

SAUDI STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH

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Abstract

The development of stock market is considered a fundamental part in economic development. In this concern, the study aims to examine the long run causal relationship between economic growth and stock market development in Saudi Arabia using the autoregressive distribute lag model (ARDL) with bound test. The results suggest that Saudi stock market development have both significant negative and positive causal relationship on economic growth. Total value of stocks traded, concentration and volatility found to cause negative significant effect on economic growth. While stock market capitalization and market turnover ratio have positively significant effect on economic growth. However, there is partial unidirectional causality flow from both stock market capitalization and stock market turnover to economic growth and a partial unidirectional causality flow from economic growth to total value of traded shares.

Keywords: Stock market development; Economic growth; market capitalization; total value of stock traded; stock market turnover, stock market volatility; Stock market concentration.

1. Introduction

In literature stock market development enables effective capital accumulation and allocation which play a crucial role in promoting economic growth. (Demirguc-Kunt; Levine, 1993) Stated, "A well-functioning stock market is expected to lead to a lower cost of equity capital for firms". (Levine & Zervos, 1998), (Demirguc-Kunt, Asli, Levine, & Ross, 1996) and (Atje & Javanovic, 1993) suggested that stock market development is necessary for economic growth. However, little work has been done to explore the relationship between economic growth and stock market development in Saudi Arabia. In this concern, the debate on the causality relationship between the economic growth of Saudi Arabia and its stock market development is considered an important empirical contribution to set up robust institutions, laws and government policies needed to flourish stock market. Consequently, to boost economic growth. The paper in this contest is organized as follows; Section 1 presents an introduction. Section 2 presents a literature review. Section 3 address the traditional indicators for measuring the development of Saudi stock market. Section 4 presents the methodology and results. Finally, conclusions are presented in Section 5.

2. Literature Review

In literature economic theory emphasized the importance of macroeconomic factors like income growth, economic stability and financial market to explain the economic growth. Recently, the growing interest in the role of stock market in promoting economic growth

received a big attention for many researchers and econometrics. The recent empirical researches showed mixed results and offer different views about the existence of the relationship and its direction. A number of studies found a positive relationship between stock market and economic growth such as (McKimmon, 1973), (Shaw, 1973) argued that financial development correlates with economic growth. (King R. and Levine R., 1993) And (Beck T, 2004) Confirmed a positively significant link between stock market development and long-run economic growth. (Bencivenga. V.R., Smith, B. & Starr, M., 1996) Pointed that large and developed stock markets are more liquid than less developed as liquidity lowers the cost of capital essential for growth especially in low income countries. The empirical results pointed that the trading is consistent with market capitalization. (Demirguc-Kunt; Levine, 1993), (T. Beck, A. Demirgüç-Kunt, & R. Levine, 2010) Presented a valuable database provides statistics on the size, activity and efficiency of various financial intermediaries and markets to construct indicators of the size and activity of financial intermediaries. (Raymond & Jovanovic, 1993), (King, 1992a), (Demirguc-Kunt, A; Maskimovic, V, 1994), suggest that economic growth correlates with many indicators of financial development. (Atje & Javanovic, 1993), Find that total value of stock traded to GDP has significant correlation with economic growth for 40 countries over the period 1980-88, and reported that the value of stock market trading relative to GDP has a significant influence on economic growth. According to (Demirguc-Kunt; Asli; Levine; Ross, 1996), show how stock market development might boost long-run economic growth. (Levine and, Zervos, 1995), and (Demirguc-Kunt, A; Maskimovic, V, 1994), show that stock markets and banking sector development can promote economic growth. (Wong, A. and Zhou, X., 2011) Found a positive significant relationship between stock market size and economic growth. (Levine & Zervos, 1998) Also, concluded that stock market volatility has positive significant correlation with economic growth using information for 41 countries over the period of 1976-1993. However, they didn't find a robust correlation for the stock market size with economic growth. As well, (Wang, B. and Ajit, D., 2013) found a negative relationship of stock market capitalization on economic growth suggested the fact that the stock market is mainly administratively driven markets. Also, (Harris, 1997), concludes that the stock market variable does not affect economic growth using a sample of 49 countries (which includes both developed and developing countries) from 1980 to 1991. Demirguc-Kunt et al. 1996, (Arestis, P., Demetriades, P.O. and Luintel, K.B., 2001), Pointed that high market liquidity can affect economic growth negatively as it cause reduction in precautionary savings due to fears and uncertainty.

Relegated empirical studies that examined the causal relationship between economic growth and stock market development:

(Filer, R., J. Hanousek, and N. Campos, 1999) tested the Granger-causality over a large number of countries with varying economic conditions and levels of stock market activity. On data covering the period (1985-1997). The results revealed that there is a strong relationship between stock market performance and future economic growth for low and lower middle income countries, but not in higher income countries or developing economies.

In Malaysia, (Choong, C. K., Z. Yusop, S. H. Law, and V. K. Liew, 2005) provided an empirical investigation to test the linkage between stock market development and economic growth through the period (1978-2000) using the (ARDL) bounds test, Granger-causality test based on the (VECM) model. The results indicated that stock market development Granger-causes economic growth.

In Greece, (Dritsaki, C. and M. Dritsaki-Bargiota, 2005) tested the causal relationship between stock market development, credit market and economic growth through the period (1988:1–2002:12) using ARDL test, Granger-causality test (VAR). The results confirmed that there is a bidirectional causal relationship between bank development and economic growth and unidirectional causality between economic growth and stock market development.

In the Indian economy (Azarmi, T., D. Lazar, and J. Jeyapaul, 2005) examined the empirical association between stock market development and economic growth using the data for the period from 1981 to 2001. The results indicated that the Indian stock market over the study period is not associated with the economic growth. Later through the period (1996-2007), (Deb, S. G. and J. Mukherjee, 2008) examined the causal relationship between the economic growth and stock market development in India using Granger causality test. The results showed that there is a stable long run relationship among them. However, the result showed a unidirection of causality from stock market activity and volatility to economic growth. And a bidirectional causality between market capitalization and economic growth.

