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An Empirical Study on the Relationship between Stock Market Index and the National Economy Growth: the Case of Jordan

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Abstract
This paper investigates the causal relationship between stock market development and economic growth for Jordan for the period 2000-2012 using a Vector Error Correction Model (VECM). The purpose of this paper is to examine the relationship between ASE market index and Jordan's national economic development (Real GDP). Researchers applied Johansen co-integration analysis based on classical unit roots tests. The results of Granger causality tests indicated that there is a unidirectional causality between stock market development and economic growth with direction from stock market development to economic growth. Granger Co integration indicated that all t-statistics were significant which indicates that variables have long-term relationship. Unit root test showed that all sector indexes have non-standing existence; while GARCH-M revealed that research hypotheses have mixed results and were not exclusively rejected.
Keywords: Stock market; Economic growth; VAR model; Granger causality.
JEL Cods : F43 ,C52 ,D30 ,H56.

1-Introduction:

Stock market development has been the main topic of intensive theoretical and empirical studies (Levine R, Zervos S, 1998).Theory suggests that structural changes in fundamentals are associated with the changes in the behavior of stock markets, since stock prices theoretically reflect expectations of future dividends, interest rates and risk premia, which in turn depend on macroeconomic conditions. It follows that both first and second moments of stock returns should be affected during the process of transition and integration of these economies to the extent that it affects fundamentals (Morana and Beltratti, 2002).Lately, the emphasis has increasingly shifted to stock market indexes and the effect of stock market on economic development. Stock market contributes to the mobilizing of domestic saving by enhancing the set of financial instruments available to savers to diversify their portfolios providing an important source of investment capital at relatively low cost. An important aspect through which stock market development may influence economic growth is risk diversification. Obstfeld suggests that international risk sharing through internationally integrated stock markets improves the allocation of resources and accelerates the process of economic growth(Obstfeld M, 1994).Fama and Schwert claim that there are three explanations for the strong link between stock prices and real economic activity: “First, information about future real activity may be reflected in stock prices well before it occurs ,this is essentially the notion that stock prices are a leading indicator for the well-being of the economy. Second, changes in discount rates may affect stock prices and real investment similarly, but the output from real investment does not appear for some time after it is made. Third, changes in stock prices lead to changes in wealth, and this can affect the demand for consumption and investment in goods(Fama E,and Schwert W, 1990).Empirical investigations of the link between financial development in general and stock markets in particular and growth have been relatively limited. A number of subsequent studies have adopted used the growth regression framework in which the average growth rate in per capita output across countries is regressed on a set of variables controlling for initial conditions and country characteristics as well as measures of financial market development(Atje and Jovanovic ,1993), Levine and Zervos (1996), and Levine and Zervos (1998) among others).All of these studies face a number of potential problems. In particular, they must deal with issues of causality and unmeasured cross country heterogeneity in factors such as savings rates that may cause both higher growth rates and greater financial sector development (Caselli et. Al,1996).The main objective of this study is to investigate the causal nexus between stock market performance and economic growth and to find the short-run and long-run dynamics of the variables by considering both monthly and quarterly data on Amman Stock Market general index as well as the indexes of banks,insurance,services and industrial sectors for the period 2000-2012.

2-Literature Preview:

