REVISITING THE ARBITRAGE PRICING THEORY (APT) IN THE NIGERIAN STOCK MARKET: A STRUCTURAL VAR APPROACH

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The focus of this study is to assess the APT in the Nigerian environment using Structural VAR approach. The nature of this study necessitates the use of a time–series research design and an extensive reliance on secondary data. The data which include selected macroeconomic variables were sourced from the Central Bank of Nigeria (CBN) statistical bulletins, for the period 1980-2012. The method of data analysis utilized in the study involves several econometric applications often used in most contemporary economic time-series studies. First, the unit root test is applied to examine the stationarity condition of the variables in a time–series analysis. Next, we conducted the VAR estimation, while the impulse response and variance decomposition followed. The results obtained in the empirical analysis suggest certain policy direction issues. First, Money supply and interest rate shocks are not unstable in their effects on stock prices and hence cannot cause destabilisation in the stock market. Second, the all share price index does not also react immediately to government expenditure shocks. Finally, money supply and interest rates shocks tend to have a stronger effect on stock prices than government expenditure shocks.

Key words: Arbitrage Pricing Theory, Macroeconomic Variables, SVAR and Nigerian Stock Market

INTRODUCTION

An important subject in capital market-based research has been the behaviour of stock returns especially the forces that influence the stock returns. Stock returns and indeed asset prices in general are commonly believed to respond to information about economic fundamentals. There are reasons to suspect that individual stock prices are influenced by a wide variety of unanticipated events and that some events have a more pervasive effect on asset prices than do others. (Chen et al., 1986). Thus there has been some level of curiosity about what could explain considerably the pattern of stock market returns.

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Retrospectively, the one-factor capital asset pricing models (CAPM) is seen in certain quarters as the dominant asset pricing model. However, the single factor assumption of the CAMP is often be cited to be its underlying weakness. The Arbitrage pricing theory (APT) model as formulated by Ross (1976) rests on the assumption that stock price is influenced by limited and non-correlated common factors and by a specific factor totally independent of the other factors. According to Morel (2001), by using the arbitrage reasoning, it can be shown that the risk associated with holding a particular security comes from two sources. The first source of risk is the macroeconomic factors that affect all securities. The whole asset market is influenced by these factors and cannot be diversified away. The second source of risk is the idiosyncratic element. This element is unique to each security and according to the APT, in a broadly diversified portfolio, it can be diversified away. The APT comes from an entirely different set of assumptions as it is not primarily concerned about the efficiency of portfolios. Instead, it starts by establishing a line of causality between each equity's return and the prevailing and pervasive macroeconomic influences as well as partly on random disturbances. Azeez and Yonezawa (2003) are of the opinion that the primary advantages of using macroeconomic factors is that firstly, the factors and their APT prices in principle can be given economic interpretations, and secondly rather than only using asset-prices to explain asset-prices, observed macroeconomic factors introduce additional information, linking asset-price behaviour to macroeconomic events. However, the research findings with regards to the suitability of the APT in explaining stock returns have indicated conflicting results across countries.

Specifically, developing economies have not provided adequate research findings. Furthermore there are also divergences with regards to which of the macroeconomic variables exert significant influence on stock returns (Humpe and Macmillan 2007; Nishat and Shaheen 2004; Maghayereh 2002; Al-Sharkas 2004). Thus this study addresses the need and thus fills the void of empirical evidence on the suitability of the APT in developing economies. There are several reasons why the Nigerian stock market is a good ground to examine the impact of the APT. Firstly, the Nigerian stock market provide a great possibility to test existing asset pricing models and pricing anomalies in special conditions of evolving markets. Second, in the light of evolving synergies between equity markets due to enhanced capital movements, it is interesting to test the extent macroeconomic fundamentals can be used as a basis for portfolio investments in the market. A related question in this respect is whether investors in this market react to news or unexpected changes in macro-economic conditions. The study adopts the

Structural VAR approach as it has been credited as the best way to discover what dynamic relations exist between multivariate series (Dungey & Pagan, 2008). The study hypothesizes that the APT macro-economic variables exerts considerable influence on stock price returns in the Nigerian Capital market.

LITERATURE REVIEW

Javed and Akhtar (2012) investigated the risk-return relationship between money supply, interest rate and term structure with stock returns of fifty (50) firms listed on the Karachi Stock Exchange in Pakistan for the period July, 1998 to December, 2008.The study which employed the Generalized autoregressive conditional Heteroscedasticity (GARCH) model demonstrates, among others, that money supply positively affects stock returns. The findings also show that the sensitivity co-efficient of term structure of interest rate is negative implying that term structure adversely affects stock returns.

Dewan (2012) in his study of econometric analysis in Bangladesh, investigated the effect of monetary policy variables on its stock market using monthly data from January 2006 to July 2012. The variables used in the study are DSE index, money supply, repo rate, inflation rate, 3 month treasury bill using econometric analysis such as co-integration, error correction model and the granger causality. He found that, money supply, inflation and treasury bill rate have a positive impact while repo rate has a negative impact on the market index.

