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The Effects of Stock Market and Banking Sector Developments on Economic Growth in Iran: Evidence from Univariate Framework Analysis

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Abstract

The main objective of this study is to examine the long-run and short-run effects of stock market development and banking sector development on economic growth in Iran. The Autoregressive Distributed Lag (*ARDL*) bounds testing approach to cointegration was applied to examine long-run relationship among the series, while short-run relationship was tested by Error Correction Model (*ECM*). Utilizing quarterly data from 1995-2010, the findings of this study reveals that stock market development is an important ingredient of growth in the long-run, but with a relative lower magnitude as compared to the other determinants of growth, particularly with banking sector development. On the other hand, stock market development has a significant effect on economic growth in short-run, but the short-run coefficient of stock market development is lower than the long-run coefficient.

Keywords: Stock Market Development, Banking Sector Development, Economic Growth, ARDL, ECM

1. Introduction

Among the determinants of economic growth, stock market development is increasingly becoming an important factor to impact upon it. Stock market contributes to the mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios providing an important source of investment capital at relatively low cost (Athanasios and Antonios, 2012). A well-functioning and liquid stock market, that allows investors to diversify away unsystematic risk, will increase the marginal productivity of capital (Pagano, 1993). In addition, Obstfeld (1994) shows that international risk sharing through internationally integrated stock markets improves the allocation of resources and accelerates the process of economic growth. But, the economic role of the stock markets in relatively less developed Asian countries is less clear. Particularly, the studies on relationships among stock market development and economic growth in Iran are relatively scarce compared to the developed economies.

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Generally, stock market in Iran suffered from social, economic and political problems such as economic instability, the trade sanctions, the freezing of Iranian assets that followed and economic isolation from the west. There is one stock exchange (Tehran Stock Exchange) operating in Iran. The Tehran Stock Exchange (*TSE*) began operation in early 1967 (Pre-revolution), dealing with shares of a limited number of private banks, industrial companies, treasury bonds, and state-backed securities. From 1967 to 1987 the TSE was not priority for the Iranian authorities and it remained primitive. The ending of the Iran-Iraq war in August 1988 signaled the beginning of a new stage in the development of *TSE*. It was successful in increasing listed companies in *TSE*, but the *TSE* has experienced boom-bust cycles in both trading volume and market value, partly attributed to macroeconomic fluctuations in this stage. The objective of this paper is to examine the effects of various determinants on economic growth with special focus on the effect of stock market development and banking sector development on it in Iran both in the long-run and the short-run. Therefore, this study clears that how does economic growth respond to changes in less developed market (*TSE*) of Iran?

The rest of the paper is as follows: Section 2 reviews existing literature on the link between stock market development and economic growth; Section 3 describes the methodology applied in this research as well as sources of data; section 4 deals with the empirical analysis and section 5 concludes the study.

2. Literature Review

Stock market development has been the subject of intensive theoretical and empirical studies. Theoretical arguments suggest that financial development plays an essential role in promoting economic growth. The theoretical literature dating back to Bagehot (1873) and Schumpeter (1911) and later broadened by Hicks (1969), McKinnon (1973), and Shaw (1973), highlights the importance of financial intermediation in facilitating economic activity. Fama (1990); Schwert (1990) claim that there are three explanations for the strong link between stock prices and real economic activity: First, information about future real activity may be reflected in stock prices well before it occurs-this is essentially the notion that stock prices are a leading indicator for the well-being of the economy. Second, changes in discount rates may affect stock prices and real investment similarly, but the output from real investment doesn't appear for some time after it is made. Third, changes in stock prices are changes in wealth and this can affect the demand for consumption and investment goods.

Empirical evidences show that stock market development is strongly correlated with growth rates of real *GDP* per capita. Atje and Jovanovich (1993) have concluded that there is strong positive correlation between the level of financial development and stock market development and economic growth.

Levine and Zervos (1998) showed a positive and significant correlation between stock market development and long-run economic growth in their study of 47 countries. They also suggest that the level of banking development measured as the ratio of bank loans to the private sector to *GDP* is directly related with the level of economic growth.

