The Determinants of Stock Market Returns: An ARDL Investigation on Borsa Istanbul

Sevinç Güler[1]
Halime Temel Nalın[2]

In this paper we examine the long run and the short run dynamics of stock return and macroeconomic and financial variables like gold prices, oil prices, export volume, import volume and exchange rate. The empirical investigation employed on monthly data between January 1988 to November 2013. The Autoregressive Distrubuted Lag (ARDL) called analytical-cointegration technique is applied to capture the dynamics of short-run and long-run relationship between veriables. According to results we found a long run relationship between stock return and economic factors and existence of significant relationship between import and stock return in long run and short run models

Keywords: Stock Return, Economic Factors, ARDL
JEL Classifications:

[1] Sevinç Güler, Assist. Prof. Dokuz Eylul University, Izmir, Turkey and visiting Scholar, University of Arkansas at Little Rock (UALR), AR, USA
[2] Halime Temel Nalın, Assist. Prof. Bulent Ecevit University, Department of Business Administration, Faculty of Economics and Administrative Sciences, Zonguldak, Turkey

1. Introduction

In recent years, there has been a compherensive debate in the literature assessing the influence of macroeconomic and financial variables on the stock return in various ways for different countries for different time periods (Fama 1981; Chen, Roll and Ross 1986; Poon and Taylor 1991; Mukherjee and Naka, 1995 etc.). Macroeconomic and financial factors have a significant impact on stock market performance. Therefore, these variables are regarded as the leading indicator of stock returns. The nature of the relationship between stock return and macroeconomic and financial variables may differ between developed and developing economies. The study covers the period 1988 to 2013 (311 observation) attemps to indicate the effect of selected macroeconomic variables such as gold prices, oil prices, export volume, import volume and exchange rate on stock prices in Turkish Stock Market.

The rest of study is structured as follows; section 2 provides reviews of the related literature; Section 3 explains the data and methodology; Section 4 focuses on the empirical results and discussion and, section 5 presents the summary and conclusion.

2. Review of Literature

Academic researchers have shown an increased interest in effects of macroeconomic and financial variables on stock return in different countries. Fama (1981) found a positive relationship between stock returns and economic factors such as GNP, money supply, capital expenditure, industrial production and interest rates. Also, Chen et al. (1986), considered some significant economic variables to have

systematic influence on asset returns with use of APT model. They showed that the changes in industrial production, inflation, the short-term interest rates, the maturity risk premium and default risk premium are the main economic factors which explain the changes in stock prices.

Furthermore, Bulmash and Trivoli (1991) noted that the U.S. stock market index has a positive relationship with M2 money in the short run. They documented also a negative relationship with M2 money, the long-term interest rate, short-term interest rate in the long run.

Mukherjee and Naka (1995) applied VECM to analyze the relationship between the Japanese Stock Market and six macroeconomic variables; exchange rate, money supply, inflation, industrial production, long-term government bond rate and call money rate. They found a long-term equilibrium relationship between the stock market.

Goswami and Jung (1997) conducted the effects of economic factors on Korean stock market using Vector Error Correction Model (VECM). According to their findings the Korean stock prices are positively related to industrial production, inflation and short-term interest rate, and negatively related to long-terminterest rates and oil prices. The sample period spans from January 1980 to June 1996.

Wongbangpo and Sharma (2002) analysed the role of selected macroecenomics variables (GNP, inflation, money supply, interest rate, and exchange rate) on the stock prices in five ASEAN countries (Indonesia, Malaysia, Philippines, Singapore, and Thailand). The study examines the monthly data available over 1985 to 1996. A negative long run relationship between stock prices and interest rates is

observed in Philippines, Singapore and Thailand. On the other hand, a positive relation is observed in Indonesia and Malaysia. In addition, the exchange rate variable is positively related to stock prices in Indonesia, Malaysia, and Philipness; negatively in Singapore and Thailand.

Mansor and Aziz (2003) used standard and well-accepted methods of cointegration and vector autoregression analyze to research the dynamic linkages between stock prices and four macroeconomic variables (between stock prices and industrial production, money supply, consumer price index, exchange rate) for Malaysia. They used monthly data over the period 1977-1998. According the study, the exchange rate is negatively associated with the stock prices.