Ardagna (2009) reports that adjustments based on expenditure reduction are related with increases in stock market prices. Darrat (1990) in his examination of the effect of fiscal policies on shares in Canada concludes that budget deficits determine share returns but did not ascertain whether it is positive, negative or ambiguous.

The empirical findings from literature have not led to any consensus as to what factors adequate impact on stock price movements. In addition, comparisons on the dynamics of macroeconomic influences in order to draw inferences on the relative adequacy of the APT variables appear insufficient.

METHODOLOGY

The nature of this study necessitates the use of a time–series research design and an extensive reliance on secondary data. The data which include selected macroeconomic

variables were sourced from the Central Bank of Nigeria (CBN) statistical bulletins, for the period 1980-2012. The method of data analysis utilized in the study involves several econometric applications often used in most contemporary economic time-series studies. First, the unit root test is applied to examine the stationarity condition of the variables in a time–series analysis. In this study we adopt the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) statistics to test for stationarity of the data. Next, we conduct the VAR estimation and then the impulse response and variance decomposition follows.

Model Specification

Since the early eighties, VAR models have become the standard tool to analyse macroeconomic policies and are found to be more successful in predicting economic relationships than the complex structural macro econometric models (Bahovec & Erjavec, 2009). The Vector Autoregressive Model can be expressed as,

$$A_O y_t = a_o \sum_{i=1}^{p} A_i y_{t-1} + e_t \quad \text{.....(1)}$$

Accordingly the baseline VAR model with p lags VAR(P) is specified in its reduced form as:

$$Y_t = a_0 + a_1(t) + A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_p Y_{t-p} + e_t \quad \text{.....(2)}$$

where a_0 is the $(k \times 1)$ vector of constants; a_1 (t) is a $(k \times 1)$ vector of linear time trend; t=1,…T; A_i are (k x k) coefficient matrices, K being the number of endogenous variables in the system and $Y_t = (MS, INT, \frac{GEXP}{GDP}, e)$ is the vector of endogenous variables. The K x 1 vector $e_t = (e_t^{asindex}, e_t^{ints}, e_t^{gexp},)$ consists of reduced form residuals ordered with their corresponding observed endogenous variables in vector Y_t. Furthermore, each residual is a mean zero white noise process that is serially uncorrelated, i.e., $e_t \sim N(0, \varepsilon_\mu)$. In order to get the reduced form of our structural model (2) we multiply both sides with A_0^{-1} such as that:

$$y_t = a_o \sum_{i=1}^{p} B_i y_{t-1} + e_t \quad \text{.....(3)}$$

where, $\mathbf{a}_0 = \mathbf{A}_0^{-1}\mathbf{c}_0$, $\mathbf{B}_i = \mathbf{A}_0^{-1}\mathbf{A}_i$, and $\mathbf{e}_t = \mathbf{A}_0^{-1}\boldsymbol{\varepsilon}_t$, i.e. $\boldsymbol{\varepsilon}_t = \mathbf{A}_0\mathbf{e}_t$. The reduced form errors $\mathbf{e}_t$ are linear combinations of the structural errors $\boldsymbol{\varepsilon}_t$, with a covariance matrix of the form $E[\mathbf{e}_t\mathbf{e}_t'] = \mathbf{A}_0^{-1}\mathbf{D}\mathbf{A}_0^{-1'}$.

The structural disturbances can be derived by imposing suitable restrictions on $\mathbf{A}_0$. The short-run restrictions that are applied in this model as the following:

$$\begin{bmatrix} \varepsilon_t^{gexp} \\ \varepsilon_t^{ms} \\ \varepsilon_t^{int} \\ \varepsilon_t^{asindex} \end{bmatrix} = \begin{bmatrix} \alpha_{11} & 0 & 0 & 0 & 0 \\ \alpha_{21} & \alpha_{22} & 0 & 0 & 0 \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & 0 & 0 \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & \alpha_{44} \end{bmatrix} X \begin{bmatrix} e_t^{gexp} \\ e_t^{ms} \\ e_t^{int} \\ e_t^{asindex} \end{bmatrix}$$

Where;

($\varepsilon_t^{Asindex}$ ε_t^{gexp}, , ε_t^{ms}, ε_t^{int}) denote the shocks in All share index used as proxy for stock market performance, Government Expenditure-GDP ratio, money supply and interest rate respectively. Furthermore, ($e_t^{asindex}$ e_t^{ms}, e_t^{intr}, e_t^{gexp}) consists of reduced form residuals ordered with their corresponding observed endogenous variables in vector Y_t.

