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The Impact of Stock Market on Real Economic Activity: Evidence from Turkey

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Abstract: This study has focused on the relationship between stock market performance and real economic activity. Recently, it was argued that the traditional links between stock market and real activity broke down since the early 1980's implying that movements of stock prices are independent from subsequent changes in real activity. This study contributes to the literature on the relationship between stock market and real economic activity using quarterly data from an emerging stock market of Turkey. In contrast to the studies carried out for developed countries, the results of this study indicate that there is a close connection between stock market prices and real economic activity and the stock market causes real economic activity.

Key words: Stock market, real activity, cointegration, Granger-causality, impulse response

INTRODUCTION

The aim of this study is to investigate interrelationship between the stock market performance and the real economic activity in the case of Turkey. The subject is important empirically as well as from a policy perspective especially for emerging market economies. The recent financial crisis and associated output declines experienced by a number of emerging market economies have increased the importance of research on the links between stock market performance and real economic activity. Despite the importance of the subject, there has been relatively little empirical research on the subject in emerging stock markets.

As shown in the theoretical literature on the subject, there is no doubt that stock prices are closely connected to real economic activity through a number of different channels. However, theoretical literature provides conflicting results on the causal direction of the underlying relationship. In their survey article, Morck *et al*. (1990) determines the five main channels, through which stock prices are connected to real economic activity, which arguably encompass most of the existing theories on stock market valuation. These established channels are related to the fact that firms and managers base their investment decisions on information provided by the stock market and the stock prices reflect the present discounted value of all future dividends. These theories imply that stock prices should lead the real activity as long as stock price movements are related to fundamentals.

There are also other links between stock prices and real economic activity that have been put in the theoretical literature. Stock market performance affects real economic activity through lowering the cost of mobilizing savings and thereby facilitating investment in the most productive technologies (Greenwood and Smith, 1997); providing liquid capital through which stock markets contribute to growth (Levine, 1991); increasing incentives to get information about firms to investors (Holmstrom and Tirole, 1993); improving resource allocation through international risk sharing (Obstfeld, 1994); increasing the wealth of investors and hence increasing consumption and in turn economic growth (Mauro, 2003).

However, several authors have provided models which provide conflicting predictions about the stock market-growth relationship. Devereux and Smith (1994) indicate that stock markets can deter growth because risk sharing through internationally integrated stock markets can actually reduce saving rate. Bhide (1993) argues that speculations and volatility in stock markets may reduce investment efficiency, which has detrimental effect to economic growth. Mauro (1995) indicate that the development of stock market will reduce economic growth through decreasing the public's precautionary savings.

However, the empirical literature provides mixed results on the relationship between stock markets and real economic activity. Several empirical studies in the literature suggest that there is a strong relationship between stock market performance and the real economic activity. Some of these studies involve Fama (1981), Fischer and Merton (1984), Barro (1990), Fama (1990), Schwert (1990), Domian and Louton (1997), Foresti (2006) for US, Choi *et al*. (1999) and Hassapis and Kalyvitis (2002) for G-7 countries, Peiro (1996) for several industrial countries, Rangvid (2001) for several emerging economies, Mauro (2003) for emerging and advanced countries.

Some other studies, however, provide evidence that stock market performance is not correlated with real economic activity (Stock and Watson, 1990, 1998;

Hu, 1993). Binswanger (2000, 2004), Mao and Wu (2007) argued that the price movements since early 1980's cannot be explained by fundamental factors implying that the link between stock prices and real economic activity has broke down. Binswanger (2000) provides evidence that the relation between stock returns and real economic activity in the US has disappeared since the early 1980's indicating that stock return ceased to lead real economic activity. Binswanger (2004) further searched for whether the breakdown of this relationship in the early 1980s can be generalized to the other G-7 countries (Canada, Japan, France, Germany, Italy, UK). The results presented in Binswanger (2004) suggest that a similar breakdown occurred in Canada, Japan and the four European G-7 countries. Therefore, the author concluded that the breakdown of the relationship is an international phenomenon that affected all major economies and hence the recent stock price movements are the result of speculative bubbles. Mao and Wu (2007) also provide similar results in their study carried out using VAR methodology for Australia.

