

A COMPARATIVE ANALYSIS OF EFFECT OF DIFFERENT MEASURES OF GLOBALIZATION ON ECONOMIC DEVELOPMENT

BALRAJ VERMA

Research Scholar

Department of Humanities and Social Sciences

Jaypee University of Information Technology

Waknaghat, Solan (HP), INDIA – 173234

DR. AMIT SRIVASTAVA*

Associate Professor

Department of Humanities and Social Sciences

Jaypee University of Information Technology

Waknaghat, Solan (HP), INDIA – 173234

Number of researches have been performed to explore the relationships between globalization and economic development of a country and it is fueled after the creation of KOF index. Later on, the index is divided into two – de facto and de jure where the former one reflects the actual flow while the later represents and policy implications. Researches on the comparative analysis of the impact of these two measures on economic development are scanty. The present study not only tests but also tries to explore the causal linkages between these two measures of globalization with economic development. The study applies Johansen Co-integration test, ARDL test and VAR/VECM for finding out the co-integration and causal linkages and stability test have also been performed. The result shows that although de facto measures and its sub-dimensions are significantly affecting the economic development but de jure is not.

Keywords: Globalization, Economic Development, KOF Globalization Index, Cointegration, VAR, VECM, Granger causality, Stationarity, CUSUM.

JEL Codes: C22, C82, F63

I. Introduction

“Globalization is a multidimensional concept having various important facets that entail economic, financial, technological, and social and political processes, which continually transform the global economy society and polity” (Chatterji & Gangopadhyay, 2017). Globalization reflects an interdependence-interaction mechanism, a mechanism guided by trade and technology between people, businesses and political formation of various nations. Technological advances, driven by favourable policy shifts at government levels,

*Corresponding author Email: sriam_2000@yahoo.com

have led to expanded international trade, the global investment and mass migration, and have been so huge, especially in the latter part of the 20th century, that many relevant analysts have called this new age of socio-economic development. Global trade in goods has risen from USD 252.66 billion in 1960 to USD 35894.17 billion in 2017 by 142 times since 1960. With just US\$ 10.17 billion in 1970, the net flow of foreign direct investment has hit a high of US\$ 3.142 billion in 2007 and now amounts to about \$2 trillion in 2017. Thomas Friedman described the present wave of globalization as “farther, faster, cheaper, and deeper”.

To investigate the impact of globalization on the economic development of any country requires the accurate analytic measurement of globalization and its dimensions or sub-dimensions first, as it is not that easy. Given the lack of consensus on what globalization actually is, the co-existence of very different indexes is only natural (Olivie and Gracia. 2020). In spite of so many problems associated with measuring globalization as well as its consequences on economic conditions of a country, the topic will still be a hot cake in near future (Griffith, Cavusgil & Xu, 2008). Several metrics like KOF, CSRG, MGI, NGI, G-Index are used to assess the effect of globalization. Among all these indices, the KOF Globalization Index is regarded as the best measure of globalization due to its comprehensiveness as the KOF globalization index makes a robust accumulation of multiple aspects and features of globalization instead of the selection of a compound measure based on the widest possible description. It covers various aspects of flow as well as restrictions related to trade and foreign investments. Moreover, the way KOF measures the social and political aspect of globalization and also its sub-indices is very extensive than the others. Furthermore, consistent methodological up-gradation and Introduction of new parameters essential for the calculation of globalization indices, makes it even more appealing for empirical investigation. Nevertheless, another merit of the KOF globalization indices is its values which are calculated and published annually over a longer period of time for a large number of countries. Since 1970, almost every nation in the world has been assessed to measure the KOF Globalization Index and its dimensions.

Although the risk of oversimplification is implicit in composite indexes which results in the miscalculation of globalization measure and hence, the empirical results produced using these measures cannot be stated as reliable and valid. To minimize this error, Gygli et al., (2018) brought out a methodological change in KOF globalization by disintegrated the existing variables, added new variables and moreover clearly defined and categorized variables as “de facto” and “de jure” based on their characteristics. They calculated separate index values for de facto and de jure, they are trade, financial, interpersonal, informational, cultural and political globalization. De facto measures comprise variables reflecting real flow or operation, de jure measures encompass variables that reflect policies, resources or organizations that allow or promote existing flows and activities. The similar distinction of de facto and de jure is preserved in all dimensions and sub-dimensions of the index. The decision for categorization of indexes into de facto or de jure globalization measures was in reference to the study carried out by Quinn et al., (2011) where they stated that de facto or de jure lead to a systemic divergence of Conclusions about the association between financial openness and economic growth.

Theoretical models provide a range of pathways for rising economic development by globalization. But there is no reliable empirical evidence that these two phenomenon are causally related. Is it worthwhile for countries like India to subject themselves to the risks of globalization if the details are too obscure of the economic development benefits of globalization? Nachane (2011) assert India's adoption of liberalization, privatization, and globalization initially was driven by a naive belief in 'the magic of markets' rather than a well planned strategic move. Therefore, India is bound to empirically assess its position on globalization, given the changing circumstances.

The present study has twin objectives – first to find out the fact that whether globalization has affected the economic development and if yes, then how far. Whereas, most of the previous studies have taken internal factors of a country (like trade share, total trade divided by GDP etc) as a proxy of globalization, the present study has considered the most comprehensive and acceptable index of globalization - KOF index. The study is comprehensive in that sense that it considers all the six dimensions of globalization, as discussed above. The second objective of the study is, it tries to evaluate the effect of both de facto and de jure indices of globalization on economic development. And the reason for this is to find out exactly that whether it is the actual flow or the policy fundamentals are important for affecting economic development. Therefore, in a way, the present study tries to perform a comparative analysis of the effect of de facto and de jure on the economic development of a country.