The relationship between financial development and economic growth has been extensively studied in last few decades. The relationship between financial sector development and economic growth has been discussed and empirically tested by Goldsmith (1969) in his work by using the cross country data, where he indicated the relationship between financial development and growth. The growth of total economic volume induces more capital running into the stock market for good fortune; with the support of the capital invested in the stock market, it is reasonable for investors to believe that the stock index will rise continually (Men,M.,& Li,R.,2006).The financial system plays an important role in full-filling the needs of investors by mobilizing funds and transforming them into an asset In such a way that, an efficient financial system allocates the resources efficiently through its financial intermediaries, which eventually identify the most productive investment opportunities.(Ndikumana, 2001). Evolution of stock market has an impact on the operation of banking institutions and hence, on economic promotion. This means that stock market is becoming more crucial, especially in a number of emerging markets and their role should not be ignored (Kahn M, Sendahji A, 2000). Levine and Zervos argued that a well-established stock market not only can mobilize capital and diversify risks between market agents but also it is able to provide different types of financial services than banking sector to stimulate economic growth (Levine R, Zervos S, 1998).The necessity of stock market development is an imperative need in order to achieve full efficiency of capital allocation if government can liberalize the financial system. As far as physical accumulation is concerned, both stock markets and banks provide sources of external financing for firms. For the purpose of resource allocation, they both create information to guide the allocation of resources. They differ only in the way the information is transmitted. Information in stock markets is contained in equity prices, while loan managers collect that in banks. Therefore, while banks finance only well-established, safe borrowers, stock markets can finance risky, productive and innovative investment projects (Caporale G,et al,2005).Time varying volatility of stock returns has been extensively modeled by the ARCH with high frequency stock data to find high persistence in volatility. The ARCH approach assumes that there is no shift in volatility; however, in such emerging markets there may potentially be sudden shifts in volatility. It is therefore important to take account of these shifts in estimating volatility persistence. In this paper, the shifts in volatility are identified by utilizing the iterated cumulative sums of squares (ICSS) algorithm of Inclan and Tiao (1994). The GARCH model is then estimated by taking account of the volatility shifts. The ICSS endogenously identifies changes in volatility of stock returns. Aggarwal et al examined emerging stock markets in Asia and Latin America (Aggarwal et al. 1999), and recently Hammoudeh and Li investigated the sudden changes in volatility for the volatile Gulf Arab stock markets (Hammoudeh and Li ,2006).The financial system plays an important role in full-filling the needs of investors by mobilizing funds and transforming them into an asset (Ndikumana, 2001). In such a way that, an efficient financial system allocates the resources efficiently through its financial intermediaries, which eventually identify the most productive investment opportunities. Bader and Abu-Qarn (2005) study documented that the direction of causality runs from financial development to economic growth in Egypt, either through increasing investment efficiency or through increasing resources for investment. Deeper, broader, and better functioning of the financial system can stimulate higher economic growth (King and Levine1993a & 1993b). However, earlier studies in developed economies provided evidence in support of economic growth lead to financial sector development. Empirical studies by Demetriades and Hussein (1996); Luintel and Khan (1999), Arestis et al. show that causality runs in both the directions i.e., financial development causes economic growth and vice versa (Arestis et al., 2001). Goldsmith's study provides evidence that there is a positive connection between financial development and economic growth. On the contrary, Ram study did not find any relationship between financial development and economic growth in his analysis of cross country data(Ram,1999).Empirical studies of Atje and Jovanovich (1993); DemirgüçüçKunt and Levine (1996);Korajczyk (1996); Levine and Zervos (1996 & 1998) showed that there exists a strong positive relationship between stock market development and economic growth. Alam and Hasan found that the stock market development has a sizeable positive impact on economic growth in the case of US (Alam and Hasan, 2003) . In a similar study by Agarwal investigated the relationship between stock market development and economic growth for nine African countries with cross sectioned data for the period of 1992 to 1997. His study documents a positive relationship between several indicators of the stock market performance and economic growth (Agarwal, 2001). Atje and Jovanovic (1993), Caporale et al, Adajaskiand Biekpe , also show that financial intermediaries usually have less information as compared to stock markets and these markets efficiently allocate the resources and enhance economic growth(Atje and Jovanovic ,1993),Caporale et al,2004),Adajaski and Biekpe ,2006).Likewise, Filer et al find that an active equity market plays an important role in promoting economic growth in developing countries(Filer et al. ,1999).Relation between stock index and inflation rate is important to be considered in calculating market stock index. In theory, stocks should inflation neutral and thus rising inflation has no impact upon stock valuation; Gultekin had tested the generalized Fisher Hypothesis, that real return is usually determined by real factors and not related to expected inflation, for 26 countries in the

period 1947-1979 and could not find a reliable positive relation between nominal stock returns and inflation rates (Gultekin,1983).In his study, Fama and Schwert had studied U.S. stocks and concluded that U.S. stock returns are negatively correlated with the expected inflation rates(Fama & Schwert,1977).Filer, et al have studied the effect of stock market prices (index) for less developed countries using Granger-causality tests; they found that well organized stock markets have a positive and significant causal relationship between the development of stock market index and economic growth. In a study conducted by Ozbay on the relation between stock returns and macroeconomic factors, the case of Turkey, results of this study revealed that the casual relationship running from stock returns is stronger than the casual relationship running from macroeconomic variables to stock returns; so, researcher concluded that stock market index can be regarded as the leading indicator of the performance of the economy as well as an important signal for changes in the economic situation(Ozbay.E,2009).

