The Impact of Macroeconomic Factors on Amman Stock Market Returns

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Abstract

The purpose of this research is to investigate the impact of macroeconomic factors on Amman Stock Market (ASE) Returns employing monthly data between (1991and 2010). This study uses six macroeconomic factors: Real money supply (RMS2), real gross domestic product (RGDP), consumer price index (CPI), real exchange rate (E1), weighted average interest rates on loans and advances (WAIR), and a dummy variable (DUM). The normality test and unit root tests are applied to the data. Also, OLS, ARCH /GARCH models are utilized. The OLS estimations are inefficient due the existence of serious autocorrelation and a sign of Multicollinearity, and are inconclusive. For this, the study used ARCH/ GARCH estimation models. The extension to a GARCH (1, 1) does not seem necessary. However, the ARCH (1) performed well. The results of the ARCH (1) estimation showed that RMS2, CPI, E1, WAIR and the Dummy Variable have a negative role on the ASE returns. In contrast, the RGDP has a positive impact.

Keywords: Jordan stock market, macroeconomic variables, stock returns

1. Introduction

Stock markets play an important role in national economies, as they are considered to be very helpful in channeling and diversifying the domestic savings and foreign capital into productive investment, fostering capital formation and sustaining economic growth and development. Gurley & Shaw (1967) stressed the importance of financial intermediation in channeling savings to investment. In line of this, Shaw (1973) also emphasized on the task of financial liberalization in stimulating domestic savings and investment, through efficient allocation of resources, and consequently promoting economic growth and development.

However, early studies of the linkage among financial asset prices and different macroeconomic variables were established in the early eighties, and argued that financial asset prices regularly respond to the variations of macroeconomic factors such as production index, interest rates, inflation, gross domestic product, unemployment rate, foreign exchange, dividends yield, etc. (Fama, 1981, 1990; Chen et al., 1986; Kwon &Bacon, 1997). The findings revealed that changes in macroeconomic could predict the stock market variation but no agreement regarding the signs & the direction of causality especially for developed markets.

The importance of the study stems from the fact that financial intermediaries play a crucial role in economic growth. This study differs from other studies in Jordan in many aspects such as the employment of different macroeconomic variables with different definitions namely; real money supply, real gross domestic product, inflation, real exchange rate, interest rate, in addition to a dummy variable. This study also incorporates a longer time period of the latest monthly data and comprises non-macroeconomic forces. The choice of the monthly sampling period is intended to capture long-term movements in ASE returns.

Moreover, the monthly data for the selected macroeconomic factors over the period 1991–2010 were taken from the Central Bank of Jordan (CBJ) statistical database, International Monetary Fund (IMF), International Financial Statistics (IFS), and Department of Statistics (DOS) (various issues).

2. Literature Review

It is well known that macroeconomic variables have vital role in stock market instability and returns. The literature regarding the impact of macroeconomic factors on stock returns is initiated at the late of 1970's.

Ross (1976) introduced the Arbitrage Pricing Theory (APT) and linked stock market returns to numerous macroeconomic factors.

Fama and Schwert (1977) examined the relationship between the USA stock market return & macroeconomic factors. The results showed a direct link between macroeconomic volatility and stock market return volatility.

An additional study carried out by Fama (1981) concluded that an inverse relationship is existed between stock returns &inflation, while there is a positive relationship between stocks returns &real activity.

Fama (1981) argued that a rise in real activity would stimulate the demand for money, which in turn generates an upward relationship between stock market returns and money supply.

A study by Chen, Roll & Ross (1986), in which they utilized APT in order to evaluate the connection between stock market returns and number macroeconomic factors: money supply, industrial output, inflation, exchange rate & interest rate. They assured that a strong systematic connection is found between the market returns and the above factors.

Asprem (1989) studied the association between stock prices and macroeconomic factors for a number of European countries .The result showed a direct relation among stock prices and both money supply and industrial output. On the contrary, stock prices were negatively related to inflation and interest rates.

Bulmash & Trivoli (1991) build up a model in order to clarify the link between stock market prices & core macroeconomic variables. The result indicated that interest rates have a negative influence on stock prices, since higher interest rate encourages other investment options, which inturn cause stock prices to decrease.