The remaining parts of the paper are arranged as follows: Section II deals with the literature reviews reviewed in accordance with current theoretical and empirical studies on the topic; Section III addresses the empirical analysis approach embraced and findings; Section IV contains the discussion portion and Section V concludes the study.

II. Review Of Literature

The Globalization as a paradigm shift followed by economic interdependence, deregulation and a minimized role of government in economic activities have defended and fostered the interests of countries. There is no question that globalization has significantly changed the conditions and contours of countries' socio-economic, trade and investment policies (Jain, 2012). Globalization has altered the world economic order and has different effects across countries as the availability and accessibility of resources differ among them and the countries at their different stages of development respond to globalization differently. The literature contains many studies to assess the impact of globalization on the economic development of different countries. Initial studies seeking connection from globalization to economic growth largely employed a single aspect of globalization and it begins with associating measures related to economic openness with growth. These studies can be differentiated based upon the proxy/ proxies used to represent globalization or their ways to measure globalization. It's always been a challenge to quantify globalization and different researchers have used numerous indicators to reflect globalization over time.

The initial researches on this subject regard trade as a percentage of GDP as the indicator for globalization. Financial openness, along with trade, has also been applied

to assess globalization through multiple researchers. Yet globalization, if we view this as a multi-faceted phenomenon, it surely comprise far more than openness to trade and capital movements. In recent years, several composite measures have been introduced to quantify globalization. Composite indices, pose themselves as simplistic solutions because they allow multiple factors to be combined in one specific index to calculate various facets of globalization. Some of the main research studies in the field concerned and the creation of the index of globalization have mentioned below.

Initial studies of seeking a connection from globalization to economic growth largely employed a single aspect of globalization and it began with associating economic openness measures with globalization. Rodriguez and Rodrik (2000) carried out a meta-analysis and stated that the association between openness and growth remains an unanswered question and demands an adequate answer. In 2000, Jang employed VAR Model in his empirical investigation on five variables such as money supply, real output, foreign price shocks, real government spending and openness measures to examine the impact on the growth of emerging East Asian economies. Jang recorded similar findings in 2000 and later Stiglitz in 2003 and the focus put on the role of the government, and on the ability of countries to counter the globalization phenomenon. Eventually, they argued that globalisation, if properly handled, would be a formidable development factor.

In an effort to create the connection between openness and growth, Lee et al., (2004) assembled a panel data set of hundreds of countries, with eight periods of five-year cycles in each ranging from 1961-65 to 1996-2000. Trade size, tariff index, import duty, and Black-market premium were used as indices of openness, and most openness metrics have had a positive impact the growth, while their estimates are smaller than the OLS estimations.

In this same manner, Aka (2006) applied the three-variable VAR model and concluded that globalization has negative effects on growth. Openness led to short-term growth. Openness and globalization, though, will not support Cote D' Ivoire's long-term economic growth. It was among the few studies to have negated the economic growth impact of globalization.

Although the globalization's measurement has remained on a single dimension over time, scientists have introduced multiple criteria to measure economic growth. In order to assess the connection between openness and growth using OLS's panel data model, Leong (2007) carried out an empirical study on India and China. The findings of the analysis indicate strong growth due to increase in export for both nations. This dispels the common analysis of the implementation of openness policy in that a one-percentage-point rise in export growth rate or FDI growth rate is seeing a lower rate of one-percentage-point rise in those countries' economic growth rate.

The sophistication of the research methodology is expanded in order to obtain greater insights into the field. To test the impact of globalization on economic growth, Zhuang and Koo (2007) have adopted reliable panel data and an empirical model of growth. The panel data set comprised of 19 developed and 37 emerging countries; for the period from 1991 to 2004, 56 countries under-studied. The results of the estimates strongly support the positive impact on the economic growth of all countries of globalization. China and India derive

most gains from globalization, which is followed by developed and then the developing nations.

Afjal (2007) has studied the time series data set from the period 1960 to 2006, using the OLS regression and error correction models, to empirically analyze the effect of globalization on economic growth in Pakistan. Trade openness and financial integration were used by him, as a proxy for globalization and GDP for economic growth. The findings have encouraged a strong association to trade openness and financial integration with growth. He concluded that liberal trade and financial integration policies would foster long-term economic growth.

Polasek and Sellner (2011) analyzed globalization-growth relations in 27 EU Member States, from 2001 to 2006, using the Space Chow-Lin Method. They acknowledged the positive effect of globalization, mostly because of trade disparities and FDI, on economic growth in the region.

A study was undertaken on eight countries (India, China, Japan, Brazil, Singapore, Malaysia, Turkey and Iran) by Moghaddam et al., (2002) to investigate the globalization measures for calculating and evaluating the rate of economic growth. The findings of the research showed that the economic growth rate in understudy countries was strongly correlated with globalization proxies such as FDI, exports and imports. As a result of the massive flow of FDI and merchandise trade, China and Singapore have seen rapid economic growth. The study findings affirm the statistical link between foreign direct investment, the gross domestic product and the economic growth rate of developing countries.

