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The Macroeconomic Determinants of Stock Market Development in Jordan

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Abstract

This study examines the causes of stock market development in Jordan. The study uses monthly data between 1990 and 2011. The data is tested for stationarity by employing unit root tests. Results confirm that all variables are stationary, enabling us to continue in the modeling process. To achieve this objective, a multivariate cointegration and variance decomposition analysis are applied to examine the impact of these sources. The estimated findings demonstrate that the variables namely; Money Supply relative to GDP_t, Total Value Traded relative to GDP_t, Gross Capital Formation relative to GDP_t, Consumer Price Index (CPI), and Credit to private Sector relative to GDP_t all have positive and considerable influences on stock market development. On the other hand, Nominal Gross Domestic Product and Net Remittances relative to GDP_t have a negative impact. From the estimated VECM, the variance decompositions (VDC) have been simulated as a basis for inferences. The Johansen and Juselius' multivariate cointegration and variance decompositions analysis also confirm the presence of both a long-term and short-term dynamic relationship between the Stock market capitalization relative to GDP and macroeconomic variables. In the light of these results, the paper provides some policy implications to Jordan.

Keywords: Jordan stock market development, macroeconomic variables

1. Introduction

The economic role of stock markets witnessed rapid increases around the world and has lately opened a new path of research into the association between stock market development and economic expansion, through enhancing mobilization of domestic and foreign resources and facilitating investments. The initial verification of the relation between stock market development and economic expansion was reported by Gurley and Shaw (1955, 1960, and 1967), Goldsmith (1969), McKinnon (1973) and Shaw (1973). The debates continued on whether stock market development causes economic expansion, or is a consequence of economic expansion.

Recent studies have focused on the three main arguments. First, financial development promotes future economic growth. Second, economic growth accelerates financial development. Finally, financial development and economic growth affect each other simultaneously. In this context, there is a general agreement among researchers that stock markets play a significant role in the economic development, which is in line with financial liberalization and global integration. A number of theoretical and empirical researches have centered on the linkages between stock markets and economic development. This view is supported by Demirguc-Kunt and Levine (1996a), Singh (1997), and Levine and Zervos (1998), Adjasi and Biekpe (2006), Agrawalla and Tuteja (2007), and Hearn and Piesse (2010).

In general, Jordan has witnessed an expansion in the gross domestic product, money supply, stock market liquidity, savings and investment, remittances, inflation and credit to private sector accompanied with many uncertainties from the high degree of openness, domestic and foreign markets, and due to political and social instability which have all influenced Jordan's stock market.

Although Jordan is characterized by the shortage of institutional progress which is considered a barrier access to capital markets, it has nevertheless started on economic reform and structural adjustment programs and liberalization policy since the early 1990s. Such programs affected the financial market performance.

1.1 The Importance

Our study attempts to look at the linkage between the Amman Stock Exchange (ASE), development and macroeconomic variables of the Jordanian economy over the period 1990-2011. In order to achieve this objective, the study uses monthly data which is extracted from various sources such as the Amman Stock Exchange (ASE), the Statistical Database of Central Bank of Jordan (CBJ), International Financial Statistics (IFS) (various issues), and the Department Of Statistics (DOS) in Jordan.

The reason for selecting monthly data is that most of the previous studies related to macroeconomic determinants of stock market development used annual data or quarterly data. Whereas, monthly data was not utilized in the case of Jordan. The using of monthly data is to make the most of the observations, and to seize the long-standing dynamic fluctuations in the stock market development process, and thus, diminish the possibilities of high degree of multicollinearity .Given that the values of both market capitalization and GDP are measured at the end of the year, we therefore use monthly data to solve the stock-flow problem.

This remainder of this paper is organized as follows: Section 2: Literature Review. Section 3: Characteristics of the Amman Stock Exchange Market. Section 4: Methodology and Econometric Model. Section 5: Descriptive Statistics of the Variables. Section 6: Empirical Results. Section 7: Conclusion and Policy implications.

2. Literature Review

Over the last two decades, the development of stock markets has been attracted great attention, as a source of economic expansion. The initial evidence has been reported by Gurley and Shaw (1955, 1960, and 1967), Goldsmith (1969), McKinnon (1973) and Shaw (1973).

An advanced study about the association among stock markets development and financial intermediaries in developing countries were examined by Demirguc-Kunt and Levine (1996). The findings indicated that most stock market signs are highly associated with banking sector developments. The findings also indicated that countries in the company of advanced stock markets are likely to have a highly developed banking sector, since banks are considered one of the main determinants of financing projects in developing and developed countries.

Likewise, Levine and Zervos (1996, 1998), and Singh (1997) found a direct association between stock market growth and future economic expansion. They also argued that there is a powerful positive relationship between stock market liquidity and long-run economic expansion.

Garcia and Liu (1999) investigated the macroeconomic determinants of stock market development, using pooled data from 15 countries in both industrial and developing countries for the period between 1980 and 1995. Their results confirmed that income level, saving rate, and financial market liquidity are all significant forecasters of stock market capitalization development. On the other hand, economic stability was found to have no effect. Also, intermediary financial institution and stock markets were found to go together hand in hand, rather than replacing one another in the growth course.

