CONFERENCE PROCEEDINGS/FULL PAPERS
ISBN: 978-625-90336-1-7/June 2026

"47th RSEP International Multidisciplinary Conference" 15-16 May 2026, HCC ST. MORITZ HOTEL, Barcelona, Spain

Macroeconomic Determinants of Amman Stock Exchange Development: Evidence from Johansen Cointegration and VECM

Rami Hijazine
Doctoral School of Regional Policy and Economics, Faculty of Business and Economics, University of Pécs, Hungary
E-mail: ramihijazine@yahoo.com

DOI: https://doi.org/10.19275/RSEPCONFERENCES397

Abstract

This paper examines the macroeconomic determinants of Amman Stock Exchange development in Jordan over the period 1980–2018. Stock-market development is measured using the market-capitalization ratio, while domestic savings, foreign direct investment, real income per capita, market liquidity, trade openness, and crisis-period effects are included as explanatory variables. Using annual data from the Amman Stock Exchange, the World Bank, and the Central Bank of Jordan, the study applies ADF unit-root testing, Johansen cointegration, and Vector Error Correction Model estimation. The results confirm the existence of a long-run relationship between ASE development and the selected macroeconomic variables. Domestic savings and market liquidity are positively associated with stock-market development in the long run, whereas real income per capita and crisis-period shocks have negative long-run effects. Foreign direct investment and trade openness are not statistically significant in the long run. In the short run, market liquidity and trade openness are the only significant variables, with market liquidity showing a negative effect and trade openness showing a positive effect. The findings suggest that ASE development depends more on domestic savings, market liquidity, and macroeconomic stability than on foreign capital inflows. Strengthening savings mobilization, improving market depth, and reducing crisis-related uncertainty may therefore support the long-term development of Jordan's stock market.

Keywords: Amman Stock Exchange, macroeconomic determinants, market capitalization, VECM, Jordan.
Jel codes: G10, C32

1. Introduction

The stock market is a crucial part of economic development since it acts as an intermediary to facilitate the flow of money from savers to investors, as it is an institutional mechanism for mobilizing local savings and directing them efficiently to productive investments that create jobs. Markets like these decrease the cost of capital for investors and reduce resource allocation issues and risk distribution problems, which in turn increase capital accumulation, a primary factor in long-term growth (Garcia & Liu, 1999). Therefore, an efficient and effective financial market is necessary to increase the speed of economic growth for countries (Levine, 1997).

Since the early 1990s, Jordanian macroeconomic indicators have changed following economic reform programs, structural adjustment, and liberalization policies. Jordan's stock market, however, suffered from many uncertainties due to the openness of its commercial markets to foreign markets, as well as geopolitical tensions in neighboring states (El-Nader & Alraimony, 2013).

Although Jordan has made legislative and economic reforms, the Amman Stock Exchange remains vulnerable to investor withdrawals and declining trading volumes, particularly since the 2008 global financial crisis. Despite recovery in many emerging markets and global markets, the ASE remained under pressure. Therefore, this study examines the following research question: Do the main macroeconomic variables have a significant impact on the development of the Amman Stock Exchange?

This study examines whether selected macroeconomic variables explain the development of the Amman Stock Exchange between 1980 and 2018. Explanatory factors include domestic savings, foreign direct investment, real income per capita, market liquidity, trade openness, and crisis-period dummy variables. By focusing on Jordan during a long period of reform, economic expansion, and crises, the study contributes to the literature by identifying both equilibrium relationships and short-term market responses through Johansen cointegration and a Vector Error Correction Model.

Following is the structure of the remainder of the paper. T In the second section, relevant literature is reviewed. The third section discusses Stock-Market Development and Variable Measurement. The data, variables, and model specifications are described in Section 4. In Section 5, we discuss the empirical results. Discussion of Results in Section 6. Section 7 concludes.