By using an econometric model, Ray (2012) attempts to determine whether Indian economic growth is the long-term product of globalization. Over the period 1990-91 to 2010-11, he used annual time series data over India. The Granger causality test and error-correction model were used to evaluate the data set. The analysis has demonstrated that private investment, openness and development of human capital have a positive effect on economic growth. Financial integration has had a negative though the insignificant impact on growth. Public spending has had a positive yet insignificant effect on economic growth. The results show that all explanatory macroeconomic variables have a long-term relationship with economic growth which proves that globalization has been one of the triggers of the dynamism of India's economy since 1991.

The emphasis has moved to recognize the effect of globalization on different sectors of the economy with ever more work on national indicators. In order to explore its effect on the development of core sectors of the Nigerian economy, Umaru et al., (2013) examined the pre-globalization and post-globalization data sets. For a comparative empirical study, the evaluation period was 1962-2009 and the approach used was a single annual average growth rate technique. The report concluded that the influence of globalization was not consistent across sectors of the economy. Globalization has had a positive influence on sectors such as agriculture and transport and communication but has also had an adverse effect on solid minerals, manufacturing and petroleum.

In order to examine the effect of globalization on Bangladesh's economic growth, Meraj (2013) used an auto-regression distributed lag model and a Granger causality analysis. Statistics from 1971 to 2005 were included in the time series. Bi-directional causalities

between exports and GDP were identified, which means export stimulates Bangladesh's economic growth. The study suggested for more export orientation with a tight import regulation would lead to the economic development of less-developed nations, such as Bangladesh.

The above research centred mainly on a single aspect of globalization, such as free exchange, total GDP exchange, net spending, and so on. Speaking about globalization using one parameter at a time cannot depict the entire picture of it. Consequently, attempts were made to develop an index that precisely and accurately measures globalization. Nevertheless, two well-known and preferred globalization indices are Kearney's globalization index (KFP) published in the American journal *Foreign Policy* and the KOF globalization index by Dreher which become the most common globalization indices. The literature also contains studies which quantify globalization by using these indices for empirical analysis.

Dreher (2006) performed one of the pioneer analyses where globalization has become a measure focused on a variety of dimensions. He launched a comprehensive model with three major dimensions economic, social and political globalization. The research sought to empirically check how the Overall globalization index and its sub-indexes are affecting economic development. A panel of data for 123 countries was examined from 1970 to 2000, showing that the global index is of positive importance that actually accelerates growth with globalization.

Globalization as an index was well embraced by various scholars. Rao etc. (2008) used the Dreher Globalization KOF Index and expanded the Solow growth model for the Thailand, Malaysia, India, Singapore and Philippines (1956) in order to determine steady-state growth rate. Empirical studies found that countries with stronger policies on globalization do have higher levels of steady-state growth (SSGRs). The finding showed that globalization, for all countries, does not have a uniform impact. The growth influence of globalization in the Indian case has therefore been listed as highest and lowest in the Philippines out of the five countries studied.

Since the globalization index was more comprehensive because it included various dimensions such as economic, social and political, researchers had the chance to study the effects of various globalization dimensions on the country's economic growth. Chang and Lee (2010) have highlighted the role of the political party as a powerful predictor of government policies on influencing the relation between globalization and economic growth. They tried to empirically check it by taking into account one of the other independent variables, such as the overall globalization index and its sub-indexes, i.e. economic, social and political globalization. For the period of 1970 to 2006, they used techniques of Pedroni panel co-integration for 23 OECD countries. Results represent unidirectional causality between overall globalization, social and economic globalization with growth in the long term, although there was very poor evidence of short-term causality. The research also confirms evidence that the philosophy of the political party affects economic development. Right-wing political parties have had an impact on economic growth. It can be described as the right-wing parties in OECD countries are perceived to be proponents of free trade.

Mutascu et al., (2011) have used an unregulated VAR model to examine the globalization in Romania. The data set was used between 1970 and 2007. They took the KOF globalization index as an indicator for globalization and the real annual growth rate for economic growth. The results of the study show that a country needs to globalize more if it wants maximum economic growth.

The relation between US economic growth, globalization, and trade was explored by Leitao (2012). Intra-industry trade was adopted as a new indicator for trade along with FDI, globalization index as regressors variable and GDP per capita as the response variable between 1995 and 2008. International trade in related products and services (IIT) reported results foster innovation and development. FDI, economic, cultural and political globalization are found to be positively significant i.e. economic growth is facilitated by explanatory variables.

The KOF index has taken its position over time and has been widely known, as it has not only been extensive but also got updated annually. It also enables the researchers to evaluate a specific aspect of globalization, such as economic, social or political, and also globalization as a whole. One such investigation was carried by Samimi et al., (2014), where an effort to examine the impact of economic globalization and the complementary policies on growth was performed. A panel of 33 OIC nations was constructed and the GMM estimator was used for analysis. The study has concluded that economic globalization has a positive impact on economic growth. For countries with a high degree of human capital and well-developed financial structures, the consequences of economic globalization are even more pronounced. In addition, economic globalization, through complementary policies, indirectly accelerates growth.

In order to examine ASEAN countries' globalization-growth linkages and the reference period for the study was taken between 1970 and 2008. Ying et al., (2014) employed the fully-modified model for OLS regression and a panel co-integration test. In order to identify the effect of globalization on growth, they took the economic, political and social aspect of the KOF Globalization Index. The outcome showed that the economic globalization effect on growth was significantly positively. The influence of social globalization was negative and significant, with an insignificant negative effect of political aspect on growth.

To investigate the economic, social or political globalization impact on growth, Kilic (2015) used the Panel Data Study for 74 developing economies. He used the least square method with fixed effects and Granger causality test. For the study, the data collection considered was between 1981 and 2011. Economic and political globalization, as shown by the findings of this study, has enhanced economic growth in 74 developing economies and, on the contrary, social globalization has generated an adverse effect on growth.