Ben Naceur, Ghazouani and Omran (2007) investigated the impact of stock market development in the MENA economies expansion, using fixed and random specification models .They found that stock market liquidity, financial intermediary, saving rate, and economic stability are all vital causes of financial market development.

Girma and Shortland (2008) examined the effect of a country's democracy characteristics and regime change on financial development, through employing panel data on developed and developing countries between 1975 and 2000. Results showed that the degree of democracy and political stability are important factors in determining the speed of financial development.

Moreover, Yartey (2008) examined the institutional and macroeconomic variables that contribute to stock market development. Through employing panel data of 42 emerging economies covering the period between 1990 and 2004, he found that income level, gross domestic investment, banking sector development, private capital flows, and the liquidity of stock markets are fundamental determinants of stock market development. He also confirms that political risk, law and order, and bureaucratic quality are important causes of stock market development, as they enhance the viability of external finance.

A more recent study carried out by Cherif and Gazdar (2010) examined the influence of macroeconomic environment and institutional quality on stock market development. They used both panel data and instrumental variable techniques from 14 MENA countries over the period of 1990-2007. They found that stock market development are influenced by income level, saving rate, stock market liquidity, and interest rates. They also showed that the banking and the stock market sectors are complementary instead of being substitutes. In addition, they found that the institutional environment did not appear to be a driving force for the stock market

capitalization in the region.

A cointegration and vector autoregressions (VAR) models were employed by Mansor (2011), in order to examine the long term connection between stock market development and real economic variables for Thailand. Results indicated dual -directional causality between the stock market capitalization increase and real GDP. Both variables exhibit positive and significant responses to innovations in the other variables. In addition to that, a causal connection was confirmed between stock market development and investment ratios, which runs from the former to the latter. Finally, dual-directional causality was found between real GDP and investment ratio, and substantial contributions of both real GDP and stock market development to variations in the aggregate price level.

Mishal (2011) examined the relationship between the economic development and financial sector developments in Jordan, by employing a multivariate vector error correction model (VECM). The findings showed a powerful stable long-term equilibrium link between financial markets' development and economic development. The study also showed dual-directional causality between banking sector increase and economic expansion in long run, and a bi-directional causality among the banking sector progress and stock market development. Moreover, the causality runs from GDP growth to the stock market development, and not vice versa.

Finally, Kemboi and Tarus (2012) investigated the macroeconomic factors that cause stock market development in Kenya for the period between 2000 and 2009, using quarterly secondary data. The error correction model was employed to estimate the association between the macroeconomic variables and stock market development. The results confirmed that macroeconomic variables such as income level, banking sector development, and stock market liquidity are significant determinants of the development of the Nairobi Stock market. In addition, the findings showed that macroeconomic stability is not a significant forecaster of the development of the securities market.

3. Amman Stock Exchange Market (ASE)

The ASE is an emerging stock market that was established in 1978. It has different connections with its neighboring Arab financial markets. The ASE performance is greatly reliant on external financial inflow such as workers' remittances, Arab aid, and foreign investment. This has strengthened the portfolio diversification products and liquidity assets. Nevertheless, the ASE experiences economical fluctuations, and is surrounded by political conflict , deficient of transparency, social conditions, accounting criteria's, and investor safety, which have all lead to Jordan being exposed to external economic fluctuations.

The ASE has witnessed a notable increase in different dimensions accompanied with fast economic expansion. This may possibly be attributed to the introduction of the new Electronic Trading System (ETS), continuation of the liberal economic policy, joined by sensible channeling of funds to both the public and private sectors.

Because the accessibility of domestic funds increase, which in turn speeds up the economic growth and decreases the pressure of the dependence on external donors; Jordan has offered many inducements towards the stock exchange market development via eliminating constraints on external involvement in listed companies on the ASE. These restructurings have created an optimistic outcome on stock market progress.

The figures in table 1 indicate that the ASE has developed quickly in volume and value. The number of listed companies has increased from106 in 1995 to 277 in 2010, and then declined to 247 in 2011, while the sum of market capitalization totaled to JD 29214.20 million in 2007, and decreased after that to JD19272.76million in 2011. The percentage of market capitalization to GDP arrived to three hundred percent of GDP in 2005. This is considered incredible high by global standards.

A further obvious growth is detected in the trading value. The trading value has quickly increased from only JD 268.89 million in 1990, to JD 20318.00 in 2008, but however fell to JD 2850.3 million in 201. This provides a sign of the economic growth fluctuation in Jordan. With regards to liquidity, it is noticeable that it is not augmented in proportion to market capitalization. Moreover, the turnover ratio has oscillated throughout the period.

The General Weighted Price Index of the ASE rose from 804.3 points in 1990 to 8191.5 in 2005. After that, it dropped down to 4648.4 in 2011. The average daily trading volume rose from JD 1.4 million in 1997 to JD 82.9 million in 2008, and was followed by a decrease to JD 11.5million in 2011. This fall is attributed to the growing energy costs, expanding deficit, and swelling debt. These economic variables spread intensively on the ASE market.

