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The Effect of Stock Market on Economic Growth: The Case of Iran

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Abstract

The main goal of this paper is to investigate the relationship between stock market development and economic growth in Iran. To this end, the paper using quarterly data from 1998Q1 to 2012Q4 and employing time series methodologies, namely Johansen's co-integration and Granger causality testing procedures in the context of Vector Error Correction Models (VECM), examine the short and long run dynamics of the relationship. The Johansen test of co-integration suggests that variables are co-integrated and the VECM reveals existence of long running relationship. In addition, the granger causality test showed a two-way causality between stock market and growth in Iran.
Keywords: Stock Market; Economic growth; Causality; Iran; VECM
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1.   Introduction

Schumpeter (1911) first discussed the role of financial markets in economic growth in the early 1910s. He explained that credit markets provide finance to business enterprises that in turn use it to acquire new technology, which eventually boosts economic growth.

For many years, the role of Stock Markets have been under looked as important components that enhance economic growth, instead bank-based financial institution were considered more instrumental in accelerating economic growth.

There is increasing volume of literature (both theoretic and empirical) on the contributions of Stock markets on Economic Growth. Some researches argue that there is a dual-relationship, and others say stock markets do not have any effect on economic growth. Arguments in favor of the positive contributions of stock markets to economic growth include, Gurley and Shaw (1955), Levine and Zervos (1998), Raj, Rev Dr J Felix and Roy (2014), Chakraborty (2008). While, a number of scholars have argued that stock markets and economic growth inter-cause one another simultaneously, implying there is a dual-causality between the two variables (see,

Luintel and Khan, 1999 and GC, 2006). However, some researchers argue that stock markets do not have any impact on economic growth (see Harris, 1997).

The debates are still ongoing, because, different studies have revealed different findings. These debates and arguments are the basis for this research aiming at finding what the relationship is in the case of Iran. Moreover, most of empirical studies carried on this relationship are cross-country with limited country specific time series studies. For the case of Iran, there are scarce studies carried on this relationship. This study seeks to investigate if the Stock Market had a hand in this continuous growth.

Prior to 1979, Iran's economic development was rapid. Traditionally an agricultural society, by the 1970s the country had undergone significant industrialization and economic modernization. This pace of growth had slowed dramatically by 1978 as capital flight reached $30 to $40 billion 1980 US dollars just before the revolution. As a mechanism to ensure continuous growth of the economy and continuous financing and growth of the private sector, Tehran Stock Exchange[1] (TSE) founded in 1967. The main aim of the establishment of TSE by the government was to provide a ground for raising funds for investment in long-term assets, mobilizing savings for investment and improving small companies' access to finance. However, in this study we investigate the main question that has the TSE enhanced economic growth since its creation?

A number of studies have discovered that stock market development is an important promoter of economic growth in an economy. Earlier studies focused on the contribution of the banking sector in the economic growth, however, in the past decades, the world stock markets surged, and emerging markets were primarily accounted for a large amount of this boom (Demirgüç-Kunt and Levine 1996). Demirgüç-Kunt and Levine (1996), Singh (1997) and Levine and Zervos (1998) find that stock market development is playing an important role in predicting future economic growth. This has propelled most developing countries to open stock Exchanges hoping to reap benefits of financial sector development as much as the developed countries (Minier 2009).

The question is, whether the new stock exchanges also will have a positive and significant effect on economic growth in developing countries. There are several debates rising on the relationship between stock market development and economic growth, which is the driving force behind this research. Some find a significant causal relationship between stock markets and economic growth; others do not find any substantial relationship especially on the contest of developing countries. These debates are the reasons for undertaking this research to assess the relationship between nascent stock markets and economic growth in the context of Tehran stock Exchange (TSE) in Iran. In addition, limited country specific studies have been carried on this relationship, as most studies are cross-country; scarce stock-market-growth link studies

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[1] The Tehran Stock Exchange (TSE) is Iran's largest stock exchange, which first opened in 1967. The TSE is based in Tehran. As of May 2012, 339 companies with a combined market capitalization of US$104.21 billion were listed on TSE. TSE, which is a founding member of the Federation of Euro-Asian Stock Exchanges, has been one of the world's best performing stock exchanges in the years 2002 through 2013. TSE is an emerging or "frontier" market the stock market in Iran however is still nascent and small.

exist in the case of Iran, which also motivate this study.