2. Literature Review

In the study (Evrim-Mandac et al, 2013), thirty developed and emerging countries were analyzed to determine the factors contributing to stock market development between 1960 and 2007. Based on market capitalization, they found that foreign direct investment, the development of the banking sector (as measured by the percentage of bank credit to the private sector), as well as worker remittances, influenced the development of stock markets. Furthermore, countries should implement policies and regulations that facilitate foreign direct investment and bank lending. The study (Şükrüoğlu & Nalin, 2014) examined macroeconomic variables and their effects on Western European stock markets. They found that monetary growth and inflation negatively impacted the stock market, whereas income, liquidity ratio, and saving rate positively affected it. Additionally, the growth of the stock market is dependent on income and savings rates.

In emerging countries, Garcia & Liu (1999) investigated the macroeconomic factors affecting stock market development in 15 Latin American and Asian countries. According to their study, GDP growth, domestic investment, and the development of the banking sector are important factors affecting stock market development. Yartey (2010) analyzed 42 emerging economies in 1990-2004 and found macroeconomic factors such as income level, domestic investment, development of the banking sector, and foreign investment and liquidity to be the most important determinants of stock market growth. On the European continent, Kurach (2010) analyzed data from 13 Central and Eastern European countries and found that the macroeconomic variables outlined above, as well as the government budget deficit and membership in the European Union, played a major role in determining stock market performance.

Mishal (2011) found a long-term relationship between the financial sector and economic development in Jordan, as well as a unidirectional causality from GDP growth to financial market development. El-Nader & Alraimony (2013) examine the reasons for Jordan's stock market's development. According to their study, the banking sector, local investments, the consumer price index, and the liquidity of the stock market all influenced stock market development, while nominal GDP and net transfers negatively affected it. Additionally, they found that the stock market capitalization to nominal GDP ratio was correlated with macroeconomic variables both on a short-term and long-term basis.

Overall, the literature indicates that stock-market development varies across countries and time periods based on macroeconomic conditions and market-specific factors. Using the Amman Stock Exchange over 1980-2018, this study examines the effects and dynamics between the study variables.

3. Stock-Market Development and Variable Measurement

3.1. Measuring Stock-Market Development

The development of financial markets has been characterized by a great deal of work, but there is no single criterion that can be used to measure its development. A number of studies have suggested, however, that a set of measures that consider all the main aspects of stock market development could provide a more accurate picture of how the size of the market has developed, since it is a complex concept that cannot be encompassed by one single measure or indicator.

In terms of expressing the market's development, market value and number of listed companies are the two main indicators. The stock market's value is first determined by dividing the total market value of all listed stocks by the gross domestic product, known as "market capitalization". According to this assumption, the market size has

a positive impact on capital mobilization and diversifying economic risks. Furthermore, retained earnings are assumed to be more closely related to GDP than sales volume or assets, and market capitalization can serve as a quick and easy way to assess risk (Levine & Zervos, 1998) (Garcia & Liu , 1999) (Rajan & Zingales, 2003).

Secondly, the number of listed companies is used as a complementary measure of market size because it isn't subject to variations in the stock market, but it is too slow to capture high-frequency changes across listed companies. Listed companies can also be affected by restructuring, mergers, and re-subscription of combined companies. Moreover, there is heterogeneity in firm sizes in economies characterized by a few, large firms, which partly reflects access to finance (Rajan & Zingales, 2003).

In the context of financial markets, growth and development are two separate concepts. The stock market grows when its size or liquidity increases. In the development concept, the stock market is improved so that it meets the economic needs by encouraging investment and reducing risks by directing resources to profitable areas, as well as promoting economic growth through the financing of development plans (El-Wassal, 2013).

3.2. Data Sources

In this study, annual time-series data is used for Jordan for the period 1980-2018. Market capitalization and trading volume are derived from historical records of the Amman Stock Exchange. The remaining macroeconomic variables were obtained from the World Bank and Jordan's Central Bank. ASE development is examined using this dataset alongside selected macroeconomic determinants, such as domestic savings, foreign direct investment, real income per capita, market liquidity, trade openness, and crisis-period dummy variables.

4. Data, Variables, and Model Specification

4.1. Dependent Variable:

In this study, Amman Stock Exchange development is proxied by its market capitalization ratio, which is calculated by dividing the market value of all shares listed on the Amman Stock Exchange by the average GDP at the end of the period at current prices, reflecting the size of the market in relation to the economy (Levine & Zervos, 1998; Garcia & Liu, 1999).