In Pakistan, (Shahbaz, M., N. Ahmed, and L. Ali, 2008) examined the casual relationship between stock market development and economic growth in the long run using Engle-Granger causality and ARDL tests over the data set from 1971 to 2006. The results showed that there is a strong relationship between stock market development and economic growth. The results confirmed that there is bi-directional causality between stock market development and economic growth.

In Greece, (Vazakidis, A. and A. Adamopoulos, 2009) examined whether there is a long-run causal relationship between financial development and economic growth from 1978 to 2007. They applied Granger causality tests based on the Vector Error Correction Model (VECM). The results indicated that economic growth has a positive effect on stock market development and credit market development. Also for United Kingdom, they found a causal relationship between financial market development and economic growth through the period 1965-2007 using a Vector Error Correction Model. The Granger causality results indicated that there is a bidirectional causal relationship between economic growth and financial market development. (Vazakidis, A. and A. Adamopoulos, 2010).

In Taiwan, (Hou, H. and Cheng, S.Y., 2010) found that stock market capitalization have a robust causality relationship with economic growth. Whereas they found that economic growth promotes stock market development. Based on the contradiction on previous empirical studies, even though we can infer that the majority of evidence about the linkages between stock market development and economic growth is in favor of that stock

market development causes economic growth. In this concern, this study aims to contribute to empirical evidence by examining the long run causal relationship between economic growth and stock market development in Saudi Arabia through the study period (2005-2019). Using (ARDL) Bound test. The research proposed hypothesis is as follows:

H0: stock market development does not affect economic growth.

H1: stock market development affect economic growth.

3. Saudi Stock Market Development

3.1. An Overview:

The Saudi stock Market was established in 1985 under the supervision of the Saudi Arabian Monetary Agency. In 2002, the stock market's main index is known as Tadawul All Share Index (TASI). In order to control operation of the stock market and trading of stocks of listed companies, the government of Saudi Arabia established Capital Market Authority (CMA) in 2004. The TASI continued accumulating surge in value during the early 2000s. The market, however, crashed in February of 2006, the TASI had lost 65% of its value after it hit a historic high of 2096658 points on February 25, 2006. The factors contributed to the 2006 crash as (Alkhalidi, 2015), explained were due to; mainly excessive speculations due to the small number of listed companies comparing to the growth of domestic liquidity, lack of transparency and disclosure by listed companies. Following the Saudi's first domestic stock market crash in 2006. TASI hit the rock bottom at 4068 points in March 2009, due to the decline in oil prices significantly to less than 40\$ per barrel as a result of the decline in the world economic after the global financial crises in 2008. In June 2015, a change in government policy allowed foreign investors to invest in the stock market as a way to boost investment activities, according to (Alkhreif, 2015) . Literature provides many indicators of stock market development. However, the most common indicators used to characterize the development of stock markets are the traditional indicators: market capitalization, liquidity, concentration, turnover and volatility (Asli Demirguc-Kunt, Ross Levine, 1995) .

3.2. Market Size:

In literature, Market capitalization to GDP (MC) is usually used as a measure of stock market size. The importance of using Market Capitalization comes from its ability to mobilize capital and lower cost (Levine, R. and Zervos, S., 1996). It can be calculated using the value of listed shares divided by GDP. Figure 1 indicates a fluctuated trend in market capitalization ratio from 196.71% in 2005, the ratio was significantly overvalued, which contributed later along with low investment channels available to a burst in 2006 and caused the subsequent decreasing in the ratio over the next years to its minimum value 47.39 % in 2011, then increased to the biggest value 303.52%, in 2019 with a mean of 92.64 and a standard deviation of 17.94 points through the study period as shown in table 8.

Although Saudi market capitalization to GDP is considered big in size, the ratio for number of companies listed, which is considered as a second ratio to measure the market size, is very low as it was 204 companies in 2019. Saudi market capitalization was 2406.82

billion U.S. dollars in 2019 according to data available on World Bank. The ranking for Saudi Arabia is the sixth based on the global ranking data on 72 countries.

Table 1: Stock Market Capitalization to GDP 2005-2019

Year	Market cap. (Million \$)	GDP (Million \$)	Market cap. to GDP
2005	646104000000	328459608764	196.71
2006	326869000000	376900133511	86.73
2007	515111000000	415964509673	123.84
2008	246337000000	519796800000	47.39
2009	318733680000	429097866667	74.28
2010	353409590000	528207200000	66.91
2011	338873290000	671238840107	50.48
2012	373374750000	735974843360	50.73
2013	467365780000	746647127413	62.60
2014	483115510000	756350347333	63.87
2015	421060070000	654269902880	64.36
2016	448831069542	644935541440	69.59
2017	451378840000	688586133333	65.55
2018	496353180000	786521831573	63.11
2019	2406819600000	792966838162	303.52

Data source: The World Bank data.

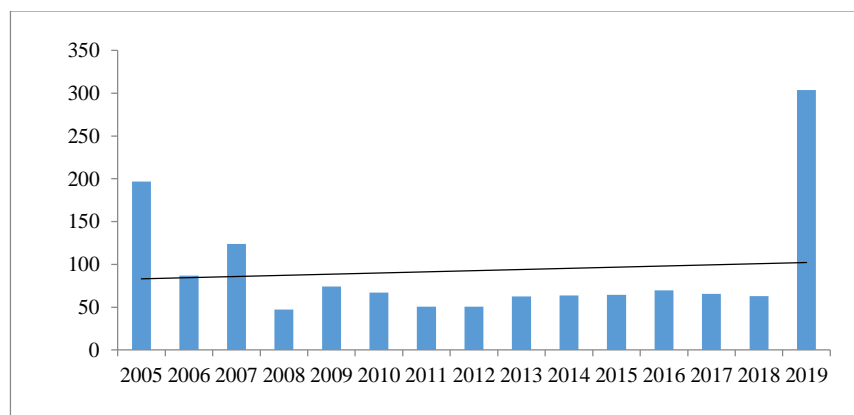


Figure 1 Market Capitalization to GDP 2005-2019

3.3. Liquidity:

Stock market liquidity refers to total value of shares traded in percentages of GDP. Which means how easily a stock can be rapidly sold without affecting its price, but this makes investment less cheap and risky. It has an important role to improve the allocation of capital to promote stock market and economic growth Demirguc-Kunt et al. 1996. It can be measured by using two measures:

3.3.1. Total value of stock traded to GDP

Total value of stock traded to GDP (TVS) is a measure for stock market liquidity which captures the economy in depth. It can be measured by dividing the total value of stock traded to GDP and so, it is considered very critical for the smooth of an economy. In table 2 the Saudi total value of stock traded showed high liquidity through 2005-2007 and began to decrease due to the world financial crises in 2008 until 2012, then began to increase again with a fluctuated trend. Demirguc-Kunt et al. 1996, noted that “the total value traded complements the market capitalization ratio” which means that with a big market capitalization, the trading may be small. Figure 2 indicates that the ratio decreased from its maximum value 372.26% in 2006 to its minimum value 27.84% in 2019 over the study period with a mean of 101.9 and a standard deviation of 108.33 points as shown in Table 8.

Table 2: Total Value of Shares Traded (% of GDP) 2005-2019

Year	GDP (Million \$)	Stocks traded, total value (current US\$)	Total Value of Traded Shares (% of GDP)
2005	328459608764	1103534500000	335.97
2006	376900133511	1403048100000	372.26
2007	415964509673	681947600000	163.94
2008	519796800000	523326600000	100.68
2009	429097866667	335109900000	78.10
2010	528207200000	201210910000	38.09
2011	671238840107	291435880000	43.42
2012	735974843360	511178270000	69.46
2013	746647127413	362402350000	48.54
2014	756350347333	567392070000	75.02
2015	654269902880	436941100000	66.78
2016	644935541440	306380423760	47.51
2017	688586133333	218380624730	31.71
2018	786521831573	229577660738	29.19
2019	792966838162	220782730000	27.84

Data source: The World Bank data.

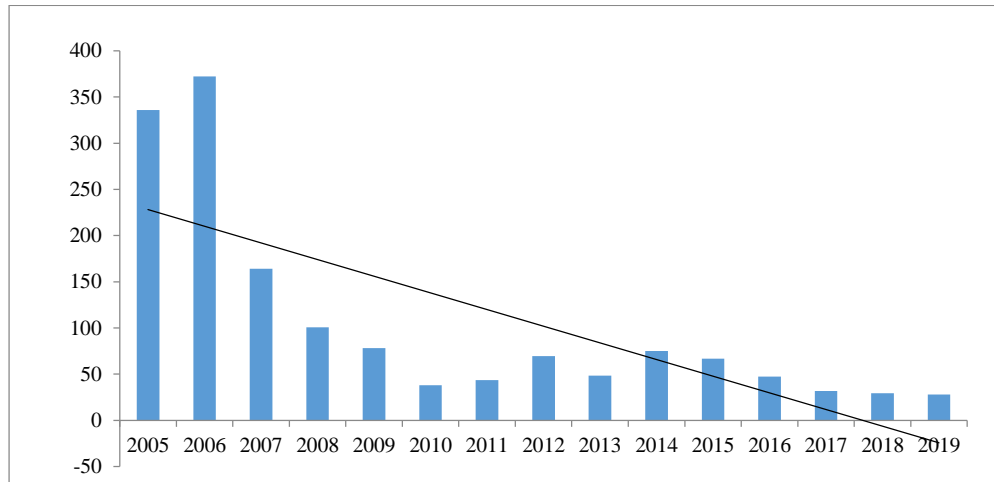


Figure 2 Total value traded to GDP 2005-2019

3.3.2. Turnover ratio

Unlike total value of stock traded to GDP, which captures liquidity in terms of the economy basis as it may not mirror actual liquidity but only capture trading relative to the economy, stock market turnover captures liquidity in the stock market basis so, it refers to the stock market efficiency as it allocate capital and allow investors to diversify their assets easily (Beck et al., 2000, Levine & Zervos, 1998). Turnover can be measured by dividing the total value of stock traded to market capitalization (Beck et al., 2000). High turnover is often used as an indicator of low transaction cost and so it can enhance economic growth. However, large stock market capitalization is not necessarily a liquid market (Levine & Zervos, 1998). Many researchers pointed that aggregating the information of market capitalization, total value traded and stock turnover together assess to give a more comprehensive vision of how a stock market's development is growing. Table 4 shows that the Saudi turnover domestic shares (TRDS) peaked at 429.24% in 2006 whereas the minimum value 09.17% was in 2019 with a mean of 120.65 and a standard deviation of 99.74 points over the study as shown in Table 8. It is noted that Saudi stock market turnover ratio was very high through 2005-2008 and began to decrease due to the world financial crises in 2008 until 2010, then from 2011 to 2014 it has unstable trend. From 2015 it decreased to its minimum ratio 09.10 in 2019.

However, the ranking for Saudi Arabia over the study period is considered very high according to the global ranking data available on 72 countries on World Bank but it suddenly reported a significant decline from 2017 as shown in figure 3.

Table 3 Stock Market Turnover Ratio. 2005-2019

Year	Market cap. (million \$)	Total value traded (million \$)	Stock Market Turnover Ratio (%)
2005	646104000000	1103534500000	170.80
2006	326869000000	1403048100000	429.24
2007	515111000000	681947600000	132.39
2008	246337000000	523326600000	212.44
2009	318733680000	335109900000	105.14
2010	353409590000	201210910000	56.93
2011	338873290000	291435880000	86.00
2012	373374750000	511178270000	136.91
2013	467365780000	362402350000	77.54
2014	483115510000	567392070000	117.44
2015	421060070000	436941100000	103.77
2016	448831069542	306380423760	77.48
2017	451378840000	218380624730	48.38
2018	496353180000	229577660738	46.25
2019	2406819600000	220782730000	09.17

Data source: The World Bank data.

