The Influence of Monetary and Fiscal Policies on the Capital Market: A Vector Autoregressive (VAR) Model

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Abstract:

The study investigates the influence of the Jordanian monetary and fiscal policies on Amman Stock Exchange (ASE) performance using the Vector Autoregressive (VAR) approach. Market capitalization (MC), money supply (M1), and government expenditure (GE) were used as proxies for ASE performance, monetary policy, and fiscal policy, respectively. The analysis was undertaken with annual data spanning over twenty-seven years in logarithms form 1978 till 2004. Moreover, Dickey-Fuller and Johansen Cointegartion tests have been applied for testing stationarity and whether the variables have long relationship. Empirical results are consistent with previous literature, especially those related to emerging markets. The results show that these variables were not stationary in their levels and do not have long relationships. However, the second difference for MC and the first difference for GE and M1 were stationary. In addition, two main tools were used to investigate whether the variables have short-term relationships, namely impulse response analysis, and variance decomposition tests. For confirming the argument concerning the direction of the relationships among variables, Granger causality test was applied. Variance decomposition results showed that MC significantly influenced by M1 whereas GE had much less influence, since M1 and GE explain was 11% and 3%, respectively of the forecast error variance of MC. In addition, results show that stock market is responding to its own shocks since MC explained 87% of its forecast error variance in a ten-years period. The impulse response test shows that any shock to the M1 had a significant effect on the MC after almost two years, whereas GE shock had a marginal effect on the MC after three years. The response of the MC to its own-shocks was highly significant. Granger causality test showed that M1 has a significant effect on MC, while GE was not.

Key Words: Capital Market, Market Capitalization, Monetary Policy, Fiscal Policy, VAR.

I. Introduction

Since the establishment of the country, Jordan has suffered from economic distortions, which peaked in 1988/1989 when the economic crises occurred. The crises featured mainly through the expansion of the public sector, intensive government subsidies, double-digit inflation rate (25.7%), inefficient tax system and trade regime, mounting budget deficit (-10.1% of GDP), deterioration of real GDP growth (-13.4%), sharp devaluation of the Jordanian currency, aggravation of external debt (190% of GDP), remarkable reduction in workers' remittances, remarkable reduction in national exports (26% of GDP), and severe depletion of foreign exchange reserves ($130 millions).

Economic reform took place to control inflation, rebuild foreign reserves, reform the pension system, rationalize government expenditures, adopt a national privatization program, removal subsidies, build a social safety net, reduce deficits in budget and current account, liberalize interest rates structure, conclude debt swap and debt repurchase agreements, and last but not least shift towards internal public debt through issuing treasury bills and bonds. Accordingly, the major economic results were reducing overall budget balance as a percentage of GDP from (-10.1%) in 1989 to (-3.3%) in 2004, reducing external debt as a percentage of GDP from (190%) in 1989 to (50.97%) in 2006[1], while increasing foreign exchange reserves from (($130 millions) in 1989 to (($4824 millions) in 2004, increasing merchandise export as a percentage of GDP from (26%) in 1989 to (36.5%) in 2004.

Although the above figures highlight the Jordanian economic achievements over the mentioned years, the Jordanian economy was significantly vulnerable to external shocks and therefore it was not easy to make the proper selection for the most powerful policy in order to reduce the severity of its economic problems. In addition, much of the interest in monetary and fiscal economics arises because of the need to understand how monetary and fiscal policies affect the behavior of the capital market over various time periods, since such policies directs mainly towards stimulating the economic activities reflected on the capital market growth performance.

It could be argued that the increase in the money supply should be reflected on the capital market for more capitalization growth because of the liquidity available among investors. Reducing interest rate on borrowing, decreasing rediscounting rate, buying government bonds issued previously by the Central Bank, reducing compulsory reserve ratio, all of which could increase money supply. Increasing money supply, however, should be controlled by making sure there is a demand for that increase directed toward adding value economic activities or companies listed in the capital market. Otherwise, such increase in the money supply means higher inflation reflected on the products prices. The same argument could be justified for the government expenditure. An increase in the government expenditure means more liquidity available among investors and consequently more investment in the capital market leading toward more capitalization growth assuming that the capital market itself has the required attractiveness for investors. Such argument still theoretical one until testing it empirically, an issue investigated in this research study to see whether there is an existence influence by the monetary and fiscal policies on ASE.

The purpose of this paper is to determine empirically whether monetary and fiscal disturbances have important effects on ASE performance. More specifically, this paper examines the dynamic relationship between money supply (M1), government expenditure (GE), and the ASE growth performance using VAR model. In section II, literature review is outlined, where in Section III, research methodology is presented. Empirical results are discussed in Section IV, and conclusions and implications are given in Section V.

