The Interaction between Globalization and Financial Development: New Evidence from Panel Co-integration and Causality Analysis

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9 December 2013

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Abstract:

The paper studies the impact of globalization on financial development in a sample of 32 developed and developing economies over the period 1989-2012. Indicators of financial development include three banking indicators (private sector credit, domestic credit, and liquid liabilities) and three indicators of stock market development (value traded, turnover ratio and stock market capitalization), all relevant to GDP. Two panel estimation methodologies are under consideration: panel co-integration and panel VAR. The findings reveal that financial development affects economic growth and globalization positively. Globalization helps mobilize economic growth, but does not help financial development as it helps increase access to external financing. Quality institutions do not impact financial development although the latter increases incentives for better quality institutions in support of sustainable growth.

Corresponding Author: Magda Kandil

Keywords: Financial development, globalization, cointegration

JEL Codes: E51;F21;F36;F43;F61;F65

*The views in the paper are those of the authors and should not be interpreted as those of the IMF or its policy.

Introduction

The economic consequence of globalization has received much attention of researchers and academicians for the last two decades. The process of globalization boosts economic growth via promoting real economic activity of an economy. It also transfers goods and services across the borders (bilateral trade), mobilizes physical and human capital, and helps the flow of ideas across the world. This process integrates the societies and economies (Agenor, 2003). Globalization has also helped the countries to discover new trade routes using efficient transport technology to reap the optimal fruits of openness to trade (David and Scott, 2005)[1]. In the presence of globalization, the domestic interest rates are influenced due to increased competition between local and foreign banks. This helps reduce the cost of investment, boosting domestic production and hence economic growth (Baldwin and Forslid, 2000).

[1]At the same time, openness to capital flows may also increase opportunities for portfolio risk diversification and consumption smoothing through borrowing and lending; and producers who are able to diversify risks on world capital markets may invest in riskier (and higher-yield) projects, thereby raising the country's rate of economic growth (Obstfeld, 1994).

There are numerous empirical studies investigating the relationship between globalization and economic growth. For example, O'Rourke (2001) defines the globalization as reducing trade barriers among nations, and increasing migration, capital flows, foreign direct investment and technological transfers. Recently, globalization is considered as one of the most important concepts for economic development. Intriligator, (2003) describes that globalization as one of the most powerful forces in determining the future of the planet. Stiglitz, (2004) exposes that globalization enables the country to take full advantage of openness by minimizing downside risk. Dreher, (2006) investigated the impact of globalization on economic growth using newly generated index of globalization. He reported that globalization boosts economic growth in highly globalized countries compared to less globalized economies. Akinboye (2007) exposes that globalization is one of the most prominent forces in today's world economy. In this paper, we define globalization as the increasing integration of global economies through trade openness and financial flows. Rao et al. (2007) indicate that the level of steady growth rate is affected by the level globalization. Countries will have high level of steady growth rate with high level of globalization and vice versa.

Our interest is to examine the impact of globalization on financial development. This idea pioneered by Mishkin, (2009) who explored how globalization affects financial development and economic growth via strengthening institutions in an economy. He exposes that globalization increases access to capital by opening financial markets to foreign capital within the country and by lowering loan cost in support of investment in productive investment products. Globalization improves the performance of institutions by opening domestic markets for foreign goods. Mishkin (2009) argued that globalization makes institutions sound and helps lead financial

development. It is also revealed by García, (2012) that globalization leads financial globalization that increases the growth of the financial sector. Similarly, Rousseau and Sylla (2003) exposed that globalization leads capital-market globalization which boosts financial development via promoting foreign capital inflows to recipient countries. Law and Demetriades, (2006) reported that trade openness and foreign capital inflows are contributing factors to financial development. Openness strongly affects financial development in middle income countries where institutional quality is good compared to developing economies. Furthermore, Law (2009) also argued that the financial sector is unable to reap the fruits of foreign capital inflows and trade openness due to weak institutional quality and low competition among the banks in developing economies. After exploring the relationship between globalization and financial development, Falahaty and Law (2012) empirically investigated globalization-finance nexus using data of MENA countries over the period of 1991-2007 by applying PVAR and FMOLS approaches. They reported that globalization does have an effect on institutional quality that impacts financial development and economic growth. Their analysis suggests that the government should play her role in designing appropriate economic policy to reap optimal fruits from globalization in the MENA region. Shahbaz and Rahman (2012) also note that foreign direct investment and imports promote economic growth that leads financial development[2].

This study contributes to existing literature by investigating the relationship between globalization and financial development in 32 developed and developing economies over the period of 1989-2012[3]. We use various indicators of financial development such as private sector credit (PC), domestic credit provided by the banking sector (DCB) and liquid liabilities (LL), all

[2]Rahman and Shahbaz, (2013) expose that foreign direct investment is significant contributing factors to economic growth.
[3] List of selected countries is given in Appendix

relative to GDP. The second measure of financial development consists of three stock market development indicators: value traded (VT), turnover ratio (TR) and stock market capitalization (SMC). We apply panel unit root tests in order to examine the unit root properties of the variables. Panel cointegration developed by Westerlund, (2007) is also applied for the long run relationship between the series. Moreover, we apply the panel VAR approach developed by Love and Zicchino, (2006) to investigate the impact of globalization on financial development and vice versa. Our findings reveal that financial development affects economic growth and globalization positively. Globalization leads economic growth positively but does not help financial development as globalization helps increase access to external financing. Quality institutions do not impact financial development, but financial development leads quality institutions. Figures 1 to 6 show the trends in financial development indicators over the period 1989-2012 in the sample of 32 countries under investigation. In general, there has been a surge, reflecting improvement in all indicators. However, it is clear from that the stock market development indicators show more fluctuation than banking sector development indicators, attesting to higher degree of volatility. Figures 7 and 8 show that there is smooth upward trend in the growth of GDP per capita and the score of the globalization index over the period 1989-2012.

Figure 1: Domestic Credit Provided by Banking Sector of 32 Selected World Countries (1989-2012)

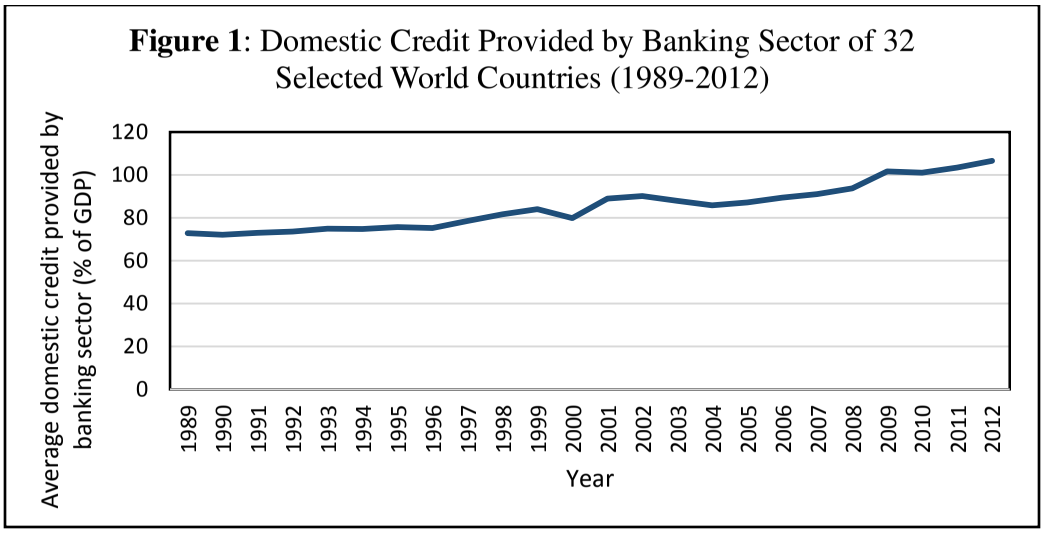


Figure 2: Private Sector Credit of 32 Selected World Countries (1989-2012)