Another study by Abdullah & Hayworth (1993) examined the influence of macroeconomic factors on stock price fluctuations. They confirmed a direct relation between stock market returns with both inflation & money supply growth rate. While, a negative relationship was found between trade deficits, government budget deficits, and interest rates.

Furthermore, a study carried out by Mukherjee and Naka (1995) employed Johansen's vector error correction model (VECM) to investigate the association between the stock market of Japan and selected macroeconomic variables. The results showed a positive link between the stock market returns, and, money supply, industrial output, and the exchange rate, While, the stock market prices and interest rates & inflation involving both signs.

Maysami & Koh (2000) investigated the association between the changing Singapore stock market prices over time and macroeconomic factors, employing the (VECM).The results showed that the growth in money supply, inflation, fluctuation in exchange rates and change in interest rates, achieve a co-integrating association with the changes in the Singapore stock market levels .

Another empirical research of the effect of macroeconomic factors on the Nigerian stock market prices was carried out by Ralph and Eriki (2001). Their study provided a significant negative impact of inflation on the response of stock market prices. Also the stock market prices are caused strongly by the money supply,GDP, interest rate, & financial deregulation. On the contrast the volatility of oil prices showed no significant impact on the prices of stock market.

Using monthly data, Maghyereh (2002) tested the causal relationship among stock market prices and macroeconomic factors in Jordan, employing Johansen's (1988) cointegration analysis .The study revealed that the macroeconomic factors were echoed in the stock prices of capital market in Jordan.

A dynamic study by Al-Sharkas (2004) investigated the link among macroeconomic factors and the prices of the ASE, utilizing (VECM) (Johansen (1991)). The empirical results confirmed that the stock prices and macroeconomics variables contain a long-run equilibrium linkage.

Tursoy, Gunsel and Rjoub (2008) studied the connection between macroeconomic factors and the Istanbul stock market using monthly data covering the period between 2001 and 2005. The results indicated a significant link between the stock returns and the macroeconomic factors; namely unanticipated inflation, risk premium, term structure of interest rate, and money supply. However, these results showed weak explanatory power based on the findings meaning that there are other omitted macroeconomic factors affecting stock market returns in ISE other than the tested ones.

Any how the literature review showed a diversity of conclusions, relying on the extent of data and the models used. Although many macroeconomic variables are common in explaining stock market returns. However, it is hard to generalize the outcomes of these variables owing to the different conditions that bound each stock market situation. More specifically, every market has its own regulations and particular kind of investors, country location, and other factors.

3. Amman Stock Exchange Market

The Amman Stock Exchange (ASE) has been considered an emerging stock market since its inauguration on the 1st of January, 1978. The ASE has links with the neighboring Arab stock markets, and is heavily dependent on foreign capital inflows (remittances; and foreign investment), which subsequently enhanced the portfolio diversification and strengthened products and liquidity. However, the ASE experiences the following weaknesses: economical and political risk, lack of transparency of the legal system, social conditions, accounting standards, investor protection, and others. Such characteristics made Jordan vulnerable to world economic cycle.

The Amman stock market has experienced remarkable expansions in line with rapid economic growth. This may be due to the implementation of the new Electronic Trading System (ETS), the maintenance of an open and liberal economy, coupled with sound macroeconomic stability by mobilizing medium and long term funds from a wide cross section of the population in order to finance public and private investment development programs and maintaining social progress and improvements in legal system.

Since the availability of domestic capital expansion accelerates economic development and reduces excessive reliance on foreign donors, the Jordanian Government has been offering a number of incentives to boost the stock exchange market through removing most restrictions on foreign participation in listed companies. These reforms have produced positive results on stock market development.