For the period 1970-2015, Savrul et. al (2017) analyzed a panel data set of 10 ASEAN countries to decide whether globalization affects development. The findings backed the argument that globalization has a major influence on the ASEAN countries ' economic development.

The relationship between globalization and Romanian economy growth was examined by Olimpia et al., (2017) and the study contained data spanning from 1990 up to 2013. For the period 2000 to 2014, Titalessy (2018) analyzed a group of 20 countries in the

Asia Pacific region. Similar results have been demonstrated in both studies. Statistically significant and positive linkages were identified between globalization's economic and political aspects and economic growth. In both reports, social globalization has a negative effect on economic growth.

Over the course of time, KOF's index has continued to update. Gygli et al (2018) work resulted in structural improvements, disintegrated the existing variables and now contains a total of six dimensions of globalization with the addition of three new dimensions, as economic globalization has now been divided into trade and financial globalization, social globalization in interpersonal, information and cultural globalization. The sixth one is political globalization. In addition to it, they split them into two based on different criteria of globalization as 'de facto' and 'de jure'.

With the aim to explore the Turkish economic growth effect of globalization for the period 1980-2015, Kılıçarslan et al., (2018) used the Fully Modified Ordinary Least Squares (FMOLS) and Johansen co-integration test. They seek to illustrate the impact of globalization, using economic, social and political aspects of globalization which are sub-dimensions of KOF de facto and KOF de jure globalization indexes. When KOF de facto and KOF de jure aspects are segregated, they showed a statistically insignificant and negative effect of economic globalization on growth. De facto Social globalization stimulates economic growth while De jure social globalization decreases economic growth. However, in the case of political globalization, both De facto and De jure indexes produced a negative impact on economic growth.

Bataka (2019) clearly differentiating between de jure and de facto facets of globalization and its sub-indexes, tried to explore its impact on economic development. The study utilized data from 40 sub-Saharan African (SSA) countries from 1980 to 2015 and used the second-generation panel analysis. The outcomes of the study confirmed the overall economic growth in the SSA countries. De jure globalization stimulates economic prosperity, although de facto globalization weakened the growth. But there is also evidence that economic growth is encouraged by de jure, de facto economic globalization and by de jure social globalization. In fact, de facto social globalization and de jure political globalization are counterproductive, while the de facto political aspect hampers growth.

The paper adds to the literature by using categorized globalization indexes as de facto and de jure to find out their association with the economic growth of India. The difference between de facto and de jure is indeed preserved in all dimensions and sub-dimensions of the index. The study will investigate the causal linkage between various sub-dimensions of de facto or de jure globalization (namely- trade, financial, cultural, interpersonal, informational and political) and the economic growth of India. As per author's knowledge, this work is the first to use all the six sub-dimensions of globalization under both De facto as well as De jure criteria of globalization, to explore its links with economic growth of a country.

III. Research Methodology

The empirical study aimed to analyze both the long-run and short-run causal effect of different dimensions of globalization on India's economic development. The proxy used

to represent the economic development was the gross domestic product (GDP) as the dependent variable. To provide specific and detailed information about the globalization, the study used the revised KOF index of globalization (Gygli et. al., 2018). The study used both “de facto” and “de jure” criteria for all six sub-dimensions of globalization (Trade, Financial, informational, interpersonal, cultural and political globalization) for the analysis. The variables under “de facto” criteria represent actual flows or activities, whereas the variables measured under “de jure criteria” emphasis on policies, resources or institutions that are responsible for actual flows and activities.

The dataset used for analysis covers the period from 1991 to 2017 (i.e. Time series data). Data were extracted from two main sources. GDP data were extracted from the World Bank database (The World Bank Data, 2018) and converted into its natural log value to linearize it. The data for the independent variables were drawn from KOF globalization index reports published annually by the Swiss Economic Institute (Konjunkturforschungsstelle). Beside calculating and publishing indices for economic, political and social globalization, they have now disentangled economic globalization into trade and financial globalization, social globalization into interpersonal, informational and cultural globalization and enabled the researcher to undertake even further in-depth analysis. A higher value of the index indicates higher globalization and vice versa.

To test for co-integration, the study used both Johansen co-integration test and Autoregressive Distributed Lag (ARDL) co-integration test and to test long/ short-run causality between the dependent and independent variables, the study used Vector Autoregressive Model/ Vector Error Correction Model (VAR/ VECM). Lastly, to ascertain the robustness and validity of the VAR/ VECM estimations, the study also performed residual tests for serial correlation and square of CUSUM test to check the stability of parameters.

Model Specification:

For analysis, the models used are:

$$\ln_GDP = \alpha_0 + \alpha_1 FI_{df} + \alpha_2 TR_{df} + \alpha_3 CU_{df} + \alpha_4 IP_{df} + \alpha_5 IN_{df} + \alpha_6 PO_{df} + \varepsilon_1 \quad (1)$$

$$\ln_GDP = \beta_0 + \beta_1 FI_{dj} + \beta_2 TR_{dj} + \beta_3 CU_{dj} + \beta_4 IP_{dj} + \beta_5 IN_{dj} + \beta_6 PO_{dj} + \varepsilon_2 \quad (2)$$

Where \ln_GDP is the natural log of the gross domestic product; FI TR, CU, IP, IN and PO refers to financial, trade, cultural, interpersonal, informational and political dimensions of globalization respectively. The subscript “df” and “dj” represents de-facto and de-jure dataset respectively. α_0 and β_0 are the intercept terms of equation 1 & 2 respectively. α_i and β_i are marginal coefficients of their respective variables. Finally, ε_1 and ε_2 represents the error terms for their corresponding equations.

