates. It should be inversely proportional to stock market liquidity. It affects cash flow, balance of payments, real output and stock market liquidity. For example, a weaker local currency would lower export costs, promote global competitiveness, and improve cash flow (Li, Lu, Ren, & Zhou, 2018). Inflation control is a primary priority for emerging markets, and an assessment of economic development is essential (Omran & Pointonb, 2001). There are several theoretical and experimental studies on inflation and stock market development (Pradhan, Arvin, & Bahmani, 2015). So, as long as the general rate of inflation rises, the price of common stocks should rise to compensate investors. This paradigm predicts a positive link between inflation and stock prices (Omran & Pointonb, 2001). The data imply that interest rate, industrial output index, and money supply are favourably associated to the Chinese and US stock exchanges. Long-term, Japan's money supply is positive, but short-term, it is negative. In Japan, the long-term interest rate is particularly significant, and the industrial production index is positively correlated with stock market values. A comparison of Indian, Pakistani, Bangladeshi and Sri Lankan stock prices (Muhammad & Rasheed, 2002). A long-run link between stock prices and exchange rates is found in Sri Lanka and Bangladesh but not in India and Pakistan. All four South Asian countries had no short run link. A study looked into how inflation affects the Egyptian stock market. Inflation has a substantial impact on both long- and short-term stock market performance (Omrana & Pointonb, 2001). The relationship between stock market volatility and real, nominal macroeconomic volatility, financial leverage, and economic activity was also studied. There is a strong link between leverage and stock market volatility.

Data and Research Methodology

The initial sample of the study is 430 listed companies at Pakistan stock exchange. The sample period for this research is 20 years from 2000 to 2019 on monthly basis. We eliminated the financial industry due to its unique capital structure and profit needs. Additionally, the companies for which data are not available are also excluded from the sample. The final sample size for this research is 82 listed non-financial companies from the textile sector of Pakistan. This study collects the data from Pakistani stock exchange and company's reports. The Karachi stock exchange, founded in September 1949, is Pakistan's largest and most liquid stock exchange. Business Week named it the "World's Best Performing Stock Market" in 2002. The KSE has 602 firms listed with a market worth of Rs5.22 trillion (PSX, 2016). Foreign interest in KSE peaked in 2007. Fluctuations began in 2007. It has grown rapidly in the last two decades. In 2015, the KSE was ranked as one of the world's top ten stock exchanges. 6 Bloomberg ranked the KSE as the third best performing market since 2009. 7 In January 2016, the Pakistan Stock Exchange merged all three marketplaces. On January 26, 2016, PSX has 558 businesses listed with a $95 billion market cap. 8. Now it's named is Pakistan stock exchange.

Table 1: Detail of the Sample of Study

Sr. No.	Sector Detail	Listed Companies	Selected Sample	Percentage
1	Textile Composite	55	23	42%
2	Textile Spinning	63	54	86%
3	Textile Weaving	11	5	45%
4	Total	129	82	64%

Measurement of Variables

This section discusses the measurement of the variables.

Measurement of Stock Market Liquidity

Market liquidity refers in which a country's stock market or a city real estate market, allows to bought and sold the securities at stable prices (Akhtar, March 2018). There are several measure and proxies for the stock market liquidity (Bannan, 2017). We measure the stock market liquidity by three proxies. The first proxy is Amihud stock market liquidity (2002). Second, proxy is the average value of share traded. Third, proxy is the trading volume.

Amihud Liquidity (2002) Measure

This measure can be defined as the average of the absolute daily return to daily trading volume. (Amihud, 2002; Akhtar, March 2018).

$$\textbf{Amihud Liquidity} = \text{SML} - \text{P1} = \frac{\text{Average of the absolute daily return}}{\text{Avg of the daily dollar trading volume}}$$

Average Value of Share Traded

The second proxy of stock market liquidity is the average value of the share traded. It defines the daily average share traded in stock market times the market price on that day.