Thus, in the same spirit with Bjornland and Leitemo (2009), the restrictions in our model can be explained, as follows: stock market performance measured by the All share index react contemporaneously to money supply and Government expenditures shocks (Kim and Roubini, 2000; Afonso and Sousa, 2011).Interest rates are influenced contemporaneously by Government expenditure shock and the money supply shock (Sims and Zha, 2006; Kim and Roubini, 2000; Elbourne, 2008).Finally, capital market performance is influenced contemporaneously by all variables (Bjornland, 2008). Our restrictions and indentication of the VAR model is based on the recursive approach using Cholesky decomposition that decomposes a given positive definite matrix. The recursive approach implies causal ordering. Altering the order implicitly changes the relationship structure of innovations. Cholesky decomposition requires the variables to be ordered in a particular fashion, where variables placed higher in the ordering have contemporaneous impact on the variables which are lower in the ordering, but the variables lower in the ordering do not have contemporaneous impact on the variables those are higher in the ordering. Variance decompositions (VDCs) and impulse response functions (IRFs) derived from vector

autoregression (VARs) approach are also used.

PRESENTATION AND ANALYSIS OF RESULT

Table 4.1: Correlation Result

	ASINDEX	INT	GEXP	MS
ASINDEX	1			
INT	0.420722	1		
GEXP	0.295218	0.331172	1	
MS	0.921798	0.19058	0.283733	1

Source: Researchers Compilation (2014)

From table 4.1 above, the correlation coefficients of the variables are examined. However of particular interest to the study is the correlation of the variables with the all share price index. As observed, a positive correlation exists between All Share index and interest rate (r=0.420). A positive correlation is observed between All Share index and Government expenditure-GDP ratio (r=0.012) and finally money supply and appears to have the strongest correlation (r=0.922) with All share index. The correlations amongst the explanatory variable are quite within limits and do not raise serious suspicions about multicollinearity. Nevertheless, the variance inflation factor (VIF) test is conducted to ascertain the multicollinerity status of the variables.

Table 4.2 Variance Inflation Factor Test

Variable	Coefficeint Variance	Centered VIF
INT	753.5774	1.229958
GEXP	387.3119	1.199542
MS	4.69E-09	1.860185

Source: Researchers Compilation (2014)

Table 4.2 shows the result for the variance inflation factor (VIF) which indicates how much of the variance of a coefficient estimate of a regressor has been inflated due to collinearity with the other regressors. Basically, VIFs above 10 are seen as a cause of concern (Landau and Everitt, 2003). As observed, none of the variables have VIF's values exceeding 10 and hence none gave serious indication of multicollinearity.

Unit root test

Generally, unit root test involves the test of stationarity for the variables used in the regression analysis. The augmented Dicky Fuller (ADF) test is employed in order to analyse the unit roots.

Table 4.3 Unit Root Test Results

Unit root test at levels			
Variable	ADFTest Statistic	95% Critcal ADF Value	Remark
ASINDEX	-0.6238	-2.96	Non-stationary
MS	-2.106	-2.96	''
INTR	-3.092	-2.96	Stationary
GEXP/GDP	-1.728	-2.96	Non-stationary
Unit root test at 1st difference			
Variable	ADF-Test Statistic	95% Critcal ADF Value	Remark
ASINDEX	-4.419	-2.96	Stationary
MS	-20.408	-2.96	''
INTR	-5.918	-2.96	''
GEXP/GDP	-6.664	-2.96	''

Source: Source: Researchers' Compilation (2014)

Table 4.3 presents the results of the ADF test in levels without taking into consideration the trend of the variables. The reason for this is that an explicit test of the trending pattern of the time series has not been carried out. The result indicates that all of the variables at levels, have ADF values that are less than the 95% critical ADF value of 2.96 except for INTR. Moving forward, we take the first differences of the respective variables and perform the unit root test on each of the resultant time series. The result of the unit root test on these variables in first differencing shows that the ADF values in absolute terms is greater than the 95% critical ADF values. With these result, these variables are adjudged to be stationary.

4.2. Lag length Selection

To obtain a reasonable conclusion, the selection of lag length is a key determinant factor to establish the appropriate VAR model. According to the criteria selection output in Table 4.4, different lag lengths are indicated for each county. A lag length of 4 is used as

the optimal lag length since it has the highest value of likelihood ratio (LR) LR and lowest information criteria (IC)

Table 4.4: Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-904.835	NA	1.15E+22	64.98824	65.22613	65.06097
1	-776.31	201.968	7.33E+18	57.59359	59.02095	58.02995
2	-760.112	19.66982	1.66E+19	58.22226	60.83909	59.02225
3	-714.543	39.05914	6.68E+18	56.75304	60.55934	57.91667
4	-602.941	55.80060*	5.85e+16*	50.56724*	55.56301*	52.09450*

Source: Researchers' Compilation (2014)