4.2. Explanatory Variables:

Garcia and Liu (1999), El-Nader and Alraimony (2013), Al-Tarawneh and Al-Assaf (2018), and Ho (2017a) provide theoretical and empirical evidence for selecting the explanatory variables.

- Market liquidity

Stock market liquidity is one of the most important factors that determine its growth, as it makes financial assets more attractive to investors who can deal in them more easily. In (Levine, 1997; Garcia & Liu, 1999), high liquidity enables investors to sell their shares quickly, thus making it easier to adapt to changes in the portfolio composition inexpensively, thereby reducing risk and facilitating long-term investment with higher returns. As a result, more savings are directed through the stock market when liquidity is greater.

Market liquidity is measured by dividing the trading volume of the Amman Stock Exchange by the GDP at current prices per million Jordanian dinars. The availability of liquidity allows investors to seize opportunities and diversify risks, which in turn leads to the efficient allocation of financial resources and the growth of the stock market. The trading volume is calculated at the end of the period, while GDP is calculated during the period. As a result of diluting the trading volume of the Amman Stock Exchange by the average GDP, the market should develop positively.

- Income level and saving rate

Increasing income will enable individuals to save, consume, and invest more, thereby increasing the demand for financial services. Economic growth and per capita GDP are closely tied to the development of financial markets. By increasing income, the multiplier affects the size of the stock market, price index, and trading volume, and thus positively influences the market's development. Furthermore, increasing income improves living standards, generates wealth, encourages savings, and thus empowers companies that operate in a better investment environment. However, when considering the per capita GDP, investors are encouraged to invest once they have met their basic needs, since income inequality weakens the relationship between economic growth and stock market development (El-Wassal, 2013).

Savings are calculated as total national income minus total consumption and net transfers. Based on current prices per million Jordanian dinars, and taking the log of total savings. It can either have a positive or a negative effect because of the two-way linkage with economic growth.

The real income per capita is calculated by dividing the income level at current prices in local currency by the population in the middle of the year. Taking the logarithm of the average per capita income. It is expected to have a positive impact on the development of the Amman financial market.

- Foreign Investment

Foreign investment provides liquidity which is important for the financial markets, as well as an additional support for the stock market. Generally, foreign investment tends to go towards successful (or expected to succeed) projects (Barrios et al, 2005), which increases the value of the shares of these companies. A company's position and size will indicate its success based on this action. Consequently, this will increase the demand for shares from local investors, which will increase trading volume and stock market activity.

The sum of equity capital, long-term and short-term reinvested returns minus investments withdrawn by investors is used to calculate this variable. The logarithm of net foreign direct investment was taken after adding an autonomous number to eliminate negative values. Amman's stock market is expected to benefit from foreign direct investment.

- Trade Openness

Trade openness and the accompanying financial openness enhance the development of stock markets through the demand for financial products and services in two different ways; the supply side and the demand side. With regard to the supply side, trade openness tends to stimulate investment and bank lending (Rajan & Zingales, 2003), while the demand side increases price elasticities, such as the demand for insurance services, despite the attendant fluctuations in income levels and increased uncertainty (Newbery & Stiglitz, 1984; Ho, 2017b).

Trade openness expresses the volume of foreign trade. A country's foreign trade is measured as a ratio of exports and imports to its Gross Domestic Product. A trade openness may affect the ASE market positively or negatively as foreign companies crowd out local businesses.

- Dummy Variable

This study includes a dummy variable to represent the Jordanian crisis of 1989, as well as the bubble in the financial market between 2006 and 2009 before the collapse (Al-Majali & Al-Assaf, 2014).

4.3. Econometric Model

Using the equation below, our study aims to understand the relationship between macroeconomic variables in Jordan and the growth of the Amman financial market:

$MKD_t = \beta 0 + \beta 1 lSAV_t + \beta 2 LFDI_t + \beta 3 LINC_t + \beta 4 MKL_t + \beta 5 TOP_t + \beta 6 SHIFT_t + u_t$

whereas:

- MKD: represents the development of the ASE, as measured by the capitalization rate of the Amman Stock Exchange.