Ratanapakorn and Sharma (2007) studied the long-term and short-term relationships between the US stock price index (S&P 500) and six macroeconomic variables (money supply, industrial production, inflation, the exchange rate, the short-term interest rate and long-term interest rate) over the period 1975:1-1999:4. They observed the S&P 500 index is negatively associated with the government bond yield, the long-term interest rate and positively affected by money supply, industial production, the inflation rate, the yen/US dollar exhange rate, the short-term interest rate and the treasury bill rate.

In another study, Hasan and Nasır (2008) examined the relationship among the inflation, industrial production, oil prices, short term interest rate, exchange rates, foreign portfolio investment, money supply and equity prices in Pakistan. ARDL approach employed for the period 6/98 to 6/2008. Results revealed that industrial production,

oil prices, inflation and foreign portfolio investment are statistically insignificant while interest rates, (-) exchange rates and money supply have significant long run effect on equity prices.

Rasiah comparative study (2010) employed time-series analysis to investigate the long-run relationships and short-run dynamic interactions between the stock market and various macroeconomic variables (industrial production, consumer price index, money supply and real exchange rate) in Malaysia over the period 1980- 2006. The cointegration test and the vector error correction model demonstrates the evidence of positive long-run relationships between real stock returns and real exchange rate.

Using VECM model, Osamwonyi and Evbayiro-Osagie (2012) determined the relationship between macroeconomic variables and the Nigerian stock market index. They used the yearly data of several macroeconomic variables such as interest rates, inflation rates, exchange rates, fiscal deficit, GDP and money supply from 1975 to 2005. According to results exchange rates are positively related to stock market index in the short run but negative in the long run. Money supply (M2) has a negative relationship with stock market index in both short and long run. GDP is not significant in the short run but significant at 10% level in the long run. Fiscal deficit is not statistically significant in the short-run, but positively related to stock market index.

Mohammad et al (2009) searched the correlation among the macroeconomics variables (foreign exchange reserve, foreign exchange rate, industrial production index (IPI), whole sale price index (WPI),

gross fixed capital formation (GFCF) and broad money M2) and share prices of KSE (Karachi Stock Exchange) in context of Pakistan during the period 1986-2008. The result showed that exchange rate and exchange reserve highly affected the stock prices. Kauser et al. (2012) also applied the ARDL model to invesigate the long and short run relationship between the Karachi stock market index and macro-economic variables (inflation, exchange rate and interest rates). Their data covers the period January 2003-April 2009. The results showed that exchange rates and interest rates have impact on the stock market in the short run while inflation, exchange rate and interest rates have long-run.

One of recent studies carried out by Eita (2012) investigates the macroeconomic determinants of stock market prices in Namibia using a VECM econometric methodology for the period 1998 to 2009. The study explained that Namibian stock market prices are determined by economic activity, interest rates, inflation, money supply and exchange rates.

Besides all these results, there are some studies find out that there is not any relationship between stock prices and macroeconomic variables. Poon and Taylor (1991) analyzed the relationship between macroeconomic variables (industrial production, unanticipated inflation, risk premium, term structure of return on value weighted market index) and the UK stock market prices. They showed the tested macroeconomic variables did not affect the stock price in the UK stock market. Similarly, Martinez and Rubio (1989)'s study for the Spanish market, and Gjerde and Saettem (1999)'s study for the Norwegian market have not determined a significant relationship

between stock returns and macroeconomic variables. Besides, Gay (2008) investigated the time series relationship between stock market index prices and the macroeconomic variables of exchange rate and oil price for Brazil, Russia, India, and China (BRIC) using the Box-Jenkins ARIMA model during the period 1999-2006. There was no significant relationship between respective exchange rate and oil price on the stock market index prices of either BRIC country.

As to Turkey case, the empirical results of Yılmaz et al. (2006) studied on the stock prices and some macroeconomic variables (consumer price index, money supply, interest rate, exchange rate, balance of foreign trade and industry production index) to indicate the existence of the relationship. They employed the least squares method; Johansen Juselius cointegration test, Granger causality test and VEC model for period January. 1990-December 2003. According to the findings there are significant relationships between exchange rates and interest rates.

Kandir (2008) used a multiple regression model to test the effects of seven macroeconomic variables namely growth rate of industrial production index, change in consumer price index, growth rate of narrowly defined money supply, change in exchange rate, interest rate, growth rate of international crude oil price and return on the MSCI World Equity Index. Kandir (2008) applied the model on the Turkish stock market for the period July 1997 to June 2005. He found exchange rate, interest rate and world market return seem to affect all of the portfolio returns. Büyükşalvarcı (2010), by using a multiple regression analyzed search for the effects of macroeconomic variables (consumer price index, money market interest rate, gold price, industrial production index, oil price, foreign exchange rate and money

supply) on the main Turkish stock market for the period 2003-2010. The result of the study presents that interest rate, industrial production index, oil price, foreign exchange rate affect negatively the stock market index**,** while money supply affect positively.

