

Trade, Financial Integration and Growth: Some Cross-Country Evidence

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National Needs, Global Standards

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DECLARATION

I, Y. N. Raju, hereby declare that the research report embodied in the present thesis entitled “*Trade, Financial Integration and Growth: Some Cross-Country Evidence*” is an original research work carried out by me under the guidance and supervision of Prof. Debashis Acharya, School of Economics for the award of Doctor of Philosophy from the University of Hyderabad.

I hereby also declare that it has not been submitted previously in part or in full to this or any other University or Institution for the award of any degree or diploma.

Date: 01 June 2021

Place: Hyderabad

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Dedicated
to
Amma and Nanna

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CERTIFICATE

This is to certify that this dissertation entitled “***Trade, Financial Integration and Growth: Some Cross-Country Evidence***” submitted by Mr. Y. N. Raju, in partial fulfilment of requirements for the award of the Degree of Doctor of Philosophy in the School of Economics, is bonafide work carried out by him under my Supervision and guidance.

This thesis is free from plagiarism and has not been previously submitted, in part or full, for the award of any other degree of this or any other University.

Further, the student has the following presentation and publication before submission of the thesis:

I. Presentations:

- A. Presented a paper titled “External Debt and Growth Nexus in India: Empirical Evidence for Post-Reform Period 1991-2013” in the International Conference of Economic Growth and Sustainability Prospects & Challenges organised by Shri Dharmasthala Manjunatheshwara Institute for Management Development (SDMIMD), Mysore Karnataka on 20-21 November 2015.
- B. Presented a paper titled “volatility and Output Growth Revisited” in the 55th annual conference of the Indian Econometric Society (TIES) Mumbai School of Economics & Public Policy, University of Mumbai & national institute of securities markets, held on the 8th 9th and 10th January 2019 at the NISM campus Patalganga.

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SL.No.	Course Code	Course Title	Credits	Results
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03	EC 703	Research Methodology	4	Pass

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ABBREVIATIONS

ADB:	Asian Development Bank
ADF:	Augmented Dickey–Fuller Test
AIC:	Akaike Information Criterion
ANZCERTA:	Australia New Zealand Closer Economic Relations and Trade Agreement
ARCH-M:	Autoregressive Conditional Heteroskedasticity
ARDL:	Autoregressive Distributed Lag
AREAER:	Annual Report on Exchange Arrangements and Exchange Restrictions
BEPS:	Base Erosion and Profit Shifting
BIC:	Bayesian information criterion
BMP:	Black-Market Premium
BPA:	Bilateral Payments Arrangements
CAPM:	Capital Asset Pricing Model
CEI:	Complete Economic Integration
CET:	Common External Tariffs
CM:	Common Market
CMEA:	Council for Mutual Economic Assistance
CPI:	Consumer Price Index
CU:	Custom Union
DEG:	Dynamic General Equilibrium
EAC:	East African Community
EEC:	European Economic Community
EFTA:	European Free Trade Association
E-GARCH:	Exponential Generalized Autoregressive Conditional Heteroskedasticity
EQBIFI:	Equity Based Financial Integration
EU:	Economic Union
FDV:	financial development variables
FEVD:	Forecast Error Variance Decomposition
EFTA:	European Free Trade Association
GARCH:	Generalized Autoregressive Conditional Heteroskedasticity
GDP:	Gross Domestic Product
GIMI:	Global Investable Markets Index
GMM:	Generalized-Moments-Of-Method

HFI:	High Financial Integration
HP:	Hodrick–Prescott
HQIC:	Hannan-Quinn Information Criteria
IAPM:	International Asset Pricing Models
IFI:	International Financial Integration
IFS:	International Financial Statistics
IH:	Identification through Heteroskedasticity
IMF:	International Monetary Fund
IPR:	Intellectual Property Rights
KAOPEN:	Capital Account Openness
LFI:	Low Financial Integration
LSDV:	Least Squares Dummy Variable
MMSC:	Moment and Model Selection Criteria
MSCI:	Morgan Stanley Capital International
MTIP:	Movement towards International Prices
NAFTA:	New Zealand Australia Free Trade Area
NATO:	North Atlantic Treaty Organisation
NOEM:	New Open Economy Macro
OAPEC:	Organisation of Arab Petroleum Exporting Countries
OAU:	Organisation for African Unity
OECD:	Organisation for Economic Co-operation and Development
OLS:	Ordinary Least Squares
OPEC:	Organisation of Petroleum Exporting Countries
PCA:	Principal Component Analysis
PEQA:	Portfolio Equity Assets
PEQL:	portfolio equity liabilities
PLO:	Palestinian Liberation Organization
PPP:	purchasing power parity
PRIVATE:	Private Sector Credit
PTR:	Panel Threshold Regression
PVAR:	Panel-Vector Autoregressive
RBC:	Real Business Cycle
RSTOPEN:	Restricted Trade Openness
TC:	Trade Creation

TFP:	Trade Diversion
TNC:	Transnational Corporations
TOPEN:	Trade Openness
VBIFI:	Value Based International Financial Integration
WDI:	World Development Indicators
WEO:	World Economic Outlook

Chapter: 1

Introduction, Objectives and Scope of the Study

“Even small difference in the growth rates, when cumulated over a generation or more, have much greater consequences for standards of living than the kinds of short-term business fluctuations that have typically occupied most of the attention of macroeconomists. To put it another way, if we can learn about government policy options that have even small effects on the long-term growth rate, then we can contribute much more to improvements in standards of living than has been provided by the entire history of macroeconomic analysis of countercyclical policy a fine-turning.....economic growth....is the part of macroeconomics that really matters, Barro and Sala-i-Martin, 1995 p-4, 5”.

1.1 Background of the study

It is undeniable that compared to the closed economies the open economies grow at a faster rate. Thus, understanding the linkage between international trade-financial integration and its influence on growth performance remains contested in international economics. A large body of evidence on the international economy observed that from mid of the 1970s, fifty per cent of countries across the world opened their economies to the global market. Later since the 1980s, globalization has been of the view that more open and integrated economies are better in economic growth. According to De Brouwer (1999), the term integration refers to the “process in which segment markets open-up and unified so that participants enjoy the equal unimpeded access”. In general, integration has the advantage of eliminating domestic and international restrictions on cross-border capital flows and goods and services trade. Trade and financial integration are known as two significant pillars of globalization because of the inter-linkage between the two. International trade is accompanied by global financial flows, since more trade results in increased demand for financial services and instrument. Integration and globalization, these two concepts are closely related. Financial globalization defines rising global connection through cross-border flows, whereas financial integration

refers to an individual country's linkage with the foreign capital market. For instance, the rise in financial globalization is associated with a quick rise in financial integration on average.

Similarly, liberalization in trade deals with policy initiatives and measures towards trade openness. In contrast, the rise in trade openness is associated with an increase in the size of a country's trade with the rest of the world in relation to total output share. Historical evidence on trade and financial integration show that both have been moving together over the past one and half centuries. Global integration worked significantly from mid-19th century to the end of World War I, and thereafter a great fall was noticed towards the end of World War II. However, the increase in trade and financial integration during the 1870s to 1914 mainly was due to technological improvement in transport and communication. The innovation in the transport sector increased the demand for new steamships and railroad services by many economies, including advanced economies.