Table 1. Key statistics of the ASE (1990-2011)

Year	Number of listed companies	Market Capitalization (Million JDs) (MCAP)	GDP at market prices (Million JDs)	Market Capitalization as a% of GDP	ASE General weighted price index (point)	Traded value (million JDs)	Traded Number of Stocks As a% of MCAP	Average Daily Trading (million JDs)
1990		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	
1992		2295.65	3611.60	63.6	1299.0	886.95	38.6	
1993		3463.93	3885.20	89.2	1585.0	968.61	28.0	
1994		3409.29	4359.20	78.2	1436.0	495.08	14.5	
1995	106	3495.44	4714.80	74.1	1591.7	418.96	12.0	
1996	135	3461.16	4912.20	70.5	1534.6	248.58	7.2	
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	16871.0	63.3	69.0
2006	227	21078.24	11092.60	190.0	5518.1	14209.8	67.4	58.7
2007	245	29214.20	12595.70	231.9	7519.3	12348.1	42.3	50.0
2008	262	25406.27	16108.00	157.7	6243.1	20318.0	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
2011	247	19272.76	20476.59	94.13	4648.4	2850.3	14.8	11.5

Source: Amman Stock Exchange. [on line] http://www.ase.com.jo

4. The Study Methodology and Econometric Model

Following the definition of Demirguc-Kunt and Levine, (1996a), this research investigates the determinants of the ASE development, by focusing on the value market capitalization relative to GDP_t .

However, many studies with different specifications have examined the link between stock market development and macroeconomic variables. Many of these empirical investigations have revealed that both macroeconomic and institutional factors are important determinants of stock market development. Following these developments, Yartey (2008) modified the Calderon-Rossell (1991) model to incorporate other variables that might affect stock market development.

To capture the underlying time series properties of the data, our analysis follows the convention methodology by adopting standard time-series econometrics. In order to verify the stationarity of our data; the Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) tests are applied.

We implement the maximum likelihood technique developed by Johansen (1988), and Johansen and Juselius (1990) to test the dynamic cointegration relationship between stocks market development and macroeconomic variables, by estimating a Vector Error Correction Model (VECM), see Engle and Granger, (1987).

Based on the integration and cointegration test results, we carry on to the VECM model estimation.

Denote X=(MCY_t, Y_t,MY_t,$TVTY_t$, $GCFY_t$, RY_t , P_t, CRY_t).

Where:

MCY_t= Stock market capitalization relative to Gross Domestic Product (GDP_t).

Y_t= MY_t=Money Supply to GDP_t.

$TVTY_t$= Total Value Traded relative toGDP_t (Measures stock market liquidity).

$GCFY_t$= Gross Capital Formation relative to GDP_t (Measures Investment).

RY_t= Net Remittances relative to GDP_t.

P_t= Consumer Price Index (CPI).(Measures macroeconomic stability).

CRY_t= Credit to private Sector relative toGDP_t.

The VECM model is written in levels as:

$$\Delta X_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \Delta X_{t-i} + \Delta EC_{t-i} + e_t \quad (1)$$

Where α_0 is a 8×1 vector of constant terms, α_i is a 8×8 matrix of coefficients, e_t is a 8×1 matrix vector of error terms, ΔEC is a vector of error correction term, and p is the optimal lag order set to render the error terms serially uncorrelated.

As noted by Johansen (1992), and Engle and Granger (1987), we need to test the importance of the ΔEC in the stock market equation. The VECM is used to estimate the short-run dynamics, and the exogenously between the 8 variables in the cointegration equation as follows:

$$MCY_t = \beta_0 + \sum_{i=1}^{p_2} \beta_2 Y_{t-i} + \sum_{i=1}^{p_3} \beta_3 MY_{t-i} + \sum_{i=1}^{p_4} \beta_4 TVTY_{t-i} + \sum_{i=1}^{p_5} \beta_5 GCFY_{t-i} + \sum_{i=1}^{p_6} \beta_6 RY_{t-i} + \sum_{i=1}^{p_7} \beta_7 P_t + \sum_{i=1}^{p_8} \beta_8 CRY_{t-1} + \varepsilon_t \ldots \quad (2)$$

In this study, the coefficient of variables (β_2, β_7) are expected to be negative, whereas ($\beta_3, \beta_4, \beta_5, \beta_6,$ and β_8) are expected to be positive.