This paper proceeds as follows. Section 2 provides an overview on the characteristics and development of stock market and economic growth literature. Section 3 deals with the econometric methodology and data description. Section 4 outlines the empirical results, while Section 5 summaries and concludes the paper.

2. Literature review
2.1. Theoretical literature

Early views by Schumpeter (1934), and (McKinnon 1973) and others, explained that financial development is an essential component that would enhance economic growth. Whereas Lucas (1988) criticizes the stating that the importance of stock market to growth is overstated.

Tachiwou (2009) explains that market liquidity in the stock markets may cause shift in investments by shareholders and investors who seek for greener pastures, this reduces the level of commitment of investment and this is considered an undesirable in the strive for economic growth attainment.

Previous studies developed three hypotheses to explain the relationship between financial markets and economic growth. Firstly, supply-leading hypothesis states that financial development is positively influence economic growth through the supply of financial services by financial intermediaries. While, demand following hypothesis argues that instead economic growth that accelerate development of stock market markets through the increasing demand for financial instruments. Finally, the feedback hypothesis argues that stock markets and economic growth have a reciprocated relationship. It explains that while a country is still at a low stage of growth, stock markets are dormant and underdeveloped, and once growth kicks up, the financial market surges.

The endogenous growth theory stipulates that financial markets are necessary ingredients for economic growth. Some of researchers such as Levine (1997) and Cameron (1993) argue in support of the Bank based view of financial system. On the other hand, Demirguc-Kunt and Haizinga (1999), Arestis *et.al (*2001), Chizea (2012) and Beck et al. (2000) have argued in favor of the market-based financial system to growth of an economy.

2.2. Empirical Literature review

Many empirical studies have examined the link between stock market development and economic growth. We classify the relationship between stock market and economic growth into four different categories of studies, that is: Cross-country, panel method, microeconomic studies and single country research.

Among cross-country studies, Rousseau and Wachtel (2000) as well as Beck and Levine (2004) also found a positive relationship between stock markets and economic growth in developed countries in the long run. Atje and Jovanovic (1993) and Harris (1997) equally established that countries with well-functioning stock markets are associated with growth in the economy. On the other hand, cross-country study carried in seven African countries by Enisan and Olufisayo (2009), show that only few countries experienced growth with the development of their stock markets.

In the case of developed countries, in a panel data study carried by Wachtel (2003), Rioja and Valev (2004) and Beck and Levine (2004) findings were that a positive relationship existed between stock market variables and economic growth. Calderon and Liu (2003), found out a dual direction of causality, yet Christopoulos and Tsionas (2004), established a one-way direction, running from stock markets to economic growth.

Examples of Microeconomic level studies to examine the causal effects of stock markets on economic growth include Rajan and Zingales (1998), Levine (1997), and Beck and Levine (2004).

2.3. Empirical study on Iran

This part focuses on the empirical studies carried on the relationship between stock market development and economic growth in Iran. However, not so many studies have been carried out on this relationship; A few found literatures on this relationship are for the case of Iran (Al-Yousif, 2002; Al-Awad and Harb, 2005). To the best of my knowledge, none of these papers has sought to investigate the channels of transmission by which financial development affects economic growth.

Taghipour, (2009) recently embarked on the journey to investigate how Tehran Stock Exchange (TSE) has influenced economic growth. He used 16 years' time series using Error Correction Models (ECM), to investigate the channels of transmission by which financial development affects economic growth. The findings suggest that banks affect economic growth mainly through the capital accumulation channel. While, it appears that the stock market does cause growth only through the productivity channel.

The criticism may arise from the analysis which does not allow for the control of other factors that affect economic growth whose effect need to be controlled for in the equation. The researcher therefore improved on this study by adopting the VAR model and controlling for other factors that affect growth in Iran. Therefore, this paper attempts to re-examine the empirical relationship between financial development and economic growth by emphasizing the various control variables by which bank and stock market development can affect growth. In addition, this study attempted to minimize omitted variable bias problems by controlling for other factors that may be considered to influence to economic growth. Such factors as Openness of the economy to international trade, government expenditure, Capital stock and financial sector were control variables.