Average value of share traded = SML - P2 = Average value of share trading in a day × Market Price of Share

Trading Volume

The third proxy to measure the stock market liquidity is the trading volume. Trading volume measures the quantity of shares. The stocks with higher trading volume are more liquid (Bogdan, Bareša, & Ivanović, 2012; Baruch & Saar, 2009).

Trading Volume = SML - P3 = Average number of share trading in given day

Table 2: Description of Independent Variables

Sr. No.	Variable Name	Measurement	References	Data Sources
1	Oil Prices	Europe Brent Spot Price (Dollars/Barrel)	(Husnain & Akhtar, 2016)	US energy information administration
2	Exchange Rate	Pakistani Rupee Per USD	(Husnain & Akhtar, 2016)	Bloomberg database
3	Stock Market Index	KSE-100 Index	(Sarwar et al., 2018)	Bloomberg database
4	Market Volatility	Standard deviation of stock market return	(Matar et al., 2013)	Bloomberg database
5	Inflation	Changes in consumer price index (CPI)	(Stanford, 2008)	Bloomberg database

Research Methodology

This research uses the following econometric equations to examine the impact of oil prices, exchange rate, stock market return, market volatility and inflation on the stock market liquidity.

This study uses three different proxies to measure the stock market liquidity, hence we developed the generic equation.

$$\text{SML} = \alpha + \rho\,\text{SML}_{t-i} + \beta_1 \text{OP}_{t-i} + \beta_2 \text{ER}_{t-i} + \beta_3 \text{Mkt Rtn}_{t-i} + \beta_4 \text{VTl}_{t-i} + \beta_5 \text{CPI}_{t-i} + \varepsilon_{t-i} \ldots\ldots\ldots (1)$$

Where; SML – P1, SML – P2 and SML –P3 denotes the three proxies for stock market liquidity,

OP shows oil prices, ER shows exchange rate, Mkt Rtn shows market return, and VTl shows the volatility in market, and CPI shows the consumer price index.

Firstly, the stationarity of variables is checked by applying the Augmented Dickey Fuller (ADF) and Phillips - Perron (PP) test. If all the variables are found to be of stationary at I (0), or I (1) or I (2) then we may apply the auto-regressive distributed lag (ARDL) approach. After applying the ARDL, we apply different diagnostics including, the normality check, serial correlation test, heteroscedasticity test. We also check the stability of the model by CUSM and CUSM square graphs for our estimated models.

The bound test among variables indicates the existence of the long run relationship. The long run and short impact of oil prices, exchange rate, market return, market volatility and inflation on stock market liquidity is estimated through the following equations;

$$\text{SML} - \text{P1} = \alpha + \rho\,\text{SML}_{t-i} + \beta_1 \text{OP}_{\text{t-i}} + \beta_2 \text{ER}_{\text{t-i}} + \beta_3 \text{KSE100 index}_{\text{t-i}} + \beta_4 \text{VTl}_{\text{t-i}} + \beta_5 \text{CPI}_{\text{t-i}} + \varepsilon_{\text{t-i}} \dots\dots\dots (2)$$

$$\text{SML} - \text{P2} = \alpha + \rho\,\text{SML}_{t-i} + \beta_1 \text{OP}_{\text{t-i}} + \beta_2 \text{ER}_{\text{t-i}} + \beta_3 \text{KSE100 index}_{\text{t-i}} + \beta_4 \text{VTl}_{\text{t-i}} + \beta_5 \text{CPI}_{\text{t-i}} + \varepsilon_{\text{t-i}} \dots\dots\dots (3)$$

$$\text{SML} - \text{P3} = \alpha + \rho\,\text{SML}_{t-i} + \beta_1 \text{OP}_{\text{t-i}} + \beta_2 \text{ER}_{\text{t-i}} + \beta_3 \text{KSE100 index}_{\text{t-i}} + \beta_4 \text{VTl}_{\text{t-i}} + \beta_5 \text{CPI}_{\text{t-i}} + \varepsilon_{\text{t-i}} \dots\dots\dots (4)$$