The causality relationship between stock market performance and real economic activity is also investigated in various empirical studies. While Fama (1990), Schwert (1990), Doong (2001), Canova and De Nicolo (1995) and Mauro (2003) reports that an increase in stock market returns cause an increase in real economic activity, Mao and Wu (2007) conclude that generally there is bidirectional long-run Granger causality between stock market prices and real economic activity in Australia. Gjerde and Saettem (1999), using Norwegian data, Know and Shin (1999), using Korean data, provide evidence that the stock market performance is not a leading indicator for real economic activity.

As shown earlier, compared to the number of empirical studies on developed countries, there are relatively few studies focusing on the links between stock market and real economic activity in emerging markets. Studying this link in emerging markets is especially important for mainly two reasons (Mauro, 2003). First, leading indicators are relatively scarce in emerging markets and stock market could be a helpful leading indicator in forecasting economic growth. In particular, it would be helpful to forecast the impact of financial crisis on economic growth during the time of financial crisis. Secondly, information about the volatility of stock prices that cannot be explained by fundamentals but affects real output would provide a guidance for economic policy makers.

The last few decades have witnessed significant development of the stock market and real economic activity in Turkey. The Turkish stock market ISI exhibited high growth since 1980's. In the last five years, Turkey has experienced consistently high growth for both stock market returns and real economic performance. Providing evidence from an emerging market economy of Turkey, the present paper aims to investigate whether the relationship between stock market growth and real economic activity holds in Turkey.

MATERIALS AND METHODS

To test whether the links between stock market performance and real economic activity holds in Turkey, we conducted cointegration analysis. The methodology employed involves estimating the related vector autoregressive (VAR) model and long-run causality. By using cointegration tests we analyze the long-run equilibrium relationship between stock prices and real activity.

The empirical analysis will employ quarterly data for stock market indices and GDP between the first quarter of 1987 and the fourth quarter of 2006. All data has been taken from the Central Bank of the Republic of Turkey (CBRT) and Istanbul Stock Exchange (ISE) electronic data delivery systems. Real stock price are obtained by deflating stock prices by Consumer Price Index (CPI). All variables used in the empirical analysis are transformed variables by the use of natural logarithms.

In the empirical analysis, the following model which shows the relationship between real quarterly stock prices and real quarterly GDP will be estimated:

$$LRGDP_t = \beta_0 + \beta_1 LRSP_t + \varepsilon_t \quad (1)$$

Where, $LRGDP_t$ denotes real economic activity (real GDP) and $LRSP_t$ represents the real stock market price index.

RESULTS AND DISCUSSION

This research provides the empirical results obtained from estimating model 1 using quarterly data over the period 1987-2006. Many macroeconomic time series contain unit roots and non-stationary regressors may invalidate most of the standard empirical results (Engle and Granger, 1987; Enders, 1995). Therefore, it is important to establish the level of integration of time series before undertaking empirical analysis. Such an analysis was undertaken for each of the variables of interest considered at levels using the Augmented Dickey-Fuller (ADF) test. In each case, ADF statistics were calculated for the LRGDP and LRSP series including intercept and intercept and trend in the underlying

Table 1: The results of unit root tests

Variables	With intercept	With intercept and trend	First difference
LRGDP	0.374 (4)	-2.742 (0)	-5.909 (3)*
LRSP	-2.872 (4)	-3.024 (4)	-6.101 (4)*

The selection of lag lengths for the ADF tests is determined based on the Akaike Information Criterion (AIC), *: Indicates that the null hypothesis is rejected at the 5% level

Table 2: Results of Johansen-Juselius maximum likelihood cointegration tests

Trace test				Maximum eigenvalue test			
Null	Alternative	Statistic	95% critical value	Null	Alternative	Statistic	95% critical value
r = 0	r≥1	18.660*	15.49	r = 0	r = 1	18.640*	14.26
r≤1	r≥2	0.014	3.84	r≤1	r = 2	0.014	3.84

