Effects of Stock Market Development on Economic Growth: Evidence from Turkey

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Abstract

The studies on the role of stock market development in economic growth have been increasing in recent years. This study examines the relationship between stock market development and economic growth in Turkey during the period 1999-2013 by using Johansen-Juselius cointegration test and Granger causality test. Our empirical results indicate that there is a long run relationship between economic growth and stock market capitalization, total value of stocks traded, turnover ratio of stocks traded and also there is unidirectional causality from stock market capitalization, total value of stocks traded and turnover ratio of stocks traded to economic growth.

Keywords: stock market development, economic growth, Johansen-Juselius cointegration, Granger causality

1. Introduction

Stock markets are one of the important parts of financial system, which enable firms to raise capital by issuing their shares and also create an environment which the shares are traded. So stock market has become one of the important ingredients of firms' expansion and in turn economic growth. Schumpeter (1911) firstly proposed that financial intermediaries provide services which are necessary for economic development. Levine (1991) stated that stock markets contributed to the economic growth by making the ownership of firms tradable and enabling investors to diversify away unsystematic risk. Moreover Levine and Zervos (1996) said that stock market affects savings mobility, liquidity, risk diversification, corporate control and obtaining information about the firms, so stock market can accelerate the economic growth through these channels.

Borsa Istanbul (BIST) inaugurated in December 1985 and stock trading commenced on January 3, 1986. BIST has developed rapidly in parallel with economic recovery from 2001 crisis. The BIST market capitalization increased $US 322,408,440 billion in April 2013 from $US 24,664,690 billion on 30 January 1986 and the number of publicly traded companies in BIST has increased 417 in 2013 from 20 in 1986. The objective of the study is to determine the contribution of rapidly expanding BIST on economic growth in Turkey. Therefore we investigated the relationship between stock market development and economic growth by using Johansen-Juselius cointegration and Granger causality tests. The proxies of market capitalization, stock market traded value and stock market turnover for the stock market development were used in the analyses.

The remainder of the paper is structured as follows. Section 2 reviews the recent empirical studies on stock market development and economic growth. Section 3 provides a brief discussion on data and methods used in this study and present empirical findings. Finally, the conclusion of this study will be presented in Section 4.

2. Literature Review

The early empirical studies were generally on the relationship between financial development and economic growth and these studies dates back to Schumpeter (1911) (See also Goldsmith (1969), McKinnon (1973), Shaw (1973), Bencivenga and Smith (1991), Levine and Zervos (1998)). There have been limited studies on the relationship between stock market development and economic growth. The studies on the relationship between stock market development and economic growth have generally taken the market capitalization ratio, value traded ratio and

turnover ratio representing the stock market development and gross domestic product (GDP) growth/GDP per capita growth as an economic growth and they have generally examined the relationship between stock market development and economic growth by Johansen cointegration and various causality tests. The recent studies on the relationship between stock market development and economic growth are presented chronologically in the Table 1.

The studies in literature have reached mixed findings depending on the country and country group. Some studies such as Ikikii and Nzomoi (2013), Rahman and Salahuddin (2010), Enisan and Olufisayo (2009), Agrawalla and Tuteja (2007), Buelens et al. (2006), Adjasi and Biekpe (2006), Arestis et al. (2001) and Levine and Zervos (1998) found that stock markets development have had positive effect on economic growth while Haque (2013) and Ake and Ognaligui (2010) found that stock markets development have not had any significant effect on economic growth.