Table 1. ASE: Market Development (Selected Indicators), 1990-2010

Year	Number of listed companies	Market Capitalization (Million JDs) (MCAP)	GDP at market prices (Million JDs)	Market Capitalization as a% of GDP	General weighted price Index (point)	Traded value (million JDs)	Traded Number of Stocks As a% of MCAP	Average Daily Trading (million JDs)
1990								NA
		1293.21	2760.90	46.8	804.3	268.89	20.8	
1991		1707.10	2958.00	57.7	1000.0	302.84	17.7	NA
1992		2295.65	3611.60	63.6	1299.0	886.95	38.6	NA
1993		3463.93	3885.20	89.2	1585.0	968.61	28.0	NA
1994		3409.29	4359.20	78.2	1436.0	495.08	14.5	NA
1995	106	3495.44	4714.80	74.1	1591.7	418.96	12.0	NA
1996	135	3461.16	4912.20	70.5	1534.6	248.58	7.2	NA
1997	145	3861.95	5137.60	75.2	1692.4	355.24	9.2	1.4
1998	150	4156.56	5609.80	74.1	1701.3	464.37	11.2	1.9
1999	151	4137.71	5778.00	71.6	1673.5	389.48	9.4	1.6
2000	163	3509.64	5998.50	58.5	1330.5	287.80	8.2	1.4
2001	161	4476.36	6363.70	70.3	1727.2	662.37	14.8	2.8
2002	158	5028.95	6794.00	74.0	1700.2	946.70	18.8	3.8
2003	161	7772.75	7228.70	107.5	2615.0	1855.18	23.9	7.7
2004	192	13033.83	8090.70	161.1	4245.6	3793.25	29.1	15.4
2005	201	26667.10	8925.40	298.8	8191.5	16871.05	63.3	69.0
2006	227	21078.24	11092.60	190.0	5518.1	14209.87	67.4	58.7
2007	245	29214.20	12595.70	231.9	7519.3	12348.10	42.3	50.0
2008	262	25406.27	16108.00	157.7	6243.1	20318.00	80.0	82.9
2009	272	22526.92	17815.60	126.4	5520.1	9665.30	42.9	38.8
2010	277	21858.18	19527.90	111.9	5318.0	6690.00	30.6	26.75

Source: http://www.ase.com.jo/en/major-financial-indicators-ase

Source: Amman Stock Exchange and Department of Statistics (2010).

In order to understand the economic importance of the stock market capitalization in our study, we examined the capitalization ratio. As seen in Table (1), we notice that the ASE has grown rapidly in size and importance in both terms of market capitalization, and in market capitalization as a percentage of GDP. The number of listed companies climbed from106 at the end of 1995 to 277 at the end of 2010, whereas the total market capitalization amounted to 29214.20million JDs in 2007 and then declined to 21858.1**8** million JDs in 2010. The market

capitalization as a percentage of GDP reached to almost 300% of GDP in 2005, which is very high by international standards.

Another noticeable growth is observed in the trading value, which has sharply increased from only 268.89 million JDs in 1990, to over 6690.0018million JDs in 2010, which gives an indication of an economic growth in Jordan. The liquidity picture (defined as the ratio of the value of total shares traded to market capitalization) which measures the activity of the stock market transactions relative to its size did not increase in proportion to market capitalization. The turnover ratio also fluctuated during the study period.

The ASE index increased from 804.3 points in 1990 to reach 8191.5 points in 2005, and then declined to 5318.0 points in 2010.The average daily trading volume increased from 1.4 million JDs in 1997 to 82.9 million in 2008 and then declined to 26.75 million JDs in 2010.This drop is due to the rising energy bills, widening deficit, and mounting debt which are in no doubt spread heavy on the ASE market. (Key Statistics of the ASE).

4. The Methodology and Econometric Model

This paper studies the impact of macroeconomic factors on stock market returns in Jordan, using different methods of estimation, in line with Muradoglu et al. (1999), and Gjerde & Saettem (1999).

Many estimation studies used the Autoregressive Conditional Heteroskedasticity (ARCH) model, which was introduced by Engle (1982, 1983) and has now become widely used in modeling the behavior of financial time series. One of the main advantages of ARCH models is its ability to capture the non- linearity and volatility clustering in stock return data. Also, ARCH models study the second moment (Conditional and non-conditional) of the time series, and thus allow the variance of a series to depend on the available information set.

This model was later extended by Engle and Bollerslev (1986) to the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model which incorporates the lagged values of conditional variance and therefore is able to capture the leptokurtosis, skewness, and volatility clustering in the time series data. The GARCH methodology also takes into account past variances in explaining future variances, and therefore when the data suffers from heteroscedasticity, the expected value of the error term is not constant.

Furthermore, all ARCH/GARCH models explain the importance of the degree of persistence of shocks to volatility in returns and macroeconomic variables. These models are also useful in examining the simultaneous interaction among stock market returns and variation in macroeconomic factors.