To capture the short run association among the variables, we estimated the following equations;

$$\Delta\text{SML} - \text{P1} = \alpha + \Delta\rho\,\text{SML}_{t-i} + \Delta\beta_1 OP_{t-i} + \Delta\beta_2 ER_{t-i} + \Delta\beta_3 \text{Mkt Rtn}_{\text{t-i}} + \Delta\beta_4 \text{VTl}_{\text{t-i}} + \Delta\beta_5 \text{CPI}_{\text{t-i}} + ecm + \varepsilon_{t-i} \dots\dots\dots (5)$$

$$\Delta\text{SML} - \text{P2} = \alpha + \Delta\rho\,\text{SML}_{t-i} + \Delta\beta_1 OP_{t-i} + \Delta\beta_2 ER_{t-i} + \Delta\beta_3 \text{Mkt Rtn}_{\text{t-i}} + \Delta\beta_4 \text{VTl}_{\text{t-i}} + \Delta\beta_5 \text{CPI}_{\text{t-i}} + ecm + \varepsilon_{t-i} \dots\dots\dots (6)$$

$$\Delta\text{SML} - \text{P3} = \alpha + \Delta\rho\,\text{SML}_{t-i} + \Delta\beta_1 OP_{t-i} + \Delta\beta_2 ER_{t-i} + \Delta\beta_3 \text{Mkt Rtn}_{\text{t-i}} + \Delta\beta_4 \text{VTl}_{\text{t-i}} + \Delta\beta_5 \text{CPI}_{\text{t-i}} + ecm + \varepsilon_{t-i} \dots\dots\dots (7)$$

Empirical Findings

We checked the stationarity of time series data through applying the Augmented- Dickey-Fuller (ADF) and Phillips-Perron (PP) test, and results are presented at table 3. The results shows that all the three proxies of the stock market liquidity for selected three sectors i.e. textile composite, textile spinning and textile weaving are stationary at level i.e. I (0). Furthermore, the oil prices are stationary at their first difference i.e. I (1), while CPI are also stationary at the first difference. Exchange rate, stock market return and market volatility are found to be stationary at level. These results are consistent with the findings of the PP test.

Table 4 presents the results of the bound test. The bound test compares F-statistics with critical values at the lower and upper bounds. This test's null hypothesis is "no long run association between variables." If the F statistic is below the lower bound, there is no long term association. If the value exceeds the upper bound, there is a long-term association. F-statistics values between 0 and 1 are considered inconclusive. In this study, the stock market liquidity is measured by suing three different proxies i.e. SML-P1, SML-P2 and SML-P3. The bound test shows that there is a long-term association between variables when the F-statistic is bigger than the upper bound. From the value of F-stats, it is clear that this value is greater than the lower and upper bound's value. Therefore, the results shows that the bound test null hypothesis is rejected. Hence, there exist long run association among the variables in three sectors under three different proxies of the stock market liquidity.

Table 3: Unit Root Test

	Variables	ADF test		PP test	
		Level	1st Diff	Level	1st Diff
Textile Composite	Txt Com P1	-5.86***	-10.22***	-5.83***	-26.40***

Stock Liquidity	Txt Com P2	-6.09***	-11.47***	-5.72***	-31.15***
	Txt Com P3	-3.22***	-4.67***	-12.08***	-44.07***
Textile Spinning Stock Liquidity	Txt Sp P1	-3.60***	-15.92***	-11.09***	-45.53***
	Txt Sp P2	-3.11***	-12.94***	-9.37***	-44.19***
	Txt Sp P3	-3.84***	-17.92***	-7.34***	-28.17***
Textile Weaving Stock Liquidity	Txt Wev P1	-8.04***	-12.43***	-8.16***	-36.19***
	Txt Wev P2	-7.82***	-11.98***	-7.68***	-51.45***
	Txt Wev P3	-3.21***	-17.32***	-12.97***	-69.16***
Oil Prices		-2.24	-10.35***	-2.06	-10.30***
Exchange Rate		2.51**	-4.98***	2.09*	-9.85***
KSE 100 Index		-2.23*	-14.33***	-2.36*	-14.33***
Stock Market Volatility		-8.87***	-10.402***	-8.82***	-61.50***
CPI		0.0397	-1.7311***	2.11*	-6.14***

Note: *, **, *** shows significance at level 10%, 5% and 1%, respectively.