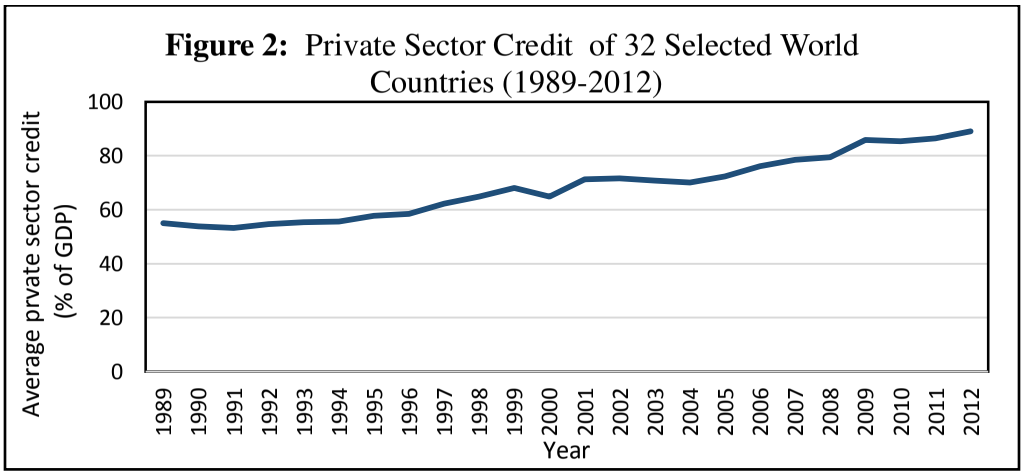


Figure 3: Liquid Liablities of 32 Seclected World Countries (1989-2012)

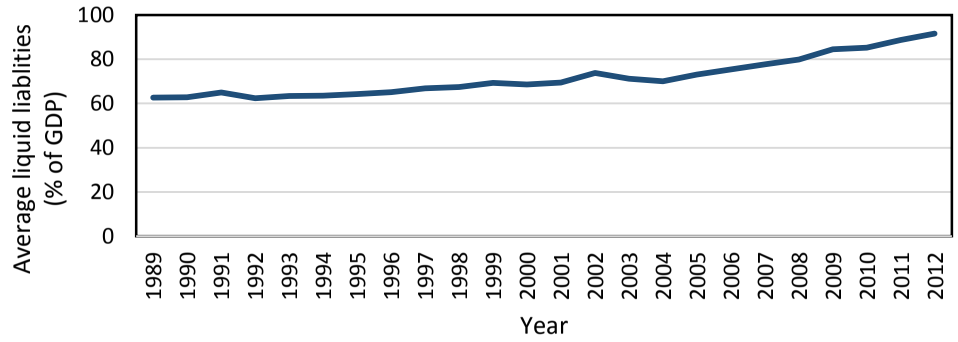


Figure 4: Stock market Capitalization of 32 Selected World Countris (1989-2012)

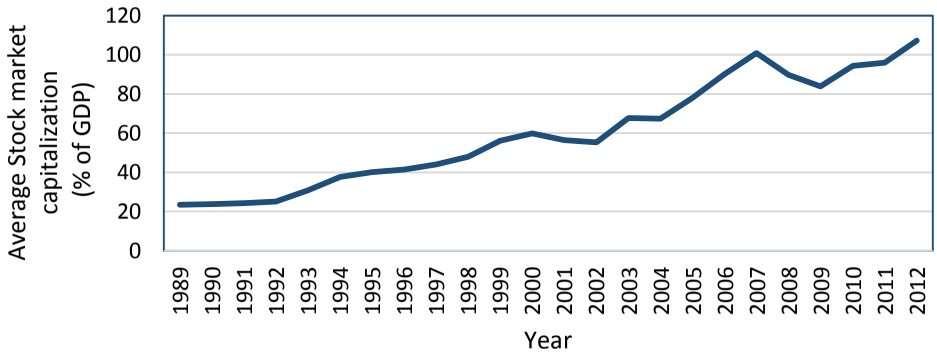
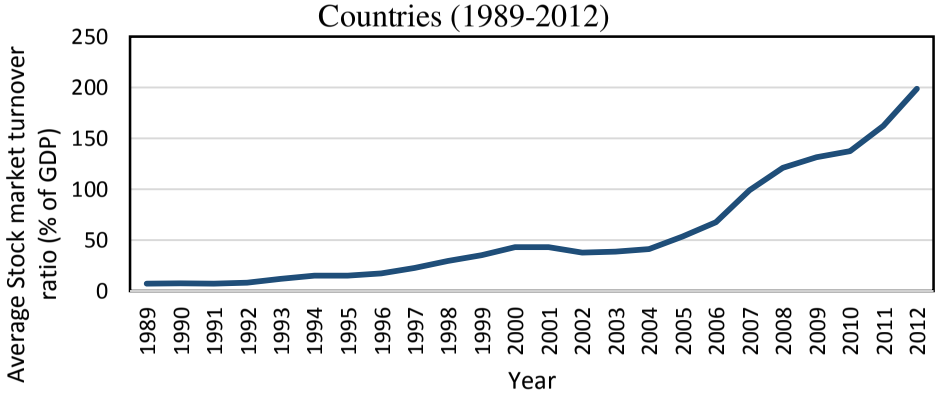


Figure 5: Stock Market Turnover Ratio of 32 Selected Countries (1989-2012)



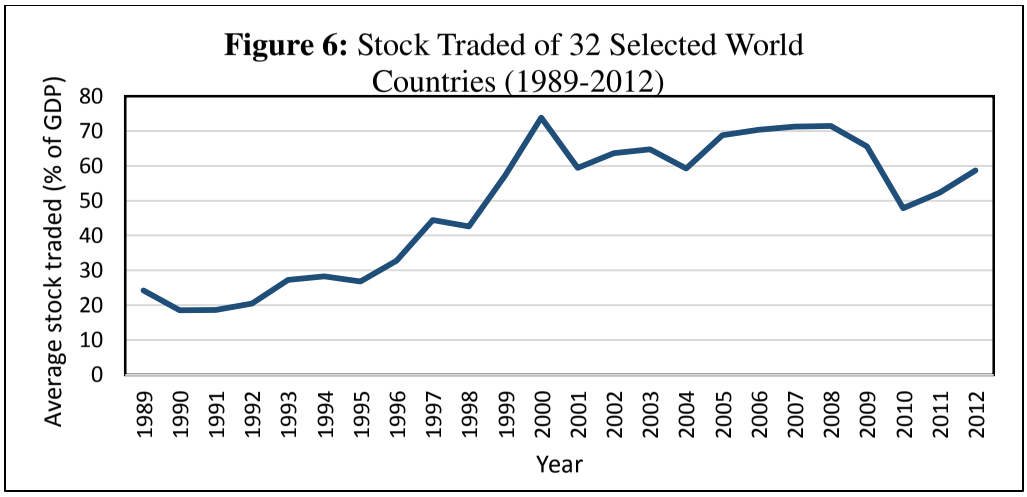


Figure 6: Stock Traded of 32 Selected World Countries (1989-2012)
Average stock traded (% of GDP)
0
10
20
30
40
50
60
70
80
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year

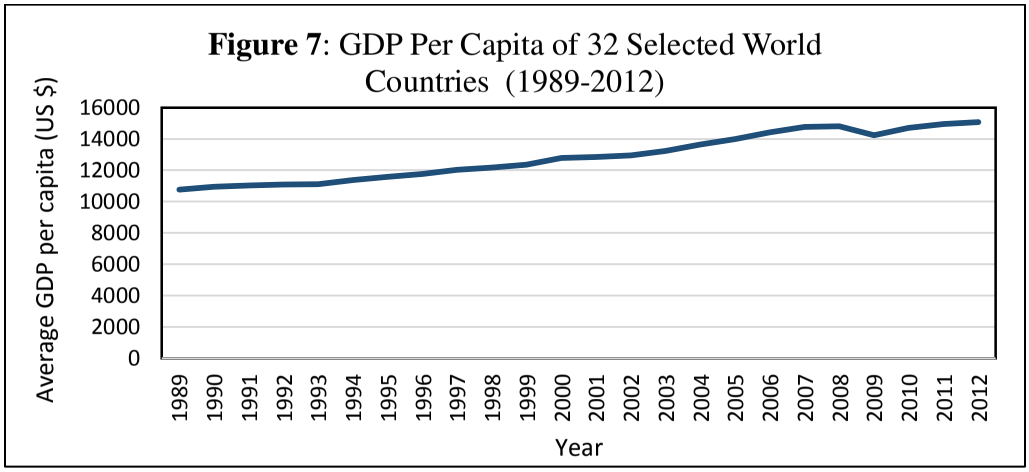


Figure 7: GDP Per Capita of 32 Selected World Countries (1989-2012)
Average GDP per capita (US $)
0
2000
4000
6000
8000
10000
12000
14000
16000
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year