II. Literature Review

Many studies have been focused on the fiscal and monetary policies in the developed countries, trying to examine their reaction functions. However, developing countries have not received similar attention. An explanation could be is that developing countries are seen as economies operating without advanced and well-developed financial markets.

[1] Total debt as a percentage of GDP was reduced from (99.82%) in 2000 to (73.08%) in 2006.

The effectiveness of monetary and fiscal polices in the economy has generated a lot of debate among economists for long time. Monetarists and Keynesians disagree about the relative effectiveness of both policies. While the Monetarists claim that the monetary policy (money supply) is the most powerful tool to influence commodities prices and consequently the level of economic activity, especially on the short run [1-3], the Keynesians believe in the opposite, since from their point view, the fiscal policy is the one which influence the level of economic activity through the interest rate. The Keynesians believe that the increase in money supply will decrease the interest rate. Consequently, decrease the interest rate will increase the level of investments and therefore increase the level of total expenditure resulting in economic growth.

In addition to the Monetarists and Keynesians, there are the Portfolio and the Classical theories. The Portfolio theory supporters believe that the change in money supply does not influence directly the level of investments since the increase in money supply creates unbalanced portfolios (i.e. investors will have more cash motivating them to buy more financial and real investments in order to re-balance their portfolios). Such a move will influence the level of economic activities positively [4].

According to the Classical theory, changes in money supply influence the nominal variables such as commodities prices and labor cost. The real variables such as production, employment, real labor cost, and real interest rate will not be affected on the long run, a phenomena called *Monetary Neutrality* [5, 6].

The empirical studies in developing countries support the monetarists argument [7, 8]. For example, [9] investigated the effectiveness of monetary and fiscal policies' estimated by money supply and government expenditure respectively, on the Jordanian economic activity over the period 1970-1988 using St. Louis equations. The study found that the effect of monetary policy on the economic activity in Jordan was much more positively significant and quicker compared with the fiscal policy.

[2] compared the influence of the monetary policy and the fiscal policy on the level of Jordanian economic activity covering the period 1978-1992, using St. Louis equations. Quarterly data were collected for the GDP, government expenditure, and money supply as estimators of the economic activity, fiscal policy, and monetary policy, respectively. The study found that the monetary policy positively and significantly influenced the Jordanian economic activity, while the influence of the fiscal policy was marginal. On the other hand, the study by [10] investigated the same issue covering a wider period (1968-1993) using the same methodology. Their findings were the opposite (i.e. the fiscal policy positively and significantly influenced the Jordanian economic activity, while the influence of the monetary policy was insignificant).

[11] investigated the role of exports in the economic growth in Jordan, over the period (1970-1997) using Johansen cointegration approach in addition to the variance decomposition and impulse responses tests. The study found that there was long relationship between exports and economic growth, beside the fact that exports played a significant role in explaining economic growth variations in the short run, according to the variance decomposition and the impulse responses tests.

In another study by [12], the monetary policy in Jordan, covering the period (167-1997), was explored using the cointegarion analysis technique. The study attempted to investigate the reaction function of Jordan’s central bank. The Johansen cointegration test showed that long run relationships among variables existed. That is money supply in the long run is a function of real income, price level, international reserves, and government spending. When the short run dynamics were examined (i.e. variance decomposition and impulse responses tests), major finding was that the government spending was the main factor affecting money supply fluctuations. This indicated that monetary policy was for the bigger part intended to finance government spending.

[13] studied whether there was a long relationship between devaluation, relative prices, and trade flows in the Jordanian economy for the period (1980-1997) using the cointegration technique. Results showed that in the case of imports demand, no cointegration vector has been found for Arab countries, whereas it showed a cointegration vector for European countries, U.S.A., and Asian countries. In the case of countries demand for Jordanian exports, however, no cointegration vector has been found for all selected countries.

[14] investigated the major determinants of the Jordanian real exchange rate against the U.S. Dollar over the period (1969-1998). A reduced-form three-variable VAR model was utilized. The three variables used were real exchange rate, real money supply, and real GDP. The model was extended to include a real interest rate variable. Results showed that positive real monetary shock had a negative effect on the real exchange rate, whereas a positive shock to either the real output or real interest rate has a positive effect on the real exchange rate.

[15] examined the output effect of monetary policy in Jordan, using VAR model. The industrial index was used as a proxy for output, while was M2 used as a proxy of money aggregate. Variance decomposition results showed that each time series explained the preponderance of its own past values; industrial index explained 90% of its forecast error variance in 2 years period, whereas M2 explained 85%. Moreover, M2 explained 7% of the forecast error variance of the industrial index, whereas the industrial index explained 15.2%.