Table 4: Bound Test

Stocks	SML-P1	SML-P2	SML-P3
	F – Statistics		
Textile Composite	10.95	11.39	11.39
Textile Spinning	5.13	4.31	4.23
Textile Weaving	13.79	9.85	7.31
	I(0)	**I(1)**	
At 1%	2.88	3.99	
At 5%	2.27	3.28	
At 10%	1.99	2.94	

Long Run Coefficient of ARDL

Co-integration test used to identify long run relationship among variables. We applied the ARDL model i.e. equation 2,3, and 4 to estimate the long run coefficient among the variables for each proxy of stock market liquidity in three sectors in Pakistan stock exchange. The results are shown in table 5. It is clear from the results that past pattern in the stock market liquidity has significant effect on the future liquidity. Exchange rate and inflation has long term negative while oil prices, stock return and stock market volatility result long term positive association with stock market liquidity. These findings are robust under three different proxies of the stock market liquidity in text composite, textile weaving and textile spinning sector in Pakistan stock exchange.

Table 5: Long run Coefficient of ARDL Model in Selected Sectors

	SML –P1	**SML –P2**	**SML –P3**
Regressors	**Coefficient**	**Coefficient**	**Coefficient**
Panel A: Textile Composite			
TXT Co (-1)	0.434*	0.4430*	0.2222**
In_ OP	0.013**	0.1208*	0.0002**
In_ ER	-0.852	-0.1514***	-0.0020
In_ KSE 100	0.698**	0.3021**	0.9100**
In_ VTL	2.722*	2.990*	1.0012**
In_ CPI	-0.949*	-0.4133***	-0.0005
Panel B: Textile Spinning			
Txt SP (-1)	0.4012***	0.2812	-0.3243***
In_ OP	0.5346*	0.0463**	0.0006*
In_ ER	-0.5346**	-0.2448*	-0.0045**
In_ KSE 100	0.2054*	0.1054***	1.6700**
In_ VTL	.0216***	2.552*	0.0035***
In_ CPI	-0.2851	-0.1449*	0.0007
Panel C: Textile Weaving			
Txt Wev (-1)	0.6368*	0.4783	-0.6416
In_ OP	0.0125*	0.0053***	0.0005**
In_ ER	-0.2946***	-0.4964***	-0.0036**

In_ KSE 100	0.0053*	0.1437**	-1.8700
In_ VTL	3.273**	12.896*	-0.0172
In_ CPI	-0.2573***	-0.0480**	-0.0004***

We estimate the above long run ARDL estimates for textile composite with following equations:

$$SML - P1 = \alpha + \rho\, SML_{t-i} + \beta_1 OP_{t-i} + \beta_2 ER_{t-i} + \beta_3 KSE100_{t-i} + \beta_4 VTl_{t-i} + \beta_5 CPI_{t-i} + \varepsilon_{t-i}$$

$$SML - P2 = \alpha + \rho\, SML_{t-i} + \beta_1 OP_{t-i} + \beta_2 ER_{t-i} + \beta_3 KSE100_{t-i} + \beta_4 VTl_{t-i} + \beta_5 CPI_{t-i} + \varepsilon_{t-i}\ SML -$$

$$P2 = \alpha + \rho\, SML_{t-i} + \beta_1 OP_{t-i} + \beta_2 ER_{t-i} + \beta_3 KSE100_{t-i} + \beta_4 VTl_{t-i} + \beta_5 CPI_{t-i} + \varepsilon_{t-i}$$