2-1-Test Hypotheses:

Ho-1: There is no significant causal effect of industrial index on real economic growth.
Ho-2: There is no significant causal effect of banks index on real economic growth.
Ho-3: There is no significant causal effect of insurance index on real economic growth.
Ho-4: There is no significant causal effect of services index on real economic growth.
Ho-5 : There is no significant causal effect of general index on real economic growth

3-Methodology:

3-1-*Data:*

GDP,CPI data were collected from Jordan's ministry of economics records. Data was compiled as follows This study uses monthly data on Amman Stock Market general index as well as sector indexes of banks ,insurance ,services and industrial sectors for the period 2000-2012.Indexes data was collected from ASE:

- Real GDP was calculated by dividing nominal GDP by CPI index.
- Economic growth rate was calculated by using the mathematical formula:
- Real economic growth = [(real GDPt – real GDPt-1)\real GDPt-1] x100% .

3-2-*Empirical Tests*:

The present study undertakes a comprehensive set of econometric tests for the empirical analysis such as; Unit root (ADF, PP and KPSS) tests, Granger Causality test, Engle-Granger Co integration method and finally; Error Correction Model (ECM). These models are described as follows:

3-2-1--unit root test: it is a statistical test for the proposition that in a autoregressive statistical model of a time series, the autoregressive parameter is one. In a data series y(t), where t a whole number, modeled by: y(t+1) = ay(t) + other terms, where a is an unknown constant, a unit root test would be a test of the hypothesis that a=1, usually against the alternative that |a| is less than 1.Augmented Dickey-Fuller (ADF) test has been developed to test univariate time series for the presence of unit roots or non-stationary. The extended maintained regression used in the ADF test can be expressed in its most general form as:

$$\Delta Y_t = \mu + \gamma Y_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta Y_{t-j} + \beta t + \omega_t$$

Where μ is the drift term, t denotes the time trend, and p is the largest lag length used. In order to analyze the deterministic trends, we used modified versions of the likelihood ratio tests suggested by Dickey and Fuller (1981). Patterson (2000) suggests the following maintained regressions, test statistics, and hypotheses:

$$\Delta Y_t = \mu + \gamma Y_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta Y_{t-j} + \beta t + \omega_t \qquad (2A)$$

$$\hat{\tau}_\beta, H_0 : \gamma = 0, H_a : \gamma < 0; \phi_3, H_0 : \gamma = 0, \beta = 0, H_a : \gamma \neq 0, \text{ and/or } \beta \neq 0$$

$$\Delta Y_t = \mu + \gamma Y_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta Y_{t-j} + \omega_t \qquad (3A)$$

$$\hat{\tau}_\mu, H_0 : \gamma = 0, H_a : \gamma < 0; \phi_1, H_0 : \mu = 0, \gamma = 0, \beta = 0, H_a : \mu \neq 0, \text{and/or } \gamma \neq 0$$

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta Y_{t-j} + \beta t + \omega_t \qquad (4A)$$

$$\tau, H_0 : \gamma = 0, H_a : \gamma < 0$$

3-2-2- ***Granger Causality Test***

Many models assume different hypotheses to discuss variables' relationship; but they could not make sure variables' cause and effect relationship.