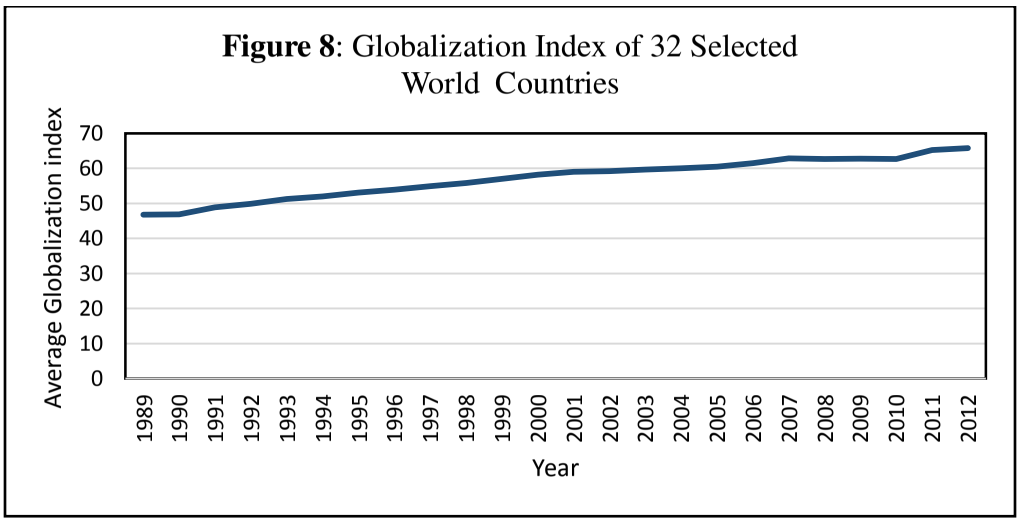


Figure 8: Globalization Index of 32 Selected World Countries
Average Globalization index
0
10
20
30
40
50
60
70
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year

II. Econometric Model, Methodology and Data Source

II.I Econometric Model

Stiglitz, (2004) argues that globalization can be a powerful source for promoting economic growth. Mishkin, (2009) points out the importance of globalization for financial development. He notes that globalization is a major factor in promoting institutional reforms that stimulate financial development and economic growth, especially in developing countries. Based on the theoretical propositions, the econometric model of financial development function is specified as following:

$$FD_{it} = \varphi_i + \theta_1 Y_{it} + \theta_2 GB_{it} + \theta_3 INST_{it} + \varepsilon_{it} \text{.....(1)}$$

FD refers to financial development index and proxied by a composite of banking sector and capital market indicators. *Y* is the real GDP per capita used to measure level of economic growth. *GB* is the globalization index and *INST* is institutional quality.

Before estimating long-run relationship between variables, it is necessary to identify the order of integration of selected variables. Various unit root tests for panel data are available in the existing econometric literature. Each test has its own advantages and restrictions. For the present analysis, we have selected Levin Lin and Chu 2002 (LLC) and Im, Pesaran and Shin 2003 (IPS) unit root tests. LLC can be considered for a pooled panel unit root test while IPS represents a heterogeneous panel unit root test.

II.II LLC Unit Root Test

Levin, Lin and Chu (2002) developed a number of pooled panel unit root tests with various specifications depending upon the treatment of the individual specific intercepts and time trends. This test imposes homogeneity on the autoregressive coefficient that indicates the presence or absence of unit root problem while the intercept and the trend can vary across individual series. LLC unit root test follows ADF regression for the investigation of unit root hypothesis. The general equation of LLC test including only intercept term is as:

$$\Delta y_{i,t} = \gamma_{0i} + \rho y_{it-1} + \sum_{j=1}^{p_i} \gamma_{1i} \Delta y_{i,t-j} + \mu_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

In the above equation, γ_{0i} is the intercept term that varies across cross-sectional units, ρ is the homogenous auto-regressive coefficient, p_i is the lag order and $\mu_{i,t}$ is the error term assumed to be independent across panel countries and follow a stationary ARMA process for each cross-sectional.

$$\mu_{i,t} = \sum_{j=1}^{\infty} \vartheta_{ij} \mu_{i,t-j} + \varepsilon_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

The null hypothesis and alternative hypothesis of unit root test is as follows:

$H_0 : \rho_i = \rho = 0$

$H_A : \rho_i = \rho < 0 \quad for\ all\ i$

LLC model presented in equation (2) is based on t-statistics:

$$t_{\rho} = \frac{\hat{\rho}}{S.E(\hat{\rho})} \text{.....(4)}$$

Where ρ is assumed to remain constant across individuals under both null and alternative hypotheses. In the presence of independently and normally distributed error term and cross-sectional independence, the panel regression test-statistics t_{ρ} converge to standard normal distribution when N and T $\to \infty$ and $\sqrt{N/T} \to 0$. In contrast, if cross-sectional units are dependent and time trend is present in the data as well as the error term is serially correlated, the resulting value of test statistics does not converge to zero. In this situation, Lavin, Lin and Chu suggested adjusted version of test statistics which is as follows:

$$t_{\rho^*} = \frac{t_{\rho} - N\tilde{T}\hat{S}_N \hat{\sigma}_{\text{ò}}^{-2} S.E(\hat{\rho}) u_m^*}{\sigma_m^*} \text{.....(5)}$$

u_m^* and σ_m^* are the adjusted mean and standard deviation whose values are generated from Monte Carlo simulation and tabulated by LLC (1993). LLC (1993) Monte Carlo simulation results show that when cross-sectional units are independent, then standard normal distribution can provide a good estimation for relatively small sample and in this case, the power of panel unit root test is much higher as compared to individual unit root test.

II.III IPS Unit Root Test

Im, Pesaran and Shin (IPS), (2003) introduced a panel unit root test in the context of a heterogeneous panel. This test basically applies the ADF test to individual series thus allowing

each series to have its own short-run dynamics. But the overall t-test statistic is based on the arithmetic mean of all individual countries' ADF statistic. Suppose a series (FD_{ti}, $Y_{ti}, GB_{it}, INST_{it}$) can be represented by the ADF (without trend).

$$\Delta y_{i,t} = \varpi_j + \rho_i y_{i,t-1} + \sum_{j=1}^{p_i} \varphi_{i,j} \Delta y_{i,t-j} + \nu_{i,t} \text{.....(6)}$$

The IPS test allows for the heterogeneity in the value ρ_i under the alternative hypothesis. This is more efficient and powerful test than the usual single time series test. The estimable equation of IPS unit root test is modeled as following:

$$\bar{t}_T = \frac{I}{N} \sum_{i=1}^{N} t_{i,t}(P_i) \text{.....(7)}$$

Where $t_{i,t}$ is the ADF t-statistics for the unit root tests of each country and P_i is the lag order in the ADF regression and test statistic is calculated as follows?

$$\mathrm{A}_{\bar{t}} = \frac{\sqrt{N(T)}[\bar{t}_T - E(t_T)}{\sqrt{\mathrm{var}(t_T)}} \text{.....(8)}$$

As $\bar{t}$ is explained above and values for $E[t_{iT}(P_i,0)]$ can be obtained from the results of Monte Carlo simulation carried out by IPS. They have calculated and tabulated them for various time periods and lags. The IPS simulation indicated that in the presence of no serial correlation, the $\bar{t}_T$ statistics is more powerful even for small sample size. When the error term is serially correlated

in heterogeneous panel and both N and T are sufficiently large, then, the power and size of $\overline{t}_T$ is just satisfactory. Another important characteristic of IPS test is that the power of this test is relatively more affected by a rise in T than a rise in N.

II.IV Panel Cointegration Test

Granger, (1981) was the pioneer who introduced the concept of cointegration in time series data. Cointegration test was further developed by Engle and Granger (1987), Philips and Ouliaris (1990) and Johansen (1988, 1991) and among others. Similar to panel unit root tests, extension of time-series cointegration to panel data is also recent. Panel cointegration tests that have been proposed so far can be divided into two groups: the first group of cointegration tests is based on the null hypothesis of cointegration (McCoskey and Kao, 1998; Westerlund, 2005) while the second group of cointegration tests take no cointegration as the null hypothesis (Pedroni, 1999; Kao, 1999; Larsson et al. 2001; Groen and Kleibergen, 2003).