Thus, we estimate the following error correction model for stock market development as follows:

$$\Delta MCY_t = \beta_0 + \sum_{i=1}^{p_1} \beta_1 \Delta MCY_{t-1} +$$

$$\sum_{i=1}^{p_2} \beta_2 \Delta Y_{t-i} + \sum_{i=1}^{p_3} \beta_3 \Delta MY_{t-i} + \sum_{i=1}^{p_4} \beta_4 \Delta TVTY_{t-i} + \sum_{i=1}^{p_5} \beta_5 \Delta GCFY_{t-i} + \sum_{i=1}^{p_6} \beta_6 \Delta RY_{t-i} + \sum_{i=1}^{p_7} \beta_7 \Delta P_t + \sum_{i=1}^{p_8} \beta_8 \Delta CRY_{t-1} + \sum_{i=1}^{p_9} \beta_9 \Delta EC_{t-1} + \varepsilon_t \ldots \quad (3)$$

Where: β_0 is a constant (The unobserved country specific fixed effect), and βs are the coefficients of the variables, Δ is the first difference operator, and EC_{t-1} is the error correction term. EC_{t-1} is the vector error correction for the model, ε_1 is uncorrelated disturbances, and p is the lag length.

5. Macroeconomic Variables, Descriptions, Definitions and Transformations

In this paper, we study the macroeconomic variables that influence stock market development in Jordan. Stock market development is a multi-dimensional concept. It is usually measured by stock market size, liquidity, volatility, concentration, assimilation with global capital markets, and the legal rule (regulation and supervision) in the market. In this study, we apply market capitalization relative to GDP_t as a proxy for measurement of stock market development.

The definitions and abbreviations of the variables are as follows:

MC_t is the monthly Stock market capitalization, and (Y_t) is the nominal monthly GDP_t in JDs millions. MCY_t is the stock market capitalization relative to GDP_t. $LMCY_t = (\ln MCY_t - \ln MCY_{t-1})x100\%$, where $LMCY_t$ is the monthly growth rate of stock market capitalization relative to GDP_t, at the present month (t). MCY_t and MCY_{t-1} stand for the stock market capitalization relative to GDP_t at the present month (t) and previous month $(t-1)$ respectively. **ln** is the natural logarithm. The usage of **ln** is to smooth the data and diminish any correlations within the variables.

Y_t is the monthly nominal GDP_t in JDs millions). $LY_t = (\ln Y_t - \ln Y_{t-1})x100\%$, whereas LY_t is the monthly growth rate of nominal GDP_t. $Y_t$and Y_{t-1} denote the monthly GDP_t at the current month (t) and earlier month $(t-1)$ respectively. However, the monthly GDP_t series was generated by using EViews.6 program.

M_t is the monthly nominalmoney supply (MS2), and (Y_t) is the nominal monthly GDP_t in JDs millions). MY_t is the money supply relative to GDP_t. It is a proxy for banking sector development. $LMY_t = (\ln MY_t - \ln MY_{t-1})x100\%$, where LMY_t is the monthly growth rate of money supply relative to GDP_t, at the current month (t). MY_t, and MY_{t-1} represent the monthly money supply relative to GDP_t at the current month (t) and previous month $(t-1)$ respectively.

TVT_t is the monthly total value traded, and (Y_t) is the Nominal monthly of GDP_t in JDs millions). $TVTY_t$ is the total value traded relative toGDP_t (Measures stock market liquidity).

$LTVTY_t = (\ln TVTY_t - \ln TVTY_{t-1})x100\%$, where $LTVTY_t$ is the monthly growth rate of stock market liquidity relative to GDP_t at the current month (t). $TVTY_t$ and $TVTY_{t-1}$ represent the stock market liquidity relative to GDP at the current month (t) and previous month $(t-1)$ respectively.

GCF_t is the monthly gross capital formation, and (Y_t) is the nominal monthly GDP_t in JDs millions). $GCFY_t$ is

the gross capital formation relative to GDP_t. It is a proxy for investment. $LGCFY_t = (\ln GCFY_t - \ln GCFY_{t-1})x100\%$, where $LGCFY_t$is the monthly growth rate of gross capital formation relative to GDP_t, at the current month (t). Where$GCFY_t$ and $GCFY_{t-1}$ represents gross capital formation relative to GDP at the current month (t) and previous month $(t-1)$ respectively.

$R_t$is the monthly net remittances to Jordan, and (Y_t) is the nominal monthly of GDP_t in JDs millions). $LRY_t = (\ln RY_t - \ln RY_{t-1})x100\%$, where LRY_t is the monthly growth rate of remittances relative to GDP_t, at the current month (t). Where, RY_t and RY_{t-1} represent the Remittances relative to GDP_t at the current month (t) and previous month $(t-1)$ respectively.

P_t is the monthly consumer price index (CPI_t). It is a proxy for macroeconomic stability. $LP_t = (\ln P_t - \ln P_{t-1})x100\%$, where LP_t is the monthly growth rate of P_t at current time(t). P_t and P_{t-1} represent the monthly price at the current month (t) and previous month $(t-1)$ respectively.

CR_t is the monthly credit to private sector, and (Y_t) is the nominal monthly of GDP_t in JDs millions). CRY_t is credit to private Sector relative to GDP_t.$LCRY_t = (\ln CRY_t - \ln CRY_{t-1})x100\%$, where $LCRY_t$ is the monthly growth rate of credit to private sector relative toGDP_t, at current time(t). Where, CRY_t and CRY_{t-1} represent the credit to private sector relative to GDP_t at current time(t) and previous month $(t-1)$ respectively.