Further, the investments in these sectors increased sharply during this period, and economies liberalized their capital account to meet their capital shortage. However, economies experienced a lion's share of capital flows in this period, which motivated them for further financial development and deeper financial integration (Neal, 1990). Later, the policymakers across the world concentrated on restrictive policies to control the capital flows. The period of the Great Depression witnessed most of the countries following substantial trade barriers to adjust their balance of payment. This included imposing strong quantitative restrictions (such as using import-substitution strategies) to increase export earnings and control capital good import to maintain trade balance. However, the situation changed again since the early 1960s, reflecting mainly the liberalization of trade and financial flows. Kose et al. (2006) observed sharp rises in cross-border financial flows from the early 1980s¹ between advanced economies and developing countries. Especially, many of these countries eliminated their capital control and spurred liberalization of capital account with anticipation of better economic growth.

The existing models in theory reiterate the significance of openness in trade and finance openness in promoting long-term economic growth. Trade openness helps the country to allocate resources efficiently through specialization and comparative advantage. The traditional trade theories in international economics focused on a static framework. The trade

¹ Kose et,al (2006) argued that the developing countries were experienced liberal trade and free capital movement in 80s and early 1990s, but for industrial countries it was confirmed one decade before developing countries.

models such as Ricardo's; comparative advantage and Heckscher-Ohlin; in two countries and two-factor frameworks used the idea of *static gain*. The resources and technology used in the production process is considered exogenous to the model. Hence, according to the classical view, free trade helps the country in production efficiency through the division of labour. An increase in productivity is seen to be growth-promoting across the countries. Thus, static trade theory suggests that free trade will have strong response to rise in income level. The static trade model considers a change in technology having direct impact on growth performance, but they neglect the reverse causality in determining trade pattern. However, both the classical and neo-classical trade models remain inefficient to generate long-term growth from trade and rise in income level, which is considered temporary in nature. The "new trade theory" with endogenous growth considers knowledge spillovers associated with international trade tends to generate faster growth among the countries (Grossman and Helpman, 1990). Similarly, Romer (1990) also suggests that trade openness facilitates easy availability of intermediate goods to domestic producers. The economics of scale make it possible to enlarge their market size to operate at the optimum level. Some studies show an indirect link between trade openness and economic growth, which works through the positive effect of trade on productivity and investment growth (Levine and Renelt, 1992).

It is well noticed from the past literature that the theory of financial integration suggests several direct and indirect channels of financial globalization that enhances long-term growth in developing countries. Three direct channels include domestic saving augmentation, cost of capital reduction through improved global allocation of risk², technological transfers and managerial skills, where financial integration attracts large share of FDI inflows with potential to produce technology spill overs (Lee, 1998). Finally, development of the domestic financial sector to monitor risk in portfolio flows increases the liquidity of the domestic stock market (Levin, 1996). Following that, two direct channels that enhance economic growth; 1) mainly associated with production specialization; for example, increase in domestic allocative efficiency spurring total factor productivity (TFP) and long-term growth (Obstfeld's, 1994; Prasad et al., 2003) and 2) through formulating better macroeconomic policies to develop financial sector (Rajan and Zingales, 2003; Gourinchas and Jeanne, 2003, 2006). However, the theoretical literature concludes that both international trade integration and financial globalization are growth-promoting in nature.

² Capital asset pricing model (CAPM) suggest that stock market openness improve the allocation of risk Henry, 2000s and Stulz, 1999),

On the other hand, some researchers argue that change in business cycle volatility is associated with the degree of trade and financial integration. One of the early works by Ramey and Ramey (1995) analyse the empirical relationship between output volatility and growth. They calculate simple mean and standard deviation for two different samples of countries, one with 92 countries for the period of 1960 to 1985 and the second with 24 OECD nations from 1950 to 1988. The result confirms a negative and statistically significant relationship between volatility and growth and implies that the higher the volatility lower the growth. Moreover, the study also suggests a significant effect of government spending volatility on output volatility.

Kose et al. (2004) conclude that both trade and financial openness appear more helpful for stabilizing output volatility without affecting growth, using a large dataset comprising 85 countries from 1960 to 2000. They employed various econometrics techniques such as cross sectional and panel regression models to explore the relationship. An event study is also used to examine the changes in relationship in two different periods. They also analyse the determinants like investment ratios, credit growth and quality of institution and improvement in domestic financial sector and its effect on dynamics of growth and volatility. The finding suggests a negative association between output volatility and economic performance. However, this result varies among the choice of country groups. These results yield positive and significant relationship for industrial countries, but negative in case of developing economies³. Later, they go a step further and examine the response of trade and financial integration towards output volatility and growth. The authors find that the relationship between trade openness and output volatility shows positive and significant effect on growth. The countries with more trade openness face lesser trade-off between output volatility and growth performance. Similar findings are observed for financial integration with output volatility, but with less significant.

Edwards (2001) empirically examines the relationship between capital account openness and economic performance using a cross-country dataset from 1975 to 1997. The dataset contains six groups of countries and three types of capital flows, such as foreign direct investment (FDI), debt flows (including debt to banks and bonds purchased by the foreigners) and other types of flows, mostly portfolio equity flows. The author focuses on two questions. Is there any evidence on high capital mobility being associated with economic growth at the cross-

³ The negative association between output volatility and growth performance in developing countries was because of lack of proper financial market integration with the global markets (Kose, et, al 2004).

country level? The second question is, does it differ between emerging and advanced economies? The results report the strong and positive association between capital account openness and economic growth. But this relationship will only work after reaching a certain degree of development in the domestic financial market. Hence, domestic financial development is the pre-condition for financial integration in emerging countries. Finally, advanced economies benefit better with financial integration, but emerging markets still lagged to reach that level, maybe due to partial integration.

Beck (2002) explores the link between the level of financial sector development and trade balance in the manufacture sector, especially to know how financial development improves the country's trade balance. A theoretical model by Beck (2002) explains the ability of the financial sector to channel domestic saving to the private sector so that it can help overcome the liquidity problem, thereafter, create some space for specialization and economies of scale. Later, the model was empirically tested for a sample of 65 countries over the period 1966-1995 using the GMM technique for a dynamic panel. Theoretically, the model suggests that, well developed financial systems encourage local producers for extensive participation in the global market to increase the export share to balance their trade account. The empirical findings conclude that countries with a strong financial system will raise their manufacturing export share in total trade and helps the country to balance their payments.

Aizenman and Noy (2004) are more concerned about the causality between trade and financial openness. Mainly, they look into the “two-way feedback” between de-facto trade and international financial integration for 83 countries for 1982 to 1998. The de-facto financial openness measure consists of total capital inflow and outflow as a percentage of GDP and for trade openness, it is the sum of export plus import percentage of GDP. The empirical findings reveal that financial integration is influenced by economic and political factors such as trade integration, political instability, and corruption. This implies that an increase of one standard deviation in trade openness will raise 9.5 per cent of de-facto financial openness.