In the determination of lag length in the VAR model, the Akaike Information Criterion (AIC) and Hannan-Quinn criteria (HQ) are employed, *: Indicates that the null hypothesis is rejected at 5% significance level, r stands for the number of cointegrating vectors

Table 3: Estimates of long-run cointegrating relationship

Dependent variable	Constant	LRSP
LRGDP	-2.225	1.423 (4.345)

Values in parentheses indicate the t-values

Table 4: Granger causality tests, 1987-2006

Null hypothesis	Observations	χ^2-statistic	Probability	df
LRSP does not Granger cause LRGDP	78	46.82*	0.000	2
LRGDP does not Granger cause LRSP	78	3.82	0.148	2

*, **: Indicate that the null hypothesis is rejected at 5 and 10% significance level respectively

Dickey-Fuller regressions. The selection of the number of lags is carried out using the Akaike Information Criteria (AIC). The results of the ADF tests computed over the sample period for the levels and first differences of variables are reported in Table 1. Inspection of the results table shows that the null hypothesis of unit root cannot be rejected in levels of variables but it is rejected in their first differences indicating that the variables considered are integrated of the same order 1, I (1).

Having established that our variables are integrated of the same order I(1), we proceeded with the Johansen multivariate cointegration tests (JJ method) to examine whether there is a long-run relationship among LRGDP, LRSP series. The selection of the optimum lag length in the underlying vector autoregression (VAR) model is carried out using the Akaike Information Criterion (AIC) and Hannan-Quinn (HQ) criteria. The AIC and Hannan-Quinn (HQ) criteria yield a VAR (4) for quarterly data. The results obtained from the JJ method are presented in Table 2.

The inspection of Table 2 indicates that the null hypothesis of no cointegration (r = 0) among the variables is rejected in favour of the general alternative r≥1 since the trace statistic is 18.66, which is above the 95% critical value of 15.49. In addition, the null of r≤1 can not be rejected at a 5% level of significance. The maximum eigenvalue tests also show that the null hypothesis of no cointegration (r = 0) is rejected at 5% and the null of r≤1 can not be rejected at 5% level of significance indicating the presence of only one cointegrating vector, r = 1. Taken the results provided by the trace and the maximum eigenvalue tests together, it can be concluded that there is only one cointegrating relationship among the two variables subject to empirical analysis.

The estimates of the long run cointegrating vector and corresponding t-values are presented in Eq. 1 for quarterly data. Examination of the results presented in Table 3 shows that the stock prices have a positive and statistically significant long-run effect on output level implying that stock prices lead real economic activity in Turkey and that both variables are causally related at least one direction. Considering the theoretical discussions above, a positive sign on LRSP coefficient indicates that stock prices and real economic activity moves in the same direction implying that the negative effects of stock market development such as reducing savings and investment efficiency did not realize in the Turkish case.

However, this does not indicate whether change in real economic activity is causing change in stock prices or whether change in stock prices is causing change in real economic activity. To determine the direction, we implemented the Granger causality test within the framework of a vector autoregression (VAR) model. Estimation results obtained from using quarterly data are presented in the following tables for the period 1987-2006. Table 4 provides Chi-square statistics and probability values of pairwise Granger causality/block exogeneity Wald test results between the endogenous variables. The null hypothesis of non-causality shows that there is a causal relationship between real economic activity and stock market prices. The direction of the causality is only from stock market prices to real economic activity.