3. Data and Methodology

3.1. Data

In our study equity market return is used as dependent variable and macroeconomic and financial variables like gold prices, oil prices, export, import and exchange rate as independent variables. Analyzed sample covers the period from January 1988 to November 2013 (311 observation). The correlation between stock returns, gold prices, oil prices, export, import and exchange rate (US dollars) is given below:

RBIST100 = f (Gold, Oil, Export, Import, Exchange).

Dependent variable (return) is calculated by using following equation;

$$RBIST100 = \ln(BIST100_t / BIST100_{t-1})$$

$BIST100_t$ and $BIST100_{t-1}$ are monthly closing values of Borsa Istanbul National 100 Index respectively. Table 1 displays the variables and their definitions. We used logarithmic and seasonal adjustment level of time series.

Table 1

Variables

Variables	Definitions
BIST 100	100 Companies Index Traded on the National Stock Exchange
Oil	Monthly closed price of crude oil (US Dollars)
Gold	Monthly closed price of one ounce gold (US Dollars)
Export	Amount of monthly export (US Dollars)
Import	Amount of monthly import (US Dollars)
Exchange	Exchange rate of US Dollars

3.2. Methodology

We employed Autoreggresive Distributed Lag (ARDL) approach proposed by Pesaran and Shin (1999) and further extended by Pesaran et.al (2000) and Pesaran et.al (2001). According to most studies, ARDL approach is preferable to other cointegration tests such as Johansen framework. The model investigates the existance of long run relationship between dependent variable and exogenous veriables. In other words ARDL model tests for single cointegration and can be applied in different order of integration. This assumption means that I(0), I(1) or mutually cointegrated regressors are applicable in model. According to Akmal (2007), pretesting of unit root tests in ARDL procedure might still be necessary to confirm whether or not the ARDL model should be used or ensure the integrated order of veriables for 2 or beyond 2.

The ARDL model specifications of the functional relationship between stock return and other macroeconomic and financialvariables can be estimated below:

$$\Delta RBIST100_t = \alpha_0 + \sum_{i=1}^{m} \alpha_1 \Delta RBIST100_{t-i} + \sum_{i=0}^{m} \alpha_2 \Delta oil_{t-i} + \sum_{i=0}^{m} \alpha_3 \Delta gold_{t-1} + \sum_{i=0}^{m} \alpha_4 \Delta ex_{t-1} + \sum_{i=0}^{m} \alpha_5 \Delta import_{t-1} + \sum_{i=0}^{m} \alpha_6 \Delta exchange_{t-1} + \alpha_7 RBIST100_{t-1} + \alpha_8 oil_{t-1} + \alpha_9 gold_{t-1} + \alpha_{10} export_{t-1} + \alpha_{11} import_{t-1} + \alpha_{12} exchange_{t-1} + \mu_t \quad (1)$$

ARDL bounds testing procedure permit us to take into consideration I(0) and I(1) variables together. In bound test the null hypotheses is built up to test $\alpha_7, \alpha_8, \alpha_9, \alpha_{10}, \alpha_{11}, \alpha_{12}$ ($H_0 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = \alpha_{11} = \alpha_{12} = 0$) . While the null hypothesis means there is no cointegration, against the alternative hypothesis of there is cointegration. $H_0 \neq \alpha_7 \neq \alpha_8 \neq \alpha_9 \neq \alpha_{10} \neq \alpha_{11} \neq \alpha_{12} \neq 0$. In equation, m is lag criteria.

The calculated F-statistics derived from Wald test are compared with Pesaran et al.(2001)'s critical values. If calculated F-statistics falls below the Pesaran et al.(2001)'s lower critical values, it is accepted that there is not relationship between time series. If calculated F-statistics is among Pesaran et al.(2001)'s lower and higher critical values, it is avoided to make certain commitment and referred to other cointegration tests. If calculated F-statistics is upper than bound

critical values, it is accepted that there is relationship between time series. In other words the null hypothesis is rejected.