[16] investigated the effect of monetary policy on the Jordanian economic activity covering the period (1970-2000). A Vector Auto Regression (VAR) model with two variables, real GDP, and money supply, was utilized in addition to Dickey-Fuller and Granger Causality tests. Concerning the causality test, results showed that money supply caused real GDP. In addition, money supply had a positive effect on real GDP.

[17] studied the quantification of the expected and unexpected consequences of monetary policy, estimated by money supply in the United States over the period 1982-1994, using the Vector Auto Regression (VAR) model. The study found that the monetary policy positively and significantly influenced U.S. economic activity. [18] tested whether monetary or fiscal policy was more important for the determination of nominal income. They found that a stable and significant relationship existed between output and money than between output and their measure of autonomous expenditures. [19], in his examination of whether money matters, concluded that changing the specification of the VAR model results in a wide variety of conclusions.

He found that money innovations explain great percentage of the output forecast error variance. In an extreme contrast, [20] states that using VAR to measure monetary policy is of no use.

[21] looked at the inflationary experience of six developing countries in Asia and investigated the determinants of the inflation rate. They found that the growth of money stock was not the major source of inflation but peoples' money-holding preferences was. In addition, they found that peoples' preferences were influenced mainly by the foreign interest rates and import prices. [22] investigated the objectives of monetary policies in some Arab courtiers using the Seemingly Unrelated Method (SUR). They found that monetary policies in most countries were designed to stimulate economic activities and to reduce unemployment.

The major difference between this study and previous empirical work is that this study is the first, to the best knowledge of the researcher, which explores the effectiveness of the monetary and fiscal policies on ASE performance since the establishment of the Jordanian capital market in 1978 utilizing a new technique in the field of accounting and finance; the VAR model for analyzing quantitatively the determinants of the ASE performance.

III. Research Methodology

Economic theory is often not rich enough to provide a tight specification of the dynamic relationship among variables. Furthermore, estimation and inference are complicated by the fact that endogenous variables may appear on both the left and right sides of the model equations. These problems lead to alternative non-structural approaches to modeling the relationship between several variables, namely the estimation and analysis of Vector Auto Regression (VAR) models.

The VAR model is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variables. This approach sidesteps the need for structural modeling by modeling every endogenous variable in the system as a function of the lagged values of all endogenous variables in the system. In other words, it is a system of reduced form equations, which expresses each set of endogenous variables as a function of the lagged values of itself and the lagged values of all other variables in the system. The essence of the VAR model is that it provides imposing restrictions necessary to identify traditional structural models adopted by [23].

In this research paper, the reduced form VAR model has been utilized instead of the Ordinary Least Square (OLS) method, mainly for the reason that shows the effect of one variable on another. Such effect may appear with lags. In the OLS method, it is not always easy to interpret each coefficient, especially if the signs of the coefficients alternate. Consequently, the impulse response function in the VAR model would be more appropriate [24]. To the best knowledge of the researcher, this is the first empirical study investigates the influence of monetary and fiscal policies on emerging capital markets such as ASE. The mathematical form of a VAR is:

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + Bx_t + \varepsilon_t \qquad (1)$$

where y_t is a k vector of endogenous variables, x_t is a d vector of exogenous variables, $A_1 \ldots A_p$ and B are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated with each other but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables in the equation.

Since only lagged values of the endogenous variables appear on the right-hand side of each equation, there is no issue of simultaneity, and OLS is the appropriate estimation technique. Note that the assumption that the disturbances are not serially correlated is not restrictive because adding more lagged *y's* means absorbing any serial correlation.

Three variables have been utilized: ASE market capitalization (MC), money supply (M1), and government expenditure (GE) are jointly determined by a three variable VAR. Let a constant be the only exogenous variable with three lagged values of the endogenous variables, then the reduced-form VAR model is formulated as the following matrix:

$$\begin{vmatrix} MC_t \\ M1_t \\ GE_t \end{vmatrix} = \begin{vmatrix} a_{11}(L) & a_{12}(L) & a_{13}(L) \\ a_{21}(L) & a_{22}(L) & a_{23}(L) \\ a_{31}(L) & a_{32}(L) & a_{33}(L) \end{vmatrix} \begin{vmatrix} MC \\ M1_t \\ GE_t \end{vmatrix} + \begin{vmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \end{vmatrix} \quad (2)$$

where;
MC: market capitalization.
M1: money supply.
GE: government expenditure.
L: is the lag operator.
ε: is a vector of three structural shocks (Disturbances). These structural shocks are assumed to have a zero expected value and to be uncorrelated.