As evident from the inspection of the table, when applied to quarterly data, the null hypothesis that the LRSP does not cause the LRGDP is rejected at 1% level of significance implying that there is one-way causality going through the stock market prices to the level of

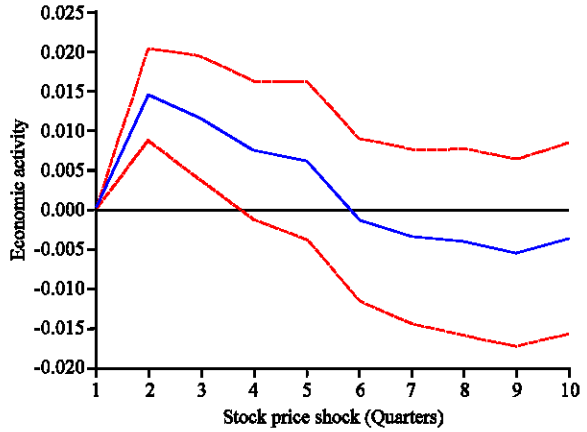

Fig. 1: Response of real economic activity to stock price shock

output. This finding implies that the development of stock markets contributes to economic growth rather than stock markets develop as economy develops. It also indicates that growth is not a good indicator for prediction stock returns.

To examine the impact of stock prices on real economic activity over time, the Impulse Response Function (IRF) of real economic activity was calculated for one standard deviation stock prices innovation. As mentioned by Runkle (1987), since reporting IRFs without standard errors or confidence intervals is equivalent to reporting regression coefficients without t-statistics we use confidence bonds around the mean response for statistical inference. When the upper and lower bounds denoted by dotted lines in the graphs carry the same sign, the responses become statistically significant at the 95% confidence level (Prock *et al*., 2003).

In order to illustrate the dynamic effects of the impact of unitary shocks on real economic activity, we consider the formulation of VAR model given in Eq. 1. Figure 1 shows the time paths or impulse responses of real economic activity to a unitary shock in stock prices up to 10 quarters. The results are shown in Fig. 1 suggest that real economic activity grows initially after a stock price shock then declines from the second quarter. This decline lasts until the sixth quarter after the shock is reached, from which point the responses become negative. Examination of the upper and lower bonds indicates that a unitary shock in stock prices exerts a statistically significant effect on real economic activity up to four quarters.

Taken together, these findings provide valuable insights into policy making. The presence of the long-run relationship and the causality among stock prices and real economic activity indicate that stock prices can be used to predict the real economic activity. Considering the fact that accurate policy making is closely related to readily available and reliable leading indicators, such information will help to make accurate predictions about the timing of crises and to develop proper policies to prevent them.

CONCLUSION

This study has investigated the relationship between stock market performance and real economic activity and the dynamic responses of real economic activity to the shocks in stock prices in the Turkish economy. The results show the existence of a long-run relationship between real economic activity and stock prices. This implies that in contrast to the evidence provided for developed countries, the traditional links among these variables still holds in case of Turkey and stock prices are closely related to changes in real activity. For this reason, it can be argued that changes in stock prices can be used as a leading indicator and policy makers can depend on the stock market information in their efforts to construct proper policies. In addition, the direction of causality is from stock prices to real economic activity. We also employed impulse response analysis to illustrate the dynamic effects of the impact of unitary shocks on real economic activity. The results indicated that real economic activity grows initially after a stock price shock then declines starting from the second quarter and a unitary shock in stock prices exerts a statistically significant effect on real economic activity up to four quarters.

REFERENCES

Barro, R., 1990. The stock market and investment. Rev. Financial Stud., 3 (1): 115-131.

Bhide, A., 1993. The hidden costs of stock market liquidity. J. Financial Econ., 34 (1): 31-51.

Binswanger, M., 2000. Stock returns and real activity: Is there still a connection? Applied Financial Econ., 10 (4): 379-387.

Binswanger, M., 2004. Stock returns and real activity in the G-7 countries: Did the relationship change during the 1980s? Quart. Rev. Econ. Finance, 44 (2): 237-252.

Canova, F. and G. De Nicolo, 1995. Stock returns and real activity: A structural approach. Eur. Econ. Rev., 39 (5): 981-1015.

Choi, J., S. Hauser and K. Kopecky, 1999. Does the stock market predict real activity? Time series evidence from the G-7 countries. J. Banking Finance, 23 (12): 1771-1792.

Devereux, M.B. and G.W. Smith, 1994. International risk sharing and economic growth. Int. Econ. Rev., 35 (3): 535-550.