According to the Granger (1969) causality procedure is explained as follows; the question of whether causes x is

to see how much of the current value of x can be explained by past values of x and test whether adding lagged values of y can improve these estimates. It is inferred that x is Granger caused by y , if x can be predicted from past values of x and y than from past values of x alone. Granger causality is used for testing the long-run relationship between stock market
development and economic growth. The Granger procedure is selected because it consists the more powerful and simpler way of testing causal relationship. He used twin factors of VAR to find variables' causal relationship. This test assumed two series and that define those messages set. The following bivariate model is estimated:

$$X_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} X_{t-1} + \sum_{i=1}^{k} \alpha_{2i} Y_{t-1} + \varepsilon_{1t}$$

$$Y_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} X_{t-1} + \sum_{i=1}^{k} \beta_{2i} Y_{t-1} + \varepsilon_{2t}$$

Where X denotes an indicator of stock market development, Y denotes economic growth and the
subscripts t and t-i denote the current and lagged values. Hsiao (1981) suggests searching over the lag lengths (k1 to k4) and applying an information criterion to determine the optimal length of the lag structure. To test four coefficients find out variables' relationship.

a. $\alpha_{2i} \neq 0 \; and \; \alpha_{1i} = 0$: It means Y lead X or X lag Y.

b. $\beta_{1i} \neq 0 \; and \; \beta_{2i} = 0$: It means X lead Y or Y lag X.

c. $\alpha_{2i} = 0 \; and \; \beta_{1i} = 0$: It means both of variables are independent.

d. $\alpha_{2i} \neq 0 \; and \; \beta_{1i} \neq 0$: It means both of variables are interactive each other and have feedback relationship.

3-2-3-Engle – Granger Co integration Test

Suggested by Engle and Granger (1987) (sometimes known as the EG test) is to run a static regression (after first having verified that yt and xt both are I(1))

yt = Θ'xt + et;

where xt is one- or higher-dimensional. The asymptotic distribution of μ is not standard, but the test suggested by Engle and Granger was to estimate Θ by OLS and the test for unit roots in et = yt- Θ'xt :

Note, that since the unit root tests test the null-hypothesis of a unit root, most co integration tests test the Null of no co integration. Unfortunately the limiting distribution of for example the t-test, does not have the limiting distribution tabulated by Dickey and Fuller. The limiting distribution does, however, resemble the Dickey-Fuller distribution even though you need a separate table for each dimension of the regressor. Typically, you will allow for dynamics in the residual and perform the equivalent of the ADF test (using the slightly different critical
values in this case). Such a procedure is usually called a Co integration ADF test, abbreviated CADF-test. Engle and Granger (1987) compared deferent tests and recommended the CADF test. They supplied critical values based on Monte Carlo simulations for the case of just one regressor.

3-2-4-*GARCH model*

Having identified the change points in variance, the GARCH model is estimated without and with sudden changes in variance. The standard GARCH (1, 1) model can be defined for the case without sudden changes as given

xt =μ + et , ht = ω + ae2t-1 + Bht-1

N represents the conditional normal density with mean zero and variance ht. It-1is the information available at t-1. If some series show evidence of autocorrelation, then AR(1) with GARCH (1, 1) is estimated. The GARCH model with sudden changes can be modified as

xt =μ + et

ht = ω + d1D1 +.....+dnDn + ae2t-1 + Bht-1

Where n D .....D 1 are the dummy variables: 1 for each point of sudden change of variance onwards and 0 for otherwise. It is argued that the standard GARCH model overestimates the persistence in volatility since relevant sudden changes in variance are ignored (Lamoreux and Lastrapes, 1990). Given the modified GARCH model, which incorporates the regime shifts detected by the ICSS algorithms, the persistence of volatility is predicted to be smaller than that found by th conventional GARCH model.

3-2-5-*The GARCH-M Model*

In finance, the return of a security may depend on its volatility (risk). To model such phenomena, the GARCHi-in-mean (GARCH-Mi) model adds a heteroskedasticity term into the mean equation. It has the specification:

$$r_t = \mu + \lambda \sigma_t + \varepsilon_t$$

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_j \sigma_{t-j}^2$$

$$\varepsilon_t = \sigma_t \times \epsilon_t$$

$$\epsilon_t \sim P_{\nu}(0, 1)$$

Where:

x_t is the time series value at time t.

μ is the mean of GARCH model.

λ is the volatility coefficient (risk premium) for the mean.

ε_t is the model's residual at time t.

σ_t is the conditional standard deviation (i.e. volatility) at time t.

p is the order of the ARCH component model.