All the VAR variables are de-trended by taking the log. This procedure is important to induce stationary by appropriately transforming any non-stationary series (i.e. trend removal).

In empirical applications, the main uses of the VAR are the impulse response analysis, variance decomposition, and Granger causality tests. An impulse response function traces the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. A shock to the *i-th* variable directly affects the *i-th* variable, and is also transmitted to all of the endogenous variables through the dynamic structure of the VAR. Consider a simple bivariate VAR(1):

$$MC_t = a_{11}\, MC_{t-1} + a_{12}\, M1_{t-1} + \varepsilon_{1,t} \quad (3)$$
$$M1_t = a_{21}\, MC_{t-1} + a_{22}\, M1_{t-1} + \varepsilon_{2,t} \quad (4)$$

A change in $\varepsilon_{1,t}$ will immediately change the value of current MC. It will also change all future values of MC and M1 since lagged MC appear in both equations. If the innovations, $\varepsilon_{1,t}$ and $\varepsilon_{2,t}$ are uncorrelated, interpretation of the impulse response is straightforward. $\varepsilon_{1,t}$ is the innovation for MC and is the innovation for M1. The impulse response functions for $\varepsilon_{2,t}$ measure the effect of a one standard deviation monetary shock on current and future market capitalization and money stock.

The innovations are, however, usually correlated, so that they have a common component, which cannot be associated with a specific variable. A somewhat arbitrary but common method of dealing with this issue is to attribute all of the effect of any common component to the variable that comes first in the VAR system. In our example, the common component of $\varepsilon_{1,t}$ and $\varepsilon_{2,t}$ is totally attributed to $\varepsilon_{1,t}$, because $\varepsilon_{1,t}$ precedes $\varepsilon_{2,t}$. $\varepsilon_{1,t}$ is then the MC innovation, and $\varepsilon_{2,t}$ the M1 innovation, is transformed to remove the common component. More technically, the errors are orthogonalized by a Cholesky decomposition so that the covariance matrix of the resulting innovations is diagonal [25]. While the Cholesky decomposition is widely used, it is a rather arbitrary method of attributing common effects. One should be aware that changing the order of equations could dramatically change the impulse responses.

Given a group of non-stationary series, we may be interested in determining whether the series are cointegrated, and if they are, in identifying the cointegrating (long-run equilibrium) relationships. Johansen's method is to test the restrictions imposed by cointegration on the unrestricted VAR involving the series.

Consider a VAR of order *p*:

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + BI_t + \varepsilon_t \qquad (5)$$

where y_t is a *k*-vector of non-stationary I(1) variables, I_t is a *d* vector of deterministic variables, and ε_t is a vector of innovations. We can rewrite the VAR as:

$$\Delta y_t = \Pi y_{t-1} + \Sigma \Gamma_i \, \Delta y_{t-i} + BI_t + \varepsilon_t \qquad (6)$$

where $\Pi = \Sigma A_i - I$, $\Gamma_i = -\Sigma A_j$

Granger's representation theorem asserts that if the coefficient matrix Π has reduced rank $r<k$, then there exist $k \times r$ matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' y_t$ is stationary. r is the number of cointegrating relations (i.e. the cointegrating rank) and each column of β is the cointegrating vector. The elements of α are known as the adjustment parameters in the vector error correction model. Johansen's method is to estimate the Π matrix in an unrestricted form, and then test whether we can reject the restrictions implied by the reduced rank of Π.

If you have k endogenous variables, each of which has one unit root, there can be from zero to *k-1* linearly independent, cointegrating relations. If there are no cointegrating relations, standard time series analyses such as the (unrestricted) VAR may be applied to the first-differences of the data. Since there are *k* separate integrated elements driving the series, levels of the series do not appear in the VAR in this case .

Conversely, if there is one cointegrating equation in the system, then a single linear combination of the levels of the endogenous series $\beta' y_{t-1,}$ should be added to each equation in the VAR. When multiplied by a coefficient for an equation, the resulting term $\beta' y_t$, is referred to as an error correction term. If there are additional cointegrating equations, each will contribute an additional error correction term involving a different linear combination of the levels of the series.

If there are exactly *k* cointegrating relations, none of the series has a unit root, and the VAR may be specified in terms of the levels of all of the series. Note that in some cases, the individual unit root tests will show that some of the series are integrated, but the Johansen tests show that the cointegrating rank is *k*. This contradiction may be the result of specification error. In this research study cointegration test was conducted by allowing for lines deterministic trend in the data (intercept –no trend- in CE and test VAR), no exogenous series in VAR, and (11) lag were used.