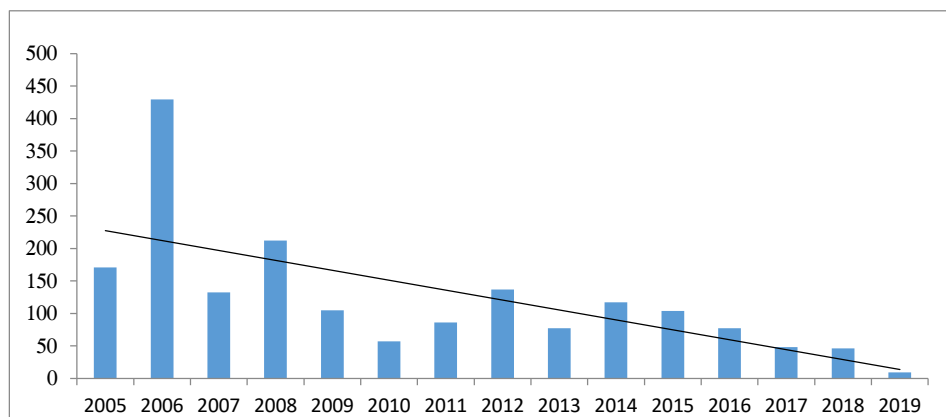


Figure 3 Stock Market Turnover ratio 2005-2016

3.4. Volatility:

Stock market volatility (VOL) refers to the variation in the prices over a period of time. It can be measured by using the standard deviation, or variance of the stock market index for a year (Schwert & William, 1989). Generally, high volatility involves high risk. Figure 4 indicates a decreasing trend in Saudi stock market volatility but faced highly volatile in 2006 and in 2009 due to the effect of the financial crash faced the Saudi's stock market in 2006 then, the world financial crisis in 2008. (Demirguc-Kunt et al, 1995) suggested that low volatility reflect low risk "Although greater volatility is not necessarily a sign of more or less stock market development, we sometimes refer to "less volatility" as reflecting greater "stock market development". Through the study period the ratio peaked at 41.02% in 2009. Whereas the minimum value 11.81% was in 2014. With a mean of 24.76 and a standard deviation of 10.90 points over the study as shown in Table 8.

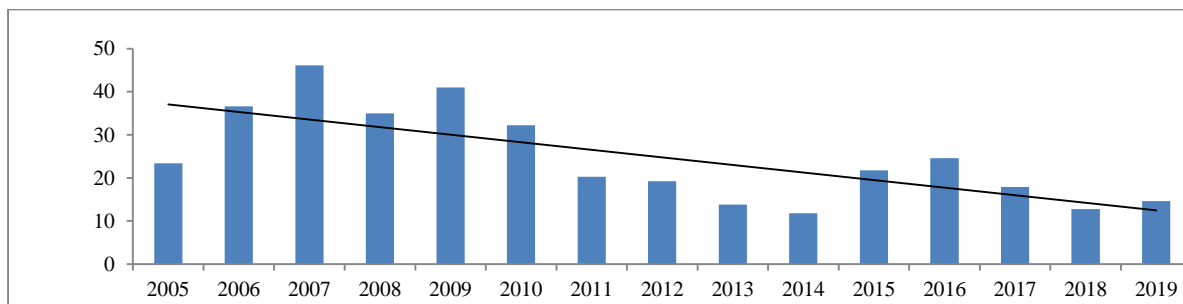


Figure 4 Stock price volatility in Saudi Arabia 2005-2019 according to the World Bank collection of development indicators.

3.5. Concentration:

(Demirguc-Kunt & Levine, 1995) [19] Show that market concentration means that only a few companies dominate the stock market, which can be measured by looking at the share of market capitalization accounted for by the largest 3 to 5 stocks. (Mauder, P., Myers, D., Wall, N. & Miller, R., 1991). High concentration ratio in an industry would be evident characterized by a true monopoly. On the contrary, low concentration ratio would indicate greater competition among the firms in that industry. To measure the market concentration ratio in Saudi Arabia, we compute the share of the 5 largest firms in total value of stock traded as a commonly used concentration ratio through the study period 2005-2019 in which the ratio peaked at 47.71% in 2018. Whereas the minimum value 13.66% was in 2006 as shown in Figure 5 which indicates increasing market concentration through the study period. It is noted here that Saudi market is characterized by high market concentration which is not desirable as it can adversely affect its liquidity as (Datta, 2013) pointed that "it is common to find a negative correlation between concentration and liquidity."

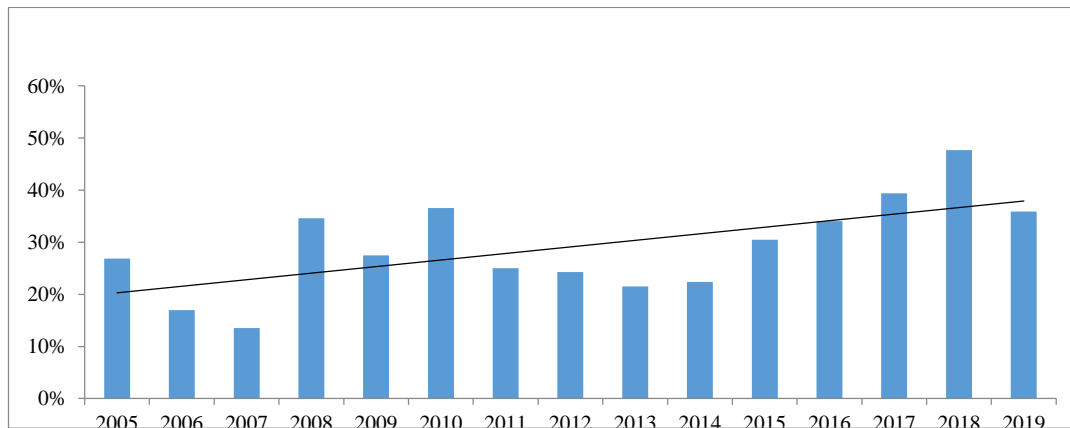


Figure 5 Concentration Ratio by top five active stocks by value of shares traded 2005-2019

Saudi Arabia market consists of 16 sectors, by calculating the market capitalization by largest 3 sectors through the time period from 2005 to 2016 according to available data we found that only 3 sectors; industries, banks, and communication make-up 60-86% of total market concentration as shown in table 4.