Data Estimation and Results:

A. Stationarity Test:

To run co-integration as well as causality tests, checking the stationarity of the series is a prerequisite. Therefore, the study applies the unit root test at 5 per cent significance level

developed by Levin, Lin and Chu (2002). The co-integration test can only be run if the series is non-stationary at a level while stationary at its first difference. Table 1 reported the outcomes of unit root test and it is evident that at level all the series are non-stationary while at their first difference all are stationary, thus, all the series qualify for further testing like cointegration and causality tests.

Table 1: Unit Root Test

Series	De-Facto Series			De-Jure Series		
	Variable	t-stat (at level)	t-stat (at first diff)	Variable	t-stat (at level)	t-stat (at first diff)
GDP	Ln_GDP	1.07373	-5.63394***	Ln_GDP	1.07373	-5.63394***
FI	FI _{df}	-0.15009	-4.48876***	FI _{dj}	-0.902763	-5.947703***
TR	TR _{df}	-0.994947	-7.015099***	TR _{dj}	-0.707329	-5.433205***
CU	CU _{df}	-0.13236	-5.574151***	CU _{dj}	0.311984	-5.202115***
IP	IP _{df}	1.180547	-5.964206***	IP _{dj}	0.09232	-4.771695***
IN	IN _{df}	1.32867	-4.26259**	IN _{dj}	-0.223203	-4.479283***
PO	PO _{df}	-1.711237	-6.712495***	PO _{dj}	-1.003967	-3.005589**

(Source: Authors' calculation) (Here *, ** and *** represents significance level at 10%, 5% and 1% respectively)

B. Cointegration Test:

The Series are shown in Table 1, also ascertain that all the series are stationary at the same level which is at their first difference i.e. all the series are I(1). Thus, the next step in the process is to run the co-integration test for the equation(1) and equation (2) separately. To ascertain the robustness of the result, we have checked long-run co-integration by using both the Johansen method as well as the ARDL approach. Johansen test can only be used if all the series are integrated at the same level, i.e., I(1) while the advantage of ARDL approach is that even if the series is a mix of I(0) and I(1), it can be applied (Pesaran, Shin and Smith, 2001). It works in two steps – first, it identified the existence of the long-run relationship between variables of interest and thereafter if relations exist then it finds out short and long-run parameters of the relationship (Gangopadhyay and Nilakantan, 2018). The outcome of co-integration obtained in the first step would decide which test for causality be used to find out short-run causality. If the series shows long-run co-integration, then Granger causality test in VECM approach be used otherwise VAR Granger Causality test will be used. SIC (Schwarz Information Criterion) is used for lag selection and its value found to be minimum at “lag 2”, therefore, the analysis is based on 2 lags. Table 2 and Table 3 present the result of co-integration by using the Johansen test and ARDL test respectively.

Table 2: Test of Co-integration: Johansen Co-integration Test

Hypothesized no. of CE	De-Facto Series				De-Jure Series			
	Trace Stat	Prob	Max-Eigen Stat	Prob	Trace Stat	Prob	Max-Eigen Stat	Prob
None	255.62	0.0000	116.49	0.0000	208.05	0.0000	70.69	0.0000
At most 1	139.12	0.0000	40.20	0.0507	137.36	0.0000	54.04	0.0007
At most 2	99.09	0.0000	33.63	0.0534	83.32	0.0029	36.58	0.0232
At most 3	65.45	0.0005	32.59	0.0104	46.74	0.0633	20.59	0.3013
At most 4	32.86	0.0215	22.35	0.0335	26.14	0.1243	15.20	0.2749
At most 5	10.51	0.2436	10.42	0.1853	10.94	0.2149	10.90	0.1592
At most 6	0.08	0.7752	0.08	0.7752	0.04	0.8340	0.04	0.8340
Remark	Co-integration exist				Co-integration exist			

Source: Authors' calculations

Table 3: Test of Co-integration: ARDL Method: Result of Bound Test

Bounds (at 5% significance level)		De-Facto Series		De-Jure Series	
Lower Critical Value I(0)	Upper Critical Value I(1)	F-stat	Remarks	F-stat	Remarks
2.32	3.50	15.61	Significant, Long-run cointegration	1.799	Non-Sig, No Long-run cointegration

(Authors' calculation. Bounds values are of Pesaran et. al., (2001) of unrestricted intercept with no trend for k=7)

Table 3 depicts the result of cointegration of ARDL Bound test. The result of the de facto series shows the presence of long-run cointegration (because the value of F statistics is 15.61 which is higher than the upper critical value 3.50), this result is similar to that of the Johansen test. On the other hand, the result of de-jure series shows the absence of long-run cointegration because the F-stat is much below the lower critical value at I(0). This result is different than the Johansen test as shown in Table 2. However, the relationship is further ascertained by using the error correction test as shown in Table 4.