Table 1. Literature summary

Author	Country/country group (period)	Method	Main Findings
Ikikii and Nzomoi (2013)	Kenya (2000-mid 2011)	Regression	Stock market trade volume and capitalization affect economic growth positively.
Osamwonyi and Kasimu (2013)	Ghana, Kenya and Nigeria (1989 – 2009)	Johansen cointegration and Granger causality	There was no causality between stock market development and economic growth in Ghana and Nigeria, while there was bidirectional causality between stock market development and economic growth in Kenya.
Marinkovic et al. (2013)	Serbia (2002-2011)	Granger causality	Turnover ratio and stock turnover to GDP was a Granger cause of real GDP growth
Tang (2013)	Australia (1960-2008)	Cointegration and Granger causality tests	There was a unidirectional causality from stock prices to economic growth.
Haque (2013)	Bangladesh, India, Pakistan, and Sri Lanka (1980-2005)	Dynamic panel	Stock market did not have any effect on growth of GDP per capita.
Kagochi et al. (2013)	Sub-Saharan Africa (1991-2007)	Panel Granger causality test	There was two-way causality between stock market development and economic growth.
Ho and Odhiambo (2012)	Hong Kong (1980-2010)	Autoregressive Distributed Lag (ARDL) bounds test	There was a unidirectional causal flow from stock market capitalization to economic growth, and a causal flow from economic growth to stock market turnover in the short and long run and a casual from stock market turnover to economic growth in the short term, and a causality flow from economic growth to stock market traded value in the short term.
Iskenderoglu et al. (2011)	Turkey (January 1991-December 2011)	Johansen cointegration test and error correction model	BIST Industrial Index affected industrial production index unidirectionally.
Rahman and Salahuddin (2010)	Pakistan (1971-2006)	Fully Modified Ordinary Least Squares (FMLS) and ARDL model bounds-testing and Error Correction Model	The efficient stock markets and stock market liquidity had positive effects on economic growth.
			Stock market development Granger causes economic growth in Egypt and South Africa while there is a bidirectional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe.
Ake and Ognaligui (2010)	Cameroon (2006-2010)	Granger causality	Stock market did not affect economic growth.

Author	Country/country group (period)	Method	Main Findings
Enisan and Olufisayo (2009)	Cote D'I voire, Egypt, Kenya, Morocco, Nigeria, South Africa, and Zimbabwe (1980-2004)	ARDL bounds test	Stock market development has a significant positive effect on economic growth.
Liu and Sinclair (2008)	China (February 1992-February 2003), Hong Kong (January 1973-February 2003) and Taiwan (January 1967-February 2003)	Co-integration and causality tests	There was a unidirectional causality from the stock prices to GDP growth in the short run
Agrawalla and Tuteja (2007)	India (1990-2007)	Multivariate Granger causality	Stock market development caused economic growth in the long run.
Buelens et al. (2006)	Belgium (1830–2000)	Cointegration analysis	Stock market development causes economic growth in Belgium. Stock market development is a better leading indicator of economic growth than bank-based development.
Adjasi and Biekpe (2006)	14 African countries	Dynamic panel data analysis	There was a positive relationship between stock market development and economic growth.
Hondroyiannis et al. (2005)	Greece (1986–1999)	Vector Auto Regression (VAR)	There was a bidirectional causality between real economic activity and stock market capitalization
Caporale et al. (2004)	Argentina, Chile, Greece, Korea, Malaysia, Philippines and Portugal (January 1977-April 1998)	Causality test and VAR	There was causality between stock market development and economic growth.
Arestis et al. (2001)	Germany (January 1973-April 1997), the US (February 1972-January 1998), Japan (February 1974-January 1998), the United Kingdom (February 1968-April 1997) and France (January 1974-January 1998)	VAR	Stock markets and banks made contributions to GDP in France, Germany and Japan, but the effects of the banks were more powerful.
Levine and Zervos (1998)	47 countries (1976—1993)	Least-square regression	Stock market size was not generally robust predictor of output growth, capital stock growth, and productivity growth, while stock market liquidity had statistically significant relationship with output growth, capital stock growth, and productivity growth.

3. Data and Method

We used the quarterly data of real Gross Domestic Product (GDP) growth rate, market capitalization as percent of GDP, total value of stocks traded as a percent of GDP and turnover ratio of stocks traded during a period 1999:Q2-2013:Q3 to investigate the effects of stock market development on the economic growth in Turkey. Stock market capitalization represents size of the stock market, while total value of stocks traded and turnover ratio of stocks traded variables represent liquidity of the stock market. The real GDP growth rate Turkey was taken from

Turkish Statistical Institute. Turkey's stock market capitalization and total value of stocks traded was taken from BIST and we calculated turnover ratio of stocks traded.

We examined the relationship between the stock market development and economic growth in a time-series analysis. First, we conducted the stationarity tests of the series with an Augmented Dickey-Fuller test (ADF). We then determined the optimal lag length for the series to be estimated, and the long-term relationship among the variables was analyzed with a Johansen-Juselius cointegration test. However, short- and long-term relationships among the variables were tested by causality analysis that used Johansen-Juselius cointegration test and Granger causality test. Eviews 7.0 software package was used in the analysis of the dataset. The variables used in the econometric analysis and their symbols are presented in Table 2.