Four error correction based panel cointegration tests developed by Westerlund, (2007) are employed in the present study. These tests are based on structural dynamics rather than residuals dynamics so that they do not impose any common factor restriction. Null hypothesis of no cointegration is tested by assuming whether the error correction term in a conditional error model is equal to zero. If the null of no error correction is rejected, then the null hypothesis of no cointegration is also rejected. The error correction model based on the assumption that all the variables are integrated of order 1 is as follows:

$$\Delta z_{it} = \delta_i' d_t + \theta_i (z_{i(t-1)} - \beta_i' y_{i(t-1)}) + \sum_{j=1}^{m_i} \theta_{ij} \Delta z_{i(t-j)} + \sum_{j=0}^{mi} \phi_{ij} \Delta y_{i(t-j)} + \omega_{it} \quad \text{.....(9)}$$

Where, $d_t = (1-t)'$ holds the deterministic components, $\delta_i' = (\delta_{1i}, \delta_{2i})'$ being the associated vector of parameters. In order to allow for the estimation of error correction parameter θ_i by least square, (9) can be rewritten as:

$$\Delta z_{it} = \delta_i' d_t + \theta_i z_{i(t-1)} + \pi_i' y_{i(t-1)} + \sum_{j=1}^{m_i} \theta_{ij} \Delta z_{i(t-j)} + \sum_{j=0}^{mi} \phi_{ij} \Delta y_{i(t-j)} + \omega_{it} \text{.....(10)}$$

Here, θ_i is the adjustment term that determines the speed by which the system adjusts back to the equilibrium relationship. The reparameterization of the model makes the parameter θ_i remains unaffected by imposing an arbitrary β_i. Now, it is possible to construct a valid test of null hypothesis versus alternative hypothesis that is asymptotically similar and whose distribution is free of nuisance parameters. In a nutshell, Westerlund (2007) developed four tests that are based on least squares estimates of θ_i and its t-ratio for each cross-sectional *i*. Two of them called group mean statistics and can be presented as:

$$G_\tau = \frac{1}{N} \sum_{i=1}^{N} \frac{\hat{\theta}_i}{S.E.(\hat{\theta}_i)} \text{.....(11)}$$

and

$$G_\alpha = \frac{1}{N} \sum_{i=1}^{N} \frac{T\theta_i'}{\theta_i'(1)} \text{.....(12)}$$

G_τ and G_α test the null hypothesis of $H_0 : \theta_i = 0$ for all i versus the alternative hypothesis of $H_0 : \theta_i < 0$ for at least one i. The rejection of the null hypothesis indicates the presence of cointegration for at least one cross-sectional unit in the panel. The other two tests are panel statistics and can be presented as:

$$P_\tau = \frac{\hat{\theta}_i}{S.E.(\hat{\theta}_i)} \text{.....(13)}$$

$$P_\alpha = T\hat{\theta} \text{.....(14)}$$

P_τ and P_α test the null hypothesis of $H_0 : \theta_i = 0$ for all i versus the alternative hypothesis of $H_0 : \theta_i < 0$ for all i. The rejection of the null hypothesis means the rejection of no cointegration for the panel as a whole.

II.V Panel VAR Approach

We also employ a panel vector auto regression methodology (PVAR) that combines the traditional VAR approach with panel data approach (Love and Zicchino 2006). Traditional VAR approach treats all the variables in the system as endogenous while panel data technique allows for unobserved individual heterogeneity and can tackle the data limitation problems. The first order VAR model incorporating fixed effects is as follows:

$$W_{it} = \Gamma_0 + \Gamma_1 W_{i,t-1} + f_i + e_{i,t} \text{.....(15)}$$

Where W_{it} is a vector of four endogenous variables (*Y, FD, GB, INST)* for country i and year t, f_i is a fixed effect variable used to capture country specifics. The term $e_{i,t}$ is a multivariate vector of white-noise error terms. According to Love and Zicchino (2006), each variable in the VAR is time demeaned, i.e., for each time period, we compute the mean of variables across panel and subtract this mean from the series. This procedure eliminates the time-specific effects and thus, mitigates the influence of cross-sectional dependence on panel data (Levin et al. 2002). Presence of fixed effects creates a problem in the estimation of VAR model because fixed effects are correlated with the regressors due to lagged dependent variables. We use forward mean differencing (the Helmert procedure) following Love and Zicchino (2006) to remove the fixed effects. In this procedure, all variables in the model are transformed in deviations from forward means. Let $\bar{W}_{it}^{m} = \sum_{s=t+1}^{T_i} \frac{W_{is}^{m}}{T_i - t}$ denote the mean obtained from the future values of W_{it}^{m}, a variable in the vector. $W_{it} = (w_{it}^{1}, w_{it}^{2}, w_{it}^{3}, ..., w_{it}^{M})'$, where T_i denote the last period of data available for a given country series. Let $\bar{e}_{it}^{m}$ denote the same transformation of e_{it}^{m}, where $e_{it} = (e_{it}^{1}, e_{it}^{2}, e_{it}^{3}, ..., e_{it}^{M})'$. Hence, we get:

$$\tilde{W}_{it}^{\ m} = \delta_{it}(w_{it}^{m} - \bar{w}_{it}^{m}).....(16)$$

$$\tilde{e}_{it}^{\ m} = \delta_{it}(e_{it}^{m} - \bar{e}_{it}^{m}).....(17)$$

where, $\delta_{it} = \sqrt{(T_i - t)/(T_i - t + 1)}$. This transformation cannot be calculated for the last year data, since there is no future value for the construction of forward means. The final transformed model is thus given by:

$$\tilde{W}_{it} = \Gamma_0 + \Gamma_1 \tilde{W}_{i,t-1} + \tilde{e}_{i,t} \text{.....(18)}$$

Where $\tilde{W}_{it} = (\tilde{w}_{it}^1, \tilde{w}_{it}^2, \tilde{w}_{it}^3, ..., \tilde{w}_{it}^M)'$ and $\tilde{e}_{it} = (\tilde{e}_{it}^1, \tilde{e}_{it}^2, \tilde{e}_{it}^3, ..., \tilde{e}_{it}^M)'$. This transformation is an orthogonal deviation, in which each observation is expressed as a deviation from average future observation. If the original errors are not auto correlated and have a constant variance, the transformed error should exhibit similar properties. Thus, this transformation overcomes the problem of serial correlation and heteroscedasticity (Arellano and Bover, 1995). Further, this technique allows the use of the lagged values of regressors as instruments and estimates the coefficients by the generalized method of moment (GMM) (Love and Zicchino (2006)).

After the estimation of panel VAR model, the next step is to compute the impulse response function (IRF). The impulse-response functions describe the reaction of one variable to the innovations in another variable in the system, while holding all other shocks equal to zero. To analyze the IRFs, we need an estimate of their confidence intervals. Since the matrix of IRFs is constructed from the estimated VAR coefficients, their standard error needs to be taken into account. We calculate standard errors of the impulse response function and generate confidence intervals by applying Bootstrap methods. Following Love and Zicchino (2006) the shocks in the VAR are measured as one standard deviation of the residual of the corresponding equation. This standardization is used in order to allow comparison of the dynamic response of different

samples. As noted by Lutkepohl (2005), the average size of the innovations occurring in a VAR depends on their standard deviations. So, impulse response analysis is more useful when innovations of one standard deviation are considered rather than unit shocks. We also report the variance decompositions, which explain the percent of the variation in one variable that is explained by the shock to another variable, accumulated over time. The variance decompositions show the magnitude of the total effect.

II.VI Data and Data Source

The 32 countries are selected for the estimation of causality between financial development, globalization and economic growth on the basis of data availability. The study covers the period between 1989-2012. To estimate the econometric model, two different data sets are used. The selection of two data sets is due to two different measures of financial development: banking sector development and stock market development. The first measure of financial development comprises three banking sector development indicators: private sector credit (PC), domestic credit provided by banking sector (DCB) and liquid liabilities (LL). The second measure of financial development consists of three stock market development indicators: value traded (VT), turnover ratio (TR), and stock market capitalization (SMC). All financial sector development indicators are expressed as ratios to GDP. We use the natural logarithm of real GDP per capita as a measure for economic growth. The data set for economic growth and financial development indicators is taken from World Development Indicators (World-Bank CD-ROM 2013) and World Bank financial structure dataset (2013). However, civil liberties and political right indices are used to measure the institutional variable. Both these indices are measured on a scale of 1 to 7, 1 represents strong democratic institutions and 7 the least democratic institutions. Civil

liberties index includes freedom of press and speech, self-governing judicial body, freedom of political associations and assembly, and also no restriction on travel inside and outside the country. Political rights include individual involvement in the political process and participation of elected representatives in community matters. The data for both indices are obtained from Heritage Foundation's subjective "Index of Economic Freedom". We normalize these two measures of democracy to a range from 0 to 1 on the basis of the following computation methodology taken by Gastil et al. (1990): INST = [14-(PR+CL)]/12 = 0 for unstable institutions

= 1 for stable institutions

The data for both indices are obtained from Heritage Foundation's subjective "Index of Economic Freedom". Data for globalization is extracted from KOF index of globalization (2012). This index developed by Dreher (2006) and covers three dimensions: economic globalization, political globalization and social globalization. Table-1 reports the summary statistics for all the variables.

Table-1: Summary of Descriptive Statistics

Variables	Mean	S.D.	Min.	Max.
Y_{it}	12859.07	14748	278.42	55377.82
DCB_{it}	85.011	69.069	-13.032	346.10
PC_{it}	68.384	57.665	3.093	302.24
LL_{it}	71.717	56.784	5.004	453.03
SMC_{it}	60.084	84.165	-91.190	1049.47
TR_{it}	48.702	71.715	-134.86	511.79
VT_{it}	56.122	258.59	-30.424	4432.96
GB_{it}	57.098	15.776	20.703	91.039
$INST_{it}$	0.611	0.311	0	1

IV. Empirical Results and their Discussions

The results of LLC and IPS panel unit root test in the presence of intercept and, intercept and trend are reported in Table-2 and Table-3. All variables are tested in level and first difference form. Empirical results suggest that all the series are non-stationary at their level form, but found to be stationary at first difference. Therefore, in our panel of 32 countries, we conclude that all the variables are integrated at I(1). This unique order of integration of the variables helps us to apply error-correction based panel cointegration presented by Westerlund (2007) to examine long run relationship between the series.