Domian, D.L. and D.A. Louton, 1997. A threshold autoregressive analysis of stock returns and real economic activity. Int. Rev. Econ. Finance, 6 (2): 167-179.

Doong, S.C., 2001. Stock returns and real activity: Empirical evidence from Asian emerging countries. NSC Report., NSC89-2416-H-035-023.

Enders, W., 1995. Applied Econometric Time Series. Wiley, New York.

Engle, R.F. and C.W.J. Granger, 1987. Cointegration and error correction: Representation estimation and testing. Econometrica, 55 (2): 251-276.

Fama, E., 1981. Stock returns, real activity, inflation and money. Am. Econ. Rev., 71 (4): 545-565.

Fama, E., 1990. Stock returns expected returns and real activity. J. Finance, 45 (4): 1089-1108.

Fischer, S. and R.C. Merton, 1984. Macroeconomics and finance: The role of the stock market. Carnegie-Rochester Conf. Ser. Pub. Pol., 21: 57-108.

Foresti, P., 2006. Testing for Granger Causality between Stock Prices and Economic Growth. MPRA Paper No. 2962.

Gjerde, O. and F. Saettem, 1999. Causal relations among stock returns and macroeconomic variables in a small open economy. J. Int. Financial Markets Inst. Money, 9 (1): 61-74.

Greenwood, J. and B. Smith, 1997. Financial markets in development and the development of financial markets. J. Econ. Dyn. Control, 21 (1): 145-181.

Hassapis, C. and S. Kalyvitis, 2002. Investigating the links between growth and real stock price changes with empirical evidence from the G-7 countries. Quart. Rev. Econ. Finance, 42 (3): 543-575.

Holmstrom, B. and J. Tirole, 1993. Market liquidity and performance monitoring. J. Polit. Econ., 101 (4): 678-709.

Hu, Z., 1993. The yield curve and real activity. Int. Monet. Fund. Staff Pap., 40 (4): 781-806.

Know, C.S. and T.S. Shin, 1999. Cointegration and causality between macroeconomic variables and stock market returns. Global Finance J., 10 (1): 71-81.

Levine, R., 1991. Stock markets, growth and tax policy. J. Finance, 46 (4): 1445-1465.

Mao, Y. and R. Wu, 2007. Does the stock market act as a signal for real activity? Evidence from Australia. Econ. Pap., 26 (2): 180-192.

Mauro, P., 1995. Stock markets and growth: A brief caveat on precautionary saving. Econ. Lett., 47 (1): 111-116.

Mauro, P., 2003. Stock returns and output growth in emerging and advanced economies. J. Dev. Econ., 71 (1): 129-153.

Morck, R., S. Shleifer and R.W. Vishny, 1990. The stock market and investment: Is the market a sideshow? Brookings Pap. Econ. Act., 2: 157-202.

Obstfeld, M., 1994. Risk-taking, global diversification and growth. Am. Econ. Rev., 84 (5): 1310-1329.

Peiro, A., 1996. Stock prices production and interest rates: Comparison of three European countries with the USA. Empirical Econ., 21 (2): 221-234.

Prock, J., G.A. Soydemir and B.A. Abugri, 2003. Currency substitution: Evidence from Latin America. J. Pol. Modeling, 25 (4): 415-430.

Rangvid, J., 2001. Predicting returns and changes in real activity: Evidence from emerging economies. Emerging Markets Rev., 2 (4): 309-329.

Runkle, D.E., 1987. Vector autoregressions and reality. J. Bus. Econ. Stat., 5 (4): 437-442.

Schwert, W., 1990. Stock returns and real activity: A century of evidence. J. Finance, 45 (4): 1237-1257.

Stock, J.H. and M.W. Watson, 1990. Business cycle properties of selected US economic time series. NBER Working Paper No. 3376.

Stock, J.H. and M.W. Watson, 1998. Business cycle fluctuations in US macroeconomic time series. NBER Working Paper No. 6528.