Table 4 Concentration Ratio of Top Five Active Stocks by total market capitalization 2005-2016

Year	Banks	Industries	Telecom & IT	%Total Market
2005	32.19	39.84	13.96	85.99
2006	34.11	34.86	14.13	83.10
2007	29.97	38.79	10.49	79.25
2008	31.10	25.62	14.58	71.30
2009	27.71	34.06	11.24	73.01
2010	26.62	37.20	10.28	74.10
2011	24.34	36.75	9.01	70.10
2012	21.96	31.41	19.91	73.28
2013	21.68	31.64	10.70	64.02
2014	28.34	23.35	9.69	61.38
2015	27.47	21.71	10.41	59.59
2016	25.52	24.70	10.04	60.26

Data source: Author's calculations from various issues of TASI historical data from Jan-2005 to Dec-2016

A deeper look at concentration ratio at the same industry level (sector), table 6 shows that only 1 firm in petrochemical industries sector, SABIC, has a market share of more than 60% of the whole concentration ratio within the same sector which makes-up along with another firm, SAFCO, a share of 16-30 % of total market capitalization. This reflects the company's dominance over the industry. On the other side, table 5 shows that the percentage of market capitalization for both firms decreased from 30% in 2005 to 17-18% in 2015-2016 as a sign of improvement.

Table 5 Concentration Ratio in largest 2 firms in industries sector 2005-2016

Year	SABIC	SAFCO	% Sector	% Market
2005	69.8	5.8	75.6	30.12
2006	66.94	5.45	72.39	25.24
2007	65.74	5.26	71	27.54
2008	65.23	9.47	74.7	19.14
2009	60.78	7.43	68.21	23.23
2010	63.74	8.1	71.84	26.72
2011	61.82	9.42	71.24	26.18
2012	61.21	11.54	72.75	22.85
2013	60.31	9.41	69.72	22.06
2014	59.18	11.09	70.27	16.41
2015	66.95	9.99	76.94	16.70
2016	66.06	7.49	73.55	18.17

Data source: Author's calculations from various issues of TASI historical data from Jan-2006 to Dec-2016

Concentration ratio in telecom and information sector as well is highly concentrated ratio that only 2 firm, STC and Eitihad Etisalat have a market share of 65- 100% of the whole concentration ratio for the sector through the study period., while that the concentration ratio for both firms as a percentage of market capitalization is going to decrease from 14 % in 2005 to 10% in 2016 as shown in table 6.

Saudi banks sector has been dominated by 4 banks, Rajhi, SAMBA, SAAB, and Riyadh. They are make-up about 70% of the whole concentration ratio for the sector in 2006, then decreased to 47% in 2015 as shown in table 7 meaning that the concentration ratio moved from highly concentrated to moderate concentrated also, they are make-up a decreasing share from 24 % of total market capitalization in 2005 to 13% of total market capitalization in 2015.

Table 6 Concentration in largest 2 firms in telecom and information sector 2005-2016

Year	STC	Etihad Etisalat	% Sector	% Market
2005	79.9	20.1	100	13.96
2006	86.42	13.58	100	14.13
2007	72.01	17.99	90	9.44
2008	72.84	16.1	88.94	12.97
2009	65.62	22.61	88.23	9.92
2010	42.6	22.25	64.85	6.67
2011	59.05	32.1	91.15	8.21
2012	56.67	34.81	91.48	18.21
2013	57.04	35.1	92.14	9.86
2014	74.28	19.23	93.51	9.06
2015	83.25	13.25	96.5	10.05
2016	85.92	10.94	96.86	9.72

Data source: Author's calculations from various issues of TASI historical data from Jan-2005 to Dec-2016

Table 7 Concentration in largest 4 firms in banks sector 2005-2016

Year	Rajhi	SAMBA	SAAB	Riyadh	% Sector	% Market
2005	31.6	15.13	11	10.55	68.28	21.98
2006	29.25	19.66	10.75	10.26	69.92	23.85
2007	30.14	18.51	9.19	10.18	68.02	20.39
2008	29.21	16.04	11.27	11.06	67.58	21.02
2009	32.26	13.72	9.82	12.18	67.98	18.84
2010	35.29	15.63	8.57	11.31	70.8	18.85
2011	33.71	13.56	9.87	11.3	68.44	16.66
2012	31.71	13.08	9.73	11.22	65.74	14.44
2013	28.81	11.84	11.58	11.53	63.76	13.82
2014	16.27	9.01	11.36	9.92	46.56	13.20
2015	19.51	10.76	8.56	8.59	47.42	13.03
2016	23.88	11.34	8.74	8.07	52.03	13.28

Data source: Author's calculations from various issues of TASI historical data from Jan-2005 to Dec-2016

4. Methodology and Empirical Results

The study explores the relationship between the stock market development and economic growth in Saudi Arabia by using the five commonly used measures of stock market development, namely: market capitalization as a percentage of GDP, total value of traded shares as a percentage of GDP, turnover stock market, stock market volatility, and stock market concentration ratio for the period of 2005 to 2019. In econometric models it is

necessary to check the stationary of the data, especially in time series data before performing the technique otherwise a spurious regression problem occurs. In order to achieve consistent and reliable results, the non-stationary data must transform to stationary data. Augmented Dicky Fuller test was used for the analysis to examine the co-integration relationship between the variables. Data are collected from official sources such as (The World Bank), various issues of annual report of (SAMA), (TASI) and (Tadawul). The methodology used is the vector autoregressive model (VAR), unit root test, Granger causality test.