- LSAV: represents the log of total domestic savings.

- LFDI: represents the log of FDI.

- LINC: represents the logarithm of the average real income per capita.

- MKL: represents the liquidity of the ASE.

- TOP: It represents trade openness, measured by total national exports and total imports relative to GDP.

SHIFT: represents the dummy variable.

- ut: indicates the random error term, and (t) indicates the time period.

4.4. Correlation Test

According to table (1), the average per capita income is positively correlated with savings, and the average per capita income and total savings are also positively correlated with foreign direct investment. The trade openness and liquidity of the ASE are also positively correlated.

Table 1: Correlations Between Variables

	LSAV	FDI	INC	MKL	LTOP
LSAV	**1**				
LFDI	**0.77**	**1**			
LINC	**0.92**	0.85	**1**		
MKL	0.28	0.37	0.3	**1**	
TOP	0.38	0.3	0.31	0.77	**1**

5. Empirical Results

5.1. Unit Root Test

Using the Augmented Dickey-Fuller unit-root test, the variables are tested for stationarity. Table 2 shows that the variables are stationary at the first difference, not at levels. Consequently, the variables are integrated of order one, I(1), which allows the Johansen cointegration test to be performed.

Table 2: Unit Root Test ADF

Variables	ADF test statistic at level			ADF test statistic at first difference		
	With intercept	With intercept and trend	Without intercept or trend	With intercept	With intercept and trend	Without intercept or trend
MKD	[-1.889]	[-1.741]	[-0.967]	[-6.677]*	[-6.644]*	[-6.773]*
LSAV	[-0.976]	[-2.780]	[1.022]	[-6.005]*	[-4.514]*	[-5.916]*
LFDI	[0.290]	[-3.177]	[1.440]	[-9.258]*	[-9.523]*	[-9.022]*
LINC	[-0.006]	[-3.165]	[1.974]	[-3.082]*	[-3.041]*	[-2.336]*
MKL	[-2.284]	[-2.244]	[-1.907]	[-6.667]*	[-6.602]*	[-6.762]*
TOP	[-1.905]	[-1.793]	[-0.543]	[-5.452]*	[-5.362]*	[-5.506] *

* Denotes the significance at 5% level. T-statistics: []

5.2. Lag length criteria

The lag-length selection results indicate that one lag is the appropriate specification for the relationship between ASE development and the selected macroeconomic variables, as shown in Table (3).

Table 3: Lag Length Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-108.43	NA	1.96	6.19	6.45	**6.28**
1	70.49	290.16*	8.88e*	-1.54	0.29*	-0.90*
2	106.66	46.92	1.03e	-1.55*	1.85	-0.35

* Denotes the adequate lang length for each period

5.3. Johansen Cointegration test

In Table (4), the Trace and Max Eigen Value tests show at least one co-integration relationship. Therefore, the variables employed in the study are cointegrated over a long period. Based on these results, a vector error correction model (VECM) can be used to estimate the long-term relationship.

Table 4: Johansen Cointegration Test

Hypothesis	Eigenvalue	Trace Test			Max Eigen Value		
		T.stat	C.V	P.value	M.stat	C.V	P.value
None	**0.826**	158.459	**125.615**	*0.0001	**64.83**	**46.231**	*0.0002
At most1	**0.467**	93.629	**95.754**	**0.0694**	**38.501**	**40.078**	**0.0744**
At most2	**0.487**	55.128	**69.819**	**0.4137**	**24.7**	**33.877**	**0.4056**

* Rejection of the null hypothesis of no cointegration at 5 per cent significance level.

5.4. Normalized Cointegrating Coefficients

Table (5) shows the long-term cointegration coefficients for the variables. Almost all of the study variables have a positive impact on the Amman Financial Market's capitalization rate, except for the average real per capita income variable and the dummy variable, which indicated that the crisis of 1989 and the crisis of 2008 had a significant negative impact over time.

Based on the absolute value of (T-statistics), most independent variables in table (5) were statistically significant over the long run, except for foreign direct investment and trade openness.