Similarly, one standard deviation improvement in democracy leads to a slowdown of 3.5 per cent of international financial flows; further, one standard deviation rise in corruption results in 3 per cent fall in financial liberalization. The authors also confirm the linear feedback between the two series. Granger causality is stronger from finance to trade than trade to finance. Finally, greater financial integration must follow the certain degree of trade openness; if not, then dealing with greater exposure to financial turbulence, imposing

restrictions on capital flows may be ineffective. Contrary to the above, Vo(2018) argues that there is bidirectional causality between trade liberalization and financial integration in Asia. The study investigates 9 Asian countries over 2001-2015 and applies simultaneous equations approach to trace the causality between them. The author confirms a positive and significant association between trade and financial integration in Asian countries. Furthermore, countries get more integrated when they experience the same level of economic development and distance is considered an important factor, which determines the volume of trade share with the partner country.

Buch, Döpke, and Pierdzioch (2005) apply the “New Open Economy Macro (NOEM) model⁴” for 24 OECD countries to evaluate whether financial market integration is influenced by business cycle volatility over the time of 1960 to 2000. The author uses a panel dataset for 24 OECD countries for 1960 to 2000. Their empirical analysis is conducted in three steps. First, Granger non-causality test is conducted to check whether financial openness and business cycle volatility has any link. Secondly, multivariate panel regression is run to test the additional factors that influence business cycle volatility and thirdly, to find the changes in business cycle volatility over time, cross-sectional regressions for individual decades are run. The estimated results confirm a consistent link between financial openness and business cycle volatility over time. The evidence shows that financial openness is highly associated with business cycle volatility during the 1990s compared to 70s and 80s. They conclude by saying that the relationship between financial openness and business cycle volatility mostly depends on the underlying shocks' nature. To the end, they point, why past studies were unable to capture the linkage between the two, maybe parameter instability is one of the reasons.

Ito (2006) conducts an empirical analysis with two broad objectives; (i) whether financial integration helps to improve the domestic financial system, (ii) whether trade liberalization is an essential condition for the country to open their capital account. The author uses four standard measures to evaluate stock market development, such as stock market capitalization, the total value of stock traded, stock market turnover ratio, and 4) private sector credit to GDP ratio. Financial integration is measured based on KAOPEN⁵ index, and country's legal

⁴ NOEM: new open economy macro is also known as stranded tool to understand international macro issues (Obstfeld and Rogoff, 1995; Sarno, 2001)

⁵ KAOPEN: implies capital account openness, which was constructed using binary variables based on “Annual Report on exchange and Arrangements and Exchange Restrictions (AREAER)”. (Quinn, 1997; Kose et al, 2003; Klein, M. (2005; Ito,2006).

and institutional quality are measured on corruption, law and order, and degree of the bureaucratic system. The empirical findings imply that financial integration will have a significant effect on the domestic financial system. Particularly in the presence of strong law and order, high quality of bureaucracy, and a lower rate of corruption, the efficiency of financial integration will increase. Moreover, trade liberalization is a precondition for Asian countries to liberalize their capital account.

Aizenman (2008) explores how the public finance channel is vital to understand the association between trade and financial integration. The estimate confirms the positive and highly significant association between trade and financial liberalization for both the set of countries over the period 1969-1988. But the author's main idea is to identify the hidden linkage of public finance that operates through this mechanism. He suggests that the pattern of costly taxes imposed by the fiscal authorities is the response factor that allows changes in both the openness⁶. Moreover, both costly collections of taxes by the government and a lower degree of trade integration will tend to financial repression⁷. So, the author suggests that the higher the degree of trade integration smaller the financial repression. In this sense, financial integration is an outcome of trade openness. Hence, he opines that financial integration without proper fiscal restructuring may lead to high public debt.

Calderón and Schmidt-Hebbel (2008) assess the impact of trade and international financial integration on growth volatility. They apply the same *de-facto* measure of trade and financial integration for 82 countries over 1979 to 2005. Their findings are presented in three folds: 1) they argue that greater trade integration will mitigate the unpredicted shocks arising due to the output volatility once the country reaches a high level of production specialization and exports. 2) High financial integration tends to have greater exposure to stabilize output volatility, only when the country is under a certain low debt-equity ratio. 3) Trade integration helps in smoothing the output volatility shocks in response to the rise in manufacturing goods trade. In the case of financial integration, equity-based integration is negatively associated with growth volatility. In contrast, there is a positive effect of loan-based integration on

⁶ In developing countries fiscal spending expenditure financed through two taxes, 1) with direct income tax and 2) implicit tax, both the taxes are costly. Implicit tax entail as "costly due to prevention of illicit capital flight which implies as the interest rate falls the domestic savers face an implicit tax on their domestic savings" where it gave rise to capital flight (illegal flows) to outside world (Aizenman, 2008; Giovannini and de Melo , 1993).

⁷ The logic is that; decrease in interest rate will have direct effect on domestic saving, where the domestic savers will experience an implicit tax on their savings. The effect of high tax collection forces individual saver to move towards higher returns on savings, which may lead to capital flight. Under these circumstances an increase in trade integration will improve financial openness, but at the cost of high capital flight (Aizenman, 2008).

growth-volatility relationship. 4) Stabilizing ability of trade integration to mitigate growth-volatility will be stronger, if the countries have a well-developed financial system. However, financial integration will have partial mitigation ability even with strong financial depth. 5) higher is the degree of trade integration lower is the probability of output drop (economic crisis), while, greater is the financial openness higher is the probability of a country experiencing economic crisis.

Chen and Quang (2014) find that international financial integration will enhance economic growth once the country achieves a certain level of threshold in income, private credit, financial depth, level institution quality, degree of trade openness and level of government expenditure. Vithessonthi and Kumarasinghe (2016) test the hypotheses 1) that greater the financial development, higher the integration of stock market with the global market, 2) greater the stock market integration, higher the trade integration with the rest of the world. A simple panel OLS regression technique is applied to test the hypotheses. They find that countries with a strong financial system can promote stock market integration with a global market. In contrast, there is no significant effect of stock market integration on trade integration with the rest of the world.

The principal issues are as follows: What if the economy cannot manage their external shocks associated with greater integration? A continuous increase in trade and financial integration tends to increase an economy's exposure to external shocks such as higher trade openness somewhat related to higher output volatility. Similarly, financial liberalization is also associated with higher capital flow volatility (especially short-term capital flow, which are more vulnerable). Does trade integration alone elevate growth performance? Or whether financial integration better explains the economic growth? Or whether both trade and financial integration together are beneficial and growth-promoting for the economy?

Considering the issues discussed above, the present study attempts a comprehensive analysis of the relationship between trade, financial integration, economic growth, and volatility.

1.2 Statement of the problem and Significance of the study

The problem statement and significance of the study is presented below, which revolves around three thematic areas in trade-finance integration and growth nexus, based on the identified gaps in the literature. They are (1) *growth and volatility relationship*, (2) *finance*

and growth nexus with threshold effects and (3) *trade-financial integration and growth nexus*. The three themes are discussed below.