After estimating the existance of long run relationship between variables the second step is selecting optimal lag lenght by using of standart criteria such as Swartz Bayesian (SBC) or Akaike Information (AIC). After that long run and short run coefficients could be predicted. ARDL long run form is exhibited in equation below:

$$RBIST100_t = \alpha_0 + \sum_{i=1}^{m} \alpha_1 RBIST100_{t-i} + \sum_{i=0}^{m} \alpha_2 oil_{t-i} + \sum_{i=0}^{m} \alpha_3 gold_{t-1} + \sum_{i=0}^{m} \alpha_4 \exp ort_{t-1} + \sum_{i=0}^{m} \alpha_5 import_{t-1} + \sum_{i=0}^{m} \alpha_6 exchange_{t-1} + \mu_t \quad (2)$$

Error correction term is used ARDL short run model. The short run dynamic model can be present as follows:

$$\Delta RBIST100_t = \alpha_0 + \sum_{i=1}^{m} \alpha_1 \Delta RBIST100_{t-i} + \sum_{i=0}^{m} \alpha_2 \Delta oil_{t-i} + \sum_{i=0}^{m} \alpha_3 \Delta gold_{t-1} + \sum_{i=0}^{m} \alpha_4 \Delta export_{t-1} + \sum_{i=0}^{m} \alpha_5 \Delta import_{t-1} + \sum_{i=0}^{m} \alpha_6 \Delta exchange_{t-1} + \alpha_7 ECT_{t-1} + \mu_t \quad (3)$$

ECT is lagged error correction term.

4. Empirical Results

Table 2(a) and Table 2(b) show the results of ADF, KPSS and Zivot Andrews unit root tests. According to ADF test except RBIST100; gold, oil, export, import and exchange rate are nonstatinary in their level and statinary in their first difference. RBIST100 is stationary in level. KPSS and Zivot Andrews test results confirm these findings.

Table 2 (a)

Unit Root Analysis

ADF TEST				
	Level		***1st Difference***	
Variables	***Intercept***	***Trend & Intercept***	***Intercept***	***Trend & Intercept***
RBIST100	-16.7568*	-16.9072*	-10.4633*	-10.4588*
gold	0.6348	-1.6725	-16.6469*	-16.8596*
oil	-1.0453	-3.0522	-13.4716*	-13.4604*
export	-0.2384	-2.1928	-5.4295*	-5.4163*
import	-0.7134	-3.0417	-27.6029*	-27.5577*
exchange	-0.0138	-2.2505	-11.6057*	-11.6267*
Critical Values %1	*-3.4513*	*-3.9879*	*-3.4513*	*-3.9880*
Critical Values %5	*-2.8706*	*-3.4243*	*-2.8706*	*-3.4244*
Critical Values %10	*-2.5716*	*-3.1352*	*-2.5717*	*-3.1352*
(*), (**), (***) mean series are stationary at %1, %5, and % 10 respectively.				
KPSS TEST				
	Level		***1st Difference***	
	Intercept	***Trend & Intercept***	***Intercept***	***Trend & Intercept***
RBIST100	0.3320*	0.0474*	0.5000*	0.5000*
gold	1.3105	0.4840	0.7917	0.1453**

oil	1.8660	0.3848	0.0795*	0.0337*
export	2.0044	0.2387	0.1545*	0.1195**
import	1.9757	0.1356**	0.0295*	0.0297*
exchange	1.8770	0.1863*	0.1523*	0.1023*
Critical Values %1	*0.7390*	*0.2160*	*0.7390*	*0.2160*
Critical Values %5	*0.4630*	*0.1460*	*0.4630*	*0.1460*
Critical Values %10	*0.3470*	*0.1190*	*0.3470*	*0.1190*
(*), (**), (***) mean series are stationary at %1, %5, and % 10 respectevely.				

Table 2 (b)

Unit Root Analysis

	Zivot Andrews Test			
	Model A		**Model C**	
	Test Statistic	***Breaking Point***	***Test Statistic***	***Breaking Point***
RBIST100	-17.2038*	2000m04	-17.2800**	1990m08
gold	-3.5098	2005m07	-3.4898	1996m10
oil	-4.3912	2004m06	-5.1468**	1999m06
export	-3.8559	2002m12	-3.2047	2002m12
import	-4.9989**	2003m11	-4.9120***	2003m11
exchange	-4.1730	2001m01	-4.2186	2001m01
Critical Values %1	*-5.34*		*-5.57*	

Critical Values %5	*-4.80*	*-5.08*
Critical Values %10	*-4.58*	*-4.82*
(*), (**), (***) mean series are stationary at %1, %5, and % 10 respectevely.		