Dependent Variable is the Stock Market Liquidity

*, **, *** shows significance at level 10%, 5% and 1%, respectively

Short Run Coefficient of ARDL

Co-integration test is also used to identify short run relationship among variables. We applied the ARDL model i.e. equation 5,6, and 7 to estimate the short run coefficient among the variables for each proxy of stock market liquidity in three sectors in Pakistan stock exchange. The results are shown in table 6. Short run defines the difference and speed of adjustment from disequilibrium to equilibrium. The short run model consists of two parts. First part is depending on coefficient of short run dynamics and second part depends on the measure of error correction speed. It shows the speed of adjustment i.e. how much disequilibrium convert in equilibrium. It is clear from the results that past pattern in the stock market liquidity has significant effect on the future liquidity. Exchange rate and inflation has short term negative while oil prices, stock return and stock market volatility result short term positive association with stock market liquidity. These findings are robust under three different proxies of the stock market liquidity in text composite, textile weaving and textile spinning sector in Pakistan stock exchange. Furthermore, F-Stat is significant for all the estimated models which shows that all the estimated modes are statistically significant.

Table 6: Short run Coefficient of ARDL Model in Selected Sectors

Regressors	SML –P1	SML –P2	SML –P3
Panel A: Textile Composite			
Δ ln_TXT (-1)	0.724**	0.015	0.255**
Δ In_ OP	0.772	-0.619	0.502**
Δ In_ OP (-1)	0.931**	0.270**	0.240***
Δ In_ ER	-0.995***	-0.031**	-0.321*
Δ In_ ER (-1)	-0.092*	-0.644***	-0.494***
Δ In_ KSE 100	0.807*	-0.482	0.091
Δ In_ KSE 100 (-1)	0.702	0.994	0.349***
Δ In_ VTL	0.392*	0.300*	0.077**
Δ In_ VTL (-1)	0.038***	0.933*	0.427**
Δ In_ CPI	-0.556	-0.413	-0.645***
Δ In_ CPI (-1)	-0.962**	-0.265***	-0.088
Ecm (-1)	-0.268**	-0.443**	-0.916***
F – Statastics (Sig.)	0.000	0.000	0.03
Panel B: Textile Spinning			
Δ ln_TXT (-1)	0.430*	0.753	0.894**
Δ In_ OP	0.957	0.625***	0.156***
Δ In_ OP (-1)	0.333	0.187***	0.510
Δ In_ ER	-0.470**	-0.841	-0.677*
Δ In_ ER (-1)	-0.065***	-0.200	-0.0077
Δ In_ KSE 100	0.403***	0.450***	0.680**
Δ In_ KSE 100 (-1)	0.196***	0.392	0.287***
Δ In_ VTL	0.536	0.460***	0.195***
Δ In_ VTL (-1)	0.034***	0.303***	0.039***
Δ In_ CPI	-0.258	-0.361**	-0.979**
Δ In_ CPI (-1)	-0.402***	-0.908	-0.010***
Ecm (-1)	-0.792***	-0.120***	-0.383***
F – Statastics (Sig)	0.000	0.021	0.024
Panel C: Textile Weaving			

Δ ln_TXT (-1)	0.255***	0.076***	0.510***
Δ In_ OP	0.476	0.327	0.056*
Δ In_ OP (-1)	0.206***	0.265**	-0.858
Δ In_ ER	-0.531**	-0.882	-0.360***
Δ In_ ER (-1)	-0.218**	-0.438**	-0.317***
Δ In_ KSE 100	-0.695	0.963***	0.315***
Δ In_ KSE 100 (-1)	0.669***	0.713***	-0.435
Δ In_ VTL	0.161***	0.704***	0.898***
Δ In_ VTL (-1)	0.917	0.528*	0.548***
Δ In_ CPI	-0.985***	-0.646***	-0.460
Δ In_ CPI (-1)	-0.772***	-0.178	-0.412***
Ecm (-1)	-0.504***	-0.718***	-0.214***
$F-$ Statastics	0.001	0.012	0.003