3. Research Methodology

The study focused on the relationship between stock market and economic growth in a single country (Iran), and adopted a time series method. This study used Johansen and VECM to analyze the relationship between stock market and economic growth in Iran and then Granger causality test to establish the direction of causality between these variables. The Cointegration test is testing the Null hypothesis, that there is no relationship between stock Market and Economic growth in Iran. In addition, the Granger causality test on the other hand looks at two hypotheses, first the Null hypothesis that stock market does not granger cause economic growth, and the second null hypothesis, that Economic Growth does not granger cause stock market development.

3.1. Data sources and collection methods and measurement

A time series data of 15 years was employed using quarterly data, from 2000Q1 to 2014Q4 to evaluate the relationship between stock market development and economic growth in Iran. I obtained data from TSE and central Bank of Iran.

The model specification in log-linear form is as follows:

$$LogGDP_t = \alpha_0 + \alpha_1 LogSD_t + \alpha_2 LogI_t + \alpha_3 LogG_t + \alpha_4 LogM2_t + \alpha_5 LogX_t + \varepsilon_t$$

Where, GDP represents Economic growth; I stands for Physical Capital Investment; G represents Government Expenditure ratio to GDP; M2 as a percentage of GDP. As proxy for financial sector development, the researcher used M2 as a percentage of GDP. X stands for Total trade ratio to GDP, which is the value of imports plus exports as fraction of real GDP per capita. This variable is used to measure the degree of openness to international trade. SD represents Variable for Stock Market Development. α_0, β_0 and δ_0 are the constants. ε is the error term and t, the time trend.

The variable market capitalization is used to explain the relationship between stock market development and economic growth in Iran. This variable shows the size of the stock exchange. Then the model specification changes as follows:

$$LogGDP_t = \alpha_0 + \alpha_1 LogMC_t + \alpha_2 LogI_t + \alpha_3 LogG_t + \alpha_4 LogM2_t + \alpha_5 LogX_t + \varepsilon_t$$

Where, MC representing Market Capitalization Ratio that calculated by multiplying the number of shares outstanding to the share price.

The econometric method used in this study is Johansen method of Co-integration. We used Augmented Dickey-Fuller unit root test, to test for stationarity. The Error Correction Model (ECM) and Vector Error Correction Model (VECM) are specified to capture the long and short-run dynamics. Finally, we used granger causality test to establish the direction of causality between stock market and economic growth.

The Granger causality test has the following pair of regression:

$$SD = \alpha_1 \sum_{t=1}^{n} \beta_1 SD_{t-1} + \sum_{t=1}^{n} GDP_{t-1} + U_{1t}$$

$$GDP = \alpha_2 \sum_{t=1}^{n} \beta_2 GDP_{t-1} + \sum_{t=1}^{n} SD_{t-1} + U_{2t}$$

Where SD is stock market development and GDP is economic growth.

4. Results and discussion
4.1. Stationarity test Results and discussion

In order to avoid problems of autocorrelation as may arise from using Dickey-Fuller test, the

researcher used Augmented Dickey-Fuller Unit root test.

Table 1: results of Augmented Dickey-Fuller, Unit Root test at Level

variable	ADF test statistic at level	1% critical value		5% critical value		result
		With trend	Without trend	With trend	Without trend	
Log GDP	-1.87	-4.38	-3.75	-3.60	-3.00	Not Stationary
Log MC	-1.32	-4.38	-3.75	-3.60	-3.00	Not Stationary
Log I	-1.60	-4.38	-3.75	-3.60	-3.00	Not Stationary
Log G	-2.04	-4.38	-3.75	-3.60	-3.00	Not Stationary
Log M2	-1.51	-4.38	-3.75	-3.60	-3.00	Not Stationary
Log X	-1.83	-4.38	-3.75	-3.60	-3.00	Not Stationary

The results as shown in the table above indicate that the variables are not stationary. This implies that there is a unit root at level, for each variable, hence not stationary.