Variance decomposition provides a different method of depicting the system dynamics. Impulse response functions trace the effects of a shock to an endogenous variable on the variables in the VAR. By contrast, variance decomposition decomposes variation in an endogenous variable into the component shocks to the endogenous variables in the VAR. The variance decomposition gives information about the relative importance of each random innovation to the variables in the VAR. The conventional orthogonalization procedure requires imposing a particular causal ordering of the VAR model variables. Normally, the choice is arbitrary. This ordering issue becomes serious when there is a contemporaneous correlation among the innovations. When it exists, it can make a significant difference for the variance decomposition [3, 26]. In order to examine the potential sensitivity of the innovation accounting result to ordering, another variable ordering is examined. The assumption here is that for the results to be conclusive, they must be robust to ordering.

Granger causality will be used for testing the cause direction among the variables, since such causation could be from two directions or just one direction, or even no influence of any of the variables on the others.

Correlation does not necessarily imply causation in any meaningful sense of that word. The econometric graveyard is full of magnificent correlations, which are simply spurious or meaningless. Interesting examples include a positive correlation between teachers' salaries and the consumption of alcohol and a superb positive correlation between the death rate in the UK and the proportion of marriages solemnized in the Church of England. Economists debate correlations, which are less obviously meaningless.

The Granger (1969) approach to the question of whether *x* causes *y* is to see how much of the current *y* can be explained by past values of *y* and then to see whether adding lagged values of *x* can improve the explanation. *y* is said to be Granger-caused by *x* if *x* helps in the prediction of *y*, or equivalently if the coefficients on the lagged *x's* are statistically significant. Note that two-way causation is frequently the case; *x* Granger causes *y* and *y* Granger causes *x*. It is important to note, however, that statement "*x* Granger causes *y*" does not imply that *y* is the effect or the result of *x*. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term.

When you select the Granger Causality view, you will first see a dialog box asking for the number of lags to use in the test regressions. In general it is better to use more rather than fewer lags, since the theory is couched in terms of the relevance of all past information. You should pick a lag length, ℓ, corresponds to reasonable beliefs about the longest time over which one of the variables could help predict the other. The null hypothesis will tested according to the following equations:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots + \alpha_\ell y_{t-\ell} + \beta_1 I_{t-1} + \beta_\ell I_{t-\ell} \quad (7)$$
$$I_t = \alpha_0 + \alpha_1 I_{t-1} + \ldots + \alpha_\ell I_{t-\ell} + \beta_1 y_{t-1} + \beta_\ell y_{t-\ell} \quad (8)$$

That is for all possible pairs of (x,y) series in the group. The reported F-statistics are the Wald statistics for the joint hypothesis ($\beta_1 = \ldots = \beta_0 = 0$) for each equation. The null hypothesis is therefore that I does not Granger-cause y in the first regression and that y does not Granger-cause I in the second regression.

Finally, since most previous empirical studies used the OLS without considering the stationarity of the variables over time, leading to inaccurate hypothesis testing, this research paper tests whether the variables are stationary, using Dickey-Fuller test before adopting the VAR approach.

IV. Empirical Results

i. Unit Root and Cointegration:

The unit root test is employed for testing whether the variables considered are stationary over the time, since being not stationary means inaccurate and misleading results. Therefore, the test was run for the variables: market capitalization, money supply, and government expenditure, using annual data of (27) observations for each. All data were expressed in logarithms. The three variables and their first differences and second differences were subject to the Augmented Dickey-Fuller (ADF) tests for the unit roots. Results are reported in Table (1) along with their 5 percent significant levels.

Clearly, it can be seen that all variables are integrated when testing for unit roots in levels (i.e. I (0)).

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Tests

Variable	I	D-W	Calculated ADF	5% ADF Critical Value	Akaike Information Criterion (AIC)	Schwarts Bayesian Criterion (SBC)	Stationary / Not Stationary
LN (MC)	0	1.87	0.295	-2.985	-0.320	-0.174	Not Stationary
LN (M1)	0	1.98	-0.202	-2.985	-2.369	-2.223	Not Stationary
LN (GE)	0	2.11	-0.664	-2.985	-2.289	-2.142	Not Stationary
LN (MC)	1	1.54	-1.862	-2.991	-0.308	-0.160	Not Stationary
LN (M1)	1	1.99	-3.593	-2.991	-2.334	-2.187	Stationary
LN (GE)	1	2.00	-4.280	-2.991	-2.250	-2.103	Stationary
LN (MC)	2	1.79	-3.453	-2.997	-0.191	-0.043	Stationary
LN (M1)	2	2.14	-4.955	-2.997	-1.985	-1.837	Stationary
LN (GE)	2	2.08	-6.164	-2.997	-1.782	-1.634	Stationary

When testing for unit roots in first difference, however, market capitalization was integrated while the two other variables, money supply and government expenditure were not integrated. Moreover, when testing for unit roots in second difference, all variables were not integrated (Stationary). D-W is the Durbin-Watson values for the residuals in the ADF equations. The Akaike Information Criterion (AIC) and the

Schwarts Bayesian Criterion (SBC) yield smaller values when using higher difference (i.e. first difference compared to levels and second difference compared to first difference).