The following abbreviations have been used for the analysis:

Dependent variable Y = GDP per capita (current US\$).

Independent variables:

GDP per capita = Market capitalization % of GDP

TVS = Total value of traded shares % of GDP

TRDS = Turnover ratio domestic shares (%)

VOL = Stocks market volatility (%)

CON = Stocks market concentration (%)

Table 8 Descriptive Statistics of the variables

	GDP	MC	VOL	TVS	TRDS	CON
Mean	20482	92.64	24.76	101.90	120.66	29.12
Median	20628	65.55	21.79	66.78	103.77	27.45
Maximum	25243	303.52	41.02	372.26	429.24	47.71
Minimum	13791	47.39	11.81	27.84	09.17	13.56
Std. Dev.	3694	69.47	10.90	108.33	99.74	9.06
Skewness	-0.364	2.49	.661	1.79	2.296	0.201
Kurtosis	1.909	6.191	-.741	4.7175	6.645	2.539
Jarque-Bera	1.075	22.186	.917	9.867	21.924	0.234
Probability	0.584	0.000	.175	0.007	0.000	0.889

4.1. Unit Root Test

Is Saudi Stock Market development linked to its economic growth? To answer this question first, a unit root tests was employed to test the stationary of variables on level, first difference, and second difference on 1%, 5%, 10% level of significance. In this study we used Augmented Dicky Fuller (ADF) test on the time series data for the period of 2005 to 2019. The null hypothesis of non-stationarity is performed at 5% significance level, The ADF test includes lagged difference as a key component in order to oppose auto-correlation. The results of the Unit Root Test tells us that all variables series are non-stationary at their level, however they are stationary in their first differences where the probability value for them are less than 5% level of significant. Table 9 shows the result of testing the stationary of the economic growth and stock market variables.

Table 9 Unit Root Test Results Related to Variables

Null Hypothesis: D(variable) has a unit root			
Exogenous: Constant			
Lag Length: 2 (Automatic – based on SIC, maxlag=7)			
(GDP)		t-Statistic	Prob.*
	ADF	-5.067486	0.0004
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	
Exogenous: Constant, Linear Trend			
Lag Length: 0 (Automatic - based on SIC, maxlag=7)			
(MC)		t-Statistic	Prob.*
	ADF	-6.042347	0.0002
Test critical values:	1% level	-4.309824	
	5% level	-3.574244	
	10% level	-3.221728	
Exogenous: Constant, Linear Trend			
Lag Length: 1 (Automatic - based on SIC, maxlag=7)			
(VOL)		t-Statistic	Prob.*
	ADF	-5.218188	0.0013
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	
Exogenous: Constant			
Lag Length: 0 (Automatic - based on SIC, maxlag=3)			
(TVS)		t-Statistic	Prob.*
	ADF	-3.518075	0.0254
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	
Exogenous: Constant			
Lag Length: 0 (Automatic - based on SIC, maxlag=7)			
(TRDS)		t-Statistic	Prob.*
	ADF	-4.187091	0.0029
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	
Exogenous: Constant, Linear Trend			
Lag Length: 0 (Automatic - based on SIC, maxlag=7)			
(CON)		t-Statistic	Prob.*
	ADF	-6.694340	0.0000
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

4.2. Co-integration Test

The second step in this analysis is to examine the co-integration between the variables, we apply ARDL bound test to know either co-integration exist or not. Co-integration mean long run relationship between the variables. If f-statistic value comes greater than upper bound test value then we conclude that there is co-integration and there is a long run relationship. As the results of the Bounds test co-integration indicate that the computed f-statistic (7.289727) exceeds the upper bound critical value (3.79) at the 5% level of significance as shown in table 10. This indicates that there is a stable long-run relationship between the economic growth and stock market development, namely: market capitalization, total value of stocks traded, turnover ratio of domestic shares, volatility, and concentration.

Table 10 ARDL Bound Test

Test Statistic	Value	k
F-statistic	7.289727	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

The long run ARDL results indicates that turnover ratio of domestic shares (TRDS), Market capitalization (MC) have positively and highly significant relationship on economic growth (GDP) at 5% level of significant while total value of stocks traded (TVS), Concentration (CON) and volatility (VOL) has negatively significant impact on economic growth (GDP) at 5% level of significant. This indicates that there is statistical evidence for long-run dynamic relationship for stock market development on economic growth that is when economic growth is the dependent. The long run ARDL results are illustrated in Table 11.

Table 11 ARDL Co-integrating and Long Run Form

Dependent Variable: GDP

Selected Model: ARDL(3, 0, 1, 1, 0, 0)

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL	-0.204376	18.020558	-13.218480	0.0000
TVS	-0.524303	29.049148	-4.114554	0.0008
TRDS	0.820377	18.202821	4.165309	0.0007
MC	0.204867	3.2682571	2.816445	0.0124
CON	-0.657021	28.877257	-3.244839	0.0051
C	0.100252	17.817567	23.773937	0.0000

4.3. Granger Causality Test

To investigate the causality relationship between economic growth and stock market development in Saudi Arabia in the time series from 2005 to 2019, Granger causality test was applied. Causality is closely related to the idea of cause-and-effect and to determine the direction of causality between the variables as well. The null hypothesis claiming the non-existence of co-integration which means no causality and will be rejected when p value is less than 0.05. From the Granger causality test result, we concluded that MC does not Granger Cause GDP probability value is less than 0.05 which mean there is causality exist. TRDS does not Granger Cause GDP probability value is less than 0.05 which mean there is causality exist. TRDS does not Granger Cause CON probability value is less than 0.05 which mean there is causality exist, MC does not Granger Cause VOL probability value is less than 0.05 which mean there is causality exist, TRDS does not Granger Cause VOL probability value is less than 0.05 which mean there is causality exist. Rest of the result tells us that causality is not existed as shown in table 12 which also indicates that there is a one way causality relationship from market capitalization and turnover domestic shares towards the economic growth, and there is a one way causality relationship from economic growth toward total value of traded shares.