Table 4: Test of Co-integration: ARDL Method: Error Correction Term

De-Facto Series			De-Jure Series		
Variable	Coefficient	Prob	Variable	Coefficient	Prob
C	0.01879	0.5102	C	0.056433	0.0696
$\Delta(\ln_GDP(-1))$	0.55597	0.1518	$\Delta(\ln_GDP(-1))$	0.126318	0.6804
$\Delta(\ln_GDP(-2))$	0.836264	0.0321	$\Delta(\ln_GDP(-2))$	0.231362	0.3488
$\Delta(TR_{df}(-1))$	-0.002707	0.7212	$\Delta(TR_{dj}(-1))$	0.002044	0.6453
$\Delta(TR_{df}(-2))$	0.001429	0.8675	$\Delta(TR_{dj}(-2))$	0.005225	0.4162
$\Delta(FI_{df}(-1))$	0.011869	0.5112	$\Delta(FI_{dj}(-1))$	-0.000832	0.8797
$\Delta(FI_{df}(-2))$	0.01556	0.3353	$\Delta(FI_{dj}(-2))$	0.003818	0.3843
$\Delta(IN_{df}(-1))$	-0.01458	0.3766	$\Delta(IN_{dj}(-1))$	-0.00741	0.6462

De-Facto Series			De-Jure Series		
Variable	Coefficient	Prob	Variable	Coefficient	Prob
$\Delta(IN_{df}(-2))$	-0.004519	0.7336	$\Delta(IN_{dj}(-2))$	-0.019781	0.2146
$\Delta(IP_{df}(-1))$	-0.027354	0.0873	$\Delta(IP_{dj}(-1))$	-0.0006	0.9368
$\Delta(IP_{df}(-2))$	-0.009023	0.4541	$\Delta(IP_{dj}(-2))$	-0.00601	0.4215
$\Delta(CU_{df}(-1))$	0.004682	0.5135	$\Delta(CU_{dj}(-1))$	-0.007119	0.5020
$\Delta(CU_{df}(-2))$	-0.007263	0.3315	$\Delta(CU_{dj}(-2))$	0.010636	0.2517
$\Delta(PO_{df}(-1))$	-0.007346	0.2368	$\Delta(PO_{dj}(-1))$	-0.002353	0.8113
$\Delta(PO_{df}(-2))$	0.001368	0.8130	$\Delta(PO_{dj}(-2))$	0.017208	0.1238
$ECT_{df}(-1)$	-0.669205	0.0415	$ECT_{dj}(-1)$	-0.266998	0.3631
Long-run Cointegration		Present	Long-run Cointegration		Absent
F-statistic		0.93474	F-statistic		0.705252
Prob(F-statistic)		0.04642	Prob(F-statistic)		0.75132
Serial Corr (LM)	0.0600	0.8845	Serial Corr (LM)	0.5404	0.3513

(Source: Authors’ Calculation. Here “ Δ ” represents first-difference operator and (-1) and (-2) represents first and second lag of the corresponding variables respectively, ECT represents Error Correction Term. Rest all the notations are same as discussed above.)

The result of Table 4 shows that long-run cointegration exists for de-facto series as the error correction term is found to be negative and significant. However, no long-run cointegration is found for de-jure series. Therefore, we can say that long-run cointegration exists for de-facto series while it is not there for de-jure series. As shown in Table 4, it can be said for de-facto series that about 67% of disequilibrium is getting corrected within a one-year period of time.

As far as the stability of the models concerned, the cumulative sum of recursive residuals (CUSUM) testis used to assess the stability of the parameter (Pesaran and Pesaran, 1997). The accompanying figures, Figure 1 and Figure 2, respectively display the outcomes of CUSUM of square test for *de facto* and *de jure* series. It is clear from the figures that both the models are stable as the CUSUM of square lines does not surpass the critical lines at 5 per cent.

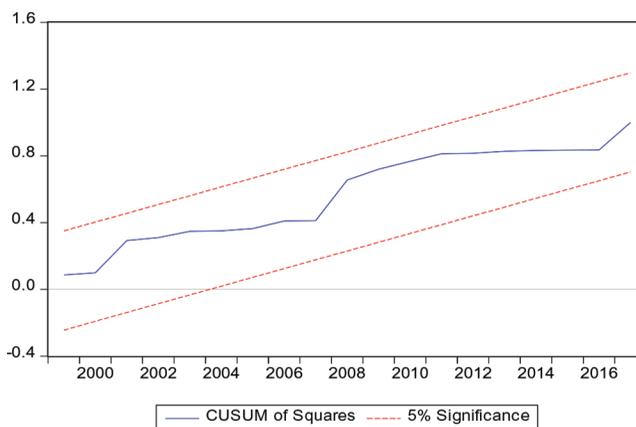


Figure 1: CUSUM of Squares test: De-Facto Series

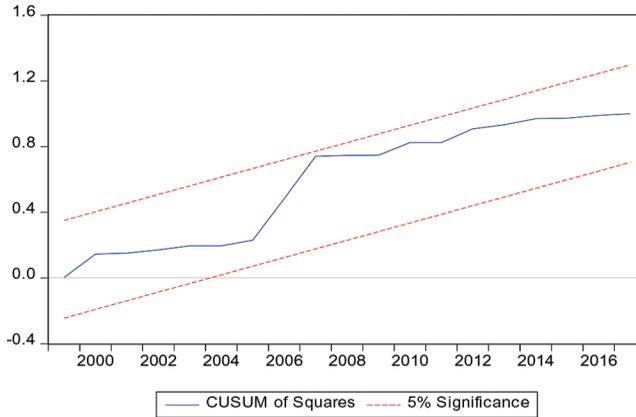


Figure 2: CUSUM of Squares test: De-Jure Series

Also, the study applies a diagnostic test for serial correlation in both the models and the null hypothesis is that there is no serial correlation. The probabilities of coefficients of LM stat for de facto and de jure models are 0.8845 and 0.3513 respectively. The p-value is over 5 per cent significance level hence supports the null hypothesis, which means Both the models are verified as being free of the serial correlation.