Finally, $\boldsymbol{\varepsilon_t}$ is the disturbance term.

6. Descriptive Analysis of the Variables

This section analyses, the descriptive statistics of the $(LMCY_t)$ and the following macroeconomic variables: LY_t ,LMY_t, $LTVTY_t$, $LGCFY_t$, LRY_t ,LP_t ,and $LCRY_t$ in the log form. It begins by examining whether the data is normally distributed. Table 2 demonstrates the descriptive statistics of the variables, namely the skewness and kurtosis statistics, Jarque-Bera(JB) normality test, and the probabilities.

Table 2. Descriptive analysis of the variables

	$LMCY_t$	LY_t	LMY_t	$LTVTY_t$	$LGCFY_t$	LRY_t	LP_t	$LCRY_t$
Mean	-0.048064	6.371368	2.593634	-1.604465	-1.322090	-1.850106	4.462530	2.177580
Median	-0.262553	6.241526	2.593258	-1.917813	-1.316314	-1.776832	4.432599	2.190905
Maximum	1.130327	7.452393	2.714658	0.688382	-0.961610	-1.547806	4.889597	2.399694
Minimum	-0.887330	5.431211	2.490883	-3.207093	-1.678705	-2.505781	4.065602	1.946675
Std. Dev.	0.478521	0.586534	0.058028	1.114120	0.186481	0.246642	0.215161	0.086173
Skewness	0.849217	0.399898	0.173576	0.601109	0.044976	-0.985713	0.274368	-0.640073
Kurtosis	2.849303	2.160480	1.808709	2.140379	1.827355	3.040835	2.285766	3.350962
Jarque-Bera	31.98123	14.78913	16.93657	24.02705	15.21507	42.77003	8.923651	19.38146
Probability	0.000000	0.000615	0.000210	0.000006	0.000497	0.000000	0.011541	0.000062
Sum	-12.68886	1682.041	684.7195	-423.5789	-349.0317	-488.4279	1178.108	574.8812
Sum Sq. Dev.	60.22247	90.47793	0.885595	326.4521	9.145853	15.99886	12.17534	1.952973
Observations	264	264	264	264	264	264	264	264

Sources: CBJ, and the ASE.

In general, the precise evaluation of the normal distribution is given by the values of Skewness and Kurtosis. The Skewness shows the amount and direction of skew (departure from horizontal symmetry), while the Kurtosis shows how tall and sharp the central peak, relative to a standard bell curve.

Table 2 revealed that all the variables possess the state of normal distribution, except $LMCY_t$ and LRY_twhich are moderately skewed to the right, whereas LRY_t and $LCRY_t$ are skewed to the left. LRY_t and $LCRY_t$ have kurtosis values of more than three, and the series are called leptokurtic. As for the remaining variables, the values of kurtosis are less than three, and the series are called platykurtic, see Bulmer, (1965).

To confirm the accuracy of the normality assumption, we employed the JB statistics and the equivalent p-values. The findings indicated that all variables are rejected at 1%, except for LP_t at 1%.

In order to capture the underlying time series properties of the data, our analysis follows the convention methodology by adopting standard time-series econometrics procedures. The Augmented Dickey Fuller (ADF) unit root test, Phillips-Perron (PP) Unit Root Test and Johansen co-integration test are utilized to test for the stationarity of data. These tests are performed to search for the appropriate model (the vector autoregression (VAR) model, and Error Correction model) that best fits the data set.

Table 3 illustrates the ADF and PP unit root tests, as well as the appropriate lag lengths. The ADF test is based on the Akiake Information Criterion (AIC),whereas the PP test is based on the Newey-West (1994) for Bartlett Kernel (Lag truncation: 4). The number of lags used in the ADF test in order to remove serial correlation in the residuals are based on AIC & Schwartz Bayesian Criterion(BIC).

Table 3. Unit root test for the stock market capitalization relative to GDP_t and selected macroeconomic variables

Variables	Augmented Dickey Fuller ADF Unit Root Test	Akaike Information Criterion (AIC)	Durbin-Watson Stat	Phillips-Perron (PP) Unit Root Tests	Akaike Information Criterion (AIC)
$LMCY_t$	(-4.34)*	(-3.79)	2.00	(-11.5)*	-3.74
LY_t	(-4.00)*	(-7.11)*	2.00	(-6.21)*	-6.87
LMY_t	(-6.94)*	(-6.01)	2.00	(-14.53) *	-6.00
$LTVTY_t$	(-3.51)*	(-1.81)	1.98	(-11.17)*	-1.77
$LGCFY_t$	(-3.73)*	(-5.30)	2.00	(-9.01)*	-5.21
LRY_t	(-4.11)*	(-5.64)	2.00	(-7.98)*	-5.50
LP_t	(-7.18)*	(-5.36)	1.99	(-18.60)*	-5.37
$LCRY_t$	(-7.57)*	(-4.44)	2.00	(-25.55)*	-4.44

Description: Both the ADF and PP unit root tests utilize the same specification, and all the variables are specified in the first difference in the ln, not including an intercept and trend, except for (LY_t) which includes an intercept, see Dickey and Fuller (1979, 1981) and Phillips and Perron (1988).