Before ARDL bound test, lag stracture of the unstructured error correction model (equation 1) is chosen with use of Akaike Information Criteria and Schwartz Bayesian Criteria. Table 3 presents the results for twelve length for ARDL model. According to results 1 lag is choosen as minimum value.

Table 3

Lag Length Table

	AIC	***SBC***
ARDL1	-1.0506*	-0.8326*
ARDL2	-1.0319	-0.7405
ARDL3	-1.0190	-0.6904
ARDL4	-0.9867	-0.5476
ARDL5	-0.9891	-0.4756
ARDL6	-0.9898	-0.4014
ARDL7	-0.9518	-0.2883
ARDL8	-0.9270	-0.1880
ARDL9	-0.9102	-0.0954

ARDL10	-0.8794	0.0117
ARDL11	-0.9009	0.0668
ARDL12	-0.9029	0.1418

Table 4 indicates the calculated F-statistics of lagged variables. 42.7578 is higher than upper bound critical values. This expresses that there is a cointegration relationship among the dependent and exogenous variables. After that ARDL (Autoregressive Distributed Lag) model can be applied to determine short and long run relationships.

Table 4

ARDL Bound Test Results

k	***F***	***Critical values at 1 per cent level of significant***		***Critical values at 5 per cent level of significant***		***Critical values at 5 per cent level of significant***	
		I(0)	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
5	42.7578	2.26	3.35	2.62	3.79	3.41	4.68

Critical values have been taken from Pesaran et al. (2001:300) Table C (iii).

ARDL long run form results are exhibited below:

Table 5

Long Run Coefficients

Variables	***Coefficient***	***t-statistics***
RBIST100	0.0402	0.7031
gold	-0.0183	0.1940
oil	0.1048	-0.4038

export	-0.1000	1.4766
import	0.0061	-1.6625***
exchange	-0.0152	-0.6202
c	-5.38E-05	-9.0942E-05

(*), (**), (***) mean series are stationary at %1, %5, and % 10 respectevely.

Long run relationship between index return and gold, oil, export, import and exchange rate in table 5 reveal that there is only a positive and significant impact in import coefficient.

Table 6

Short Run Coefficients

Variables	***Coefficient***	***t-statistics***
ΔRBIST100	0.0470	0.7736
Δgold	0.1885	0.8446
Δoil	0.1139	1.1512
Δexport	0.1119	1.3737
Δimport	-0.2421	-2.6898*
Δexchange	0.1526	0.7700
EC (-1**)**	-0.9862	-11.6457*
c	-0.0007	-0.0895

(*), (**), (***) mean series are stationary at %1, %5, and % 10 respectevely.

Short run results are presented in Table 6. According to results negative and significant relationship between import and RBIST100 has been observed. Estimated error coefficient (EC) is statistically significant at %1 level. EC_{t-1} indicates the cointegration and should have be negative and significant. In other words the error correction term expresses the speed adjustment to restore equilibrium in the dynamic model and it should have a statistically significant coefficient with a negative sign. Narayan and Smyth (2006) proved that if EC_{t-1} term is bigger than 1, model converges to equilibrium fluctuatingly. The coefficient of EC_{t-1} = -0.98, implies that deviation from the long-term growth rate is corrected by the following year by 98%.

5. Conclusion

The aim of this study was to estimate relationship between stock return and macroeconomic and financial variables such as gold prices, oil prices, export import volume and exchange rate. We employed ARDL approach to test the long run and short run dynamics. Our findings indicate that there is a cointegration between time series. We also find that in long run import volume has a statistically significant and positive impact on stock return. However, the same impact is negative in short run. This implies that import is vital macroeconomic variable that have an impact of stock return in national index. The Borsa Istanbul National 100 index is composed of 100 companies which are selected amongst the companies traded on the national market and real estate investment trust and venture capital investment trust. Most companies traded on national market are export/import companies that have import dependency on intermediate goods. Exchange rate fluctuations occured in short run and cause increasing costs and immediate decisions for companies. However in long run

increasing import volume efforts companies' profit, in other words effects index returns in positive way.

References

Akmal, M.S. (2007), "Stock Returns and Inflation: An ARDL Econometric Investigation Utilizing Pakistani Data", Pakistan Economic and Social Review, 45 (1): 89-105.