This study hypothesizes that Amman Stock Exchange Price index (ASE) display the behaviour of the stock market prices in Jordan. It also hypothesizes that the returns of the Amman stock exchange are affected by macroeconomic variables namely; Real money supply (RMS2), real gross domestic product (RGDP), consumer price index (CPI), real exchange rate (E1), weighted average interest rates on loans and advances (WAIR) and a dummy variable (DUM). The study uses monthly data rather than quarterly data covering the period of 1991-2010, in order to maximize the number of observations, and capture the long-term movements in the ASE returns, by employing ARCH /GARCH model.

The model is as follows:

$$ASE = f\ \{RMS2, RGDP, CPI, E1, WAIR, Dum\} \tag{1}$$

The derived mathematical multiple regression of the above model is:

$$ASE_t = \beta_0 + \beta_1\ RMS2_t + \beta_2 RGDP_t + \beta_3\ CPI_t + \beta_4\ E1_t + \beta_5\ WAIR_t + Dum + \varepsilon_t \tag{2}$$

In equation (2), β_0 is constant & β s are the coefficients, & ε_t is the error term. In the light of the literature review, the coefficient of variables; β_1, β_3, β_4 and $\beta_5$are expected to be negative, while β_2 is expected to be positive.

To conduct a partial elasticity analysis, the study takes the logarithm form of the variables in the above equation, which enable us to evaluate the impact of a change in the independent variables on the dependent variable while other variables remaining constant.

$$lnASE_t = \beta_0 + \beta_1\ lnRMS2_t + \beta_2\ lnRGDP_t + \beta_3\ lnCPI_t + \beta_4\ lnE1_t + \beta_5\ lnWAIR_t + Dum + \varepsilon_t \tag{3}$$

5. Macroeconomic Variables Definitions & Transformations

ASE_t is the monthly General Price Index of Amman Stock Exchange Market. The index is the market-value weighted average of month-end closing prices for All-stock shares listed on Amman Stock Exchange markets for the period from January, 1991 to December, 2010. $rtr_t = (ASE_t/CPI_t)x100$, where rtr_t is the real general

price indices of the Amman stock exchange at the current month (t) and the CPI_t is the consumer price index at the current month (t). $LRTR_t = ln(rtr_t/rtr_{t-1})x100$, where $LRTR_t$ is the monthly rate of return of real General Price Indices of Amman stock exchange at the current month (t). Hence, in the sequel, the term "returns", loosely means continuously compounded returns. rtr_t and rtr_{t-1} represent the real general price indices of Amman stock exchange at the current month (t) and previous month $(t-1)$ respectively, whereas ln is the natural logarithm. Therefore, the use of natural logarithm, rather than levels and percentage changes, is to mitigate the correlations among the variables and in order to smooth the data of all variables.

$RMS2_t$ is the month-end Real money supply (RMS2) (broad definition) =Nominal money supply, in JDs millions divided by the Consumer price index (CPI). $LRMS2_t = ln(RMS2_t/RMS2_{t-1})x100$ where $LRMS2_t$ is the monthly growth rate of $RMS2$. $RMS2_t$ and $RMS2_{t-1}$ represent the monthly real money supply at the current month (t) and previous month $(t-1)$ respectively, while ln is the natural logarithm.

GDP_t is the monthly-end gross domestic product, in JDs millions).The month-end real gross domestic product (in JDs millions) = nominal gross domestic product, in JDs millions) divided by the consumer price index (CPI). $LRGDP_t = ln(RGDP_t/RGDP_{t-1})x100$, where, $LRGDP_t$ is the monthly growth rate of $RGDP_t$. $RGDP_t$ and $RGDP_{t-1}$ denote the monthly real gross domestic product at the current month (t) and previous month $(t-1)$ respectively, whereas ln is the natural logarithm. However, many macroeconomic series such as GDP are normally available on annual or quarterly basis. The monthly gross domestic product series was generated using the software program EViews.6.In order to reduce the high degree of multicollinearity, real GDP is employed in this empirical work. The choice of this variable is almost similar to Chen, Roll and Ross (1986), Darrat & Mukherjee (1987), Lee (1992), and Mukherjee& Naka (1995).

CPI_t is the month-end consumer price index. $LCPI_t = ln(CPI_t/CPI_{t-1})x100$, where $LCPI_t$ is the monthly growth rate of CPI_t at current time (t). CPI_t and CPI_{t-1} represent the month-end consumer price index at the current month (t) and previous month $(t-1)$ respectively, whereas ln is the natural logarithm.