Table 2. Variables used in the econometric analysis and their symbols

Variables	Variables
RGDP	Real GDP growth rate
MC	Market capitalization as a percent of GDP
STV	Total value of stocks traded as a percent of GDP
TR	Turnover ratio of stocks traded (Total value of stocks traded / market capitalization)

We tested the stationarity of the variables before the co-integration and causality analysis. The stationarity test results of the variables are presented in Table 3. The Stationarity test results demonstrated that that RGDP and TR variables are stationary at level and that MC and STV variables are not stationary at level because the p value is greater than 0.05. Therefore, we took first differences of the MC and STV variables, and then both variables became stationary according to the ADF test statistic.

Table 3. Stationarity test results of the variables

Variables	Coefficient Value		Value of 1 st Difference	
	Intercept Only	Intercept and Trend	Intercept Only	Intercept and Trend
RGDP	-3,708(0) [a]	-3,686(0) [a]		
MC	-0,514(2)	-4,327(4)	-8,040(1) [a]	-7,944(1) [a]
STV	-2,075(0)	-4,999(0)	-8,275(1) [a]	-8,198(1) [a]
TR	-5,493(0) [a]	-6.453(0) [a]		
Critival Values				
a = % 1	-3,550	-4,127	-3,550	-4,127
b = % 5	-2,914	-3,490	-2,914	-3,490
c = % 10	-2,595	-3,173	-2,595	-3,173

The superscripts a= 1%, b= 5% and c= 10% denote the critical values at the respective significance levels. The figures in parentheses are the minimum lag lengths as per the Akaike and Schwartz Information Criterion assuming no autocorrelation.

3.1 Johansen Juselius Cointegration Test

Johansen-Juselius (1988) cointegration test was used to determine whether there is a long run relationship between RGDP and MC, STV and TR variables. Johansen-Juselius cointegration test utilizes the eigenvalue of a parameter in order to test whether the series is cointegrated with another series. Therefore we assume that a first degree vector autoregressive time series is given as follows:

$$Y = A \underset{\sim t-1}{Y} + \underset{\sim t}{e} \qquad (t = 1, 2, 3,\ldots,n) \tag{1}$$

In Equation (1), matrix A indicates a k-dimensional parameter matrix, and $\underset{\sim t}{e}$ values denote a white noise process with a variance-covariance matrix V. Provided that Π= A-I, the series are not cointegrated if the rank of matrix Π equals zero. Since Johansen-Juselius test is based on the Likelihood Ratio, it is also referred to as the Trace Statistic. If there exists any cointegration among the variables, it is possible that there is at least a unidirectional causality relationship among the variables. In this case causality test among the supposedly cointegrated variables will also come up (Kaya, Gulhan and Gungor, 2010).

Johansen-Juselius cointegration test results of RGDP, MC, STV and TR were presented in Table 4. Johansen-Juselius cointegration test indicated that RGDP was cointegrated with MC, STV and TR variables, in other words there was a long run relationship between RGDP and MC, STV and TR. If there is cointegration among the variables in the model, it is possible that there is at least unidirectional causality among the variables (Gujarati, 1999: 623).

Table 4. Results of Johansen-Juselius cointegration analysis

Variable Pairs	Hypothesis		Likelihood Ratio	%1 Critical Value	%5 Critical Value
	H_0	H_1			
RGDP	r = 0	r = 1	65,91[a]	19,94	15,49
MC	r ≤ 1	r = 2	14,93[a]	6,64	3,84
RGDP	r = 0	r = 1	64,93 [a]	19,94	15,49
STV	r ≤ 1	r = 2	14,38 [a]	6,64	3,84
RGDP	r = 0	r = 1	35,24 [a]	31,15	18,40
TR	r ≤ 1	r = 2	12,97 [b]	16,55	12,51

a, b respectively denotes 1% and %5 significance level

3.2 Granger Causality Test

A causality analysis is used to determine causation between two variables and to determine the direction of the relationship in the event that there is a relationship. We examined the causal relationship among the variables by the Granger Causality. Granger causality test was originally proposed by Granger (1969), and then was developed by Hamilton (1994). Granger causality test investigates the direction of relationship between two variables such as X and Y. In case the current Y values can be predicted by the past values of X rather than its current values, then Granger causality is said to exist in the direction from variable X towards variable Y (Ozer, Kaya and Ozer, 2011). Granger causality test is conducted by the assistance of the two equations as follows:

$$Y_t = \alpha_0 + \sum_{i=1}^{k1} \alpha_i Y_{t-i} + \sum_{i=1}^{k2} \beta_i X_{t-i} + \varepsilon_t \quad (2)$$

$$X_t = \chi_0 + \sum_{i=1}^{k3} \chi_i X_{t-i} + \sum_{i=1}^{k4} \delta_i Y_{t-i} + \nu_t \quad (3)$$