1.2.1 Understanding growth and volatility relationship

Of late, the question of macroeconomic volatility affecting economic performance has received attention. Specifically, the business cycle volatility and growth models deal with different doctrines such as short-run economic fluctuation and long-run economic growth are independently determined in different time horizons. However, the prominent work of Ramey and Ramey (1995) conclude that countries with higher volatility of growth have lower growth. Further there is a strong effect of volatility on growth in developing countries. The theory seems to suggest that the economic growth and output volatility relationship is far from being uncontroversial. The relationship between output volatility and growth may be positive or negative depending upon the mechanism which drives this relationship. For example, theoretical analysis suggests that the link between growth and volatility is contingent on investment dynamics, in which irreversibilities in investment and asymmetric adjustment costs lead to higher volatility, lower investment, and lower economic growth.

In contrast, Black (1987) finds that the choices of technology are made from a set of possibilities where the average rate of return (growth) and return volatility (output volatility) are related positively. The technology that produces faster average growth is inherently riskier. This conflict in theoretical predictions is also seen in empirical studies like Kormendi and Meguire (1985), Grier and Tullock (1989), supporting the positive effect of output volatility on growth. On the contrary, Ramey and Ramey (1995), Martin and Rogers (2000), and Fatas (2003) find a negative relationship between output volatility and growth. One of the empirical studies' criticisms is that the growth-volatility relationship is endogenously and jointly determined. Furthermore, several recent empirical studies yield a negative effect of volatility on growth, both in absolute terms and controlling a different set of standard growth determinants such as domestic policy management like inflation, government expenditure, trade openness and role of the financial development. Some of the empirical research point out that increase in trade integration is associated with higher growth and, at the same time, higher volatility, but the effect of financial integration on the growth-volatility relationship are far less clear.

Given the above, the present study investigates this growth-volatility relationship deeply and understands the effect of output volatility on economic growth in different groups of countries with different financial integration levels.

1.2.2 Finance and growth nexus with threshold effects

The financial development and economic growth relationship might be too complex to understand. Economists hold different opinions regarding the role of the financial system and its importance in economic growth. The first is the “supply leading” view, which says financial development positively affects economic growth. Two important channels through financial intermediary system influence economic growth: (1) by raising capital accumulation efficiency and thereby increasing in marginal productivity of capital, (2) rise in individual saving levels leading to increase in level of investment. In other words, as the size of saving increases and efficiency of investment rises, the level of financial development triggers the long-run economic growth (Bagehot (1873), Schumpeter (1912), Gurley and Shaw (1955), Gold Smith (1969) and later like McKinnon (1973), Greenwood and Jovanovich (1990) and Merton Miller (1998). The Second view is “demand following”, where the relationship between finance and growth goes back to Joan Robinson (1952), “where enterprise leads finance follows”. Hence, prospective financial intermediaries develop and respond according to the change in demand from the real sector. Hence, as the real side of the economy expands, the demand for financial services rises, which in turn enlarges the growth of these services. The third view put forward by Robert Lucas (1988) argues that there is no direct association between financial development and economic growth. The empirical literature on the role of financial intermediation and economic growth focuses on two different types of financial systems, i.e., bank-based financial system and market based financial system. Some empirical works find a positive relationship between bank development (stock market) and economic growth. These include studies by King and Levine (1993b), Levine and Zervos (1996), Berthelemy and Varoudakis (1996), Corray (2010). The other studies underlining the negative impact of financial development on economic growth include Naceur and Ghazouani (2007), Nili and Rastad (2007), Odedokun (1996), Narayan and Narayan (2013), Rioja and Valev (2014). All three thought and empirical literature streams yield a mixed and inconclusive relationship between financial development and economic growth. This varied and inconclusive finance-growth nexus merits studying the non-linearity between financial development and economic growth by focusing on the presence of contingency effect in the relationship. The present work is different from past finance-growth studies since it uses non-

linear panel threshold models to capture various well-documented precondition factors. Notably, the empirical strategy better arrests the threshold effect of the financial development on economic growth with flexibility than the past studies. The significant contribution is estimating the threshold above (below) at which the level of financial development accelerates/ slowdown economic growth using different threshold variables.

1.2.3 The trade-financial integration and growth nexus

International trade and international finance as two important aspects of economic growth have drawn researchers and policymakers' attention for the past few decades. Indeed, many countries have undertaken a series of financial market reforms paving the way for greater financial integration, reducing cross-border capital flow restrictions across the countries. Equally, international trade integration has also played an important role in determining the economic growth critically in the world of fast-growing financial integration across the globe. The evolution towards the global financial integration and higher trade intensity is well documented in (Kose et al. 2004), (Schumukler S, 2003), (Carrieri et al. 2007) and (Torre and Schmukler, 2007). The process of globalization, which represents the significant rise in the volume of trade and the cross-border capital flows among the industrial and developing economies since the mid of 1980s (Kose et al.2004). Kearney and Lucey (2004) document that the spread of trade linkages and the global financial system leads to strong global integration. This is due to increased international trade in commodities, services and financial assets. Kose and Yi (2006) argue that, increase in international financial integration fail to conclude positive and significant effect on growth. Stiglitz (2000) finds that capital account openness is associated with greater instability due to change in the foreign capital flows resulting from acute economic policies. Many of the economies have experienced a rapid increase in cross-border capital flows for the last two decades. Still, the real benefits of this financial integration in terms of economic growth remain highly controversial (Obstfeld, 2009) and some experience severe financial crises.

These developments naturally raise a question asking if trade and financial integration together determine the relationship between global integration and economic growth. Next, whether these relationships vary across countries based on their income level. More specifically, do higher growth rates in some countries be fuelled by greater global integration with increased trade volume and gross capital flows? Further, are the level of country's development and degree of global integration important in determining the validity of this relationship.

Finally, the last contribution rests on the application and econometric techniques used in this work, which lacks in the trade-financial integration and economic growth literature. This establishes an important evidential milestone in the present work because the significance and robustness of the results largely depend on usage and the rigours of the empirical methodology. With the help of these new techniques, the study produces some fresh evidence inspiring future research in this area, particularly with-in sub-sectors and sub-regions.

Many studies try to explore the impact of trade and financial openness on economic growth. However, some try to find out the nexus between trade openness and growth, and some are on the beneficial effect of financial globalization on economic growth. But very few studies rigorously examine the causality between trade, financial integration, and economic growth.

1.3 Research questions

- 1) Whether the growth and volatility relationship has changed based on the level of economic development?
- 2) Is financial development's effect on economic growth is contingent on the relative speed of growth in the financial system?
- 3) At what threshold financial development will affect economic growth?
- 4) Do the level of trade and financial integration matter in explaining higher economic growth?
- 5) Which group of countries benefit from the process of global integration?

1.4 Research objectives

The overarching objective of this thesis is to understand the countries' growth performance when they adopt policies towards trade and financial liberalization. In other words, the study aims to examine the aggregate effect of global integration (trade-finance) on economic growth over time. Specifically, the study explores the change in growth-volatility relationship with an increase in financial integration; then explores the finance-growth relationship based on certain threshold variables conditioned on the financial development and growth relationship. Finally, the aim is to examine the growth performance when countries adopt global integration. Accordingly, the following objectives are formulated.

1. To examine the relationship between economic growth and its volatility among the developing and industrial countries.

2. To examine the non-linearities in financial development and economic growth nexus in the presence of threshold effect.
3. To examine the role of trade-financial integration and its impact on economic growth.