Table 5: Cointegration Results

Normalized Cointegrating Coefficients (standard error in parentheses)					
LSAV	LFDI	LINC	MKL	TOP	SHIFT
0.2555	0.03223	-0.4518	1.8044	0.3155	-0.9902
(0.0603)	(0.0229)	(0.105)	(0.0824)	(0.2469)	(0.0944)
[4.2355]	[1.4086]	[-4.3032]	[21.897]	[1.2778]	[-10.485]

()Standard errors **&** [] T-statistics

Based on the normalized cointegrating vector, the long-run equation can be expressed as follows:

MKD = 0.2555LSAV + 0.0322LFDI − 0.4518LINC + 1.8044MKL + 0.3155TOP − 0.9902SHIFT

The long-run equation shows that, domestic savings, foreign direct investment, market liquidity, and trade openness all positively influence stockmarket development, while real income per capita and crisis-period

shocks negatively affect it. While domestic savings, real income per capita, market liquidity, and the crisis dummy are statistically significant, foreign direct investment and trade openness are not.

5.5. Vector Error Correction Model (VECM)

In Table 6, the error-correction coefficient is negative and statistically significant, confirming the existence of long-run equilibrium adjustment. Within one year, approximately 74% of deviations from the long-run equilibrium are corrected. The relatively high adjustment speed indicates that the Amman Stock Exchange responds quickly to disequilibrium caused by macroeconomic changes.

Domestic savings, foreign direct investment, real income per capita, and the crisis dummy do not show statistical significance in the short run. Short-run liquidity is negative, while short-run trade openness is positive. Based on these results, ASE short-run dynamics are primarily driven by liquidity conditions and external trade exposure, whereas long-run dynamics are more strongly linked with domestic savings, market liquidity, income, and crisis periods.

Table 6: VECM Results

CointEq1	D(LSAV(-1))	D(LFDI(-1))	D(LINC(-1))	D(MKL(-1))	D(TOP(-1))	D(SHIFT(-1)
-0.7407	0.1601	0.02084	-1.1106	-1.3312	1.6599	0.2896
-0.3342	-0.2467	-0.0527	-1.247	-0.4472	-0.6169	-0.1912
[-2.216]	[0.6490]	[0.3956]	[-0.8906]	[-2.9767]	[2.6907]	[1.5146]

()Standard errors **&** [] T-statistics

5.6. Granger Causality

According to appendix (1), there is a bidirectional causality between MKL and MKD, and between TOP and MKD, in addition to having a unidirectional causality from LINC to LFDI, and from MKD to LINC, and from LASV to TOP, all at 5% level.

5.7. Diagnostic Tests

Based on the residual diagnostic tests in Table (7), the model does not exhibit serial correlation or heteroskedasticity. As the reported probability values greater than 5%, the diagnostic results support the accuracy of the VECM specification.

Table 7: Residual Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test		Heteroskedasticity Test: White no cross term	
0.8096	Prob. Chi-Square	**0.2052**	Prob. Chi-Square

5.8. Variance Decomposition

As compared to foreign direct investment, the domestic saving, average real income per capita, trade openness, and market liquidity have a greater influence on market development.

Appendix (2) shows that, for the trade openness, the second period was the strongest to explain variability in the development of the ASE, as it reached 6.2%, then it decreased to reach 2.75 in the last period. Foreign direct investment didn't seem to have an explanatory significance through time. The dummy variable can explain up to 6.7% variability in the development at the last period, while saving variable is around 4%, and the real income is 3.3%.

5.9. Impulse Response Function

Appendix (3) indicates, one standard deviation shock in the independent variables leads to an increase in market development, with the exception of the local savings variable, which causes a decrease in market development

upon reaching the last time period. This points out the existence of long-term effect from the independent study variables to the development of the ASE.

6. Discussion of Results

Domestic savings have a positive relationship with ASE development in the long-run only. By increasing investment opportunities locally, domestic savings might support stock-market development over time.

Foreign direct investment is not statistically significant in either the short or long run, indicating that long-term foreign capital played a limited role in the ASE during the study period, particularly during times of financial instability.

Real income per capita has a negative long-run relationship with ASE development, contrary to expectations. One explanation is that income growth has gone toward consumption or non-financial assets, such as real estate, rather than stock market investments.