$\alpha_0, \alpha_1, \alpha_2, \ldots \alpha_p$ are the parameters of the ARCH component model.

q is the order of the GARCH component model.

$\beta_1, \beta_2, \ldots \beta_q$ are the parameters of the GARCH component model.

$[\epsilon_t]$ are the standardized residuals:

$$[\epsilon_t] \sim i.i.d$$

$$E[\epsilon_t] = 0$$

$$VAR[\epsilon_t] = 1$$

- P_{ν} is the probability distribution function for ϵ_t. Currently, the following distributions are supported:
  1. Normal distribution
     $$P_{\nu} = N(0, 1)$$
  2. Student's t-distribution
     $$P_{\nu} = t_{\nu}(0, 1)$$
     $$\nu > 2$$
  4. Generalized error distribution (GED[i])
     $$P_{\nu} = GED_{\nu}(0, 1)$$
     $$\nu > 0$$

4- Analysis:

4-1-*Data Analysis*

Table (1) shows ASE sector indexes, CPI, and N.GDP and R.GDP percent changes for the quarters of the years 2000-2012.By comparing the general index trend with that of percent change in both nominal and real GDP growth, we find a positive relationship, although there were certain periods which have drop in their values, i.e.in the period from Jan.,2000- sep.2000 the general index dropped from 1627 to 1327 while R.GDP has grown by : 3.25,6.25,4.104,4.188 respectively; the same happened during June-Sep.,2008 ,the index dropped from 10491 to 8846 ,while R.GDP has grown up 6.33% , 7.23% respectively; this positive trend recurred in 2011 when general index moved from5302 ,4884,4787,and 4545;the R.GDP growth was diminishing from 2.486 ,1.762,1.731and 1.961.From these index readings and their corresponding percentage growth we can infer that there are other factors that have effects on economic growth.

4-2-*Statistical Analysis*:

Table (2) is composed of six variables' descriptive statistics and finds INDUS, INSUR AND SERV indices are non-normal. According to kurtosis INDUS and SERV appear leptokurtic phenomena. Also, We conclude that the relation between ASE sectors and R.GDP growth rate is not linear.

Unit Root Test: based on Augmented Dickey-Fuller test and Lag Length based on Schwartz Bayesian Information Criterion. This test is conducted to test the stationary existence of ASE sectors indexes and the general index.

Table (3) indicates that all the variables do not reject unit root null hypothesis. This means that all the variables in the level stage have non-stationary existence. After variables run first difference I (1) that show all of

variables achieve to 1% significant level. The lag length is for1for all variables.

4-2-1-*Engle – Granger Co integration Test*

This study adopted Eagle-Granger co integration test to explain the long-run relationship between two variables. The test depends on applying ADF test on the residuals (Zt) to check whether the residuals are stationary or not. The results denoted in the following table:

Following are Augmented Dickey-Fuller t-test statistic findings:

Variables	t-statistic	Prob.
RGDP & INDUS	-7.131990	0.0000
RGDP & BANK	-8.240174	0.0000
RGDP & INSUR	-7.992946	0.0000
RGDP & SERV	-7.696145	0.0000
RGDP & GEN	-8.327234	0.0000

The findings show that all values of t-statics are significant which means all variables have long term equilibrium relationship.

4-3-*Hypotheses Testing:*

H0-1: There is no significant causal effect of industrial index on real economic growth. Table (4) indicates that industry index has a significant influence power on real gross product, where coefficient (-0.000280) indicate a significant negative effect, with p-value (0.0327) less than 0.05. Also Table (5) shows Q-stat value (24.758) and corresponding p-value (0.419) which indicates that there was no serial correlation phenomena. In Addition to that,,the F-value (0.0703) and corresponding p-value (0.7869) show that there was no ARCH effect, which means there is no volatility and no spillover in the regression.

H0-2: There is no significant causal effect of banks index on real economic growth.

Table(6) indicates that bank index has no significant influence power to real gross product, where coefficient (2.08E-05) indicates no significant effect, with p-value (0.6810) greater than 0.05. Also, table (7)reflects that Q-stat value (39.758) and corresponding p-value (0.054) show that no serial correlation phenomena. Also, F-value (0.1677) and corresponding p-value (0.1612) show no ARCH effect, which means there is no volatility and no spillover in the regression.