1.5 Data and Methodology

1.5.1 Data description

The study employs an annual data set for the period 1978 to 2017, extracted from various sources. The data on variables like per-capita GDP growth, population growth, inflation, human capital, investment (gross fixed capital formation) to GDP ratio are obtained from *World Development Indicators* (WDI) of the World Bank, *International Financial Statistics* (IFS), *World Economic Outlook* (WEO) and *Barro and Lee Educational Attainment* dataset. Data on financial development indicators; private sector credit, liquid liabilities (M_3), gross domestic savings (all expressed as ratio to GDP) are extracted from *World Bank Financial Development and Structural* database. Finally, we collect data on trade and financial integration, such as ratio of exports plus imports to GDP as proxy for trade openness and the ratio of gross capital flow to GDP (sum of capital inflows and outflows/GDP) as a proxy for financial integration from *World Development Indicators* (WDI) of the World Bank and Lane and Maria Milesi-Ferretti (2015) dataset. Moreover, policy restrictions data are collected from Chinn-Ito (2007) KAOPEN index and the index of freedom to trade international dataset.

1.5.2 Methodology

Three different methods are employed based on the objectives. A brief description is given below. The method in detail is given in respective chapters.

In chapter 2, the study employs both cross-sectional and panel data approach to analyse the output volatility-growth relationship. The output volatility is computed as the standard deviation of per capita GDP growth and the standard deviation of output gap. First, cross-sectional regression analysis average are used to understand the volatility-growth relationship. Later, fixed and random effect models are used to probe the relationship further. The study employs a data set of 67 countries (industrial, high financial integrated and low financial integrated) selected using MSCI (Morgan Stanley Capital International) global investable markets index over 1978 to 2017.

Chapter 3 investigates the level of financial development and its impact on economic growth. The study employs panel threshold regression (PTR) models to capture the non-linearity in the variable of interest. It explains the difference in coefficients and their magnitude, below and above the threshold level. The non-linearity is why the level of financial development and its impact on growth could also depend on the change in other variables. This moderates the finance and growth relationship in a discontinuous manner. Hence, the panel threshold regression (PTR) model serves as an excellent alternative to other linear models to observe breaks or asymmetries in most of the macroeconomic time series variables that are frequently used in business cycles theory. The study employs a dataset of 82 countries comprising industrial, developing, and underdeveloped countries from 1978 to 2018. The choice of the countries is entirely based on the availability of data for a long time of 40 years.

Chapter 4 examines the relationship between financial integration, trade integration and economic growth. Examining the relationship is not straightforward because there may be causality between these three indicators. Hence, estimating the relationship may mislead and produce inconsistent results. Thus, the study adopts a panel-vector autoregressive (PVAR) model with GMM⁸ framework to capture the relationship between trade, finance integration and economic growth. The advantage of this P-VAR is twofold, i.e., it applies the same traditional VAR approach by treating all the variables in the system as endogenous. Secondly, the panel data method allows for the unobserved individual heterogeneity in the data by taking a fixed effect, which improves the consistency of the estimates (Love and Zicchino 2006). The study uses an annual dataset for a sample of 90 countries, in which there are 34 industrial countries, 56 emerging and developing economies, throughout 1988 to 2017. Two different proxies are employed to measure both trade and financial integration, one is the *de-facto* measure (the ratio of exports plus imports to GDP as a proxy for trade openness and the ratio of gross capital flow to GDP as a proxy for financial integration). The other is the *de-jure* measure (based on policy restrictions) for integration.

⁸ which was developed by Arellono and Bond (1991) and Arellono and Bover (1995).

1.6 Organisation of the thesis

The rest of the thesis consists of four chapters,

- I) Chapter two reviews the past literature on growth-volatility relationship and empirically examines the link between economic growth and volatility for the three different groups of countries based on their level of financial integration.
- II) Chapter three presents both theoretical and empirical literature on finance and growth nexus and examines the non-linear relationship between financial development and economic growth based on threshold models.
- III) Chapter four empirically examines the effect of trade and financial integration on economic growth over the chosen period across the countries. Here, the attempt is to explain how trade integration and financial integration are important in determining economic growth.
- IV) Chapter five concludes with some key findings, limitations of the study, policy recommendations and suggestions. The scope for further research is also briefly presented in this chapter.

The thesis has no separate chapter on the review of the literature. Each chapter is devoted to an objective, as listed above. The relevant literature, data, and econometric method employed to achieve the objective dealt in respective chapters are presented, yielding self-contained looks to the chapters.

Chapter: 2

The Volatility-Growth Relationship: An Empirical Re-examination

2.1 Introduction

The primary objective of this chapter is to understand the growth and output volatility relationship between industrial and developing countries. From the theoretical point of view, both phenomena are driven by some macroeconomic variables. In this regard, macroeconomic stability has long been an objective of economic policy in emerging economies, although views on how this should be achieved varied across the countries. However, from the past four decades, the most volatile countries in the world are developing countries. Small countries such as the Dominica republic or Togo and large economics like Mexico, India, and Argentina are also on the list of most volatile countries because most of these nations are predominantly primary goods exporter and capital goods importers. The growing literature establishes that nine out of ten OECD countries come under the very least volatile economies list. Whether the growth and volatility relationship investigate independently or jointly is a subject of some debt. According to stochastic dynamic business cycle literature, the difference between trend and cycle is an artificial one, and both growth and fluctuations are driven by the same set of shocks. In theory, the link results from volatility and growth as endogenous variables, which means the causal effect may run from one variable to another.

Moreover, this link may be positive or negative depending on the mechanism that drives the relationship. Despite all this argument, the empirical relationship between macroeconomic volatility and economic growth is undeniable, making volatility as one of the prime determinants of underdevelopment. The welfare cost of the macroeconomic volatility is noticed mainly in developing economies. One can identify this welfare loss from the deviation in the pattern of consumption smoothing. In developing countries, volatility has a negative impact on output growth, reflecting a decline in future consumption patterns. This

negative link between volatility and output was first recognized by Ramey and Ramey (1995) and the work is then extended by the Fatas (2000), Hnatkovska and Loayza (2005). In their studies they conclude that volatility has an indirect welfare effect through reduction in economic growth, especially in those countries that are financially and intuitively underdeveloped.

The chapter presents an overview of the theory and empirical evidence on the effects of output volatility on long-term economic growth with a large dataset of 67 countries (including industrial and developing countries) for the 40-year period from 1978 to 2017. The analysis is done at two levels. The first part looks at the connection between output volatility and economic growth and its main components based on descriptive statistics. These results capture well the volatility and growth effect in the different country grouping. Although this relationship varies over time even in the country grouping, this implies no clear pattern emerge for this analysis and some uncovers interesting connections left in the analysis. The second part briefly discusses the possibility that volatility has a significant effect on economic growth rates by conducting various empirical testing with different econometric models. Finally, the conclusion is that output volatility negatively affects long-term economic growth, especially for developing countries.

The rest of the chapter is organized as follows; Section 2.2 describes predictions of economic theory and existing evidence. Section 2.3 describes the data set and the models employed. Section 2.4 presents the empirical results and finally, Section 2.5 concludes.