Market liquidity affects ASE development in a positive and significant way long-term, but in a negative way short-term, suggesting that liquidity may support stock market development over time, although short-run fluctuations may reflect speculative trading or market instability.

Short-run trade openness is statistically significant. Hence, external trade exposure may influence short-run market dynamics without necessarily affecting ASE development in the long run. Finally, the crisis dummy shows a negative and significant long-run relationship, proving that crises weakened stock markets.

7. Conclusion

Several macroeconomic variables were examined for their impact on the development of the Amman Stock Exchange over the period 1980-2018. As a measure of stock market development, the market capitalization ratio was used, as well as variables relating to domestic savings, foreign direct investment, real income per capita, market liquidity, trade openness, and crisis-period dummies. The study employed Johansen cointegration and VECM estimation.

Macroeconomic variables and ASE development have a long-run equilibrium relationship, according to the results. As shown by the normalized long-run equation, domestic savings and market liquidity are positively correlated with ASE development, whereas real income per capita and crisis-period shocks are negatively correlated. Trade openness and foreign direct investment are not statistically significant over time. Short-run, market liquidity and trade openness are statistically significant, while most other variables are not.

As a result of these findings, the development of the Amman Stock Exchange is not only dependent on attracting foreign investment but also on enhancing domestic savings, improving market liquidity, and ensuring macroeconomic stability. Thus, policymakers should increase local savings, improve the investment environment, encourage long-term capital inflows, and reduce stock market liquidity costs. As part of future reforms, the ASE should focus on deepening the market, diversifying listed firms, and improving investor confidence.

References

Al-Majali, A. A., & Al-Assaf, G. I. (2014). Long-Run and Short-Run Relationship Between Stock Market Index and Main Macroeconomic Variables Performance In Jordan. European Scientific Journal, 10(10).

Al-Tarawneh, A., & Al-Assaf, G. (2018). Macroeconomic Drivers of Stock Market Development: Evidence From Jordan. International Journal of Financial Research, 9(3), 117-124.

Barrios, S., Gorg, H., & Strobl, E. (2005). Foreign direct investment, competition and industrial development in the host country. European Economic Review, 49(7), 1761-1784.

Bekaert, G., Harvey, C., & Lundblad, C. (2005). Does Financial Liberalization Spur Growth? Journal of Financial Economics, 77(1), 3-55.

El-Nader, H. M., & Alraimony, A. D. (2013). The Macroeconomic Determinants of Stock Market Development in Jordan. International Journal of Economics and Finance, 5(6), 91-92.

El-Wassal, K. A. (2013). The Development of Stock Markets: In Search of a Theory. International Journal of Economics and Financial, 3(3), 606-624.

Evrim-Mandac, P., Aktan, B., Kurt-Gumuş, G., & Tvaronaviciene, M. (2013). Determinants of Stock Market Development: Evidence from Advanced and Emerging Markets in a Long Span. Business: Theory and Practice, 14(1), 51-56.

Garcia, V. F., & Liu, L. (1999). Macroeconomic Determinants of Stock Market Development. Journal of Applied Economics, 2(1), 29-59.

Ho, S. Y. (2017a). The Macroeconomic Determinants of Stock Market Development: Evidence from South Africa (MPRA Paper 76493). München: University Library of Munich.

Ho, S. Y. (2017b). The Macroeconomic Drivers of Stock Market Development: Evidence from Hong Kong. Unisa Economic Research Working Paper Series 16/2017.

Kurach, R. (2010). Stock market development in CEE countries—The panel data analysis. Ekonomika, 89(3), 20-29.

Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. Journal of Economic Literature, 35(2), 688-726.

Levine, R., & Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. The American Economic Review, 88(3), 537-558.

Mishal, Z. A. (2011). Financial Development and Economic Growth: Evidence from Jordan Economy. Journal of Business & Economic Studies, 17(2), 20-35.

Newbery, D. M., & Stiglitz, J. E. (1984). Pareto Inferior Trade. The Review of Economic Studies, 51(1), 1-12.

Rajan, R. G., & Zingales, L. (2003). The great reversals: the politics of financial development in the twentieth century. Journal of Financial Economics, 69, 5-50.