The VAR model was employed when variables are not cointegrated. Variables are cointegrated when there is one or more liner combinations among them, which is stationary. If variables are stationary and cointegarted, the Error Correction Model (ECM) should be used. Table (2) presents the Johansen Cointegartion tests.

Table 2: Johansen Cointegration Test

Eigenvalue	Likelihood Ratio	5% Critical Value	1% Critical Value	No. of Cointegrating Equations
0.463963	24.86814	29.68	35.65	None
0.290693	9.279344	15.41	20.04	At most 1
0.027326	0.692659	3.76	6.65	At most 2

From the above results, it could be argued that VAR model is the appropriate one for testing the research hypothesis, since the likelihood ratio rejects any cointegration at 5 percent level.

ii. Impulse Responses and Variance Decomposition:[2]

Using EVIEWS program, the dynamic adjustments of money supply and government expenditure to the system are represented by the impulse response function in Figure (1) and variance decomposition in Table (3). The output shows the response of market capitalization (MC) to a standard deviation shock in the money supply (M1), government expenditure (GE) and to its own shock.

Table (3) reports variance decomposition for one to ten years ahead of the variables. The results indicate that the effect of MC shocks is greater than the effect of M1 and GE shocks in influencing the movements in the ASE market capitalization over the period 1978-2004. However, M1 explanation of the forecast error variance of MC is greater than that for the GE variable. Concerning the response of MC to its own shock, the explanation of its forecast error variance was 100% in the first year, while GE and M1 shocks influence were zero. Moreover, results show that MC significantly influenced two years after the M1 shock with almost fixed level of effect over the ten-years period. On the other hand, MC influenced three years after the GE shock with almost fixed level of effect over the ten-years period considered. As it can be seen from Table (3) MC explains 87% of its forecast error variance in a ten-years period, whereas GE explains 65% of its forecast error variance, and M1 explains 25% of its forecast error variance. In addition, GE and M1 respectively explain 3% and 11%, of the forecast error variance of MC.