After establishing the evidence of the presence or absence of long-run cointegration, now the short-run causal effect needs to be explored. To explore the short-run causal effect, the series which are cointegrated, the VECM model has to be used while the series which are not cointegrated, in that case, unrestricted VAR model should be used. The same has been discussed in the next section.

C. Causality Test:

The previous section discussed the presence or absence of long-run cointegration in de-facto and de-jure series respectively. To explore the short-run causality, we need to apply the VEC Model for de-facto series and unrestricted VAR Model for de-jure series.

Table 5: Short-Run, One-Way Causality Testing of D-Facto Series (VECM) and De-Jure Series (VAR)

De-Facto Series (VECM)		De-Jure Series (VAR)	
Variable	Coefficient	Variable	Coefficient
CointEq	-1.5631***		
$\Delta(\ln_GDP(-1))$	1.0811***	$\ln_GDP(-1)$	0.5094***
$\Delta(\ln_GDP(-2))$	1.1279***	$\ln_GDP(-2)$	0.4510***
$\Delta(TR_{df}(-1))$	0.0444***	$TR_{dj}(-1)$	0.0015
$\Delta(TR_{df}(-2))$	0.0285***	$TR_{dj}(-2)$	-0.0051
$\Delta(FI_{df}(-1))$	0.0149*	$FI_{dj}(-1)$	0.0095*
$\Delta(FI_{df}(-2))$	0.0406***	$FI_{dj}(-2)$	0.0008
$\Delta(IN_{df}(-1))$	-0.0817***	$IN_{dj}(-1)$	-0.0235

De-Facto Series (VECM)		De-Jure Series (VAR)	
Variable	Coefficient	Variable	Coefficient
$\Delta(IN_{df}(-2))$	-0.0495***	$IN_{dj}(-2)$	0.0023
$\Delta(IP_{df}(-1))$	-0.0153**	$IP_{dj}(-1)$	0.0004
$\Delta(IP_{df}(-2))$	-0.0060	$IP_{dj}(-2)$	-0.0051
$\Delta(CU_{df}(-1))$	0.0237***	$CU_{dj}(-1)$	0.0006
$\Delta(CU_{df}(-2))$	0.0042	$CU_{dj}(-2)$	0.0052
$\Delta(PO_{df}(-1))$	-0.0006	$PO_{dj}(-1)$	0.0156*
$\Delta(PO_{df}(-2))$	0.0102***	$PO_{dj}(-2)$	-0.0076
Const	0.0043		
Wald Test	Chi-Square	Wald Test	Chi-Square
ΔTR_{df}	50.2208***	TR_{dj}	0.5863
ΔFI_{df}	46.0237***	FI_{dj}	5.1737*
ΔIN_{df}	56.9009***	IN_{dj}	5.8522*
ΔIP_{df}	5.2202*	IP_{dj}	0.9938
ΔCU_{df}	38.3306***	CU_{dj}	2.5004
ΔPO_{df}	13.3972***	PO_{dj}	4.4905

(Authors’ Calculations. ***, **, * represents significance at 1%, 5% and 10% respectively. Variables name are same as discussed above. Wald test is done at two lags – lag 1 and lag 2.)

Table 5 shows the result of one-way Granger causality of both de-facto as well as de-jure series. Since de-facto series are found to be cointegrated, therefore, Vector Error Correction Model (VECM) is used to explore the one-way short-run causality. However, de-jure series was not found to be cointegrated, therefore, Vector Auto Regression (VAR) model is used. As shown in Table 5, the defacto series shows the coefficient of cointegration negative and significant, reassure the existence of cointegration. Most of the variables are also found to be significant at 5% level of significance. Moreover, the de facto series also shows the presence of one-way causality from the index of globalization to economic development. All the independent variables have been tested at two lags – lag 1 and lag 2. It shows that except index of interpersonal globalization, all other indices (trade, financial, informational, cultural and political) are found to be significant even at 1% level of significance. Therefore, as far as the de-facto series is considered, most of the globalization indices are causing significantly the level of economic development.

As far as the de-jure series is concerned, as shown in Table 5, the VAR model is applied to explore the causal link from the indices of globalization to the level of economic development. It can be seen that individually none of the indices are found to be significant at 5% level of significance. One-way short-run causality test also shows that no indices are having any causal effect of the level of economic development.

IV. Discussion

A long-term convergence between Indian economic development and de facto globalization has been demonstrated through data analysis. With the exception of de facto interpersonal

globalisation, the five aspects of de facto globalization (i.e., trade, financial, cultural, information and political) have caused India to grow in short-run. Gygli et al., (2018) explained that not all variables are available in all countries and for all years when calculating KOF index values for different dimensions / sub-dimensions. The interpersonal index for India is not exempted from such issues. De facto Interpersonal globalization encompasses aspects like International voice traffic, Transfers, International tourism and Migration. There is no data available on Indian International voice traffic and International tourism prior to 2000 and 1995 respectively. The data required for analysis must be available annually however the data on migration is available on every fifth year. Many other dimensions are also subjected to such issues but in the case of de facto interpersonal globalization index for India, it is prominent as three out of four parameters used to calculate the index value faces this issue. These may be the reasons for interpersonal Globalization not responding the way other de facto dimensions have responded towards economic development of India.

On the other hand, De jure globalization aspects neither established any long-run association with Indian economic development nor any causality with any of its dimensions towards economic development. It has produced diverged results from De-facto globalization index. Their measurement methods may be a significant explanation for different outcomes, as the de factor indexes focus on activities and the de jure indexes concentrate on policies.