Table-2: IPS Panel Unit Root Test

Variables	At level				At 1st Difference			
	Drift & No Trend	P-value	Drift & Trend	P-value	Drift & No Trend	P-value	Drift & Trend	P-value
Y_{it}	4.744	1.000	1.363	0.913	-9.706	0.000	-7.446	0.000
DCB_{it}	1.542	0.938	1.356	0.912	-11.496	0.000	-9.758	0.000
PC_{it}	1.883	0.970	0.485	0.686	-9.965	0.000	-7.831	0.000
LL_{it}	1.659	0.951	1.690	0.985	-19.669	0.000	-19.281	0.000
SMC_{it}	0.873	0.808	0.368	0.643	-6.518	0.000	-3.782	0.000
TR_{it}	-0.593	0.276	-0.244	0.403	-13.004	0.000	-10.422	0.000
VT_{it}	1.399	0.919	4.748	1.000	-15.099	0.000	-13.049	0.000
GB_{it}	0.126	0.550	-1.031	0.151	-11.481	0.000	-7.827	0.000
$INST_{it}$	-0.226	0.410	-0.867	0.192	-11.086	0.000	-8.357	0.000

Table-3: LLC Panel Unit Root Test

Variables	At level				At 1st Difference			
	Drift & No Trend	P-value	Drift & Trend	P-value	Drift & No Trend	P-value	Drift & Trend	P-value
Y_{it}	1.838	0.967	0.723	0.765	-9.712	0.000	-8.254	0.000
DCB_{it}	-0.316	0.375	1.329	0.908	-9.809	0.000	-8.613	0.000
PC_{it}	0.738	0.770	0.216	0.585	-7.619	0.000	-5.987	0.000
LL_{it}	-0.563	0.286	1.407	0.796	-8.749	0.000	-7.312	0.000

SMC_{it}	-0.369	0.356	4.799	1.000	-13.989	0.000	-11.753	0.000
TR_{it}	0.935	0.825	1.834	0.966	-10.866	0.000	-9.220	0.000
VT_{it}	0.980	0.836	0.161	0.564	-6.478	0.000	-3.509	0.000
GB_{it}	-0.146	0.441	-0.197	0.421	-10.258	0.000	-5.749	0.000
$INST_{it}$	-0.410	0.340	1.861	0.968	-9.617	0.000	-7.409	0.000

Table-4: Panel Cointegration Test Analysis

Model 1: ($DCB_{it}, Y_{it}, GB_{it}, INST_{it}$)			Model 2: ($PC_{it}, Y_{it}, GB_{it}, INST_{it}$)		
Statistics	**Value**	**P-Value**	**Statistics**	**Value**	**P-Value**
G_τ	-1.761	0.387	G_τ	-1.234	0.996
G_α	-0.897	1.000	G_α	-0.342	1.000
P_τ	-9.555	0.063	P_τ	-5.203	0.957
P_α	-4.590	0.387	P_α	-0.620	1.000
Model 3:($LL_{it}, Y_{it}, GB_{it}, INST_{it}$)			Model 4: ($SMC_{it}, Y_{it}, GB_{it}, INST_{it}$)		
Statistics	**Value**	**P-Value**	**Statistics**	**Value**	**P-Value**
G_τ	-1.766	0.377	G_τ	-1.829	0.254
G_α	-1.335	1.000	G_α	-0.567	1.000
P_τ	-7.979	0.343	P_τ	-8.596	0.076
P_α	-4.564	0.396	P_α	-1.703	0.989
Model 5: ($TR_{it}, Y_{it}, GB_{it}, INST_{it}$)			Model 6: ($VT_{it}, Y_{it}, GB_{it}, INST_{it}$)		
Statistics	**Value**	**P-Value**	**Statistics**	**Value**	**P-Value**
G_τ	-1.570	0.638	G_τ	-2.016	0.045
G_α	-0.800	1.000	G_α	6.494	1.000
P_τ	-8.870	0.072	P_τ	1.565	0.941
P_α	-4.067	0.572	P_α	1.838	0.967
Note: P-values are computed using 300 bootstraps.					

Table-4 reports the results of panel cointegration tests. Empirical evidence indicates that the null hypothesis of no cointegration cannot be rejected by all the four tests. Therefore, we say that there is no support for the presence of one joint cointegrating relationship among all variables in the model -economic growth, globalization, institutions and financial development- over time across all countries in the sample. Further, the empirical properties of the variables examined

require estimation of the VAR in first differences, since there exists no cointegrating relationship between variables. Westerlund (2007) cointegration test describes that cointegration relationship between variables of panel does not provide any information about the direction of causality, so we proceed with panel causality tests using the panel VAR methodology.

Panel VAR results are reported in Table-5. We find that financial development impacts economic growth positively in three different panels that use stock market indicators as financial development indicators. On the other hand, the impact of economic growth on financial development is found to be positive in all six panels and is statistically significant once we used domestic private sector credit as an indicator of financial development. The impact of financial development on globalization is positive in three panels, but is found to be significant once the stock market capitalization is used as an indicator of financial development. On the other hand, the impact of globalization on financial development is negative and significant once we treated domestic private sector credit as an indicator of financial development. While puzzling, the evidence attests that globalization may reduce constraints on external financing, reducing incentives for domestic financial development. The estimated coefficients further show that the impact of economic growth on globalization is positive and significant in the first four panels while the response of economic growth to financial development is negative in all panels, except panel V where we used the turnover ratio as an indicator of financial development. While unexpected, the results indicate that economic growth has accelerated independently of financial development in many of the countries under investigation. The results do not support the significant relationship between globalization and institutional reforms in all panels. The impact of financial development on institutions is positive in three different panels where banking sector

indicators are used as proxy for financial development. On the other hand, the institutional reforms do not show any significant impact on financial development, indicating unidirectional causality Further, at lag one, the economic growth variable is found to be significantly influenced by its own lagged value in all of six panels, implying high degree of persistence in the growth process.

The results of variance decomposition are reported in Table-6. It is applied to determine the relative strength of the shocks in explaining the variation in financial development, economic growth, globalization and institutions of global countries. More than 1% of the variation in economic growth is explained by financial development in panel I, II and VI. However, economic growth explains more than 2% of the variation in financial development in panel II, III and IV. However, the response of globalization and institutions to financial development and the response of financial development to globalization and institutions is close to zero. Thus, the variance decomposition results do not support the Mishkin's hypothesis that globalization affects institutional reforms which in turn promote economic growth and financial development. Further, the response of globalization to economic growth is close to one but the response of institutions to economic growth is less than 1%.

Table-5: Panel VAR Estimation Results

Response of	**Response to**			
	ΔFD_{it} (t-1)	ΔY_{it} (t-1)	ΔGB_{it} (t-1)	$\Delta INST_{it}$ (t-1)
Panel I: FD =Domestic Credit				
ΔFD_{it}	-0.052 (-0.435)	0.369(1.641)	-0.345(-1.098)	-0.287(-2.446)
ΔY_{it}	-0.0003(-0.159)	0.247(4.199)*	-0.0005(-0.735)	0.043(1.567)
ΔGB_{it}	-0.006(-0.961)	0.0431(1.821)***	0.033(0.741)	-0.502(-0.331)