2.2 Economic theory and existing evidence

The global economic crises of the 20th century raised the issue of macroeconomic volatility as a critical factor that affects economic growth. Macroeconomists worldwide tended to analyse the sources of this fluctuation and the factors that cause economic growth. However, the theoretical and empirical studies try to analyse the standard dichotomy of whether volatility is related to growth over time, if yes, then what are the determinants of this. The burgeoning literature examine the linkage between growth and volatility. This mechanism is explained in two ways; the first emphasizes investors' behavior towards uncertainty about the future and its impact on long-term growth. Due to uncertainty, the firm gets the wrong signal from the market where the investors invest in the wrong projects. Moreover, increase in volatility tends to reduce the investment, if irreversibilities characterise the investment. Joshua and Nancy (1993) employ endogenous growth model to assess the effect of policy uncertainty on

economic growth in the endogenous growth framework with investment irreversibility. Their findings suggest that the policy fluctuations between the two tax regimes determine the level of growth. Such as, the policy uncertainty will boost growth in the lower-tax regime and slow down growth when the tax regime is higher. However, the gap between the policy regimes and their persistence determines the level of investment and economic growth. Another mechanism deals with the structural interaction between the growth process and business cycle fluctuations (associated with shifting from recession to boom). In terms of the business cycle, the relationship will be positive if volatility is related to recession.

Moreover, if the recession is associated with higher research and development (R&D), then an innovation will lead to the destruction of least productive firms⁹. This may later generate higher long-run output growth as well as higher output volatility. (Grier and Tullock (1989); Caporale and McKiernan (1996); Kormendi and Megurie (1985).

Imbs (2002, 2003) argue that the negative growth-volatility relationship found by Ramey and Ramey (1995) and Martin and Rogers (2000) is the reason for the wrong composition of aggregate GDP. In general, the composition of aggregate GDP itself impacts the nature of the growth-volatility relationship. Here, the author re-examines the growth-volatility relationship based on disaggregated data at the sectoral level and applies a non-parametric approach to assess the linkage. The author observes that volatility will positively and significantly affect growth when data is disaggregated. Hence, when the data is disaggregated, the negative association between aggregate output growth and its volatility becomes positive. The reason might be a rise in productivity growth at the sectoral level.

Koteski et al. (2013) study a broad dataset of 208 regions to examine the output growth and its volatility over the period 1960 to 2000. The study confirms that output volatility will have a positive effect on GDP growth over the period. In addition, the quality of institutions shows no impact on growth-volatility relationship. Finally, the author concludes that volatility of growth will continue to affect GDP growth in countries with low institutional quality. Another argument in favour of the positive growth-volatility relationship is by Yeh, Huang and Lin (2013) where they employ the ‘pooled mean group’ technique to examine the effect of financial structure on growth and growth volatility relationship in 40 countries over the period 1960 to 2009. They measure financial structure based on bank development indicators and market-based indicators. Here, the volatility is measured using G-ARCH type models and

⁹ Schumpeter (1939) “creative destruction”

5-years-moving standard deviation of real GDP growth rate. Their findings suggest a long-run co-integration between financial development, growth, and its volatility. Especially, the market based financial structure will help the countries to increase the level of economic growth, but at the cost of high output volatility. Overall, the authors conclude that the long-run country will experience faster growth but suffers from high fluctuation.

On the other hand, the growth-volatility relationship becomes negative when the recession is tied to the worsening of financial and fiscal constraints. Here, the recession will have an inverse effect on human capital development by lowering the process of learning-by-doing, which may later decrease productivity enhancement and economic growth. In addition, volatility also depends on government policies, such as labour-market restriction to control the firm and make them less flexible to the innovation (Viktor and Norman, 2003). Hence, the theoretical impact of financial globalization on business cycle volatility is ambiguous. Ramey and Ramey (1995) conclude a negative relationship between growth and volatility over the period, while the connection is stronger for the developing countries. Mendoza (1994) apply stochastic dynamic business cycle model and find that financial integration has little impact on output and consumption volatility. The author also observes that output volatility increases when the shocks are large and persistent over time. Some recent studies use a dynamic stochastic sticky-price model to explain the importance of monetary and fiscal shocks on output and consumption volatility. In the presence of monetary (fiscal) policy shocks, the volatility of output increases (decreases) while the consumption volatility decreases (increases) depending on the degree of financial integration (Sutherland, 1996 and Senay, 1998). Finally, Aghion and Saint-paul (1999) study using the business cycle theory and find that in recession the cost involved in innovation decrease, which tends to improve productivity and higher economic growth. Finally, Grier and Perry (2000) apply bivariate GRACH-M model to examine the link between uncertainty, inflation, and output growth for United States over the period of 1948 to 1996. They do not find any statistically evidence to support these relationships.

Guillaumont et al. (1999) examine the role of various types of instabilities and their impact on Africa economic growth during the 1970s and 80s. Mainly, they analyse three types of “primary” instabilities such as climate instability, term of trade and political instabilities. Their results confirm the instability in Africa during the 70s and 80s, which is greater than the others developing countries. Significantly, the term of trade and political instability is

strongly associated with African economic growth. Moreover, bad policies projection may lead to increase in investment instability and exchange rate instability in Africa than others.

Kroft and Lloyd-Ellis (2002) empirically analyse the association between average per-capita growth and growth volatility, using Ramey and Ramey (1995) dataset of 92 countries. The volatility of growth is measured in two ways; 1) based on year-to-year uncertainty and 2) based on business cycle fluctuations. They observe a negative and significant effect of medium-term business cycle movements on growth. On the other hand, growth and year-to-year volatility are positive and highly significant in the short run. These results are confirmed for both OECD and 92 sample countries. The authors also suggest a robust correlation between growth and with-in-phase volatility after including investment control, but human capital has no significant effect on the growth-volatility relationship. Hence, the relationship between growth and its volatility is ambiguous, even if positive.

The study by Badinger (2010), confirm three significant findings, 1) the negative growth-volatility relationship confirms for the sample of 128 countries, 2) the negative effect of output volatility on economic growth is due to the endogenous effect of volatility, 3) the volatility spillover will lead the developing countries to experience slower growth rate, and 4) no change in negative growth-volatility nexus, even after controlling for institutional quality. Furthermore, Lin and Kim (2014) analyse the relationship between GDP growth and its volatility using simultaneous equations (SE) technique with an application of identification through Heteroskedasticity (IH). They apply GARCH model to assess growth volatility for 1960 to 2010 for 158 countries. Their findings observe that volatility will have a negative and significant effect on the growth equation, where the 1 per cent increase in volatility will reduce 1.15 per cent of output growth. On the other hand, reverse causality is existing between output growth and its volatility equation, which shows one per cent increase in growth will raise 0.05 per cent volatility. However, there is no change in the results even after using an alternative measure for volatility. Moreover, the result strongly supports the negative effect of output volatility on growth, and better stabilization policies are recommended to mitigate unusual growth fluctuations.

Dabusinskas, Kulikov and Randveer (2012) utilize a cross-section of 121 countries and confirm the negative volatility effect on economic growth. Moreover, the effect of macroeconomic volatility is persistent for developing countries than the OECD economies over the period.