In addition, Beck and Levine (2001) investigate the impact of stock markets and banks on economic growth using a panel data set for 1976-98 and applying recent generalized method of moments (GMM) techniques developed for dynamic panels. The authors illustrate econometrically the differences that emerge from different panel procedures. On balance, stock markets and banks positively influence economic growth and these findings are not a result of biases induced by simultaneity, omitted variables, or unobserved country-specific effects.

Boubakari and Jin (2010) explored causality relationship between stock market and economic growth based on the time series data compiled from 5 Euronext countries (Belgium, France, Portugal, Netherlands and United Kingdom) for the period 1995:Q1 to 2008:Q4.The results of this study suggest a positive links between the stock market and economic growth for some countries for which the stock market is liquid and highly active. However, the causality relationship is rejected for the countries in which the stock market is small and less liquid.

Athanasios and Antonios (2012) investigated the causal relationship between stock market development and economic growth for Greece for the period 1978-2007 using a Vector Error Correction Model (*VECM*). They reported that economic growth has a direct positive effect on stock market development while interest rate has a negative effect on stock market development and economic growth respectively.

However, there exists some authors who could not established any significant link between stock market development and growth such as Bencivenga and Smith (1991), Naceur and Ghazouani (2007) and Adjasi and Biekpe (2006) who looked at developing countries.

3. Model, Data and Methodological Framework

3.1. Specification Model and Data

The model that has been used in this research, is based on the principles of some earlier studies (e.g. King and Levine, 1993; Levine and Zervos, 1998; Levine *et al.*, 2000; Christopoulos and Tsionas, 2004; Seetanah, 2008 and Seetanah, 2010). The model takes the following functional form:

Y = f (XMGDP, PRIGDP, INDEX)

The dependent variable output, *Y* proxies by the real gross domestic product (*GDP*). *XMGDP* is total of export and an import divided by the *GDP* of the country and is a measure of trade openness. To measure banking development, we followed (Levine *et al.*, 2000) and used *PRIGDP*, which is the value of credits by financial intermediaries to the private sector divided by *GDP*.

Our indicators of stock market development have been used in previous studies (for example, Pagano 1993 and Demirgiic-Kunt and Levine 1996, Rousseau and Wachtel, 1998, Beck and Levine, 2001). The ratio of stock market capitalization to *GDP* (*INDEX1*) is a measure of both the stock market's ability to allocate capital to investment projects and its ability to provide significant opportunities for risk diversification for investors. The ratio of total value of shares traded to *GDP* (*INDEX2*) and the ratio of total value of shares traded to market capitalization (*INDEX3*) are indicators of market liquidity. We also combine the three indicators in an equally weighted index of market development, *INDEX*.

To assess the relationship between stock market development, and economic growth in a developing economy like Iran, we utilize log-linear model as follows:

$$\ln Y_t = \alpha_0 + \alpha_1 LnXMGDP_t + \alpha_2 lnPRIGDP_t + \alpha_3 \ln INDEX_t + U_t$$

The reason for taking log is that taking the natural logarithm of a series effectively linearizes the exponential trend (if any) in the time series data since the log function is the inverse of an exponential function (Asteriou and Price, 2007).

We used quarterly data in exploring the relationship between stock market development and economic growth. Its information is according to the time series and duration of this study was in 1995:1-2010:4. The main source that is used for the data related to model variables is the Central Bank of Iran (*CBI*).

3.2. Methodological Framework

A number of alternative tests are available for testing whether a series is stationary. Usually augmented Dickey Fuller (*ADF*) and Phillips and Perron (1988) tests have been used by researchers. This study used *ADF* test for finding unit roots in time series. An indication of whether the researcher should supplement *ADF* tests by also using the adjustments proposed by Phillips and Perron (1988) can be gained by inspection of the diagnostic statistics from the *ADF* regression (Perman, 1991).

This paper applies the autoregressive distributed lag (*ARDL*) approach introduced in Pesaran *et al*. (2001) in order to investigate long-run relationship between stock market development and economic growth in Iran. Traditionally, the cointegration approach has widely been used to establish long-run relationship among certain variables. It is believed that *ARDL* estimation technique has a numerous advantages compared to other integration estimation techniques. The main advantage of *ARDL* is because of it flexibility, which is can be applied irrespective of whether underlying regressors are purely *I(0),* purely *I(1)* or mutually cointegrated. Another advantage of using the *ARDL* approach is that it performs better than Engle and Granger (1987) and Philips and Hansen (1990) cointegration test in small samples (Pesaran and Shin, 1995).