$\Delta INST_{it}$	0.0004(2.252)**	0.121(1.385)	-0.002(-1.380)	0.035(0.467)
Panel II: ΔFD =Private Credit				
ΔFD_{it}	-0.004(-0.040)	0.454(2.164)**	-0.331(-2.004)**	-0.501(-0.107)
ΔY_{it}	-0.0005(-0.243)	0.248(4.166)*	-0.005(-0.732)***	0.0434(1.577)
ΔGB_{it}	0.0003(0.046)	0.047(1.933)***	0.313(0.702)	-0.489(-0.324)
$\Delta INST_{it}$	0.0009(0.510)	0.105(1.167)	-0.001(-1.298)	0.033(0.435)
Panel III: FD =Liquid Liabilities				
ΔFD_{it}	-0.051(-0.185)	0.474(1.630)	-0.372(-1.484)	-0.155(-1.158)
ΔY_{it}	-0.0002(-0.532)	0.248(4.131)*	-0.0005(-0.679)	0.044(1.578)
ΔGB_{it}	0.004(0.443)	0.045(1.928)***	0.030(0.688)	-0.509(-0.339)
$\Delta INST_{it}$	0.0003(1.036)	0.104(1.192)***	-0.001(-1.340)	0.032(0.428)
Panel IV: FD =Stock Market Capitalization				
ΔFD_{it}	0.052(0.149)	0.106(0.754)	-0.415(-1.143)	0.032(0.228)
ΔY_{it}	0.0005(1.826)***	0.243(3.835)*	-0.0006(-0.784)	0.041(1.493)
ΔGB_{it}	0.004(1.777)***	0.041(1.766)***	0.029(0.654)	-0.618(-0.408)
$\Delta INST_{it}$	-0.0008(-0.697)	0.110(1.221)	-0.001(-1.258)	0.036(0.469)
Panel V: FD =Turn Over Ratio				
ΔFD_{it}	0.014(0.108)	0.223(0.604)	0.001(1.347)	-0.189(0.789)
ΔY_{it}	0.0001(1.852)**	0.867(3.030)*	0.001(1.796)***	0.001(0.026)
ΔGB_{it}	-0.0001(-0.140)	-2.181(-1.135)	0.957(9.054)*	0.674(0.235)
$\Delta INST_{it}$	-0.0003(-2.282)	0.021(0.412)	0.0001(0.099)	0.907(6.722)*
Panel VI: FD =Value Traded				
ΔFD_{it}	0.606(4.316)*	0.160(1.538)	0.310(0.454)	0.254(1.636)
ΔY_{it}	0.0002(0.222)	0.309(1.833)***	-0.0008(-0.723)	0.053(1.335)
ΔGB_{it}	0.005(0.694)	0.028(0.779)	0.039(0.834)	-0.765(-0.497)
$\Delta INST_{it}$	-0.0001(-0.737)	0.148(1.247)	-0.002(-1.409)	0.041(0.538)

Note:*, ** and *** show significance at 1%, 5%and 10% level respectively.

Table-6: Variance Decomposition Analysis Results (10 periods ahead)

	ΔFD_{it}	ΔY_{it}	ΔGB_{it}	$\Delta INST_{it}$	ΔFD_{it}	ΔY_{it}	ΔGB_{it}	$\Delta INST_{it}$

Variables	Panel I:FD= Domestic Credit				Panel II: FD =Private Credit			
ΔFD_{it}	0.963	0.010	0.003	0.022	0.967	0.027	0.004	0.0002
ΔY_{it}	0.013	0.978	0.0009	0.006	0.011	0.980	0.0009	0.006
ΔGB_{it}	0.004	0.009	0.986	0.0004	0.001	0.010	0.988	0.0003
$\Delta INST_{it}$	0.008	0.005	0.003	0.022	0.0002	0.004	0.002	0.993
	Panel III: FD =Liquid Liabilities				Panel IV: FD =Stock Market Capitalization			
ΔFD_{it}	0.965	0.022	0.004	0.008	0.978	0.019	0.0008	0.0002
ΔY_{it}	0.005	0.987	0.0007	0.007	0.003	0.968	0.011	0.006
ΔGB_{it}	0.002	0.011	0.987	0.0003	0.004	0.009	0.985	0.0004
$\Delta INST_{it}$	0.012	0.004	0.002	0.981	0.006	0.004	0.002	0.988
	Panel V: FD =Turn Over Ratio				Panel VI: FDEV =Value Traded			
ΔFD_{it}	0.995	0.0004	0.003	0.001	0.960	0.036	0.0002	0.003
ΔY_{it}	0.002	0.990	0.0009	0.006	0.097	0.892	0.002	0.008
ΔGB_{it}	0.004	0.011	0.984	0.0004	0.026	0.017	0.956	0.0007
$\Delta INST_{it}$	0.002	0.0003	0.002	0.991	0.022	0.013	0.003	0.960

Finally, we describe the graphs of the impulse response functions and the 5% error bands generated by Monte Carlo simulations. Figure-1 to 6 display the graph of impulse responses for all selected panels. The effect of financial development shocks on economic growth is found to be negative in Figure 1, 2, and 3 and positive in figure 4, 5 and 6. This implies that for financial development, banking sector shocks have different effect than stock market shocks on economic growth. This is consistent with the graphical presentation above, as stock market indicators experienced frequent volatility weakening their association to economic growth over time. On other hand, the effect of economic growth shocks on financial development is found to be positive in all six figures. The impact of one standard deviation shock of financial development on globalization is found to be negative in Figure-1 to 4, and positive in Figure-5 and 6 while the

reverse causation is found to be positive in all figures. Globalization has a robust positive effect on financial development while the reverse relationship varies based on indicators of financial sector development. Moreover, the effect of institutional shocks on financial development is found to be negative in four different figures portrayed in panel I, II, III, and V while positive in Figure-4 and 6. Again, the effect of institutions on financial development varies based on the indicators of financial development. The response of economic growth and institutions to globalization shocks is observed to be negative in all figures. The implication is the reform agenda is not highly motivated by globalization shocks. Furthermore, the response of globalization to shocks to economic growth appears to be negative for a short time period and converge to positive. That is, robust growth evidence is necessary to increase the scope for globalization. Similarly, the impact of institutional shocks on globalization is found to be negative, although small in magnitude in all figures. The evidence further attests to disconnect between institutional quality and globalization.

Figure-1: Impulse Response for Panel I (Variables: DCB, Y, GB, INST)

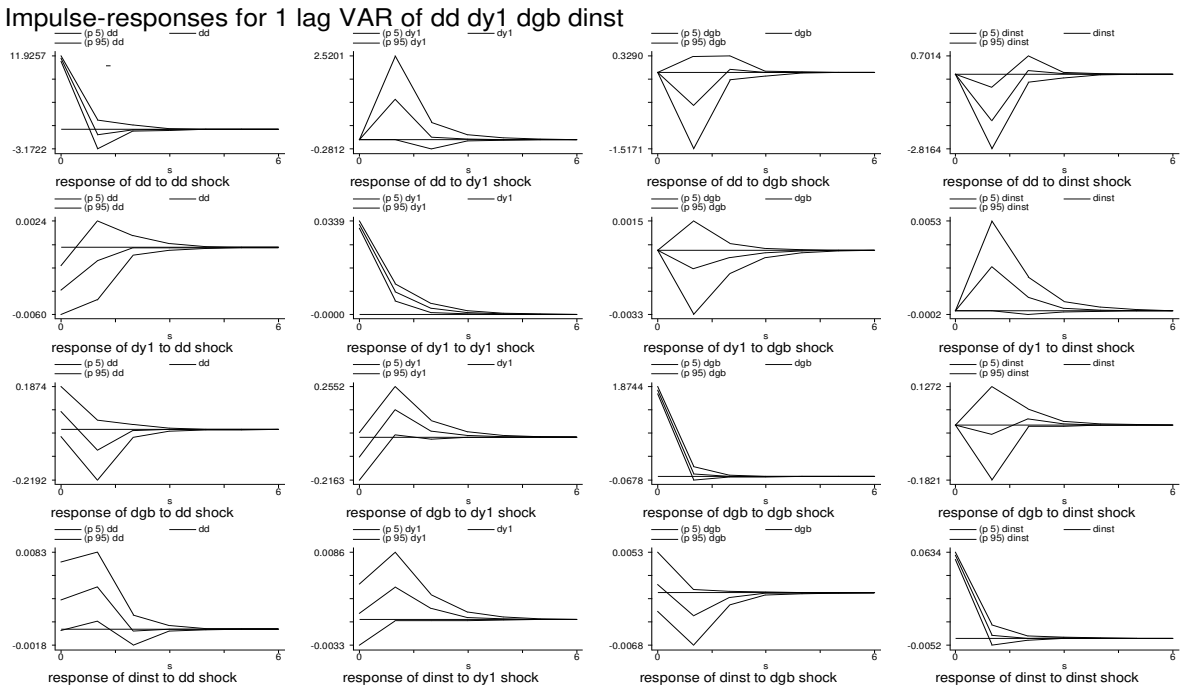


Figure-2: Impulse Response for Panel II (Variables: PC, Y, GB, INST)