H0-3: There is no significant causal effect of insurance index on real economic growth.

Table(8) indicates that insurance index has a significant positive influence power to real gross product, where coefficient (0.000490) indicates a significant effect, with p-value (0.0005) less than 0.05. In addition,table (9) indicates that the Q-stat value (26.421) and corresponding p-value (0.495) shows that no serial correlation phenomena. Also, F-value (0.7640) and corresponding p-value (0.7583) show no ARCH effect, which means there is no volatility and no spillover in the regression.

H0-4: There is no significant causal effect of services index on real economic growth.

Table(10) indicates that the service index has no significant influence power to real gross product, where coefficient (0.000626) indicates no significant effect, with p-value (0.3008) greater than 0.05. And table (11) shows that the Q-stat value (30.178) and corresponding p-value (0.306) show that no serial correlation phenomena. Also, F-value (0.3070) and corresponding p-value (0.2975) show no ARCH effect, which means there is no volatility and no spillover in the regression.

H0-5: There is no significant causal effect of general index on real economic growth

Table(12) indicates that the general index has no significant influence power to real gross product, where coefficient (5.14E-05) indicates no significant effect, with p-value (0.7622) greater than 0.05. Table (13) reflects that Q-stat value :(29.804) and corresponding p-value: (0.323) show that no serial correlation phenomena. Also, F-value (0.4646) and corresponding p-value (0.4545) show no ARCH effect, which means there is no volatility and no spillover in the regression.

5- Findings

The main purpose in this study is to investigate the causal nexus between stock market performance and economic growth and to find the short-run and long-run dynamics of the variables by considering both monthly and quarterly data on Amman Stock Market general index as well as the indexes of banks, insurance, services and industrial sectors. The present study undertakes a comprehensive set of econometric tests for the empirical analysis such as; Unit root (ADF, PP and KPSS) tests, Granger Causality test, Engle-Granger Co integration method and finally; Error Correction Model (ECM). In order to obtain accurate results, researchers had to analyze the relationship between econometric factors which are: ASE indexes, N.GDP, R.GDP.Unit root test is used to examine ASE sectors stationary existence. Results showed that all sector indexes have non-stationary existence .Findings indicated that all variables have achieved up to 1% significant level. Eagle Granger Co integration test is used to explain the long-run relationship between the pairs of variables.ADF test revealed that all t-test values were significant and thus have long-term equilibrium relationship.

GARCH-M had been conducted to examine the research hypotheses. Test showed that:
Ho-1: is rejected and showed that industry index has a significant influence on the R.GDP growth rate.
Ho-2: is confirmed,i.e. bank index indicates no significant on R.GDP growth rate.
Ho-3: is rejected and showed that insurance index has a significant influence on R.GDP growth rate.
Ho-4: is confirmed, i.e. service index has no significant influence on R.GDP growth rate.
Ho-5: is rejected,i.e. general index has no significant influence on R.GDP growth rate.

6-Conclusion

Many researchers tried to find the interrelationship between economic sectors and real economic growth; many studies in developed economies provided evidence in support of economic growth lead to financial sector development(Robinson, 1952; Kuznets, 1955; Friedman and Schwartz, 1963).Other researchers studied the effect of stock market prices (index) for less developed countries using Granger-causality tests; they found that well organized stock markets have a positive and significant causal relationship between the development of stock market index and economic growth(Filer, et al).In another study, the researcher concluded that stock market index can be regarded as the leading indicator of the performance of the economy as well as an important signal for changes in the economic situation(Ozbay.E,2009).Other empirical studies show that causality runs in both the directions i.e., financial development causes economic growth and vice versa (Luintel and Khan (1999).This research is an empirical Study on the relationship between stock market index and the national economy growth of Jordan. This study investigated the effect of ASE index and sector indexes on the real GDP growth rate for the period 2000-2012.This study results coincide with research results conducted by Ozbay.E, 2009, who concluded that stock market index can be regarded as the leading indicator of the performance of the economy as well as an important signal for changes in the economic situation (Ozbay.E, 2009).