Macri and Sinha (2000) employ the ARCH-M model to analyse the effect of growth volatility on Australian economic growth. The authors apply two quarterly datasets from 1957: Q3 to 1999: Q4, one with an index of GDP and the other with industrial production index. The estimated result shows a strongly negative and significant association between output variability and economic growth in Australia. A similar study conducted by Fang and Miller (2009), re-examine the output growth and output growth volatility in the case of Japan. The study uses the same quarterly data of real GDP growth from 1955: Q2 to 2008: Q2 and employs various GARCH (I-GARCH, E-GARCH and ARCH (1)-M) models to assess the growth volatility. They find high volatility persistence after correcting for outliers, and low variance, including a break. Finally, they confirm the ambiguous relationship between real GDP growth and its volatility in Japan. Following, this Lee (2010) examines the same growth-volatility relationship in G7 countries over 1965 to 2007. Using G-ARCH type models, the author concludes that all these countries experienced faster economic growth at the cost of high output volatility.

Easterly, Islam and Stiglitz (2000) examine the growth-volatility linkage considering the structure of the economy, quality of institutions and policy variations. They use a panel of 70 countries over the period 1960-97. Their findings indicate the importance of financial sector development in reducing output volatility, while the nature of volatility changes according to the country economic structure and policy regime. Such as, a country with greater trade openness will have greater exposure to the external shocks, where it helps to mitigate the volatility over time. Furthermore, strong macroeconomic (fiscal or monetary) policies anticipate lower output variability, while the quality of institutions plays a vital role to reduce output volatility. Overall, the authors suggest that developing countries are more vulnerable compared to OECD countries.

Utilizing the Bayesian approach to model volatility, Malik and Temple (2009) point out the importance of institutional and geographical attributes in determining the output growth and its volatility in developing countries. Their investigation is conducted for 88 countries for the period 1960-99, taking a wide range of institutional and geographic measures¹⁰. Their findings support that countries with weak institutional quality will have significant output volatility. While the geographic attributes will have a considerable effect on growth-volatility

¹⁰ Institutional quality is measured based on average of six indicators: voice and accountability, rule of law, legal origins, political stability/violence and government efficiency. While geographic indicators are: tropical/temperate location, climate change, market access (distance from coastal) and soil suitability.

nexus, such as countries that are distant from the seacoast will experience high volatility due to lack of export diversification (increases term of trade volatility).

In view of this ambiguous and mixed evidence on the volatility and growth relationship, the present study is motivated to revisit the issue, and this chapter undertakes this task. Specifically, this chapter examines the effects of output volatility on economic growth for a set of 67 countries (including industrial and developing countries) for the period 1978 to 2017.

2.3 Data and Methodology Used

The empirical analysis attempted in this paper heavily draws upon the idea of Ramey and Ramey (1995) to re-examine the volatility and output growth relationship. Two different methods are applied for a set of 67 countries (40 developing and 27 industrial counties) over an annual data set spanning over 1978-2017, see appendix 2.I. The selection of the country grouping is based on the MSCI (Morgan Stanley Capital International) global investable markets index or stock markets index. The index categorizes countries into industrial, high financial integrated (HFI) and low financial integrated (LFI) countries. The recent global index, approved in April 2017, is used here¹¹.

The measure of volatility is taken to be overall output volatility as a proxy of macroeconomic volatility. Both simple standard deviation of per capita GDP growth and standard deviation of output gap are employed to measure output volatility. These measures are employed by most of the empirical studies on volatility wherein standard deviation of per capita GDP growth is calculated for each country over the sample time (i.e., realized volatility, measuring the standard deviation of the concerned variable based on the past information). Then the average growth rate of per capita GDP is regressed on macroeconomic volatility. Growth is taken as the dependent variable and its volatility is taken as the main explanatory variable. The alternative is based on real business cycle (RBC) literature, which considers the standard deviation of per capita GDP gap. First, the trend GDP is estimated for each country's per

¹¹ The HFI (high financial integrated) countries are also called “emerging markets” according to the methodology used by MSCI GIMI (global investable markets index). Next LFI (less financial integrated) countries are called as “Frontier market”. The methodology used to construct the MSCI Frontier Markets Indexes is similar, but not identical, to the construction of the indexes for Developed and Emerging Markets. One of the prime differences is that the Frontier Markets are divided into size (Large, Small) and liquidity (Average, Low, and Very Low) categories (MSCI Global Investable Market Indexes Methodology, 2017).

capita GDP series, and then the gap between the actual and trend GDP is obtained. Finally, the standard deviation of the gap series is calculated. This can be estimated by applying HP filter developed by Hodrick–Prescott (1997). The standard deviation of the output gap may underestimate macroeconomic volatility. Hodrick–Prescott (1997) filter decomposes the series into a non-stationary trend component (y^p_t) and stationary cyclical component (y^c_t)

$$y_t = y^p_t + y^c_t \quad T = 1, 2, 3, 4, \dots, t \quad \dots\dots\dots (2.1)$$

$$\min_{\{y^p_t\}_{t=1}^T} \left| \sum_{t=1}^T (Y_t - Y_t^p)^2 + \lambda \sum_{t=2}^{T-1} (\Delta^2 Y_t^p)^2 \right| \quad \dots\dots\dots (2.2)$$

Here, λ is the smoothing parameter. In equation (2.2) the first term implies minimizing the variance in the cycle component (y^c_t) and the second term shows smoothing the change in the trend component. The HP filter identifies the cyclical component (y^c_t) from (y_t). As λ approaches to infinity ($\lambda \rightarrow \infty$) the variance in the growth of the trend component approaches to zero and the trend component (y^p_t) becomes simple linear trend. On other extreme, if $\lambda = 0$ the filter series is equivalent to the original series. The choice of the value of λ is arbitrary. As proposed by Hodrick–Prescott (1997) $\lambda = 100$ is taken for the annual data series.

The first model estimated is cross-sectional using data averaged over the period 1978 to 2017, such that one observation is obtained for each country (especially country averages over full sample and decadal average in some places). To examine the relationship between growth and volatility, a simple regression of per capita GDP growth on each of the two measures of macroeconomic volatility as defined above is carried out. This is done for the full sample of countries as well as for MSCI country groupings.

The following model is estimated by ordinary-least-squares (OLS).

$$Gr_i = \beta_0 + \beta_1 vol_i + e_i \quad \dots\dots\dots (2.3)$$

Where, Gr_i represents average growth rate of per capita GDP over time for the i^{th} country as a dependent variable, “ vol_i ” is a measure for volatility, and e is the residual.