In summary, the *ARDL* procedure involves two stages. At the first stage, cointegration implying existence of a long-run equilibrium relationship between the variables of the model will be test. The second step of analysis of cointegration consists of modeling underlying short-run dynamics leading to the long-run level equilibrium equation.

4. Empirical Result

Before conducting any econometric analysis, the time series properties of the data must be investigated. So, we first conduct augmented Dickey Fuller (ADF) test to establish the order of integration for the real gross domestic product (*Y*), measure of trade openness (*XMGDP*), measure of banking development (*PRIGDP*) and index of stock market development (*INDEX*) series. The results of the unit root tests are presented in Table 1. The null hypothesis of unit root is rejected by *ADF* test for *Y* and *XMGDP* series and so are the series stationary in the level. We conducted the same test on the first difference of *PRIGDP* and *INDEX* series and found them stationary. As a result, these data series can be characterized as *I(0)* and *I(1)* for period of analysis.

Table 1: Results of Unit Root Test

Series	**Order**	**ADF[1]**
LnY	Level	-3.71
	1st difference	-8.23
LnXMGDP	Level	-3.13
	1st difference	-4.28
LnPRIGDP	Level	-2.79
	1st difference	-7.45
LnINDEX	Level	-4.07
	1st difference	-5.20

1 Augmented Dickey-Fuller unit root test, denotes significance at 5%

The method of cointegration requires that variables be integrated of the same order. The results of the *ADF* stationary test showed that time series data are mix of *I(0)* and *I(1).* The *ARDL* model overcomes this problem by introducing bounds testing procedure to establish long-run relationship among variables. It does not require, as such, that variables of interest have the same order of integration to model long-run relationship.

The selection of lag to *ARDL* procedure is very important step. In this condition, maximum lags will be determined by researcher with respect to sample size. Given the Quarterly data available for estimation, we set the maximum lag order of the various variables in the model equal to four. In this study, the lag length criteria was obtain from unrestricted *VAR* estimation results which based on the maximum value of Akaike Information Criterion (*AIC*) and Schwarz Bayesian Criterion (*SBC*). Based on the *VAR* estimation, the maximum value of *AIC* and *SBC* is equal to 4 and therefore the total number of regression estimated through *ARDL* approach is equal to $(p+1)^k=(4+1)^4=3125$. The lag length criteria results are reported in Table 2 as follows:

Table 2: Selection of Lag Length Criteria

Order	LL	AIC	SBC	LR test	Adjusted LR test
4	702.18	634.18	562.97	…….	…….
3	665.86	613.86	559.40	CHSQ(16) = 72.3557[.000]	52.0626[.000]
2	593.15	557.15	519.45	CHSQ(32) = 218.052 [.000]	156.2712[.000]
1	497.87	477.87	456.93	CHSQ(48) = 408.614 [.000]	292.8402[.000]
0	32.936	28.936	24.747	CHSQ(64) = 1338. 50[.000]	959.2544[.000]

AIC=Akaike Information Criterion
SBC=Schwarz Bayesian Criterion

First step is to examine the long-run relationship using *ARDL* bound testing procedure, where the real gross domestic product (*Y*) is considered to be the dependent variable and the best lag distribution of the independent variables, measure of trade openness (*XMGDP*), measure of banking development (*PRIGDP*) and index of stock market development (*INDEX*), was modeled.

The results of bounds testing approach for long-run relationship represent that the calculated *F- statistic* is 5.83 which is higher than the upper level of bounds critical value of 5.61 and lower bounds value of 4.38, implying that the null hypothesis of no Cointegration cannot be accepted indicating that there is indeed a cointegration relationship among the variables at 1per cent level of significance. Table 3 compared the *F-statistic* against the bounds calculated value with intercept and no trend.