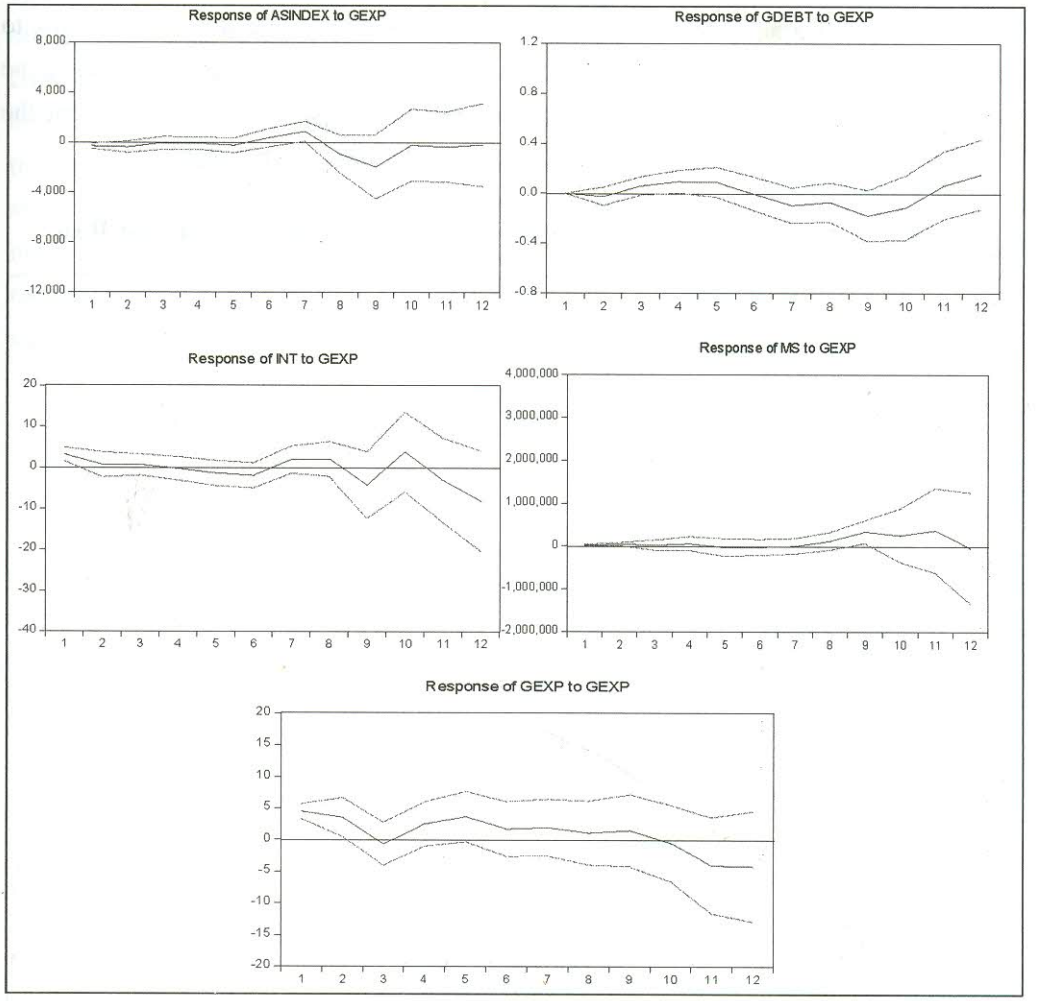
* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

4.2 Impulse Response Functions

The impulse responses show the path of all share price index when there are innovations in the macro-economic policy variables. The figures below show four panels of impulse response graphs indicating how innovations in policy variables affect stock prices over a period of 12 quarters. The analysis is presented below;