Estimating Short Run ARDL Equation for Textile sector:

ΔSML- P1=$\alpha + \Delta\beta_1 OP_{t-i} + \Delta\beta_2 ER_{t-i} + \Delta\beta_3 KSE100_{t-i} + \Delta\beta_4 OPRD_{t-i} + \Delta\beta_5 CPI_{t-i} + VTL_{t-i} + CPI_{t-i} + ecm + \varepsilon_{t-i}$

ΔSML- P2=$\alpha + \Delta\beta_1 OP_{t-i} + \Delta\beta_2 ER_{t-i} + \Delta\beta_3 KSE100_{t-i} + \Delta\beta_4 OPRD_{t-i} + \Delta\beta_5 CPI_{t-i} + VTL_{t-i} + CPI_{t-i} + ecm + \varepsilon_{t-i}$

ΔSML- P3=$\alpha + \Delta\beta_1 OP_{t-i} + \Delta\beta_2 ER_{t-i} + \Delta\beta_3 KSE100_{t-i} + \Delta\beta_4 OPRD_{t-i} + \Delta\beta_5 CPI_{t-i} + VTL_{t-i} + CPI_{t-i} + ecm + \varepsilon_{t-i}$

*, **, *** shows significance at level 10%, 5% and 1%, respectively

Diagnostic Test

The Breusch–Godfrey serial correlation is a type of serial correlation. The LM test is used to determine whether or not there is autocorrelation in the errors of a regression model. It makes use of the residuals from the model that is being analyzed in a regression analysis to complete the calculation. The null hypothesis is that there is no serial correlation between the two variables. The null hypothesis of heteroscedasticity states that there is no evidence of heteroscedasticity in the data. Moreover, while its P-value is not significant, the null hypothesis cannot be rejected because the residuals of the model remain stable throughout the sample period. Thus, the results of diagnostic testing indicate that the model is statistically stable and well-fit.

Table 7: Diagnostic Test

Sectors	Variables	Serial Correlation	Heteroscedasticity
Textile Composite	Txt P1	0.799	0.563
	Txt P2	0.778	0.318
	Txt P3	0.277	0.421
Textile Spinning	Txt Sp P1	0.644	0.125
	Txt Sp P2	0.023	0.326
	Txt Sp P3	0.940	0.120
Textile Weaving	Txt Wev P1	0.304	0.320
	Txt Wev P2	0.312	0.210
	Txt Wev P3	0.870	0.507

CUSUM Test for Coefficient Stability

Stability tests indicate whether model is smooth and stable over time (Bahmani-Oskooee, 2001). The stability of coefficient of regression is estimated by CUSUM statistics against critical bounds presented by Brown et al. (1975). If the curve of the statistics exists within value of 5% significance level, null hypothesis (i.e. all coefficients in ECM model are stable) cannot rejected. As shown in figure 1, 2, and 3 that the stability plot remained within critical bound. Therefore, it is concluded that econometric model is stable.