Table 3*:* ARDL Bound Test to Long-run Cointegration

Test Statistics	Calculated-Value	Lag - order	Significance level	Bound Calculated Value	
				I(0)	*I(1)*
F - Statistics	5.83	4	1%	4.385	5.615
			5%	3.219	4.378
			10%	2.711	3.823

The second stage of an *ARDL* modelling for univariate cointegration test is to estimate the long- run coefficients of model. Table 4 presents the solved static long-run results of the *ARDL* model. The estimated coefficients show that measure of trade openness (*XMGDP*), measure of banking development (*PRIGDP*) and index of stock market development (*INDEX*) have a positive effect on the real gross domestic product (*Y*) in long-run, and all the regressors are statistically significant.

Table 4: Estimated long-run Coefficients the *ARDL* Approach
ARDL (4, 1, 1, 3) selected based on Schwarz Bayesian Criterion Dependent variable is *LnY*

Regressors	Coefficient	Standard Error	T-Ratio [Prob]
LnXMGDP	0.16364	0.068906	2.3748[.022]
LnPRIGDP	0.15003	0.031574	4.7516[.000]
LnINDEX	0.09827	0.051893	1.9038[.052]
Intercept	11.9577	0.13137	91.019 [.000]
R-Squared	0.997921	R-Bar-Squared	0.99964
DW-statistic	1.7844	F-stat. F(13,46)	12661.5[.000]

The results of a few diagnostic tests indicate that there is no error autocorrelation and conditional heteroskedasticity, and that the errors are normally distributed. This evidence indicates that the relationship between variables is verified (see Table 5).

Table 5: Diagnostic Tests

Test Statistics	***LM Version***	***F Version***
A: Serial correlation	CHSQ(4) = 9.2616[.055]	F(4,42) = 1.9166[.125]
B: Functional form	CHSQ(1) = 2.0860[.149]	F(1,45) = 1.6209[.210]
C: Normality	CHSQ(2) = 1.2563[.534]	Not applicable
D: Heteroscedasticity	CHSQ(1) = .72957[.393]	F(1,58) = .71394[.402]

A: Lagrange multiplier test of residual serial correlation.

B: Ramsey's RESET test using the square of the fitted values.

C: Based on a test of skewness and kurtosis of residuals.

D: Based on the regression of squared residuals on squared fitted values.

Next, recursive estimation using *CUSUM* and *CUSUM* square tests found that the parameters remain stable over the entire study period because both of the recursive lines are in the bound. These indications clearly illustrated through Fig. 1 and 2.

Figure 1: Plot of Cumulative sum of Recursive Residuals

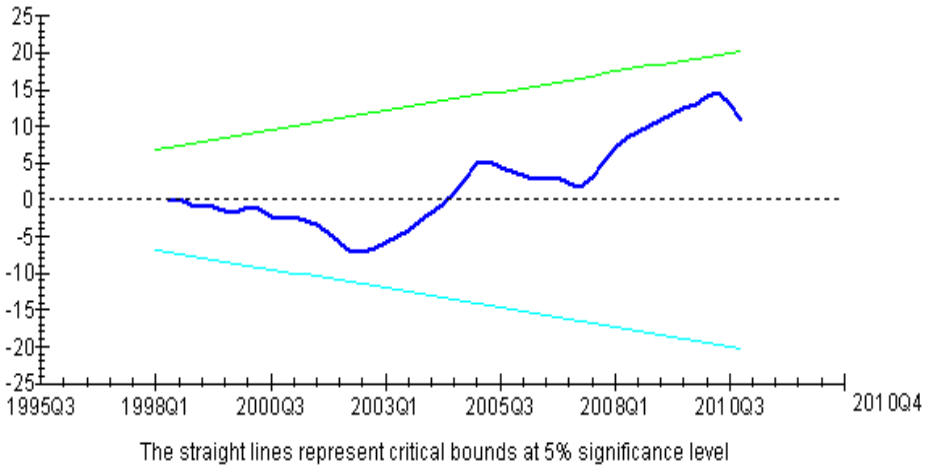
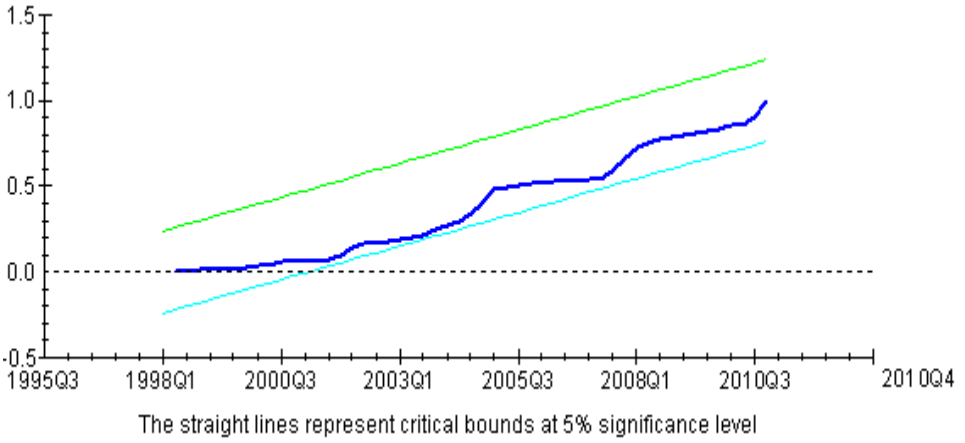