Table 4.5: Responses of One standard Deviation Shocks to Government Expenditure

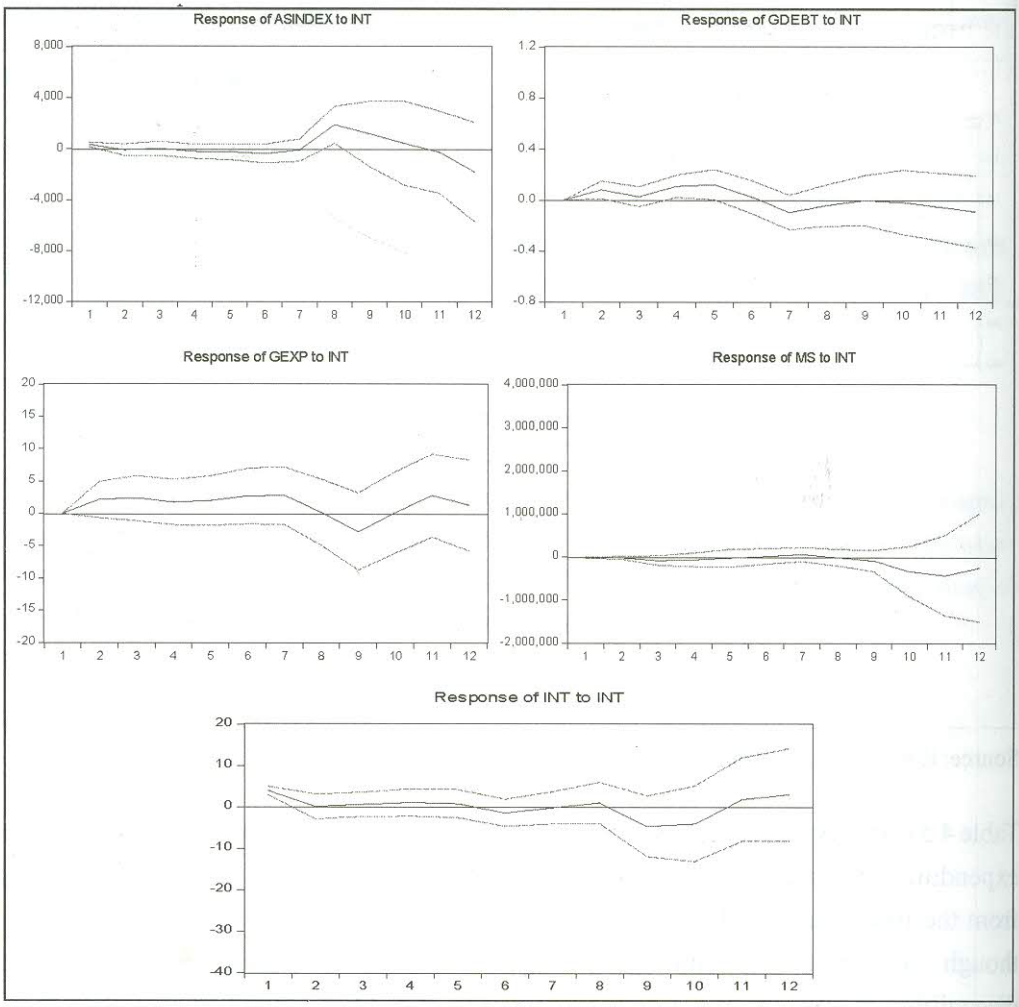


Source: Researchers' Compilation (2014)

Table 4.5 displays the responses of all variables in the VAR to innovations in government expenditure. As observed, All share index used appears to maintain it stability beginning from the first quarter and even up to the six quarter. Afterwards, it fluctuates slightly though non-negatively until the 11th quarter where it begins to slide towards disequilibrium. We observe a delayed response of market capitalization to shocks in government expenditure and the tendency for asymptotic disequilibrium. With respect to interest rates, the fluctuations observed resulting from government expenditure shocks

seem to be quite benign up till the sixth quarter. Indicating that interest rates do not react immediately to government expenditure shocks but with a significant lag. The sensitivity of interest rate appears to be slightly heightened from the seventh quarter leading the path eventually towards disequilibrium. Money supply in appears to be stable in response to government expenditure shocks from the first and down to the eighth quarter. Finally, the persistence of government expenditure which shows the pattern of development the variable within a protracted period caused by a shock to itself is fairly stable.