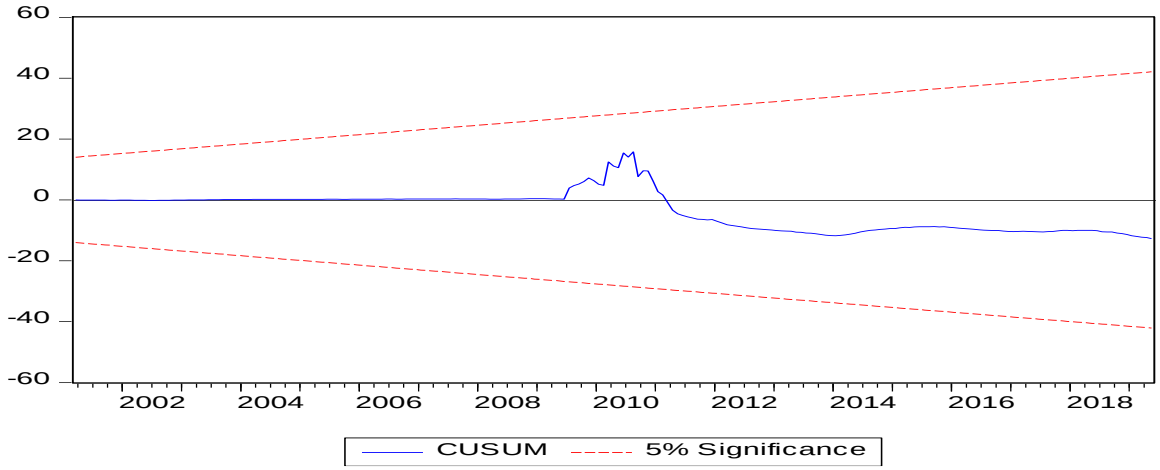

Figure: Plot of the CUSM for Textile Composite Sector

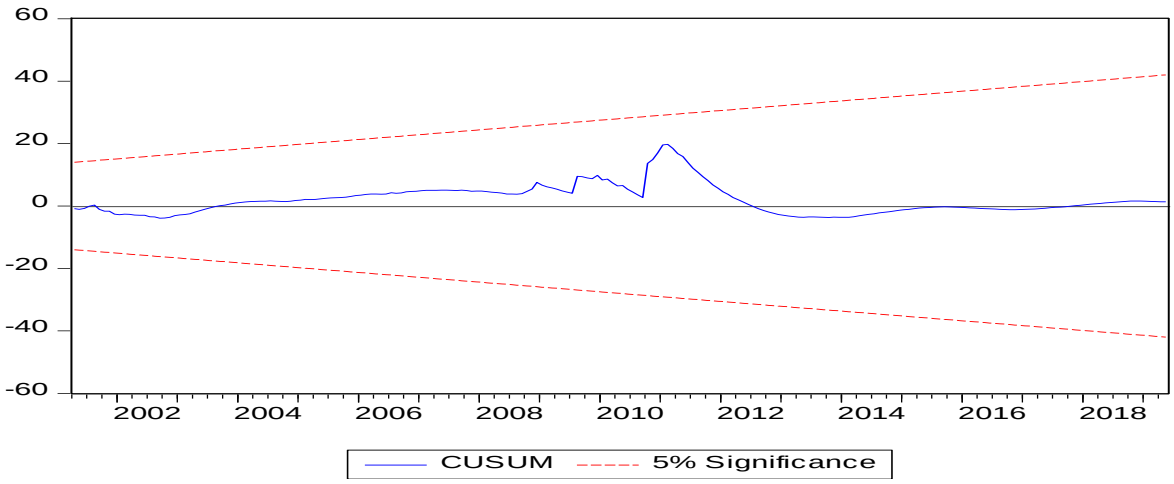

Figure: Plot of the CUSM for Textile Spinning Sector

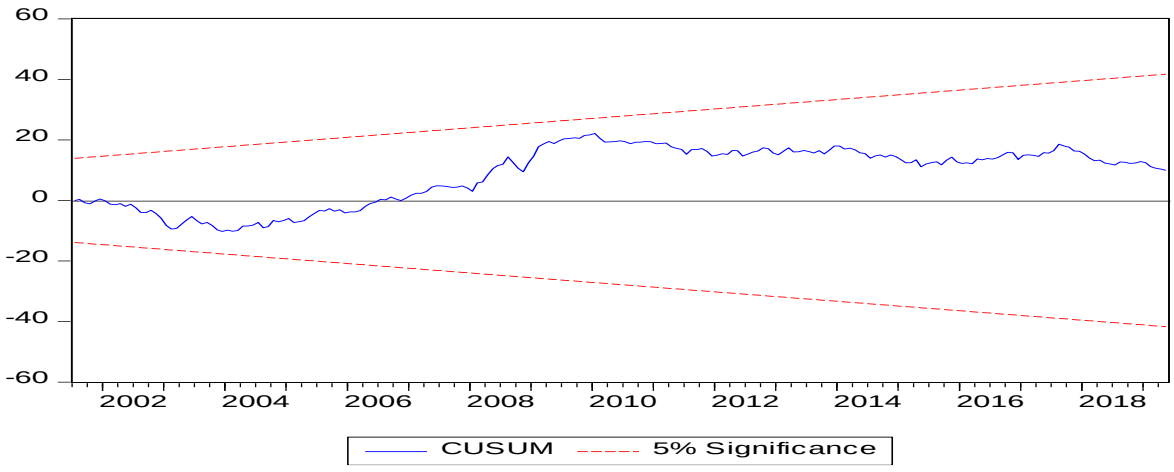

Figure: Plot of the CUSM for Textile Weaving Sector

Conclusion of the Study

The stock market liquidity is a major area of research in financial economics. The substantial theoretical & empirical studies on that topic have shown in last years. Stock market is a best place where invest in large & small projects through invest in different portfolios. This research examines the impact of macroeconomic variables on Pakistani stock exchange liquidity. The

sample period for this research is 20 years from 2000 to 2019 on monthly basis. The final sample size for this research is 82 listed non-financial companies from the textile composite, textile spinning and textile weaving sector of Pakistan stock exchange. The oil prices, exchange rate, stock market index, market volatility and inflation are the macro-economic indicators, whereas the stock market liquidity is measured by using three proxies – Amihud liquidity, the value of the share traded and trading volume of the stocks. We employ the auto-regressive distributed lag (ARDL) approach for analyzing the long run and short run nature of relationship among variables. After applying the ARDL, we apply different diagnostics including, the normality check, serial correlation test, heteroscedasticity test and CUSM models for the stability of the models.

Overall, the findings indicate that all three proxies of stock market liquidity for the three sectors studied, namely textile composite, textile spinning, and textile weaving, are stationary at the same level, which I (0). Also, of note, oil prices are stationary at their first difference, which is I (1), and the Consumer Price Index (CPI) is stationary at its first difference, which is I (1). Exchange rate, stock market return and volatility are found to be stationary at level. The findings of the PP test are congruent with the findings of this study. It is obvious from the value of F-stats that this value is bigger than the values of the bottom and upper bounds of the distribution. As a result, the data demonstrate that the null hypothesis of the bound test is rejected. As a result, there is a long-term