Arshad H., Nasır Z.M. (2008), "Macroeconomic Factors and Equity Prices: An Empirical Investigation by Using ARDL Approach", The Pakistan Development Review, 47 (4): 501–513.

Bulmash, T. G., Trivoli, G. W. (1991), Time-Lagged Interactions between Stock Prices and Selected Economic Variables, the Journal of Portfolio Management, 17: 61—67.

Büyükşalvarcı, A. (2010), "The Effects of Macroeconomics Variables on Stock Returns: Evidence from Turkey", European Journal on Social Science, 14(3): 404–416.

Chen, N. F., Roll, R., Ross, S. 1986." Economic Forces and the Stock Market," Journal of Business, 59: 383–403.

Fama, E. F. (1989), Stock Return, Real Activity, Inflation, and Money. American Economic Review, 71(4): 545–65.

Gay, R. D. (2008), "Effect Of Macroeconomic Variables On Stock Market Returns For Four Emerging Economies: Brazil, Russia, India and China", International Business and Economics Research Journal, 7(3), 1-7.

Goswami G, Jung, S.C. (1997), "Stock Market and Economic Forces: Evidence from Korea", IMF Working Paper.

Kandir, S. Y. (2008), "Macroeconomic Variables, Firm Characteristics and Stock Returns: Evidence from Turkey", International Research Journal of Finance and Economics, 16: 35-45.

Kouser, R., Shah A.A., Aamir, M., Saba, I. (2012), "Empirical Analysis of Long and Short Run Relationship among Macroeconomic Variables and Karachi Stock Market: An Auto Regressive Distributive Lag (ARDL) Approach", Pakistan Journal of Social Sciences (PJSS), 32 (2): 323-338.

Martinez, M., Rubio, G. (1989), "Arbitrage Pricing with Macroeconomic Variables: An Empirical Investigation Using Spanish Data", Working paper, European Finance Association, Universidad Del Pais Vasco, Bilbao.

Mohammad, S. D., Hussain, A., Ali, A. (2009), "Impact of macroeconomics variables on stock prices: empirical evidence in case of KSE (Karachi Stock Exchange)", European Journal of Scientific Research, 38(1), 96-103.

Mukherjee, T., Naka, A. (1995), "Dynamic Linkage between Macroeconomic Variables and the Japanese Stock Market: An Application of a Vector Error Correction Model", Journal of Financial Research, 18: 223-37.

Narayan, P.K., Smyth, R. (2006), "What Determines Migration Flows from Low-Income to High-Income Countries? An Empirical

Investigation of Fiji-US Migration 1972-2001", Contemporary Economic Policy. 24 (2): 332-342.

Osamwonyi, I.O., Evbayiro-Osagie, E. I. (2012), "The Relationship between Macroeconomic Variables and Stock Market Index in Nigeria", Journal of Economics, 3(1): 55-63.

Pesaran, M, H, Shin Y. (1999), "An Autoregressive Distributed Lag Modelling Approach To Cointegration Analysis", in S Strom, (ed.), Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium, Cambridge: Cambridge U P.

Pesaran M.H, Shin, Y, Smith, R.J. (2000), "Structural Analysis of Vector Error Correction Models With Exogenous I (1) Variables", Journal of Econometrics, 97: 293–343.

Pesaran, M. H., Shin, Y., Smith, R.J. (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", Journal of Applied Econometrics, 16: 289-326.

Poon, S., Taylor, S.J. (1991), Macroeconomic Factors and the UK Stock Market. Journal of Business and Accounting, 18(5): 619–636. http://dx.doi.org/10.1111/j.1468-5957.1991.tb00229.x

Rasiah, R. (2010), "Macroeconomic Activity and the Malaysian Stock Market: Empirical Evidence of Dynamic Relations", The International Journal of Business and Finance Research (IJBFR), 4(2): 59-69.

Ratanapakorn, O., Sharma, C. (2007), "Dynamic Analysis between the US Stock Returns and the Macroeconomic Variables", Applied Financial Economics, 17: 369-37.

Wongbangpo. P., Sharma, S.C. (2002), "Stock Market and Macroeconomic Fundamental Dynamic Interactions: Asean-5 Countries. Journal of Asian Economics", 13:27-51.

Yılmaz, Ö., Güngör, B., Kaya, V. (2006), "Hisse Senedi Fiyatları ve Makro Ekonomik Değişkenler Arasında Eşbütünleşme ve Nedensellik", İMKB Dergisi, 9(34): 1-16.