There is a one way causality relationship from market capitalization towards the turnover domestic shares, total value of traded shares, and stock market volatility.

There is a one way causality relationship from turnover domestic shares towards stock market volatility. There is a causality relationship from turnover domestic shares towards stock market concentration, and from stock market concentration towards turnover domestic shares.

Table 12 Pairwise Granger Causality Test Results

Null Hypothesis:	F-Statistic	Prob.
CON does not Granger Cause GDP	0.23080	0.7957
GDP does not Granger Cause CON	2.51995	0.1024
MC does not Granger Cause GDP	7.01425	0.0042
GDP does not Granger Cause MC	0.15095	0.8607
TRDS does not Granger Cause GDP	5.26163	0.0131
GDP does not Granger Cause TRDS	1.34060	0.2814
TVS does not Granger Cause GDP	2.83948	0.0790
GDP does not Granger Cause TVS	3.94918	0.0335
VOL does not Granger Cause GDP	1.45431	0.2542
GDP does not Granger Cause VOL	0.62611	0.5435
MC does not Granger Cause CON	1.25740	0.3032
CON does not Granger Cause MC	2.48063	0.1058
TRDS does not Granger Cause CON	4.83413	0.0177
CON does not Granger Cause TRDS	3.68429	0.0409
TVS does not Granger Cause CON	2.48617	0.1053
CON does not Granger Cause TVS	2.43897	0.1095
VOL does not Granger Cause CON	0.29506	0.7473
CON does not Granger Cause VOL	0.09947	0.9057
TRDS does not Granger Cause MC	0.26935	0.7663
MC does not Granger Cause TRDS	6.99758	0.0042
TVS does not Granger Cause MC	0.20320	0.8176
MC does not Granger Cause TVS	5.02141	0.0155
VOL does not Granger Cause MC	0.46583	0.6334
MC does not Granger Cause VOL	10.6999	0.0005
TVS does not Granger Cause TRDS	1.49833	0.2445
TRDS does not Granger Cause TVS	1.16860	0.3286
VOL does not Granger Cause TRDS	0.45739	0.6386
TRDS does not Granger Cause VOL	3.55511	0.0452
VOL does not Granger Cause TVS	2.17255	0.1367
TVS does not Granger Cause VOL	3.05338	0.0667

Lags: 2

4.4. Vector Error Correction Model (VECM)

The vector autoregressive (VAR) model is employed in this study as there is a long term relationship between the variables. Usually, if the time series are not stationary then the VAR framework needs to be modified to allow consistent Estimation of the relationships among the series. The error correction term tell us the speed with which our model returns

to equilibrium, if it should be negatively signed indicating a move back towards equilibrium and if it a positive sign indicates movement away from equilibrium. The coefficients of the error correction with GDP, MC and VOL as dependent variable are negative and statistically significant indicating that there is a convergence from short dynamics towards long run equilibrium.

Table 13 Vector Error Correction Estimates

Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1					
GDP(-1)	1.000					
CON01(-1)	3145 (1560) [2.02]					
MC(-1)	-35.79 (2.68) [-13.34]					
TRDS(-1)	-107.17 (3.05) [-35.09]					
TVS(-1)	86.72 (3.00) [28.88]					
VOL(-1)	329.73 (11.79) [27.98]					
C	-22166					
Error Correction:	D(GDP)	D(CON)	D(MC)	D(TRDS)	D(TVS)	D(VOL)
CointEq1	-0.035 (0.136) [3.19]	0.110 (4.6E-1) [0.67]	-0.002 (0.004) [-0.43]	0.010 (0.004) [4.78]	0.088 (0.002) [3.55]	-0.001 (0.000) [-3.37]
C	329.22 (431.7) [0.76]	0.007 (0.02) [0.50]	-4.607 (13.56) [-0.34]	-4.295 (13.36) [-0.32]	-10.58 (7.30) [-1.45]	-0.365 (1.30) [-0.28]
R-squared	0.273	0.016	0.007	0.459	0.318	0.296
Adj. R-squared	0.246	-0.020	-0.030	0.439	0.293	0.270
Sum sq. resids	1.46E+1	0.167	143948	139702	41778	1322.7
S.E. equation	2325	0.079	73.016	71.932	39.336	6.999
F-statistic	10.150	0.449	0.180	22.887	12.611	11.363
Log likelihood	-264.90	33.633	-164.54	-164.109	-146.61	-96.541
Akaike AIC	18.407	-2.182	11.486	11.456	10.249	6.796
Schwarz SC	18.501	-2.087	11.580	11.550	10.343	6.890
Mean dependent	329.22	0.007	-4.607	-4.295	-10.579	-0.365
S.D. dependent	2677.8	0.078	71.940	96.013	46.786	8.193
Determinant resid	3.35E+14					
Determinant resid covariance	2.18E+14					
Log likelihood	-725.6307					
Akaike information criterion	51.28487					
Schwarz criterion	52.13354					

As shown in table 13 the adjustment coefficients were 0.03 percent, 0.001 percent and 0.001 percent respectively towards long run equilibrium in case of disequilibrium situation in this case of CON, TRDS and TVS the adjustment coefficients is positive but not significant which indicates the lack of significant adjustment towards long run equilibrium in any disequilibrium situation.

4.5. Variance Decomposition

Now, under VAR environment, we will develop variance decomposition for economic growth and stock market development variables in Saudi Arabia for the series begin from 2005 until 2019. The variance decomposition indicates the amount of information each variable contributes to the other variables in the auto regression model. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. It also reveals how much of the changes in each variable may be explained by itself, and how much is explained by other variables.

Table 14 shows that from second period forward stock market development variables together have strong influence on GDP in long run and short run period, in long run, period5, it can be noted that the shock to GDP can contribute 84.25% to GDP, shock to stock market variables can contribute to 15.75% . All stock market development showed increasing fluctuation in GDP in long run.