Ex_t is the month-end exchange rate of U.S. dollar($) per Jordanian dinar. $ex1_t = 1/ex_t$(Exchange rate of Dinar per $).In general, researchers use the nominal exchange rate as a measure of the exchange rate variable. The nominal exchange rate is defined as domestic currency units per unit of US dollar.$Le1_t = ln(e1_t/e1_{t-1})x100$, where the $Le1_t$ is the monthly growth rate of real exchange rate at current time(t). $e1_t$ and $e1_{t-1}$ represent the month-end exchange rate of the JDs to US$ at the current month (t) and previous month $(t-1)$ respectively, while ln is the natural logarithm. The authors used the real exchange rate; $e1_t = (ex1_t)x\left(\frac{CPI_t}{wpim_t}\right)$, which is defined as the nominal exchange rate in terms of JDs per USD times by the ratio of domestic price level to foreign prices (P_d/P_f).

$WAIR_t$ is the monthly return on weighted average interest rates on loans and advances.$LWAIR_t = ln(WAIR_t/WAIR_{t-1})x100$, where $LWAIR_t$ is the monthly growth rate of $(WAIR_t)$ at current time (t). $WAIR_t$ and $WAIR_{t-1}$ represent the weighted average interest rates on loans & advances at the current month time (t) and previous month $(t-1)$ respectively. ln denotes the natural logarithm.Using an interest rate may cause problems since the interest rate is highly correlated with other macro-variables. Owing to the correlation problem between interest rates and other macroeconomic variables, the weighted average interest rates on loans and advances is used instead of the short interest rate, and because, short interest is mostly unregulated. However, the study used the nominal interest rate rather than the real rate of interest as Gjerde et al. (1999) employed.

The purpose of the dummy variable (Dum) is to capture the effect of the recent non-macroeconomic forces on the stock returns. (Dum) takes the value of one during the following periods: 11 September, 2001 in the US, the

Iraqi war in 2003, world financial crisis in 2008 and recent political events in 2010.Otherwise, (Dum) takes the value of zero.

ε_t is a disturbance term.

6. Descriptive Statistics of the Study Variables

In this section the relationship between the rate of return of the (ASE) index and selected macroeconomic variables has been examined through various descriptive statistics analysis. It starts by analyzing whether the time series data is normally distributed, by finding the determinants of the sample normality through the skewness, and kurtosis statistics. The following table describes the statistical data. Also, the probabilities (p-values) are used in order to provide evidence whether to reject the null hypothesis of the normality for the unconditional distribution of the monthly rate of return.

Table 2. Statistics for Amman stock Price Index and macroeconomic variables namely MS2, GDP, CPI, EXR, and WAIR

	ASE_t	$RMS2_t$	$RGDP_t$	CPI_t	EXR_t	$WAIR_t$
	(RTR_t)	$(RMS2_t)$	(RYX_t)	(CPI_t)	$(E1_t)$	$(WAIR_t)$
Mean	2103.770	4.965714	452.0521	136.8767	1.395773	10.98733
Median	1376.681	4.981162	395.7913	130.6677	1.460323	11.22000
Maximum	6012.092	5.922678	825.7001	199.8447	2.068295	13.97000
Minimum	1000.000	3.842361	212.2633	100.0000	0.738877	7.580000
Std. Dev.	1297.813	0.542207	158.6230	26.74066	0.327844	1.710810
Skewness	1.281083	-0.261175	0.957551	0.726740	-0.210054	-0.119641
Kurtosis	3.406914	2.493428	2.805582	2.649288	2.353304	1.737654
Jarque-Bera	67.30271	5.294641	37.05413	22.35602	5.947072	16.50772
Probability	0.000000	0.070841	0.000000	0.000014	0.051122	0.000260
Sum	504904.9	1191.771	108492.5	32850.40	334.9856	2636.960
Sum Sq. Dev.	4.03E+08	70.26331	6013541.	170900.0	25.68810	699.5219
Observations	240	240	240	240	240	240

Sources: 1. Central Bank of Jordan. 2. Amman Stock Exchange.