De jure trade globalisation has three components as trade regulations, trade taxes and tariffs. Factors such as trade regulations and tariffs are used from Economic Freedom of the World survey (Gwartney et al., 2017). Trade regulation and tariff are part of Freedom to trade internationally index, which is one of the five main parameters of economic freedom. As per the 2017 statistics India's rating (from 0 to 10) and rank among 164 countries for Freedom to trade internationally is not quite encouraging and it is 6.08 and 131st respectively. Similarly, India is also rated on the same scale from zero to ten, for its unweighted mean tariff rate component and the ratings over the years is 0.00 (1990), 3.50 (2000), 6.60 (2005), 7.48 (2010), 7.32 (2015) and 7.24 (2017). Additionally, the third component of De jure trade globalisation, taxes on international trade as a percentage of revenue of India was 25.795 in 1991 and now it is 11.128 in 2017.

To measure de jure financial globalization index, Gygli et al., (2018) used factors like investment restriction and two different capital account openness index (KAOPEN) developed by Chinn-Ito (2017) to measure financial openness and Jahan-Wang (2016) to measure the openness of the capital account. India's rating for investment restriction/foreign ownership is 4.05 in 2000, 7.40 in 2005, 6.13 in 2010, 5.86 in 2015 and 5.83 in 2017 (Gwartney et al., 2017). Hence, it is evident from the data that India has not improved its rating for investment restriction over the years. In context to de jure financial openness Chinn, Ito (2017) developed KAOPEN index (Capital account openness index). Out of 163 countries under investigation, India along with other 56 countries attained the second lowest value of KAOPEN index. To measure the de jure openness of the capital account, Sarwat Jahan and Daili Wang in their study categories 164 countries into three broader categories as Open/ Wall/ Gate over the period 1996–2013. An open nation has barely any

capital control over any group of assets during the sample period, a Wall nation has broad control across all or mostly on all of its asset categories. A nation of the Gate episodically uses capital checks. India with Fourteen other countries fell under “Wall category”. Additionally, Jahan-Wang index was constructed based on IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). IMF reports six indicators under aggregate openness index as Overall Openness Index (all asset categories), Openness of Capital Inflows Index, Openness of Capital Outflows Index, Financial Market Openness Index (equity, bond, money market, collective investment, derivatives), Nonresident Openness Index, Resident Openness Index, where the index value ranges from 0 (least liberalized) to 1 (fully liberalized). They have grouped the countries in six categories based on their index value (i.e. No values, Under 0.2, 0.2-0.4, 0.4-0.6, 0.6-0.8, 0.8-1) in all the six openness indicators India falls in “Under 0.2 range” as it attains values 0.2, 0.14, 0.0, 0.1, 0.1 and 0.1 respectively. This suggests that the financial globalization of India is less liberalized in the sense of de jure criteria.

The fixed and mobile telephone subscription has increased exponentially in India but suffers from data unavailability issue from 1991 to 1999 vital for empirical investigation. On the other hand, India is rated very low i.e. 0.33 out of 10 over the years in terms of ease of getting Indian visa for tourism and business purposes to any foreigner (Gwartney et al., 2017). The number of international airports per capita is another consideration in the estimation of the de jure interpersonal globalization. India currently has 34 international airports but the factor value is likely to be very low in proportion to the population and therefore unable to contribute much to the de jure interpersonal globalization to significantly generate any effect on development.

The following may be the possible reasons why the Indian economic development has not been brought on by the de jure political globalization. Though, India has signed enormous agreements (bilateral or multilateral) with a large number of countries over the years related to various areas or subjects matters. KOF De jure political globalization index considered the bilateral agreements only to measure political globalization index. Not only this, but the index also assigned more weightage for the same number of treaties with smaller partners as an indicator of strong individual connect rather than a desire to build global political networks.

Overall, The changes in policy criteria (de jure) over the period of time cannot be negated, however, this change is small in itself and are not able to produce the significant effect on the economic development of a country empirically, however, these small changes in policies result in a significant change in the actual flow and activities (de facto) in the economy as both are interlinked.

5. Conclusion

The study explores the influence of sub-dimensions of globalization on economic development by performing a comparative analysis between de jure and de facto facets of globalization. The study tested the equations for co-integration and causality by using

unit root test, Johanson co-integration test and Vector Autoregressive Model/ Vector Error Correction Model (VAR/ VECM). The study found that de facto globalization's sub-dimensions boosts the Indian economic development and established a "The catch-up effect" in long-run. The results also established short term causality between five sub-dimensions of de facto sub-dimensions of globalization namely trade, financial, cultural, information and political with development, although de facto interpersonal globalization failed to establish such a relationship. There was no evidence of alignment between the sub-dimensions of de jure globalization and economic development in the long run. Not even single sub-dimension of de jure globalization is found to cause Indian economic development in the short run.

The empirical findings confirmed that the outcomes are subjected to our choice of globalization measure used (de facto or de jure). De jure sub-dimensions just not lack comprehensiveness but also are unable to measure the degree of trade of a country and how financially open it is internationally. Also, imposing restrictions on foreign exchange transaction does not limit the capital flows. We advocate de facto measures as best suited because they do not reflect policy claims but rather practice. For future research, similar studies can be replicated on other country or number of countries. The impact of globalization, by splitting the de facto and de jure globalization indices, may be studied on other macroeconomic factors will definitely add values to the existing literature. In-fact, index of globalization vs composite index of economic development may probably give a new insight, however, it is a matter of further research.

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