Table 1: results of Augmented Dickey-Fuller, Unit Root test at first difference

variable	ADF test statistic at level	1% critical value		5% critical value		result
		With trend	Without trend	With trend	Without trend	
D Log GDP	-4.170	-4.38	-3.75	-3.60	-3.00	Stationary
D Log MC	-5.312	-4.38	-3.75	-3.60	-3.00	Stationary
D Log I	-4.121	-4.38	-3.75	-3.60	-3.00	Stationary
D Log G	-5.081	-4.38	-3.75	-3.60	-3.00	Stationary
D Log M2	-3.754	-4.38	-3.75	-3.60	-3.00	Stationary
D Log X	-4.987	-4.38	-3.75	-3.60	-3.00	Stationary

4.2. Cointegration Results and discussions

Johansen Co-integration test was performed using Eviews, and the results are discussed below in table 3.

Table 3: co-integration results

Hypothesis	Trace Statistic	5% critical value	Maximum Eigen value	5% critical value
R =0	111.3456	95.7538	46.5098	40.0771
R ≤1	78.5896[**]	69.8186	37.5643[**]	33.8765
R ≤2	39.8756	47.8564	19.3221	27.5849
R ≤3	22.1231	29.7974	17.6549	21.1317
R ≤4	13.3457	15.4942	10.5998	14.2644
R ≤5	5.1348	3.84141	5.4561	3.84149

** indicates that the hypothesis cannot be rejected at the 5% level.

From table 3, the Trace statistics indicate that the variables are co-integrated. The Maximum Eigen values also show co-integration. We see that the trace statistics are higher than the critical values at five percent; we can then reject the null hypothesis, because variables are co-integrated. Both of trace test and of Eigen values indicate two co-integrating equations at the 0.05 level.

4.3. Vector Error correction model (VECM) results

Given that the variables are co-integrated as shown in the trace statistics, it is important to establish the short run dynamics and long-run dynamics of this relationship, hence the Vector error correction model (VECM). Data converted to first difference automatically.

Table 4: Vector Error correction model (VECM) results

variables	coefficient	Standard Error	t-statistics
ECT	-0.18***	0.125	-6.345
D(Log GDP(-1))	3.124***	0.737	4.236
D(Log MC(-1))	0.167**	0.075	2.213
D(Log I(-1))	-0.812**	0.382	-2.124
D(Log G (-1))	-0.456***	0.124	-4.157
D(Log M2(-1))	0.487**	0.230	2.120
D(Log X (-1))	-0.932***	0.181	-5.144
Constant	-0.125**	0.032	-3.943

*** Significance in 1%   ** significance in 5%   * significance in 10%

ECT is speed of adjustment towards equilibrium or error correction term. From model simulation results, the Error correction term also called the speed of adjustment has a negative sign, implying that there is long run causality running from the independent variables jointly to GDP. In addition, the error obtain has high possibilities of moving much further toward the equilibrium path as time goes on and on. Moreover, the ECT coefficient shows that 18 percent of the error produced in the previous period is corrected in the current period. The error term however is statistically significant.

From the ECM results in table 4, since the MC coefficient is significant in 5%, we can say there is a short-run causality running from MC to GDP. For all variables, we conclude that a short-run causality moving from explanatory variables to Economic growth.

4.4. Granger Causality Test results

The co-integration results alone are not adequate to explain the relationship between stock markets and economic growth in Iran. We need to establish the direction of this relationship, hence the causality test. Given that a relationship exists between stock market and economic growth as shown from the Johansen co-integration test, we ought to examine the causation of this relationship.

Table 5: Granger Causality Test results

Variable of stock market	Stock Market Causes Economic Growth		Economic Growth causes Stock Market	
	F- statistics	P- value	F- statistics	P- value
MC	10.324	0.002	12.651	0.001

In this case, we can say that stock market, does granger cause economic growth in Iran. Economic growth peroxide by real per capita GDP has p-values lower than 5 percent. In addition, since the p-value of stock market is lower than 5 percent, then economic growth also does granger cause stock market development. The granger causality results prove that there exist two-way causation between stock market and economic growth in Iran.

5. Conclusions

This paper has employed the Johansen method and Granger causality procedures in the context of error correction models to investigate empirically how the stock market development affect economic growth in Iran over the period 1998-2014. The Johansen test proved that variables were co-integrated, yet granger causality test showed two-way causality between stock market and economic growth in Iran. Therefore, these findings are consistent with evidence in Levine's (1997) study, supporting the fact that as economies develop, stock markets become larger, as measured by market capitalization relative to GDP. Results show that, it is feasible to trace the contribution of the stock market in the economic growth in Iran.

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