In Table (2), the variables are normally distributed and highly skewed, excluding the Amman stock price index (ASE) which is significantly skewed to the right and has an excess kurtosis (deviated from 3), and the series are leptokurtic (for more details, see M.G. Bulmer, 1965). While, RMS2, EXR, and WAIR are skewed to the left and the less kurtosis and the series are platykurtic.

Furthermore, the normality test is applied to the data through using the Jarque-Bera test (1980), which measures the goodness –of fit that depart from normality, and based on the sample kurtosis and skewness. Based on the Jarque-Bera statistics and p-values, this assumption is rejected at 1% significant level except EXR and RMS2, at 5% and 10% respectively.

Subsequently, the descriptive statistics show mixed results regarding the normality distribution. We can state that there is no randomness in the data, and the data could be heavily subjected to speculation and displays periodic change. This indicates that an investor can earn a noticeably superior profit rate from ASE Market.

Before proceeding with the Ordinary Least Square (OLS) and ARCH/GARCH models, a unit root tests are performed (Dickey and Fuller, 1979; 1981) & (Phillips and Perron, 1988).

Table (3) shows the ADF and PP unit root tests. The optimal lag lengths of ADF test based on the Akiake Information Criterion (AIC), which measured the goodness of fit of the estimated statistical model. Consistent with that, these criteria should provide the lowest value to fit the data. The PP test is based on the Newey-West (1994) for Bartlett Kernel (Lag truncation: 4).

Table 3. The Results of Unit Root Test for (Amman Stock Price Index &Macroeconomic Variables)

Variables	ADF Unit Root Test	PP Unit Root Test	Akaike Information Criterion (AIC)	Durbin-Watson Stat
ASE	-5.191*	-12.725*	(-2.97)	2.0
M2	-7.389*	-19.617*	(-5.35)	2.00
GDP	-5.59*	-16.947*	(-5.10)	2.03
CPI	-5.906*	-12.859*	(-6.70)	2.00
EXR	-3.659*	-12.33*	(-4.60)	2.02
WAIR	-6.767*	-21.078*	(-4.75)	2.03

Unit root test / Augmented Dickey Fuller test Variables at first difference in natural logarithm without Intercept and Trend.

Notes:

1. Asterisk (*) shows the rejection of the null hypothesis of non-stationary at the 1% level.

2. MacKinnon (1996) critical values are used for ADF and PP tests (At first difference in natural logarithm without Intercept and Trend). The 1%, 5% & 10% critical value for the ADF and PP tests is -2.5742 and -1.9410and -1.6164 respectively.

As shown in Table (3), the null hypothesis of the existence of a unit root are lying in the rejection of the null area and therefore is rejected at 1% significance level in both the ADF and PP tests, since the test statistics are more negative than the calculated critical values. Moreover, the Durbin-Watson statistics indicates there is no evidence of autocorrelation.

Since all of the data series are stationary, we can now continue to estimate the influence of macroeconomic factors on the Amman Stock Price Index, through employing the ARCH/GARCH models.

7. Empirical Results and Interpretations

Many studies examined the associations between stock market prices and chosen macroeconomic factors and show a mixture of findings. The findings of these studies depend on the extent of these studies. However a number of factors are universal for every stock market. Anyhow, it is hard to generalize the outcomes because of the different exchange market environment & background. Every market possesses different rules, regulations, location of the country, sort of investors, and other features.

With regards to this study; all variables indicate that they are stationary, lending continuity in the modeling process. Therefore, the influence of macroeconomic factors on the (ASE) returns is estimated utilizing both OLS and ARCH/GARCH estimation models respectively.

Table 4. The OLS estimation of the impact of macroeconomic variables on the rate of return of stock exchange price index for the period: (1991:01- 2010:12). Dependent Variable: LRTR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.94700	4.972259	3.408309	0.0008
LRMS2	-1.922606	0.988467	-1.945038	0.0530
LRYX	-0.001454	0.244007	-0.005960	0.9952
LCPI	-0.418148	0.881510	-0.474354	0.6357
LE1	-0.566324	0.086019	-6.583698	0.0000
LWAIR	-1.698604	0.152458	-11.14144	0.0000
DUM	-0.202680	0.021501	-9.426700	0.0000
R-squared	0.905669	Mean dependent var		7.497781
Adjusted R-squared	0.903240	S.D. dependent var		0.525384
S.E. of regression	0.163428	Akaike info criterion		-0.756159
Sum squared resid	6.223106	Schwarz criterion		-0.654641
Log likelihood	97.73913	F-statistic		372.8370
Durbin-Watson stat	0.229872	Prob(F-statistic)		0.000000