Table 14 Variance Decomposition
Variance Decomposition of GDP:

Period	S.E.	GDP	CON	MC	TRDS	TVS	VOL
1	1947.3	100.0	0.00	0.00	0.00	0.00	0.00
2	2593.5	92.91	0.08	2.23	3.59	0.29	0.90
3	2666.7	88.71	1.34	4.76	3.46	0.86	0.85
4	2718.5	85.49	3.43	5.38	3.44	1.37	0.87
5	2758.8	84.25	3.48	5.35	4.33	1.35	1.21

Variance Decomposition of CON

Period	S.E.	GDP	CON	MC	TRDS	TVS	VOL
1	0.058	9.36	90.64	0.00	0.00	0.00	0.00
2	0.078	33.96	55.57	2.17	4.85	1.03	2.43

3	0.084	39.45	49.26	1.93	4.26	1.98	3.11
4	0.085	39.10	47.83	3.57	4.25	2.14	3.10
5	0.085	38.98	47.80	3.60	4.37	2.15	3.10

Variance Decomposition of MC:							
Period	S.E.	GDP	CON	MC	TRDS	TVS	VOL
1	39.48	1.30	4.47	94.25	0.00	0.00	0.00
2	46.86	3.07	20.04	74.49	0.88	1.20	0.31
3	50.13	7.50	18.01	66.16	6.22	1.045	1.06
4	51.55	9.43	17.07	64.86	5.96	1.24	1.43
5	52.19	9.37	16.88	64.79	6.23	1.27	1.45

Variance Decomposition of TRDS:							
Period	S.E.	GDP	CON	MC	TRDS	TVS	VOL
1	39.06	5.43	27.81	24.04	42.73	0.00	0.00
2	47.68	11.53	20.79	34.25	28.90	3.52	1.00
3	54.17	13.07	18.28	39.00	23.72	4.81	1.11
4	55.61	12.94	17.40	37.50	26.01	4.83	1.31
5	56.76	12.63	16.70	39.55	25.06	4.64	1.42

Variance Decomposition of TVS:							
Period	S.E.	GDP	CON	MC	TRDS	TVS	VOL
1	25.47	12.44	42.13	16.45	20.79	8.19	0.00
2	28.04	13.85	36.14	14.58	17.19	18.061	0.18
3	31.64	13.37	29.97	23.32	13.68	19.50	0.15
4	32.99	12.84	27.59	22.98	16.92	18.64	1.03
5	33.74	12.55	26.61	25.01	16.50	17.82	1.51

Variance Decomposition of VOL:							
Period	S.E.	GDP	CON	MC	TRDS	TVS	VOL
1	4.28	56.70	5.26	1.04	18.96	2.47	15.56

2	7.16	52.08	2.84	15.73	21.75	1.92	5.67
3	7.72	45.15	5.41	19.88	21.51	2.569	5.48
4	7.98	42.70	9.85	18.672	20.15	3.49	5.13
5	8.22	43.33	10.20	17.83	19.91	3.38	5.34

5. conclusions

In recent decades, the role of stock market development on economic growth has received considerable attention. The focus of this study is to detect the relationship between economic growth and stock market development in Saudi Arabia through the period from 2005 to 2019. The results suggest that stock market development have both negative and positive significant causal relationship with economic growth. Total value of stocks traded, concentration and volatility found to cause negative effect on economic growth. While stock market capitalization and market turnover ratio have positively affect economic growth which is consistent with economic theory. The results are consistent to reject the null hypothesis. However, the results suggest a partial unidirectional causality flow from both stock market capitalization and stock market turnover to economic growth and a partial unidirectional causality flow from economic growth to total value of traded shares. As represented by negative effect for total value of stocks traded, concentration and volatility beside the description for stock market indicators in section 3, the analysis explain that development of Saudi stock market indicators standout as a dramatically fluctuating market over the study period as all market indicators have unstable trend as a result for two consecutive financial crises faced the market, the Saudi stock crash in 2006 and the global financial crisis in 2008., this recommend some important implications for the regulators to concentrate on:

Increasing investment channels, as Saudi market capitalization is overvalued compared to its number of companies listed which is considered very low and imply a low investment channels available. The growth of market capitalization should be accompanied with increasing in the industrial and manufacturing growth of the country. The supporting role of the government to increase the investment in public and private sectors is crucial to promote the economic growth.

Improving the market efficiency as stock market liquidity in depth affects economic growth negatively as a sign of stock market inefficiency through low level of shares trading. This need more attention to encourage more inflow of foreign capital to improve the functioning of the stock market also to improve transparency and information ease to the investor and to eliminate unnecessary taxes in the market which will decrease the investor risk. On the other hand, will help the firms to have the needed capital quickly at relatively lower cost which will reflect better resource allocation and so it can promote the long-run economic growth. Furthermore, stock market regulators should maintain transparency in stock market.

conducting the market to diminish its high concentration which is not desirable as it can adversely affect its liquidity and consequently considered mainly administratively driven market, an evidence, shows a negative effect on stock market.

In variance decomposition results, 84.25% shock to GDP point to there are other influences cause shock in variance fluctuation in GDP, like other financial intermediaries or macro variables which may affect the economic growth in Saudi Arabia over a longer stable study period. In this concern, to enhance the empirical study, it is recommended in future papers to reexamine the relationship between economic growth with stock market development combined with other exploring variables in an integrated framework such as foreign direct investment and capital formation and allocation which captures the market efficiency to distribute the scarce resources. Saudi market has done more effort recently by opening for foreign investors since 2015 along with a government policy which is highly supportive of private businesses listing besides, Tadawul's IPO has been on the cards since 2016. (McKimmon, 1973) States that financial liberalization and stock market would promote economic growth. Thus, it is recommended that the government needs to take more interest to stock market development as it will reflect better resource allocation and so it can promote the economic growth.

Finally, due to the limitation for the available shorter intervals of the data, the present study used the annual data of the stock market development in the analysis. However, the results can be more accurate if the shorter intervals of the data could be used.

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