Granger causality test is performed by testing whether the coefficients of the lag lengths of the independent variables preceding the error term in the models given above are collectively equal to zero. In Equation (2), if the coefficients of β_i is found to differ significantly from zero at a particular significance level, X is said to cause Y. Similarly, in case the coefficients of δ_i in Equation (3) also differ from zero at a certain level of significance, then Y is said to cause X. In this case, a mutual causality relationship between Y and X is present. If only the coefficients of β_i in Equation (2) are different from zero, then a unidirectional causality exists from X towards Y; while if only the coefficients of δ_i in Equation (3) differ from zero, then a unidirectional causality exists from Y towards X. Finally, in case neither the coefficients of β_i nor δ_i significantly differ from zero, then no causality exists between the two variables (Kadilar, 2000).

In context of Granger causality test firstly, the dependent variable is regressed against its own lag lengths in order to choose the lag length that minimizes the Akaike Information Criterion (AIC) and/or Schwartz Bayesian Information Criterion (SIC). After the dependent variable with the optimal lag length is incorporated into the model, the AIC or

SIC values of all the regression models built by using every possible lag length of the independent variable are determined. Thus, the particular lag length of the dependent variable in the model with the lowest information criterion is selected. Finally, this lag length is used to conduct the causality test whose procedure was explained previously (Kaya, Gulhan & Gungor, 2010).

AIC and SIC values of the regression model, which was formed from of 0-6 lagged values of RGDP, MC, STV and TR variables, were presented on Table 5. The minimum information criterion for the MC and TR variables was at 5th lag length, while the minimum information criterion for the STV variable was at 4th lag length.

Table 5. Lag length according to the AIC and SIC criteria

Lag Lengths	MC		STV		TR	
	Akaike Information Criterion	Schwartz Information Criterion	Akaike Information Criterion	Schwartz Information Criterion	Akaike Information Criterion	Schwartz Information Criterion
0	26,3369	26,4120	41,4380	41,5137	23,0004	23,0755
1	23,1743	23,3995	40,6365	40,8638	***22,1562***	***22,3613***
2	23,1655	23,5407	40,4274	40,8062	21,9900	22,3652
3	22,9433	23,4686	40,5010	41,0313	22,0303	22,5556
4	23,0579	23,7334	***40,4174***	***41,0992***	21,9420	22,6175
5	***22,5790***	***23,4050***	40,4374	41,2708	21,9006	22,7261
6	22,6652	23,6408	40,5165	41,5014	21,9924	22,9680

Bold and italic numbers indicate the lowest information AIC and SIC criteria

The results of Granger causality test between RGDP and MC, STV, TR were presented in Table 6. The empirical results indicated that there was a unidirectional causality from MC, STV and TR variables to RGDP variable. In other words changes in RGDP variable did not have impact on MC, STV and TR variables, but changes in MC, STV and TR variables had impact on RGDP variable.

Table 6. Results of pairwise Granger causality test

Variables	Direction of Causality	F Statistics	Probability
RGDP - MC	———	6,547	0,797
MC - RGDP	——→	0,470[a]	0,000
RGDP - STV	———	1,286[a]	0,290
STV - RGDP	——→	3,939	0,009
RGDP - TR		2,995[c]	0,089
TR - RGDP	——→	0,589	0,446

a, b and c respectively denotes 1%, 5% and 10% significance level.

4. Conclusion

The studies on the relationship between financial development and economic growth dates back to Schumpeter (1911). Notwithstanding the first studies predominantly focused on the effects of banking industry development on economic growth and disregard the possible effects of stock market. The relationship between stock market development and economic growth has investigated with rapidly expanding stock market during the past three decades. This study examined the relationship between stock market development and economic growth in Turkey during the period 1999-2013 by using Johansen-Juselius cointegration test and Granger causality test.

We found that there was a long run relationship between economic growth and stock market capitalization, total value of stocks traded, turnover ratio of stocks traded and also there was unidirectional causality from stock market capitalization, total value of stocks traded and turnover ratio of stocks traded to economic growth. Our finding was consistent with the general trend in the literature

Consequently we determined that there was a long run relationship between stock market development and economic growth in Turkey and the stock market development affected economic growth positively. So stable expansion of

BIST is vital for the sustainability of economic growth of Turkish economy. Therefore policies for the development of BIST will also contribute to the economic growth of Turkish economy. Moreover other developing countries, which want to increase their economic growth, should consider to develop their stock markets.

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