Table 3: Variance Decomposition Test

Variance Decomposition of MC:				
M1	GE	MC	S.E.	Period

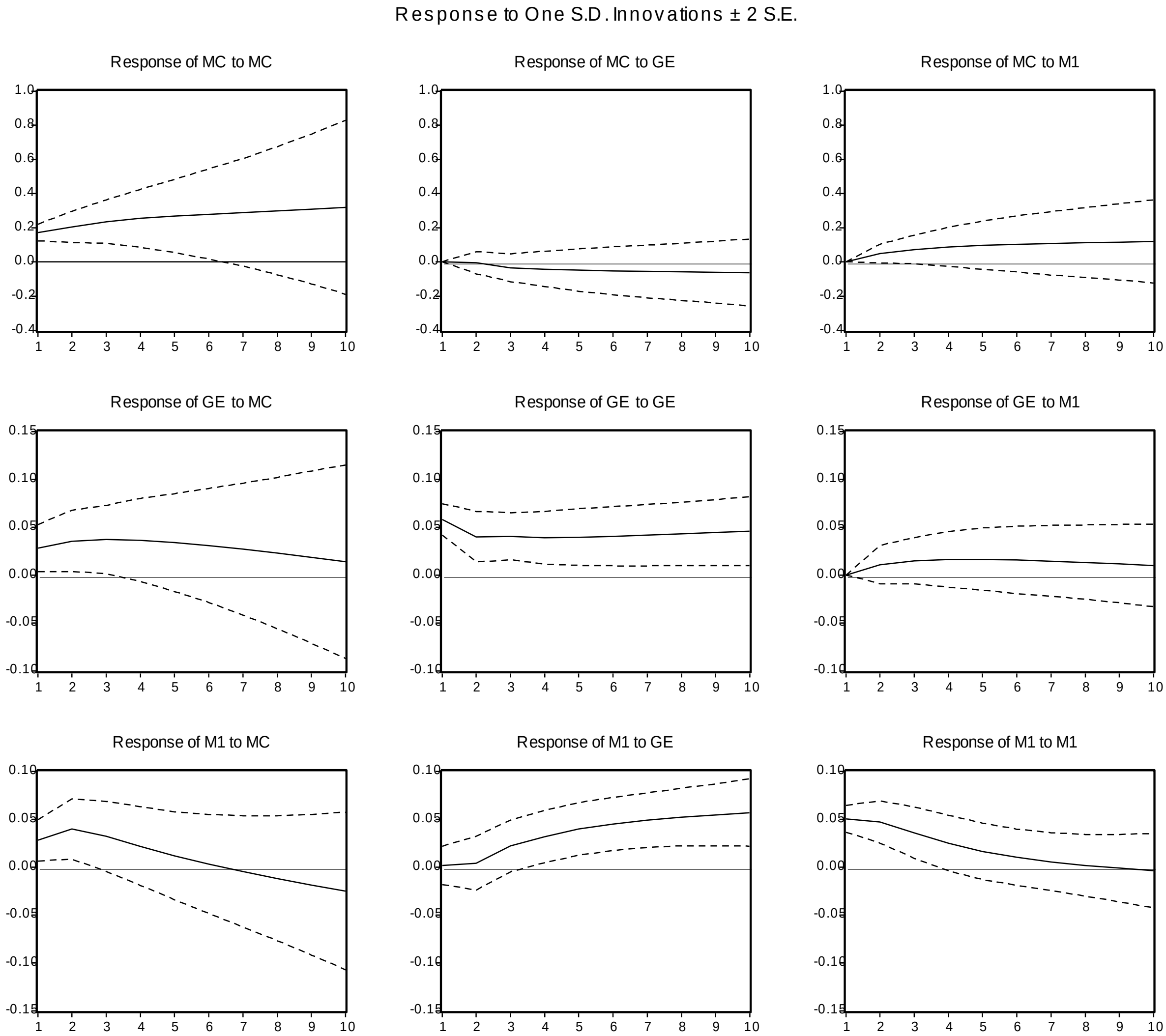
[2] Impulse responses and variance decomposition tests were rerun to see whether the results did not change significantly (See Appendix 1a -1b). The new order of the variables is: MC, M1, and GE. Generally speaking, Appendix (1a -1b) highlights the fact that the results are almost the same. Other tests were using the following order of the variables: M1, MC, and GE (See Appendix 2a – 2b).

0	0	100	0.17114503099	1
3.12934011488	0.039406171646	96.8312537135	0.271571549746	2
5.63679911285	0.906006691202	93.4571941959	0.368692250545	3
7.32350608621	1.400221225	91.2762726888	0.458233170435	4
8.43467485937	1.80580265617	89.7595224845	0.54198398173	5
9.18984517073	2.08723093812	88.7229238912	0.62073802983	6
9.71895123275	2.29724006616	87.9838087011	0.695708451875	7
10.1023508933	2.45631760874	87.441331498	0.767841647831	8
10.38855891	2.58174207819	87.0296990118	0.837936409046	9
10.6080374233	2.68369789328	86.7082646835	0.90662203702	10
Variance Decomposition of GE:				
M1	**GE**	**MC**	**S.E.**	**Period**
0	81.0123377266	18.9876622734	0.0644076983234	1
1.58195871768	69.6985311334	28.7195101489	0.0842517261722	2
3.2028914755	63.8109538606	32.9861546639	0.101445009443	3
4.4481961962	60.3522360569	35.1995677469	0.115581706085	4
5.27341504948	58.9034719403	35.8231130103	0.127726584955	5
5.77456016244	58.7336499616	35.4917898759	0.138227851885	6
6.03202360683	59.46836101	34.4996153832	0.147482310275	7
6.10942914875	60.8286135251	33.0619573262	0.155781794654	8
6.05139345284	62.6219004036	31.3267061435	0.163385519697	9
5.89074195478	64.694304423	29.4149536222	0.170518912632	10
Variance Decomposition of M1:				
M1	**GE**	**MC**	**S.E.**	**Period**
76.5151246527	0.0847418977769	23.4001334495	0.0574404301865	1
66.7002902875	0.252686835067	33.0470228775	0.0841132127365	2
60.891239739	5.07389232129	34.0348679397	0.0992633174364	3
55.4779727318	12.4568469437	32.0651803245	0.109239374666	4
49.5436068874	21.9455670842	28.5108260284	0.117900701151	5
43.6144542353	31.5926391768	24.7929065879	0.126569446402	6
38.0149065988	40.3369504636	21.6481429376	0.135845935945	7
32.9699045613	47.5982741186	19.4318213201	0.145899196446	8
28.5407893906	53.23006752	18.2291430894	0.156832257903	9
24.7156036863	57.2890467726	17.9953495411	0.168732738775	10
Ordering: MC GE M1				

The second method to estimate the dynamic response of each variable to an unexpected change in another variable is the impulse response functions. Figure (1) shows that impulse responses with upper and lower two standard error bands for the VAR model adopted in this paper. The first row in the figure, which is the purpose of this research paper, shows the dynamic responses of the MC to own shocks, to GE shocks, and to M1 shocks, respectively.