Şükrüoğlu, D., & Nalin, H. T. (2014). The Macroeconomic Determinants of Stock Market Development in Selected European Countries: Dynamic Panel Data Analysis. International Journal of Economics and Finance, 6(3), 65-71.

Yartey, C. A. (2010). The institutional and macroeconomic determinants of stock market development in emerging economies. Applied Financial Economics, 20(21), 1615-1625.

Appendix (1)

VECM Granger Causality/Block Exogeneity Wald Tests

Included Observations: 37							
Dependent variable: D(MKD)				**Dependent variable: D(LSAV)**			
Excluded	Chi-square	df	Prob.	Excluded	Chi-square	df	Prob.
D(LSAV)	0.4212	1	0.5163	D(MKD)	0.0093	1	0.9231
D(LFDI)	0.1565	1	0.6924	D(LFDI)	0.0092	1	0.9236
D(LINC)	0.7932	1	0.3731	D(LINC)	0.1076	1	0.7429
D(MKL)	8.8608	1	0.0029***	D(MKL)	0.8454	1	0.3579
D(TOP)	7.2397	1	0.0071***	D(TOP)	2.1068	1	0.1466
D(SHIFT)	2.2941	1	0.1299	D(SHIFT)	0.0027	1	0.9585
Dependent variable: D(FDI)				**Dependent variable: D(INC)**			
Excluded	Chi-square	df	Prob.	Excluded	Chi-square	df	Prob.

D(MKD)	0.0353	1	0.8509	D(MKD)	6.7933	1	0.0091***
D(LSAV)	0.0022	1	0.9225	D(LSAV)	3.6130	1	0.0573
D(LINC)	3.8615	1	0.0494**	D(LFDI)	0.9602	1	0.3271
D(MKL)	0.0661	1	0.7971	D(MKL)	0.5921	1	0.4416
D(TOP)	0.0481	1	0.8264	D(TOP)	0.0166	1	0.8974
D(SHIFT)	0.5358	1	0.4642	D(SHIFT)	4.1751	1	0.0410*
Dependent variable: D(MKL)				**Dependent variable: D(LTOP)**			
Excluded	Chi-square	df	Prob.	Excluded	Chi-square	df	Prob.
D(MKD)	10.5854	1	0.0011***	D(MKD)	13.5241	1	0.0002***
D(LSAV)	0.3662	1	0.4551	D(LSAV)	3.8915	1	0.0485**
D(LFDI)	0.3209	1	0.5711	D(LFDI)	1.1775	1	0.2779
D(LINC)	0.0078	1	0.9294	D(LINC)	7.5144	1	0.0061***
D(TOP)	6.4189	1	0.0113***	D(MKL)	8.0717	1	0.0045***
D(SHIFT)	0.1514	1	0.6972	D(SHIFT)	2.2730	1	0.1316
Dependent variable: D(SHIFT)							
Excluded	Chi-square	df	Prob.				
D(MKD)	1.6588	1	0.1978				
D(LSAV)	0.8754	1	0.3495				
D(LFDI)	0.0674	1	0.7951				
D(LINC)	0.2294	1	0.6320				
D(MKL)	0.3643	1	0.5461				

D(TOP)	0.3314	1	0.5648

* Denotes significance at 5 per cent level.

Appendix (2)