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APPENDIXES:
Table-1.Compiled Data set

year	CPI	Bank Index	Insur. index	Serv. index	Indus. index	Gen. index	N.GDP%	R.GDP%
01\2000	0.8	2442	1228	1123	930.5	1627	2.6	3.25
03\2000	0.8	2305	1224	1061	879	1536	5	6.25
6	0.804	2122	1148	1088	825	1432	3.3	4.104478
9	0.795	1975	1200	999	755	1327	3.33	4.188679
01\2001	0.795	2077	1257	997	752	1367	5.44	6.842767
3	0.802	2097	1259	1002	769	1385	5.95	7.418953
6	0.802	2197	1369	1024	729	1409	6.11	7.618454
9	0.82	2499	1373	1034	772	1547	4.9	5.97561
01\2002	0.825	2762	1328	1137	961	1761	4.26	5.163636
3	0.83	2648	1416	1112	975	1722	4.73	5.698795
6	0.827	2741	1422	1171	1146	1854	5.11	6.17896
9	0.825	2645	1452	1080	1026	1742	6.51	7.890909
01\2003	0.83	2643	1561	1040	1027	1727	6.61	7.963855
3	0.845	2587	1574	1022	1031	1704	4.14	4.899408
6	0.85	3019	1713	1088	1333	2009	3.72	4.376471
9	0.855	3896	2140	1180	1410	2372	3.76	4.397661
01\2004	0.863	4757	2499	1389	1602	2822	5	5.793743
3	0.87	4659	2431	1373	1479	2728	7.87	9.045977
6	0.88	4600	2520	1358	1682	2795	8.03	9.125
9	0.876	5105	2804	1505	1793	3068	9.34	10.6621
01\2005	0.89	8895	4482	2064	2747	4977	8.88	9.977528
3	0.895	9445	5770	2538	3062	5484	9.89	11.05028
6	0.89	13494	7126	3802	3229	7375	10.02	11.25843

9	3.8	15086	7627	3522	3290	7845	6.72	1.768421
01\2006	0.935	17714	7557	3419	2987	8531	6.38	6.823529
3	0.936	14340	6482	2711	2822	7070	8.36	8.931624
6	0.93	12133	5306	1510	2376	6055	7.15	7.688172
9	0.936	11960	4704	2578	2565	6084	7.04	7.521368
01\2007	0.98	12150	4434	2456	2740	6146	9.82	10.02041
3	1.035	11969	4514	2543	2782	6149	10.58	10.22222
6	1.04	10774	4664	2427	2902	5762	10.04	9.653846
9	1.035	10535	4702	2446	2986	5728	7.3	7.05314
01\2008	1.052	14396	4914	2826	4839	7824	5.24	4.980989
3	1.08	13082	4489	2805	6695	8086	6.51	6.027778
6	1.176	15451	5298	3060	11033	10491	7.45	6.335034
9	1.186	14409	4847	2686	7916	8846	8.58	7.234401
01\2009	1.247	10517	3895	1817	4624	5971	6.32	5.068164
3	1.177	9130	4500	1938	4648	5625	5.1	4.33305
6	1.171	10202	4507	1799	4837	5935	5.16	4.40649
9	1.169	10220	4459	1849	4485	5850	7.68	6.569718
01\2010	1.213	9088	3804	1695	4575	5434	3.88	3.198681
3	1.23	8785	3792	1727	4404	5302	2.42	1.96748
6	1.23	8751	2647	1540	4035	5039	1.39	1.130081
9	1.258	8681	2364	1573	4055	5041	2.24	1.780604
01\2011	1.287	8809	2132	1523	4801	5302	3.2	2.486402
3	1.282	8339	2026	1424	4176	4884	2.26	1.762871
6	1.294	8003	1977	1378	4289	4787	2.24	1.731066
9	1.31	7698	1905	1299	3999	4545	2.57	1.961832
01\2012	1.327	7185	1584	1302	4067	4414	3.08	2.321025
3	1.348	7747	1330	1311	4359	4692	2.98	2.210682
6	1.346	7197	1264	1198	4175	4390	2.9	2.154532
9	1.377	7274	1256	1172	4626	4552	2.6	1.888163