Notes: Asterisk(*) demonstrates the rejection of H_0 of non-stationary at the 1% .And the critical values of MacKinnon (1996) for ADF &PP tests with proceeded specification .The 1%, 5% & 10% critical value for the ADF &PP tests is -2.5735and -1.9408 & -1.6163 in that order.

As indicated in table 3, the null hypothesis of a unit root is located in the rejection area. For this reason, it is rejected at 1% level for both the ADF and PP tests. However, the ADF and PP tests suggest the variables in this study are non-stationary in their original forms, and are integrated of the order one (stationary in first difference).

We can now go on to assess the effect of macroeconomic variables on the continuously compounded growth rates of stock market capitalization relative to GDP_t, through employing a multivariate cointegration test, and error correction model. Furthermore, the multivariate variance decomposition test is conducted within an error correction framework.

7. Empirical Results and Interpretations

7.1 Cointegration Analysis

Our study uses cointegration analysis to assess the outcome of selected variables on stock market development. The advantage of carrying out cointegration analysis is to provide evidence of a stable long-term equilibrium relationship amongst our variables.

Also, the utilization of the Johansen cointegration test and VECM model is to avoid possible misspecification biases, as resulted from the conventional VAR model. If the variables used in the VAR model were cointegrated, then the model may have been misspecified because it excluded an additional channel of influence, resulting from a long-run equilibrium relationship between these factors (Engle and Granger, 1987).

The Johansen-Julius cointegration technique was used for two main reasons. First, the factors are integrated of order one, which is a precondition for the use of Johansen-Julius technique; and secondly, our model is a multivariate model. Given these issues, there is a possibility of having more than one cointegrating vector in our model.

Since the results derived from these tests were receptive to the choice of the lag length, three criteria for lag order selection were used: AIC (Akaik Information Criterion), and SC (Schwarz -Information Criterion).

The results indicate that when three lags are used, the H_0 of no co-integration (r=0) is rejected at 5% or 1 % in both the maximum eigen-value test and trace test respectively (see Table 4).

This provides evidence on the presence of a long-run association between the variables. Having established the number of cointegrating vectors we now proceeded to estimate an error correction model to determine the relationship among the variables.

Given that there were eight variables in the model (n = 8), there could be a maximum of seven cointegrating vectors; thus, r would be equal to 0,1, 2, 3, 4, 5,6 or 7.

Table 4. Tests for cointegration using the Johansen procedure

Model: $MCY_t = (Y_t, MY_t, TVTY_t, GCFY_t, RY_t, P_t, CRY_t)$.using the monthly data for the period between 1990-2011.
Lags interval (in first differences): 1 to 3

1 Percent	5 Percent	Max-Eigen		Hypothesized
Critical Value	Critical Value	Statistic	Eigenvalue	No. of CE(s)
57.69	51.42	53.90493	0.187246	None *
51.57	45.28	37.72290	0.135054	At most 1
45.10	39.37	29.84683	0.108452	At most 2
38.77	33.46	25.68342	0.094060	At most 3
32.24	27.07	16.01269	0.059729	At most 4
25.52	20.97	10.52950	0.039689	At most 5
18.63	14.07	6.493007	0.024664	At most 6
6.65	3.76	0.000630	2.42E-06	At most 7

*(**) refers to rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 1 cointegrating equation(s) at the 5% level
Max-eigenvalue test indicates no cointegration at the 1% level

1 Percent	5 Percent	Trace		Hypothesized
Critical Value	Critical Value	Statistic	Eigenvalue	No. of CE(s)
168.36	156.00	180.1939	0.187246	None **
133.57	124.24	126.2890	0.135054	At most 1 *
103.18	94.15	88.56608	0.108452	At most 2
76.07	68.52	58.71925	0.094060	At most 3
54.46	47.21	33.03583	0.059729	At most 4
35.65	29.68	17.02314	0.039689	At most 5
20.04	15.41	6.493638	0.024664	At most 6
6.65	3.76	0.000630	2.42E-06	At most 7

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 2 cointegrating equation(s) at the 5% level
Trace test indicates 1 cointegrating equation(s) at the 1% level

The results of the cointegration rank test for the model are presented in Table.4. The max-eigen value test indicated the existence of 1 co-integrating equation at 5% level. Consequently, $LMCY_t$, LY_t, LMY_t, $LTVTY_t$, $LGCFY_t$, LRY_t, LP_t, and $LCRY_t$ were cointegrated.

At the same time, the value of the trace test (λtrace) indicated that the null hypothesis of none cointegrating vectors (r= 0) can be rejected at the 1% level. That is, it suggests the presence of one cointegrating vectors between $LMCY_t$, LY_t, LMY_t, $LTVTY_t$, $LGCFY_t$, LRY_t, LP_t, and $LCRY_t$.