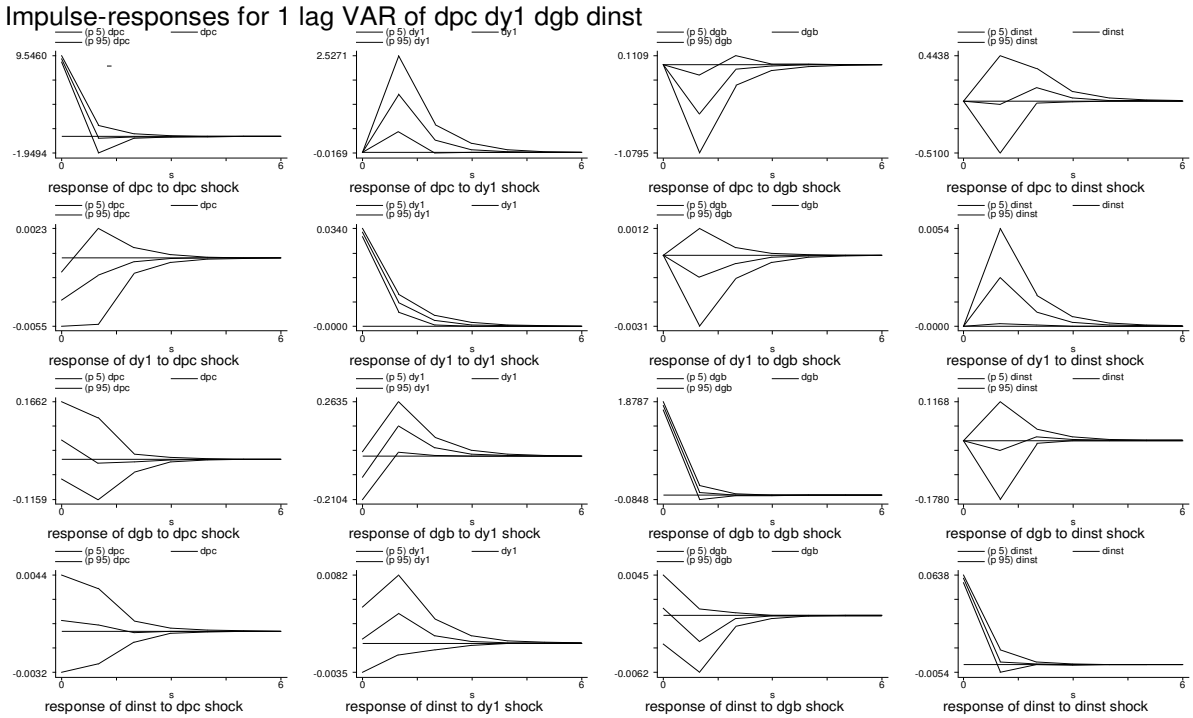


Figure-3: Impulse Response for Panel III (Variables: LL, Y, GB, INST)

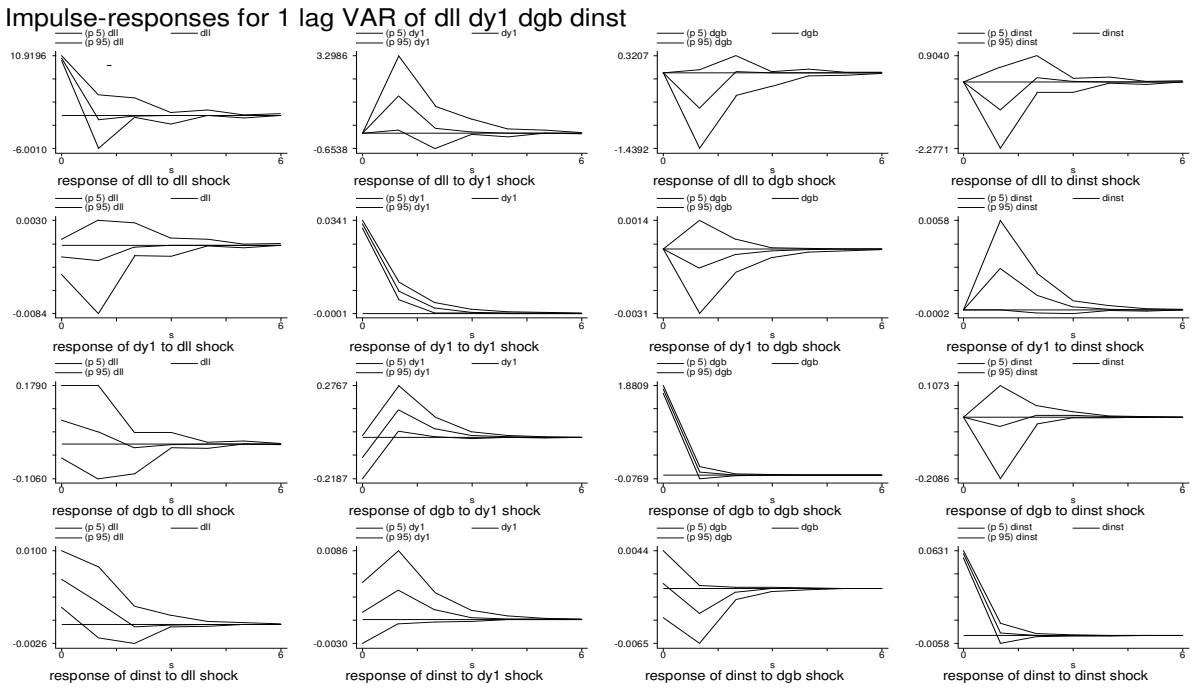


Figure-4: Impulse Response for Panel IV (Variables: SMC, Y, GB, INST)

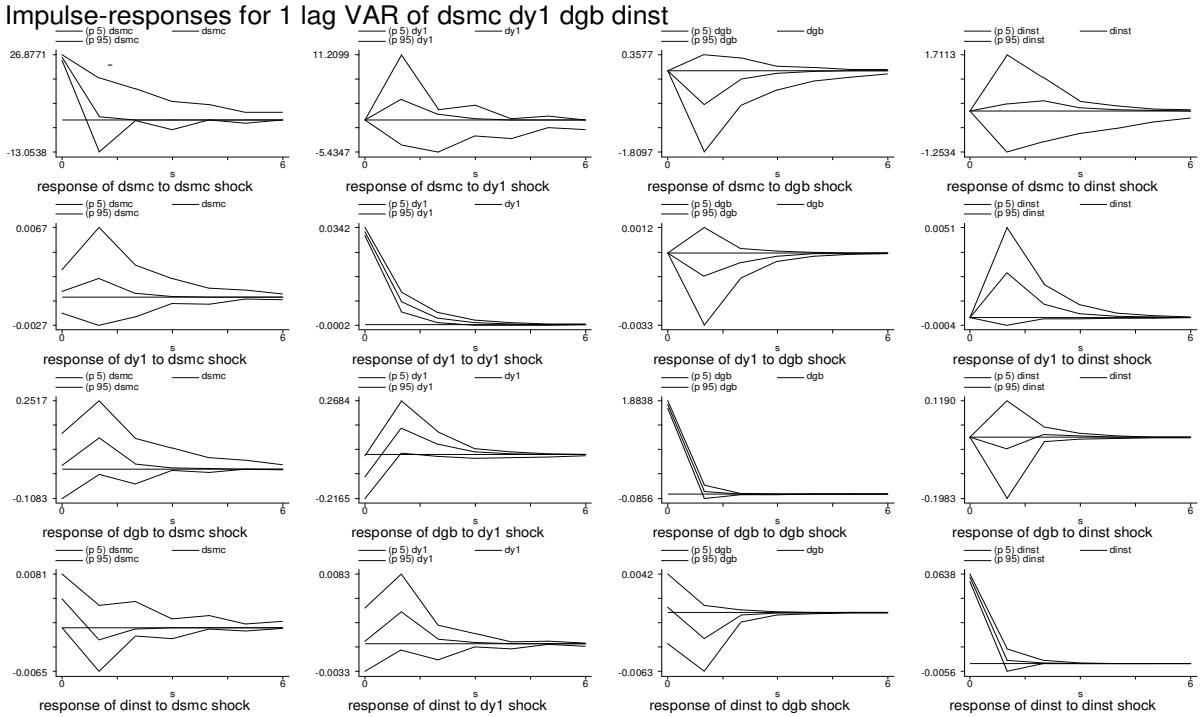


Figure-5: Impulse Response for Panel V (Variables: TR, Y, GB, INST)