Clearly it can be seen from Figure (1) that any shock in the M1 has a significant and positive effect on the MC after almost two years, which remained fixed until the end of the ten-years period. On the other hand, a GE shock has a marginal and negative effect on the MC after almost three years, which remained fixed until the end of the ten-years period. The response of the MC to its own-shocks is highly significant, suggesting that a strong predetermined component in the MC existed. The above result may be explained in the sense that any increase in M1 causes increases in the amount of investment and eventually reflects on MC.

Figure 1: Impulse Responses Test



Generally speaking, the results reported in Table (3) and Figure (1) highlight the fact that money supply is the only factor influencing MC ASE growth performance.

iii. Granger Causality:

To support the choice of the policy variables in the model, pair-wise Granger Causality test was implemented for independent variables and the results are reported in Table (4).

Table 4: Granger Causality Test

H_0	F-Statistics	Prob.	Reject H_0 / Accept H_0
LN (GE) does not Granger Cause LN (MC)	2.01126	0.16000	Accept H_0
LN (MC) does not Granger Cause LN (GE)	0.79429	0.46565	Accept H_0
LN (M1) does not Granger Cause LN (MC)	3.91104	0.03685	*Reject H_0*
LN (MC) does not Granger Cause LN (M1)	0.05016	0.95120	Accept H_0
LN (M1) does not Granger Cause LN (GE)	1.06729	0.36273	Accept H_0
LN (GE) does not Granger Cause LN (M1)	1.14276	0.33890	Accept H_0

It was found, according to Granger Causality test, only the monetary policy estimated by money supply (M1) with log form, Granger-Cause the market capitalization growth in ASE, since F-statistic is quite high (Probability less than 5%) while fiscal policy, estimated by government expenditure (GE), does not Granger-Cause the Jordanian capital market growth (MC). Such argument is supported by the results in Section IV (ii).

V. Conclusion and Recommendations

This paper examines the effect of monetary and fiscal policies on ASE capitalization using time series techniques, in particular Unit Root, Cointegration, and VAR model. The results show that the variables considered are not stationary in their levels and do not have long relationships. However, the second difference for MC and the first difference for GE and M1 are stationary. In addition, two main tools are used to investigate whether the variables have short-term relationships, namely, impulse response analysis and variance decomposition tests. Concerning the direction of the relationships among variables, granger causality test is applied.

Variance decomposition results show that MC significantly influenced two years after the M1 shock. On the other hand, MC influenced three years after the GE shock, with almost fixed level of effect over the ten-years period. As it can be seen from Table (3) MC explains 87% of its forecast error variance in a ten-years period, whereas GE explains 65% of its forecast error variance, and M1 explains 25% of its forecast error variance. In addition, GE and M1 respectively explain 3% and 11%, of the forecasted error variance of MC.

The impulse response test shows that any shock to the M1 has a significant and positive effect on the MC after almost two years, which remain fixed until the end of the ten-years period. On the other hand, a GE shock has a marginal and negative effect on the MC after almost three years, which remain fixed until the end of the ten-years period. The response of the MC to its own shocks is highly significant, suggesting that a strong predetermined component in the MC exist. The above result may be explained in the sense that any increase in M1 causes increases in the amount of investment and finally reflected on MC.

Granger causality test shows that M1 has a significant and positive effect on MC much more than the GE. Such findings highlight the fact that only monetary policy estimated by money supply (M1) has much stronger effects on the ASE market capitalization growth. This implies that fiscal policy might be less influential on economic activities in emerging market compared to advanced markets. Such results might be due to the fact that financial markets in developing economies under developed. The importance of Central Banks in these countries mainly is confined to finance government deficits.

The results suggest that tools of the monetary policy managed by the Central Bank of Jordan should be directed toward maximizing the Jordanian capital market value since the monetary policy is more influential on the capital market and economic activities. Moreover, fiscal policy estimated by government expenditure did not have that influence suggesting that most of the government expenditure not for long-term investment (capital investment), but for financing consumption activities, a fact could be clearly seen by exploring the government expenditures over the years, an issue could be taken into consideration by the Jordanian government in order to increase the positive influence of the fiscal policy on ASE growth performance. Finally, ASE efficiency should be increased in all kinds, namely operational, informational, and allocation. Such an effort for sure will attract more investment and liquidity to the capital market.

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