CPI: consumer price index,

Descriptive Statistic: Table (2) the Descriptive Statistics of Variables

	GEN	INDUS	BANK	INSUR	SERV	RGDP
Mean	4464.423	3019.279	7754.519	3139.923	1744.635	5.737759
Maximum	10491.00	11033.00	17714.00	7627.000	3802.000	11.25843
Minimum	1327.000	729.0000	1975.000	1148.000	997.0000	1.130081
Std. Dev.	2373.140	2045.328	4433.824	1872.969	754.1195	2.872315
Skewness	0.286451	1.338033	0.241030	0.719422	1.028302	0.146700
Kurtosis	2.289844	6.033439	1.976938	2.467126	3.020806	2.003916
J-B p-value	1.803832 (0.406)	35.45334 (0.000)	2.771251 (0.250)	5.100824 (0.078)	9.165114 (0.010)	2.336244 (0.311)

Table (3) : Unit Root Test

	Level I(0)	First Difference I(1)	Lag Length
GEN	-1.532692 (0.5092)	-5.646251 (0.0000)	$I_1(1)$
INDUS	-1.815640 (0.3690)	-5.889020 (0.0000)	$I_1(1)$
BANK	-1.469706 (0.1480)	-6.094884 (0.0000)	$I_1(1)$
INSUR	-1.785469 (0.3833)	-4.045559 (0.0026)	$I_1(1)$
SERV	-1.759837 (0.3958)	-6.723332 (0.0000)	$I_1(1)$
RGDP	-2.649192 (0.0901)	-8.416077 (0.0000)	$I_1(1)$

Table (4) GARCH (1, 1) - M to run the regression of real gross product with industry index.
Dependent variable R.GDP

Model 1	Coefficient	Std. Error	z-test	p-value
Intercept	5.772235	0.596654	9.674335	0.0000
INDUS	-0.000280	0.000131	-2.135475	0.0327

Table (5) : ARCH effect and serial correlation phenomena

Model 1	LB(27)		Arch Effect	
	Q-stat	25.736	F-value	0.0703
	p-value	0.533	p-value	0.7869

Table (6) GARCH (1,1)- M to run the regression of real gross product with bank index and Dependent variable RGDP

Model 2	Coefficient	Std. Error	z-test	p-value
Intercept	6.158893	1.029181	5.984266	0.0000
BANK	2.08E-05	5.07E-05	0.411037	0.6810

Table (7) tests the ARCH effect and serial correlation phenomena

Model 2	LB(27)		Arch Effect	
	Q-stat	39.758	F-value	0.1677
	p-value	0.054	p-value	0.1612

Table (8) GARCH (1,1)- M to run the regression of real gross product with insurance index and Dependent variable R.GDP

Model 3	Coefficient	Std. Error	z-test	p-value
Intercept	5.628358	0.960396	5.860456	0.0000
INSUR	0.000490	0.000141	3.462032	0.0005

Table (9) testing serial correlation and ARCH effect

Model 3	LB(27)		Arch Effect	
	Q-stat	26.421	F-value	0.7640
	p-value	0.495	p-value	0.7583

Table (10) GARCH (1,1)- M to run the regression of real gross product with service index and Dependent variable RGDP:

Model 4	Coefficient	Std. Error	z-test	p-value
Intercept	5.461075	1.064836	5.128561	0.0000
SERV	0.000626	0.000605	1.034673	0.3008

Table (11) testing serial correlation and ARCH effect

Model 4	LB(27)		Arch Effect	
	Q-stat	30.178	F-value	0.3070
	p-value	0.306	p-value	0.2975

Table (12) GARCH (1, 1) - M : run the regression of real gross product with RGDP

Model 5	Coefficient	Std. Error	z-test	p-value
Intercept	6.053767	0.782362	7.737805	0.0000
GEN	5.14E-05	0.000170	0.302636	0.7622

Table (13) testing serial correlation and ARCH effect

Model 5	LB(27)		Arch Effect	
	Q-stat	29.804	F-value	0.4646
	p-value	0.323	p-value	0.4545

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