Table 4.6: Responses of One Standard Deviation Shocks to Interest Rate

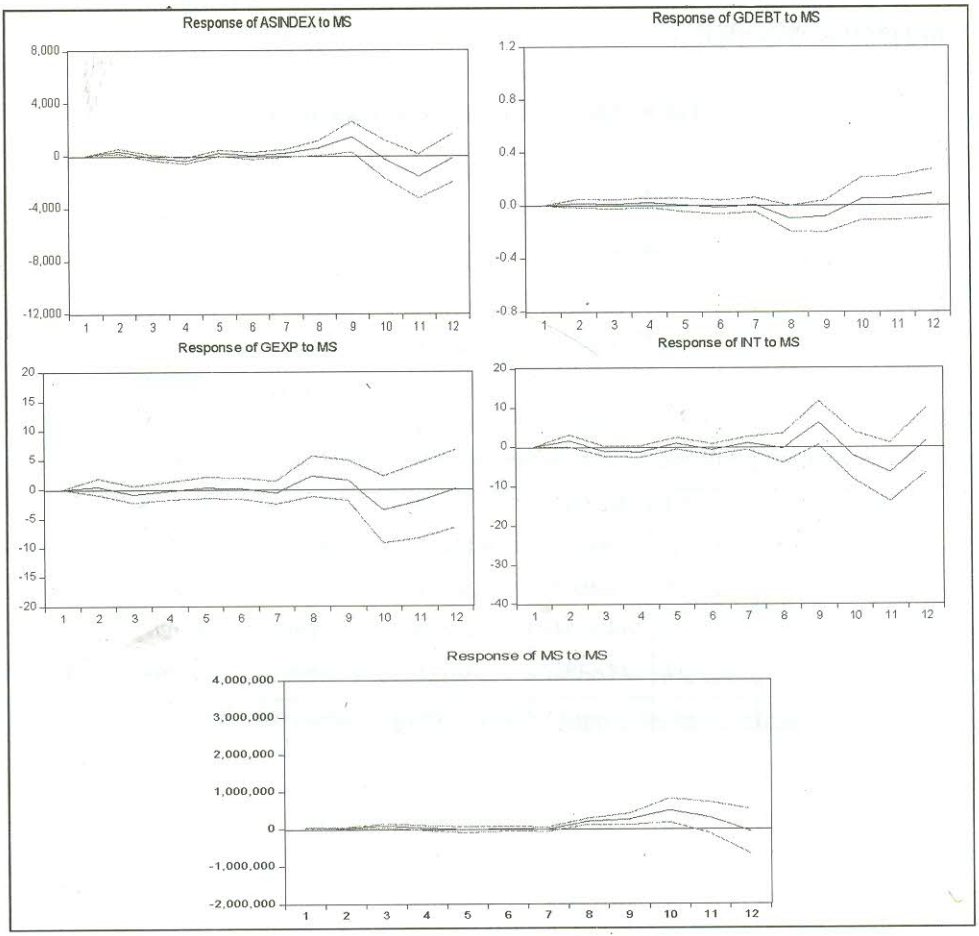


Source: Researchers' Compilation (2014)

Table 4.6 displays the responses of all variables in the VAR to innovations in interest rate. As observed, innovations in interest rates leave the time path of all-share index

largely stable beginning from the first quarter up to the eight quarter. Afterwards, it slides downwards and then rises again at the eleventh quarter with fluctuations that appear to be quite benign. Clearly, there is a delay in the response of share price index to interest rate shocks and when it does react, the response do not appear to be very strong. Government expenditure shows a sustained rise from the on-set to interest rate shocks until the eight quarter when it tends downwards and rises immediately. Despite this, the time path remains largely stable. We also consider the responses of money supply to shocks Interest rates. The time path of money supply appears very much stable until the ninth quarter where it exhibits some response fluctuating slightly (negatively). Finally, the persistence of interest rate shocks which shows the pattern of development of the variable within a protracted period caused by a shock to itself is fairly stable.

Table 4.7: Responses Of One Standard Deviation Shocks to Money Supply



Source: Researchers' Compilation (2014)

Table 4.7 displays the responses of all variables in the VAR to innovations in money supply. As observed, all share index appears to maintain it stability beginning from the first quarter up to the seventh quarter. Afterwards, it oscillates slightly about its natural path eventually maintain asymptotic stability over the horizon. This suggest hat share prices index does not react immediately to Money supply shocks but with a significant lag and response is not strong such as to be able to distort the time path from equilibrium over time. We also consider the responses of government expenditure to shocks in money supply. The response is quite steady with minor fluctuations which do not seem to pose significant threats to the stability of the time path and this holds over all quarters. With respect to interest rates, the time path observed resulting from money supply shocks seem to also be quite stable with minor fluctuations occurring up to the eight quarter and then more relatively intense fluctuations over the remaining period. Finally, the persistence of money supply which shows the pattern of development the variable within a protracted period caused by a shock to itself is fairly stable.

Table 4.8: Variance Decomposition

	Period	S.E.	$\varepsilon_t^{asindex}$	ε_t^{gexp}	ε_t^{ms}	ε_t^{int}
VD OF ASINDEX	1	655.8994	23.25968	11.36562	25.93068	16.7428
	3	1055.065	20.78622	6.229071	10.60836	40.81664
	6	1646.891	24.6888	13.76935	12.6965	32.13057
	9	5552.718	14.83323	3.145434	17.21475	45.58629
	12	8068.812	27.60305	8.572107	13.63532	40.73479
VD OF GEXP	1	5.172475	0	0	0	0
	3	7.682558	0.130554	7.787968	29.1159	3.175474
	6	10.36046	3.506215	5.999737	24.78772	4.131745
	9	13.81448	8.212804	4.786093	29.21285	21.54789
	12	18.44922	18.3956	8.936052	22.07864	29.54775
VD OF INT	1	5.462768	0	3.323145	85.45983	0
	3	6.372917	6.976406	6.214788	71.43297	6.621391
	6	7.993298	9.916942	6.001342	57.83543	16.49757
	9	18.55384	12.39981	2.746393	25.43455	32.28826
	12	26.80052	26.22916	8.618362	17.74382	33.76245

VD OF MS	1	64122.6	0	11.11928	5.213372	82.87743
	3	326843	18.04398	2.163416	12.83831	56.34247
	6	473064.3	25.19171	6.322194	13.15851	43.17795
	9	1132468	20.1322	2.568321	23.2531	49.13273
	12	3033894	24.56275	6.898619	14.76027	42.8843

Source: Researchers' Compilation (2014)