relationship between the variables in three sectors that are measured using three separate proxies for stock market liquidity. It is obvious from the findings that the pattern of liquidity in the stock market in the past has a substantial impact on the liquidity in the future. The exchange rate and inflation have a long-term negative relationship with stock market liquidity, but oil prices, stock returns, and stock market volatility have a long-term positive relationship with stock market liquidity. It was discovered that these findings are robust under three different proxies of stock market liquidity in three separate sectors: text composite, textile weaving, and textile spinning on the Pakistan stock exchange. Moreover, these findings are equally valid in the short term. It was determined that the econometric model is stable as a result of the many diagnostic tests, including the normality check, serial correlation test, heteroscedasticity test, and CUSM models, which were conducted.

This study has certain limitations such as the many researcher's research on stock market liquidity in different countries but very sufficient research on Pakistan. Furthermore, data is not available properly a lot of discrepancies exist in the data. The other issue time constraints and no more research on this data. That gives theorists much to think about. There is little theoretical work on time-series liquidity fluctuations, and no theory linking liquidity movements across stock and fixed-income markets. Endogenous trading across stock and bond markets seems ideal in a market equilibrium model. Theoretical links between monetary policy, money flows, and stock and bond market liquidity are also unexplored. We hope our work inspires further inquiry. Also, recent mergers of NYSE and Euronext and planned partnership with Tokyo Stock Exchange show a strong trend towards globalization of trading. It would create a global equity trading market. The influence of globalization on liquidity is still unknown. While the research agrees that liquidity and liquidity risk are valued in the market, little is understood about how market design influences this pricing (risk). How much do liquidity and execution risk affect traders' portfolio decisions? These questions offer an exciting and hard study route.

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