The estimated normalized coefficients of this cointegrating relationship (the βs) were significantly different from zero for all the variables. These results confirm the presence of a long-run link among $LMCY_t$ and the other variables in the study using the monthly data for the period between 1990 and 2011.

Table 5. Results of normalized equation based on the Johansen Cointegration test

Cointegrating Eq:	LMCY(-1)	C	LY(-1)	LMY(-1)	LTVTY(-1)	LGCFY(-1)	LRY(-1)	LP(-1)	LCRY(-1)
CointEq1	1.00	35.737	4.188	-2.066	-0.310	-1.422	0.511	-11.901	-2.452
			0.623	0.698	0.065	0.273	0.171	1.711	0.537
			[6.724]	[-2.958]	[-4.779]	[-5.203]	[2.984]	[-6.954]	[-4.569]

Standard errors in ( ) and t-statistics in [ ]

In our base model, shown in table 5, our estimation results show that the macroeconomic variables have a positive and significant effect on stock market development. (In this, we need to reverse the signs of the estimated coefficients of variables according to the Johansen cointegration procedure). However, nominal GDP and remittances have a negative impact on stock market development.

As we can see from in table 5, the empirical results confirm that the growth rate of nominal GDP_t has a negative impact on stock market development, since the coefficient is (-4.188) and highly significant. This is in agreement with our hypothesis, as it may possibly be attributed to the fact that the variable is in nominal terms, and during the study period, the marginal propensity to consume experienced very high rates accompanied by lower propensity to invest in the stock market by general investors, and at the same time, stock market capitalization is a ratio to nominal GDP_t, and thus, any increase in the nominal GDP_t will decrease this ratio.

Our findings also indicate that the growth rate of money supply to GDP_t, has a direct effect on the MCY_t.The positive value of the coefficient is (2.066) and is greatly significant, and indeed, the banking sector is important in the economic development, and more so in the development of stock market, and this is consistent with Berthelemy and Varoudakis (1996), Garcia and Liu (1999), Christopoulos and Tsionas (2004), Ben Nacuer et al., (2007) and Yartey (2008).

Moreover, additional findings show a positive and significant impact of the growth rate of stock market liquidity on the stock market development, since the coefficient is (0.310) and highly significant. The results are in line with the findings of Levine and Zervos (1998), Garcia and Liu (1999), Yartey (2008), Mishal (2011), and Josphat and Tarus (2012).

The study also confirmed that the growth rate of gross capital formation relative to GDP_t, has a positive effect on the MCY_t, since the coefficient is highly significant with a magnitude of (1.422). This is consistent with the findings of Yartey (2008), and Mansor (2011).

Our findings also show that the growth rate of net remittances relative to GDP_t has a negative impact on MCY_t, since the coefficient is (0.511) and is not as anticipated. This may possibly be due to the fact that during the study period, the marginal propensity to consume was very high, and most of the people working abroad are classified as medium & low income. Therefore, most of their remittances go towards purchasing land, flats, marriage and education. However, the financial crisis interrupts the flux of capital flow, thus creating a lesser capital available for ASE. On the contrary, Aggarwal et al. (2006) argued that remittances promote financial development in developing countries during financial stability.

We use the inflation rate as a proxy to measure macroeconomic stability, though there is no agreement on the link between macroeconomic stability and MCY. The empirical results of our study show that the growth rate of the consumer price index has a positive influence on MCY, since the coefficient is (11.188) and highly significant.

Furthermore, the positive influence of macroeconomic instability on MCY_t can be linked to the fact that that macroeconomic instability acts a substantial role in influencing MCY. This is consistent with the findings of Demirguc-Kunt, and Levine (1996b), where they argued that when there is high macroeconomic instability, prices become signals, especially when there is large standard deviation of the coefficient, which makes it very difficult to emphasize whether price changes are temporary or permanent, and thus markets become more uncertain and prone to attract gamblers.

Finally, the growth rate of credit to private sector relative to GDP_t was found to have a positive influence on MCY. The coefficient is (2.452) and highly significant as anticipated. The positive relationship is in line with the findings of Demirguc-Kunt, and Levine (1996a).

7.2 Variance Decomposition

Although the VECM was estimated, it is however difficult to interpret the individual coefficients since there are three lags for each of our eight endogenous variables. Due to this problem, most practitioners often estimate the so-called variance decomposition (VDC). However, the VDC traces out the variation of the dependent variable in the VECM system to shocks in the error term, and the accuracy of VDC result depends on the Cholesky ordering. Therefore, we employ different ordering variables in order to estimate accurate results.