In evaluating the variance decomposition result in table 4.8, we are particularly interested in the forecast error variance in the all share price index. The variance decomposition shows that in the first quarter 23.259 % of the forecast error variance in all share price index is explained by the shock in itself declining by 2.473% to explain 20.786% in the third quarter and rising by 3.90% to explain 24.688% of forecast error variance in the sixth quarter. It declines further in the ninth quarter and then eventually pushing up to 27.60% in the twelvth quarter. This confirms that all share price index shocks are highly dependent on other shocks in the economy. As shown in table 4.8 above, government expenditure shocks explain about 22.70% of the forecast errors of all share price index in one quarter and then declines by 1.142% to explain 21.559 % of the error variance in all share price index in the third quarter. From third quarter, it declines by 4.844% to explain 16.714% in the sixth quarter and 19.22% in ninth quarter and 9.455% in the twelfth quarter respectively. From the variance decomposition evaluation, we find that shocks in government expenditure exert some influence on forecast errors of all share price and this suggest that government expenditure may not be neutral in its effect on stock prices. Interest rate shocks explain about 25.93% of the forecast errors of all share price index in one quarter and then declines by 15.32% to explain 10.608 % of the error variance i in the third quarter. From third quarter, it rises by 2.088% to explain 12.6965% in the sixth quarter. In the ninth and twelvth quarter interest rate variable explains 17.214% and 13.635% % of the forecast errors of all share price index in respectively. Money supply shocks explains about 16.743% of the forecast errors of all share price index in the first quarter and then rises to 40.8166% in the third quarter. From third quarter, it declined by 8.68607% to explain 32.13057% in the sixth quarter. In the ninth and twelvth quarter money supply variable explains 45.586% and 40.735% % of the forecast errors of market capitalization respectively.

CONCLUSION AND POLICY IMPLICATIONS

An attempt has been made in this paper to revisit the Arbitrage pricing theory in the Nigerian stock market using the Structural VAR approach. The results obtained in the

empirical analysis above are quite interesting and suggest certain policy direction issues. First, the result revealed that both money supply and interest rates impact on the all share price index. The very strong correlation between market capitalization and money supply suggests that the coordination of monetary policy will be important in stimulating stock market returns. Second, money supply and interest rate shocks are not unstable in their effects on stock market and hence cannot cause destabilisation in the stock market. This suggests that monetary policy moves may not have adverse effects on the market and the long-run stability of the market would not be threatened. Third, share price index does not react immediately to money supply shocks but with a significant lag. Although this is not the case for interest rate shocks. Fourthly, the all share price index does not also react immediately to government expenditure shocks. Finally, money supply and interest rates shocks tend to have a stronger effect on stock market performance than government expenditure shocks. This suggests that there is the need for effective fiscal policy coordination and increased efficiency of institutions that are expected to facilitate the fiscal policy execution.

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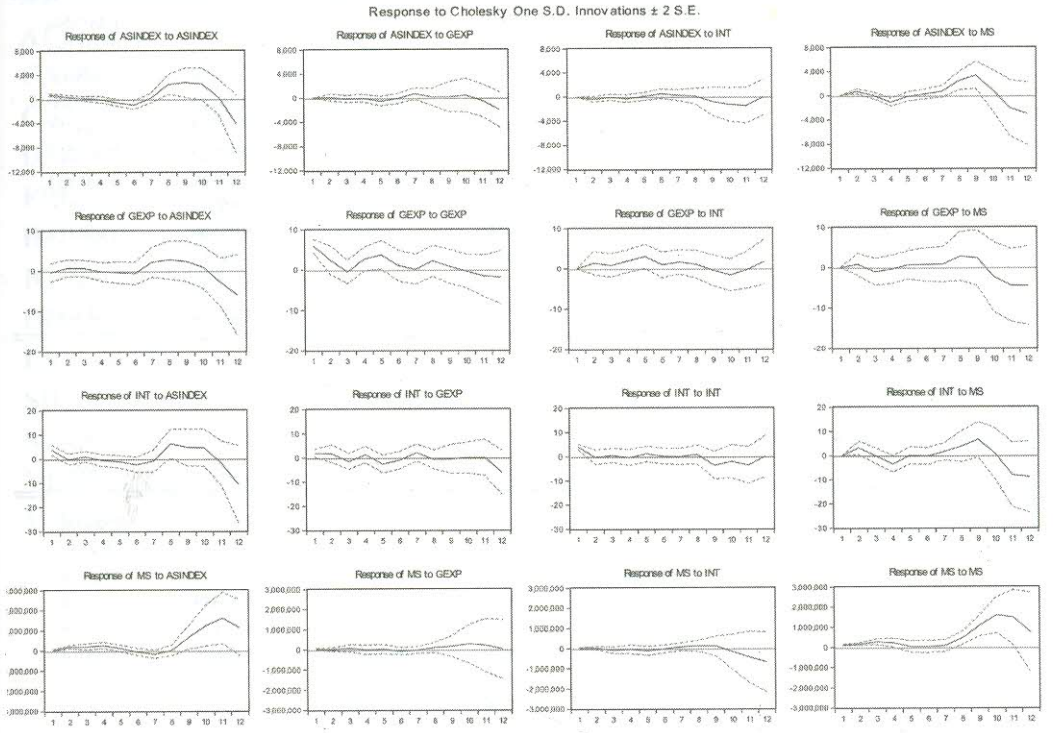
ANNEXTURE