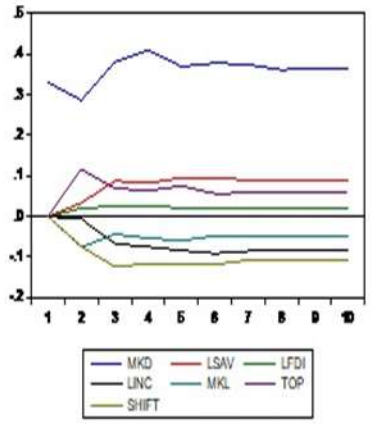
Variance Decomposition Results

period	**S.E.**	**MKD**	**LSAV**	**LFDI**	**LINC**	**MKL**	**TOP**	**SHIFT**
1	0.3300	100.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.4658	87.94	0.4970	0.1874	0.019	2.6435	6.1575	2.5551
3	0.6303	84.58	2.2072	0.2634	1.1600	1.9277	4.5653	5.2971
4	0.7741	84.15	2.5906	0.2870	1.7170	1.7613	3.7023	5.7943
5	0.8805	82.67	3.1490	0.2798	2.2468	1.8232	3.5827	6.2500
6	0.9776	82.03	3.5235	0.2729	2.6902	1.7183	3.2372	6.5300
7	1.0624	81.84	3.6861	0.2649	2.9268	1.6835	3.0329	6.5640
8	1.1370	81.53	3.8456	0.2583	3.1070	1.6753	2.9389	6.6407
9	1.2084	81.41	3.9481	0.2540	3.2373	1.6441	2.8229	6.6852
10	1.2753	81.33	4.0144	0.2505	3.3236	1.6324	2.7502	6.7037

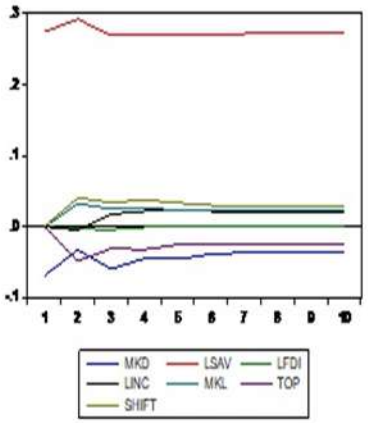
Appendix (3)

Impulse Response Function Results

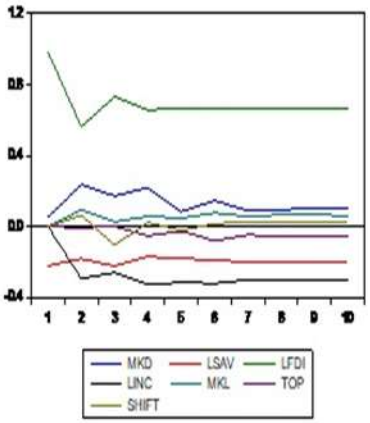
Response of MKD to Cholesky
One S.D. Innovations



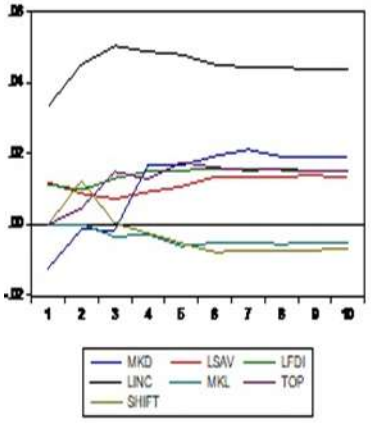
Response of LSAV to Cholesky
One S.D. Innovations



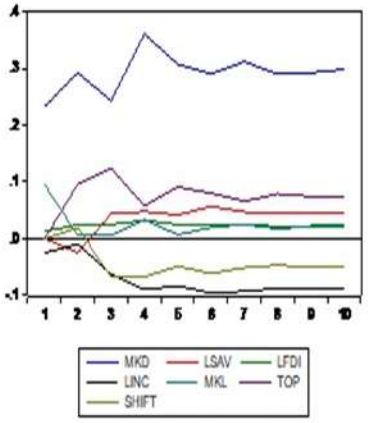
Response of LFDI to Cholesky
One S.D. Innovations



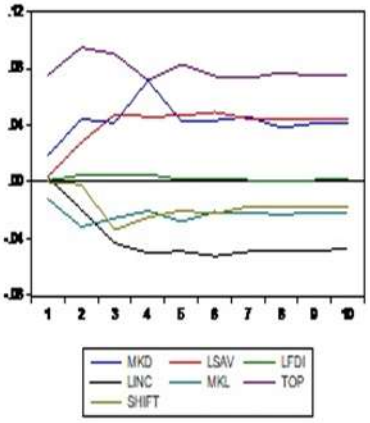
Response of LINC to Cholesky
One S.D. Innovations



Response of MKL to Cholesky
One S.D. Innovations



Response of TOP to Cholesky
One S.D. Innovations



Response of SHIFT to Cholesky
One S.D. Innovations