The model gives an explanation of 90% of the variation in the stock market prices. The calculated coefficients of LRMS2, LRYX, and LCPI, LE1, LWAIR are negative and significant at 5% and 1% respectively with the exception of LRYX and LCPI. The Durbin-Watson statistic confirms the existence of serious autocorrelation and shows a sign of Multicolinearity .Therefore, the OLS estimation is inefficient. The Cochrane-Orcutt method (AR1) and (AR2) is used but results still show mixed estimated coefficients and significance levels. Furthermore, a correlation matrix is constructed, yet multicolinearity remains present which makes them untrustworthy by enlarging their variance.

However, we employ ARCH/GARCH models in order to eliminate the preceding problems. This is shown in the following table.

Table 5. The effect of macroeconomic variables on the rate of return of stock exchange price index is examined by Method: ML - ARCH (Marquardt) ARCH1/ GARCH(1)estimation for the period: (1991:01- 2010:12). Dependent Variable: LRTR

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	15.72163	0.006760	2325.782	0.0000
LRMS2	-1.811843	0.056694	-31.95847	0.0000
LRYX	0.129717	0.002401	54.03616	0.0000
LCPI	-0.494647	0.022188	-22.29302	0.0000
LE1	-0.516599	0.046878	-11.02000	0.0000
LWAIR	-1.439426	0.067902	-21.19867	0.0000
DUM	-0.218608	0.010999	-19.87506	0.0000
Variance Equation				
C	0.002279	0.000419	5.438414	0.0000
ARCH(1)	1.064035	0.241522	4.405541	0.0000
GARCH(1)	-0.017565	0.076746	-0.228871	0.8190
R-squared	0.899979	Mean dependent var		7.497781
Adjusted R-squared	0.896065	S.D. dependent var		0.525384
S.E. of regression	0.169379	Akaike info criterion		-1.437581
Sum squared resid	6.598501	Schwarz criterion		-1.292554
Log likelihood	182.5097	F-statistic		229.9452
Durbin-Watson stat	0.198219	Prob(F-statistic)		0.000000

Table 6. The effect of macroeconomic variables on the rate of return of stock exchange price index is examined by Method: ML - ARCH (Marquardt): ARCH1 estimation for the period: (1991:01- 2010:12). Dependent Variable: LRTR.

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	14.60040	0.016283	896.6577	0.0000
LRMS2	-1.755744	0.049483	-35.48165	0.0000
LRYX	0.378007	0.009253	40.85069	0.0000
LCPI	-0.712028	0.017324	-41.10109	0.0000
LE1	-0.462680	0.040720	-11.36240	0.0000
LWAIR	-1.194532	0.054655	-21.85597	0.0000
DUM	-0.228514	0.011639	-19.63270	0.0000
Variance Equation				
C	0.001542	0.000101	15.32398	0.0000
ARCH(1)	1.161338	0.223361	5.199373	0.0000
R-squared	0.889289	Mean dependent var		7.497781
Adjusted R-squared	0.885455	S.D. dependent var		0.525384
S.E. of regression	0.177814	Akaike info criterion		-1.553006
Sum squared resid	7.303714	Schwarz criterion		-1.422482
Log likelihood	195.3607	F-statistic		231.9387
Durbin-Watson stat	0.161401	Prob(F-statistic)		0.000000

The estimated results of the influence of macroeconomic variables on the rate of return of the stock exchange price index, using ARCH/ GARCH were performed. The value related to the lagged squared error term is positive & significant at 1% level, which satisfies the specification requirement of the model. On the other hand, GARCH (1, 1) which incorporates the coefficient of the lagged variance term is found to be negative but not statistically significant. Therefore, the extension of GARCH (1, 1) does not seem necessary. Therefore, the ARCH (1) does perfectly well.

However, the results of this study based on the ARCH (1) estimation as showed in table (6) indicate that money supply (M2 either in real terms) has an inverse impact on the ASE return .The negative value of the coefficient is (-1.755744) and highly significant & consistent with Fama (1981) and Jensen et. al (1996).