ANNEXTURE 1



ANNEXTURE 2

Variance Decomposition of ASINDEX:

Period	S.E.	ASINDEX	GEXP	INT	MS
1	775.3077	100.0000	0.000000	0.000000	0.000000
2	1161.412	52.33701	0.984154	10.98740	35.69143
3	1176.887	51.86667	2.134533	11.15605	34.84275
4	1617.951	27.46429	1.137829	9.196229	62.20165
5	1801.207	32.54573	9.110728	7.606793	50.73675
6	2125.811	44.13391	6.727986	11.00605	38.13205
7	2361.938	36.38355	14.24054	10.05810	39.31782
8	4190.497	44.44668	4.671062	3.247736	47.63452
9	6088.511	41.10372	2.298985	3.208178	53.38912
10	6764.703	46.69598	2.287743	6.352561	44.66372
11	7243.806	40.83415	2.406222	9.558070	47.20156
12	9081.508	46.78659	6.238764	6.085830	40.88882

ANNEXTURE 3

Variance Decomposition of GEXP:

Period	S.E.	ASINDEX	GEXP	INT	MS
1	6.020794	0.440268	99.55973	0.000000	0.000000
2	6.730326	1.523054	92.85717	4.171191	1.448586
3	6.912979	2.481237	88.54461	5.276145	3.698003
4	7.689774	2.075644	84.19156	10.46205	3.270750
5	9.088469	1.624937	76.86824	18.65861	2.848216
6	9.243788	1.977984	75.64062	19.07917	3.302226
7	9.673033	6.949327	69.09513	20.27269	3.682853
8	10.71886	12.19671	60.56658	17.50245	9.734256
9	11.27323	15.49346	55.28029	15.98500	13.24124
10	11.66626	15.00857	51.71777	16.78333	16.49032
11	12.88105	16.89236	43.85602	13.81347	25.43814
12	15.13511	28.08437	33.37179	11.28142	27.26242

ANNEXTURE 4

Variance Decomposition of INT:

Period	S.E.	ASINDEX	GEXP	INT	MS
1	5.926307	40.96848	11.02257	48.00895	0.000000
2	6.952320	29.83515	14.66675	35.00419	20.49392
3	7.180378	29.51990	17.85255	33.33710	19.29044
4	8.130771	23.48166	16.73417	26.26649	33.51768
5	8.684761	22.17028	23.70383	24.73121	29.39468
6	9.078841	27.40094	22.93062	22.66696	27.00147
7	9.500467	25.85663	25.82879	20.70289	27.61169
8	12.02541	43.22890	16.49488	13.44239	26.83382
9	15.00120	37.82486	10.73712	14.72171	36.71631
10	15.81811	42.19997	9.657085	14.97933	33.16362
11	18.21227	32.86585	7.286627	15.21133	44.63619
12	23.72778	39.69125	11.07337	8.961997	40.27338

ANNEXTURE 4

Variance Decomposition of MS:

Period	S.E.	ASINDEX	GEXP	INT	MS
1	119766.2	0.531970	2.538797	0.433705	96.49553
2	276738.6	48.93992	0.585271	0.303287	50.17152
3	452109.1	37.26703	2.310836	4.121715	56.30042
4	563716.6	44.38354	1.534571	3.412378	50.66952
5	590598.7	44.16147	1.472369	7.974929	46.39123
6	600937.7	43.75508	3.274925	7.947976	45.02202
7	635957.2	46.45656	3.121373	8.611880	41.81018
8	805299.8	28.99226	3.363942	7.387973	60.25582
9	1505934.	27.17090	2.076367	2.667432	68.08530
10	2540402.	33.02604	1.909381	1.442053	63.62253
11	3387404.	41.27419	1.428671	2.538267	54.75888
12	3708637.	43.66209	1.192838	5.517324	49.62775

Cholesky Ordering: ASINDEX GEXP INT MS

LIST OF ABBREVIATIONS

ADF: Augmented Dicky Fuller
AIC: Akaike Information Criterion
APT: Arbitrage Pricing Theory
CAMP: Capital Asset Pricing Models
CBN: Central Bank of Nigeria
DSE: Dhaka Stock Exchange
FPE: Final Prediction Error
HQ: Hannan-Quinn
IC: Information Criteria
IRF: Impulse Response Function
LR: Likelihood Ratio
SIC: Schwarz Information Criterion,
SVAR: Structural Vector Autoregression
VDC: Variance Decomposition
VIF: Variance Inflation Factor