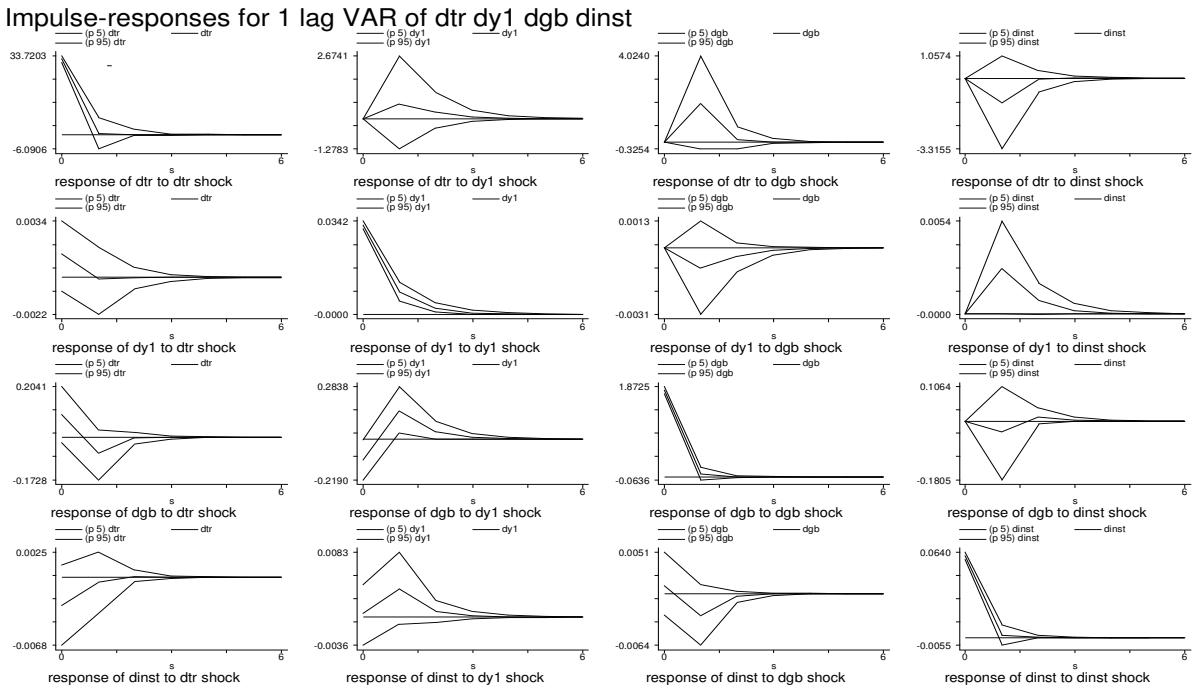
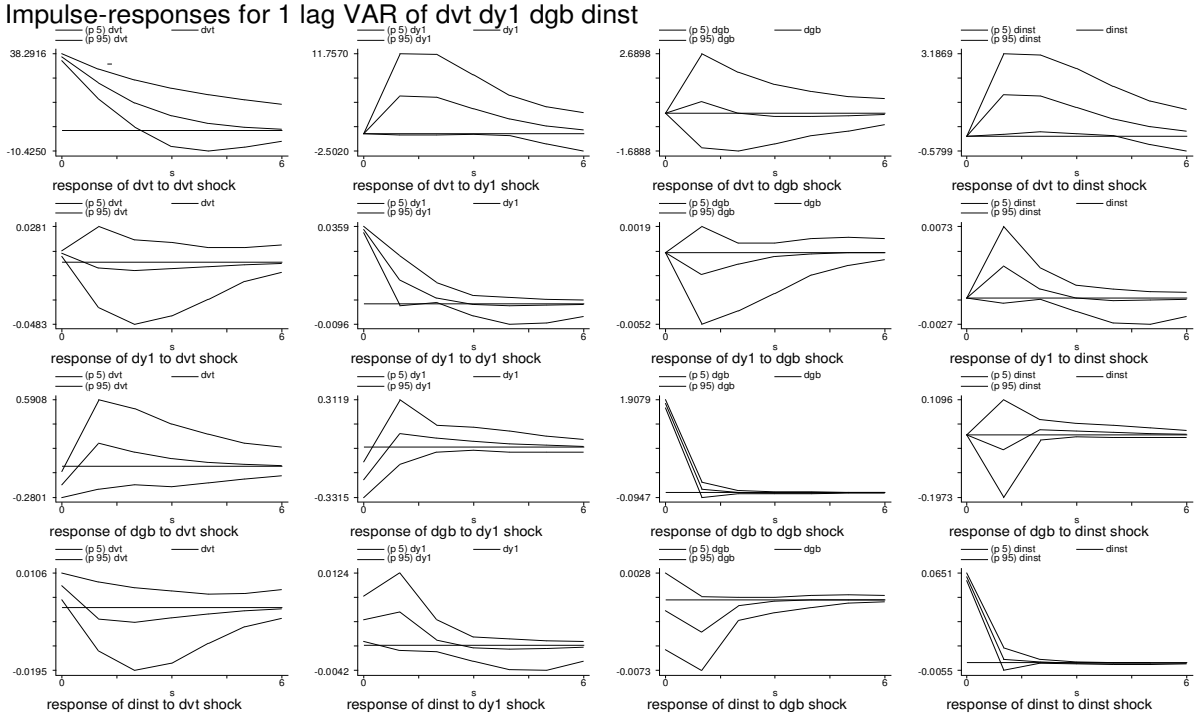


Figure-6: Impulse Response for Panel VI (Variables: VT, Y, GB, INST)



V. Conclusion and Policy Implications

This paper investigates the relationship between financial development and globalization, incorporating economic growth and institutions using data of 32 countries (developed and developing) over the period of 1989-2012. Panel unit root tests, panel cointegration, panel vector auto regression methodology (PVAR) have been applied for empirical purposes. Our empirical evidence illustrates that there is no cointegration between financial development, globalization, economic growth and institutions, attesting to heterogeneity in the developments of these variables over time across the sample of countries under investigation. Furthermore, financial development has a positive impact on economic growth and economic growth also leads financial development, i.e., financial development and economic growth have complementary relationship that supports their positive effects over time. Financial development affects globalization but globalization impedes financial development. One possible explanation is that globalization may relax constraints on external financing, reducing incentives for financial development. Finally, financial development leads quality institutions because it encourages incentives to mobilize efforts in support of quality of institutions.

From a policy perspective, the general results of the study suggest that policy efforts should be focused on financial sector development; promoting financial integration; minimizing government intervention in financial sector; facilitating the establishment of financial institutions for increasing credit delivery to the private sector; creating the enabling legal environment for the efficient allocation of credit to private sector; creating reforms to strengthen creditors' rights and strengthening the operation of stock markets. All these factors help financial sector development and enhance the efficiency of resource allocation, enabling a better function of medium and long term finance for investment. Further, to take advantage of the positive

interaction between financial development and economic growth, countries should liberalize the economy, enhance quality institutions and reduce impediments to further global integration. In addition, institutional quality is essential to accelerate globalization and financial development, further increasing the premium on financial sector development to that end, policies should aim at offering a better protection of property rights, achieving political stability, reduction in government corruption, strong law enforcement system, better quality of financial information, enhanced supervision of the banking system, more stable macro-economic environment, and sound management of ethnic conflict with a goal to promote globalization and financial development in support of sustained economic growth over time.

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Appendix: List of Countries

Canada	Kenya	Cyprus	Japan
Korea, Rep.	Singapore	Sweden	Switzerland
Trinidad and Tobago	United States	Saudi Arabia	Oman
Italy	Germany	Argentina	Cote d'Ivoire
India	Iran, Islamic Rep.	Jordan	Mauritius
Morocco	Nigeria	Pakistan	Papua New Guinea
Peru	Philippines	South Africa	Sri Lanka
Tunisia	Kuwait	Tanzania	Zimbabwe

Definition of Variables and Data Source

Variables	**Definition**	**Sources**
Private Sector Credit (% of GDP)	Private sector credit refers transfer of financial resources to private sector through loan, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.	World Development Indicators (WB, CD-ROM,2013)
Domestic Credit provided by banking sector (% of GDP)	Domestic credit provided by banking sector includes all credit to various sectors on gross basis. The banking sector include monetary authorities and deposit money bank as well as other banking institutions where data are available.	World Development Indicators (WB, CD-ROM,2013)
Liquid Liabilities (% of GDP)	Liquid liabilities is known as M_3 and is the sum of currency and deposit in the central bank (M_0), plus transferable deposit and electronic currency (M_1) plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M_2), plus	World Development Indicators (WB, CD-ROM,2013)

	travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.	
Stock Market Capitalization (% of GDP)	Stock market capitalization is equal to share price times the number of share outstanding	World Bank Financial Structure Database (2013)
Stock Market Turnover Ratio (% of GDP)	Stock market turnover ratio is equal to ratio of total shares traded and average real market capitalization	World Bank Financial Structure Database (2013)
Total Share Value Added (% of GDP)	Stock traded refers to the total value of shares traded during the period	World Bank Financial Structure Database (2013)
Institutions	Civil liberties and political rights indices are used to measure institutions. Civil liberties index includes freedom of press and speech, self-governing judicial body, freedom of political associations and assembly, and also no restriction on travel inside and outside the country. Political rights index include individual involvement in political process and participation of elected representative in community matters.	Freedom Hause (2013)
Globalization	Globalization is a composite index comprisesthree dimensions; economic globalization, political globalization and social globalization	The KOF Index of Globalization (2012)