The result show a positive impact of RGDP on the Amman stock price index as expected and the coefficient is (0.378007) and highly significant. This is in agreement with the studies of Geske and Roll (1983), Chen, Roll and Ross (1986), Fama (1990), Kearney and Daly (1998), and Maysami & Koh (2000) Maghayereh (2002), Al-Sharkas (2004).

Our findings also confirmed an inverse relation between the Amman stock prices index and inflation, where the coefficient (-0.712028) is as anticipated and highly significant. The negative relationship is consistent with Chen et al (1986), Mukherjee & Naka (1995).

The study found a negative link between real exchange rate and ASE returns, and the coefficient is (-0.462680) and highly significant. However, the result is in agreement with Maysami & Koh (2000) findings.

Our study indicates an inverse relationship between interest rates & stock market returns,and the coefficient is found to be highly significant with a magnitude of (-1.194532). However, the result is consistent with Choi& Jen (1991), Maysami & Koh (2000), Al-Sharkas (2004), Kandir (2008), and Adam and Tweneboah (2008) findings.

in the last two decades. Following the 9/11 attacks, During the study period the world has experienced a considerable increase in economic globalization, liberalization, competitiveness and financial crisis in both local and international levels, which affected the stock markets, especially global stock markets dramatically declined in 2002 following the long-term effects. Basically, the financial crisis of 2007/08 became severe as house prices fell, and the bank lending decreased in attempts to rebuild their balance sheets, in addition to other contributory factors such as the inadequate regulations that didn't anticipate the extent of credit risk taken by banks and the dangers of relying on interbank funding, and not forgetting the failure of credit rating agencies as they gave high ratings without proper assessment of the true credit risk.

However, Jordan has experienced financial liberalization, financial crisis, economic reforms and privatization, in addition to political uncertainty such as the Gulf War and Peace Treaty which both affected the stock market prices index. The consequences of these changes, to a large extent, resulted in more volatile financial prices.

Finally, the study indicated a negative link between the dummy variable and ASE returns. The coefficient is (-0.228514) and highly significant. This is consistent with Grabel (1995) Grigor'ev and Salikhov (2009), and Poole (2010) findings.

8. Conclusion and Implications

This research studies the impacts of macroeconomic factors on ASE returns in Jordan, using monthly data between 1991 and 2010. The monthly rates of returns are computed as the first difference in the logarithmic closing prices. Unit root tests for data stationarity are applied. As a result, all the variables proved to be stationary, lending continuity in the modeling process.

The paper selected six domestic variables namely: real money supply (RMS2), real gross domestic product (RGDP), consumer price index (CPI), real foreign exchange rates (E1), weighted average interest rates on loans and advances (WAIR), and the dummy variables (Dum).

The OLS and ARCH /GARCH models are utilized. The ARCH model results are useful and suitable and indicated a strong linkage among the macroeconomic factors and ASE returns.

The results of the ARCH (1) estimation confirmed that real money supply (RMS2), inflation, real exchange rate, change in nominal interest rates, and the Dummy Variable all have a negative role on the ASE returns, whereas the increase in the economic activities (RGDP) has a positive role on ASE return.

In the light of the study results, policy makers ought to be concerned regarding the variation in money stock in order to be consistent with financial stock market performance. Therefore, the monetary policy should be guided to influence the stock market, and weighing up the positive impact of the economic activities.

Furthermore, policy makers should restrain the inflationary process in order to maintain the desirable demand for financial assets.

As for the exchange rate, a negative relationship is found with the ASE returns. Therefore, this implication depends on whether the economy is export dominant or import dominant. For an export leading country, (exports firms that categorized on the ASE), the increase of exchange rate has a negative influence on ASE returns.

On the contrary, for an import leading country (imports firms that categorized in the ASE), the decrease of exchange rate boosts the ASE returns.

The stock returns react negatively to rising interest rates. Therefore, high interest rates influence the stock market returns and subsequently causing stock prices to fall. Whenever returns on government assets increase, investors are likely to change out of stocks and causing a decrease in stock prices. This can be explained through the behavior of the weighted average interest rates on loans and advances.

Finally, the Dummy Variable has a negative impact on the ASE return. In the light of these results, policy makers should be well –informed of both non-macroeconomic and financial variables that affect stock market return and their decisions should be more effective and accurate.

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