Table 6. Variance decomposition results

Variance Decomposition of LMCY									
Period	S.E.	LMCY	LY	LMY	LTVTY	LGCFY	LRY	LP	LCRY
1	0.037	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.058	99.491	0.025	0.011	0.012	0.046	0.008	0.385	0.022
3	0.079	98.677	0.135	0.015	0.023	0.113	0.029	0.908	0.101
4	0.100	97.354	0.289	0.298	0.027	0.146	0.052	1.592	0.242
5	0.121	96.005	0.443	0.506	0.034	0.195	0.088	2.354	0.375
6	0.140	94.621	0.578	0.715	0.042	0.256	0.138	3.128	0.521
7	0.160	93.149	0.706	0.904	0.051	0.313	0.180	4.041	0.657
8	0.179	91.834	0.812	1.058	0.060	0.365	0.222	4.866	0.782
9	0.198	90.639	0.901	1.185	0.069	0.412	0.261	5.636	0.896
10	0.216	89.612	0.977	1.287	0.078	0.452	0.293	6.307	0.994
11	0.233	88.741	1.040	1.370	0.086	0.486	0.320	6.880	1.079
12	0.250	88.007	1.093	1.436	0.092	0.515	0.342	7.364	1.150

With the finding of cointegration, we estimate a level VECM to discern dynamic causal interactions among the growth rate of $MCY_t$and macroeconomic variables in the system.

From the estimated VECM, we simulate variance decompositions (VDC) as a basis for inferences. The VECM lag order is set to 3, in line with the above cointegration test, in order to make the error terms serially uncorrelated. From the estimated VECM, we generate the VDC with the following variables ordering:

$LMCY_t$, LY_t, LMY_t, $LTVTY_t$, $LGCFY_t$, LRY_t, LP_t, $LCRY_t$.

Table 6 presents corresponding variance decompositions. Several aspects of the results are noteworthy. From the variance decompositions in Table.6, roughly 91.83%, 0.81%, 1.06%, 0.06%, 0.37%, 0.22%, 4.87%, and 0.78% of the variations in $LMCY_t$ is explained by itself, and LY_t , LMY_t , $LTVTY_t$, $LGCFY_t$, LRY_t , LP_t , and $LCRY_t$ respectively shocks over the 8-month horizon.

At the same time, forecast error variance is attributed to innovations in itself, andLY_t, LMY_t, $LTVTY_t$, $LGCFY_t$, LRY_t, LP_t, and $LCRY_t$ respectively after 12-month horizon and the results are as follows: more than 88%, 1.09%, 1.44%, 0.09%, 0.52%, 0.34%, 7.36%, and 1.15% of $LMCY_t$.

The different ordering between the variables cannot have potential effects on the results. This indicates that $LMCY_t$, and LP_t are still the main important variables in the variations of $LMCY_t$ variance decompositions analysis in the short run.

8. Conclusion and Policy Implication

This research investigates the main macroeconomic factors that affect stock market development in Jordan; by employing monthly data between 1990 and 2011. The unit roots tests are employed to test the data's stationarity. The results confirmed that all the variables were stationary, which enabled us to continue in the modeling process.

The relationship between the growth rate of stock market development ($LMCY_t$) and the growth rate of the macroeconomic variables, namely LY_t, LMY_t, $LTVTY_t$, $LGCFY_t$, LRY_t, LP_t, and $LCRY_t$ was examined by utilizing the cointegration and variance decompositions analysis.

Moreover, the analysis results proved to be valuable and appropriate, as they provided strong evidence of a stable relationship between the macroeconomic factors and stock market development in both long-term and short term.

Finally, empirical results indicated that the macroeconomic variables showed both positive (after altering the signs of the coefficients according to Johansen cointegration procedure) and significant effects on $LMCY_t$, in contrast to both the growth rate of nominal GDP_t and net remittances relative nominal GDP_t, which confirmed negative effects on $LMCY_t$.

This paper has a number of policy implications to Jordan.

Firstly, the growth rate of nominal gross domestic product (LY_t) plays a negative role in stock market development. As a result, policymakers in Jordan should maintain the coincident ratio of financial market capitalization to nominal GDP_t.

Secondly, Jordan policy makers should be worrying about the development of the banking sector via the alteration in money supply, in line with stock market behaviour. Therefore, policymakers should take into consideration the signs of the stock market fluctuations, and consider the positive effect of the economic actions.

Policy makers should also concentrate on the stock market liquidity, given that it has a positive effect on market capitalization. Therefore, improving liquidity would promote the stock market development.

In addition, given that there is a strong direct link between the saving rate and investment, our results indicated that the investment variable plays an important role in determining market capitalization, and therefore, Jordan has to encourage savings and investment by appropriate policies through encouraging competition and improving the institutional framework.

Furthermore, the growth rate of net remittances relative to GDP_t plays a negative role in stock market development. Therefore, Jordan should encourage and facilitate the flow of these remittances not only to improve living conditions, but also as a source of private saving by means of investing in the stock market.

The macroeconomic stability represented by the growth rate of consumer price index (LP_t) plays a positive role in stock market development. For this, decision makers should restrain the variation of inflationary course of action, to sustain macroeconomic stability, and subsequently to achieve the desirable demand for financial assets, and to be in line with the financial stock market performance.

Finally, the growth rate of credit to private sector relative to nominal gross domestic product ($LCRY_t$) has a positive effect on stock market development. Therefore, the government has to maintain reasonable interest rates in order to increase the demand for credit to the private sector, and subsequently influence the stock market development.

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