Figure 2: Plot of Cumulative sum of Squares of Recursive Residuals



Finally, having found a long-run relationship, we applied the *ARDL-ECM* version to investigate the short-run dynamic relationships. A "general-to-simple" methodology is adopted. Thus, an over parameterized error correction model is pursued. The results of this are not reported and using the information criterion as a guide, this estimated equation was reduced to a more preferred specification. The results are presented in Table 6.

Table 6: Error Correction Representation for *ARDL* Model

Dependent variable is Δ *LnY* - Preferred Specification

Regressors	**Coefficient**	**Standard Error**	**T-Ratio [Prob]**
Δ LnXMGDP	-0.02694	0.02495	-1.0810[.285]
Δ LnPRIGDP	-0.05592	0.03202	-1.7461[.087]
Δ LnINDEX	0.05488	0.01143	4.7992 [.000]
Intercept	0.93443	0.20696	4.5151 [.000]
ECT(-1)	-0.07814	0.01729	-4.5195[.000]
R-Squared	0.95251	R-Bar-Squared	0.93909
DW-statistic	1.7844	F-stat. F(10,49)	92.272[.000]

The results of *ECM* indicate that, indexes of stock market development (*INDEX*) promote the economic growth positively and significantly at 1 per cent significant level in short-run. In addition, measure of banking development (*PRIGDP*) has a negative effect economic on economic growth at 10 per cent significant level and the measure of trade openness (*XMGDP*) is not statistically significant. The coefficient of the error correction term (*ECT*) is equal to -0.07. According to this estimation, speed of adjustment is very slow. In addition, the *ECM* can explain 95 per cent of fluctuation of economic growth.

5. Conclusion

This paper focused on Iranian stock market development with the purpose of examining banking sector development, stock market development, and economic growth in a unified framework. In fact, it examines long-run and short-run relationship between stock market development, banking sector development and economic growth during the post-war in Iran. Utilizing quarterly data from 1995-2010 the results of *ARDL* bounds test to long-run

cointegration showed that long-run relationship between variables is verified. Our findings suggest that there exist significant positive relationship between stock market development, banking sector development and economic growth in Iran. The results support other studies for developing countries, such as Seetanah (2010).

The implications of the present study are that although there have been some developments in the stock markets of Iran during the post-war, yet, a strong need for implementation of effective regulations that contribute to transparency and effectiveness exists. Iran has experienced many fluctuations on exchange rate and monetary variables over the periods of 2009-2012. First, the gap between official and black market exchange rates started increasingly through time and inflation rate rose continuously from 2010 in Iran. Second, the provisional profit rates for term investment deposits in private banks and non-bank credit institutions have been changed in two stages from 2009 to 2012. It is clear that these fluctuations launched in Iran in the last few years reduced financial instability. Therefore, it is necessary that the authorities manage exchange rate and control inflation rate to a stable condition.

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