To further strengthen the model, an additional conditional information set is included. First, a simple conditional variable set, usually applied in growth literature say X_i including initial level of per capita income (to explain transitional convergence effect), the average investment

as share of GDP and initial human capital (average years of total schooling, age 25 plus total) is added. The model is specified as

$$Gr_i = \beta_0 + \beta_1 vol_i + \beta_2 X_i + e_i \text{-----} (2.4)$$

Secondly, the other policy conditional information set includes government consumption expenditure ratio of GDP (Govtexp) to measure the size of the government, rate of inflation (Inf) to measure price stability. Third, the entire conditional information set includes trade openness index (Tradeopen) and a proxy for i.e., credit to the private sector as % of GDP(PrivatCD).¹²

2.4 Results and Discussion

The descriptive statistics for the sample of 67 countries is presented in Table 2.1 The average per capita GDP growth is 2.2 % for the full sample, and it ranges between 8.5 % and -0.32%. This implies a huge difference in per capita GDP growth across countries. The mean of output growth volatility is 2.9 %, and the investment to GDP ratio is 23% for the full sample. Mean of trade openness is between 5.9% and 3%. The private Credit % of GDP shows an average of 3.9% and it ranges from 5.1% to 2%. The correlation matrix indicates a positive relationship between economic growth and investment to GDP ratio, human capital, trade openness and private credit. On the contrary, output volatility, inflation, and government consumption expenditure are negatively correlated with growth.

Table 2.2 presents the cross-sectional mean at level and volatility (standard deviation) of per capita output growth, including five other macroeconomic variables over the past four decades. Here, cross-sectional mean growth of GDP per capita at level and volatility of its growth rate and five other macroeconomic variables, i.e., export, import, investment, government consumption and private consumption are calculated. The macroeconomic volatility measured by the standard deviation of the growth rate of each variable for each country over the corresponding sample period is also presented. One finds that output growth is the highest in industrial countries followed by HFI and LFI economies. As regards

¹² All conditional variables include period dummies to control for time-varying factors and country-specific dummies to arrest the effect of structural variables that does not change over time.

Table: 2.1
Descriptive statistics: (1978 to 2017)

Panel A	Growth	Volatility	LNinitial GDP	Investment	Human capital	GovtExp	Trade open	PrivateCD	Inflation
Mean	2.196	2.937	9.075	23.085	7.538	16.343	4.171	3.892	10.06
Median	1.846	2.578	9.108	22.365	7.822	16.32	4.124	4.103	4.92
Stdv	1.385	1.159	1.458	3.538	2.748	4.904	0.57	0.643	16.51
Max	8.543	5.771	11.172	35.478	12.661	26.893	5.865	5.175	110.89
Min	-0.32	1.399	5.93	13.166	0.954	4.918	3.028	2.08	1.149
Observations	67	67	67	67	67	67	67	67	67
Correlation Matrix									
Panel B	Growth	Volatility	Initial GDP	Investment	Human capital	GovtEXp	Tradeopen	PrivateCD	Inflation
Growth	1.00								
Volatility	0.0221	1.00							
LNinitial GDP	-0.091	-0.4187	1.00						
Investment	0.6717	0.1317	0.1271	1.00					
Human capital	0.0104	-0.3793	0.8744	0.1415	1.00				
GovtExp	-0.366	-0.2583	0.559	-0.1014	0.5082	1.00			
Tradeopen	0.159	0.3394	0.1701	0.2819	0.1734	0.1104	1.00		
PrivateCD	0.229	-0.2366	0.7374	0.4625	0.656	0.412	0.4009	1.00	
Inflation	-0.134	0.1137	-0.0718	-0.2278	-0.1094	-0.0474	-0.3454	-0.3303	1.00

Table: 2.2
Growth and Volatility
(Mean and Standard deviation for selected macroeconomic variables)

Countries groups	Full sample 1978-2017	Decade				Full sample 1978-2017	Decade			
		1978-1987	1988-1997	1998-2007	2008-2017		1978-1987	1988-1997	1998-2007	2008-2017
(1) Per capita Output growth						(2) General Government consumption growth				
Industrial Economies	2.04	2.4	2.37	2.35	0.95	2.39	3.17	2.16	2.64	1.58
Developing Economies [*]	1.90	1.41	1.81	2.33	2.06	3.61	3.34	2.41	4.36	4.25
HFI ^{**} Economies	2.33	1.61	2.87	2.72	2.11	3.70	3.83	3.46	3.75	3.60
LFI ^{***} Economies	1.48	1.21	0.75	1.94	2.04	3.35	3.04	1.36	4.96	4.74
Output volatility						General Government consumption volatility				
Industrial Economies	2.55	2.35	2.36	1.90	2.46	2.35	2.40	2.45	1.61	1.60
Developing Economies [*]	3.83	4.55	3.29	2.72	2.29	7.39	7.11	8.35	6.22	4.58
HFI ^{**} Economies	3.58	4.22	2.75	2.88	2.35	4.70	5.41	4.29	3.96	2.77
LFI ^{***} Economies	4.09	4.89	3.84	2.56	2.24	10.08	8.81	12.42	8.48	6.38
(3) Private consumption growth						(4) Investment Growth				
Industrial Economies	5.29	2.76	2.88	3.08	1.62	2.91	2.46	4.02	3.76	1.36
Developing Economies [*]	3.79	3.41	3.78	4.22	3.74	4.01	1.22	5.24	4.54	4.35
HFI ^{**} Economies	3.94	3.64	4.64	4.06	3.36	4.05	3.80	6.59	3.73	2.82
LFI ^{***} Economies	3.64	3.18	2.88	4.38	5.35	3.97	1.36	3.89	5.35	5.89
Private consumption volatility						Investment Volatility				
Industrial Economies	2.48	2.40	2.45	1.61	1.60	7.74	7.97	7.94	5.26	7.38
Developing Economies [*]	5.48	6.18	5.43	4.21	3.88	14.37	14.38	12.55	15.26	9.56
HFI ^{**} Economies	3.74	4.22	3.22	3.22	2.22	11.63	9.67	11.07	7.16	2.35
LFI ^{***} Economies	7.21	8.13	5.12	5.12	4.55	17.91	17.14	15.43	19.45	11.96

^{*}Developing economies (HFI+LFI) ^{**}HFI (High financial integrated) and ^{***} LFI (Low financial integrated)

volatility, the picture is just the opposite. The industrial economies face less output volatility compared to HFI and LFI countries. Overall, the LFI country groups meet high volatility and low economic growth.

Further, this is confirmed by the scatter plot of GDP per capita growth with volatility. The figure for the full sample of countries is presented in appendix II, Fig. 2.1(A and B). A negative growth-volatility relationship is seen across all the countries for both the volatility measures, i.e. standard deviation of per capita GDP growth and standard deviation of the output gap. But a positive relationship between growth and volatility among the industrial economies (figure 2.2) is seen, whereas for developing countries, the relationship is negative (figure 2.3). It is also seen that the relationship between growth and volatility is strongly negative for LFI economies (figure-2.5) and the same is positive for the HFI economies (figure-2.4). Therefore, one may say that the poor countries are somewhat more volatile compared to the developed ones.

Further, a decadal analysis of the macroeconomic fluctuations over the sample period is attempted. The results are presented in Table-2.2 It is found that the average output growth in the industrial economies has been declining over the four decades. Though the output volatility declined in first three decades, it increased again in the fourth decade. This decline in macroeconomic fluctuations is also seen in the study by Stock and Watson (2002). They confirm that from 1970s to 2000s, the industrial countries witness a steady decline in output volatility and a steady rise in output growth rate. In the developing country sample, both HFI and LFI countries notice a decrease in average output growth in the 1980s and 1990s. The growth rebounds in the 2000s and 2010s with an average increase of two points. Both the HFI and LFI economies experience high output volatility, which is more than its output growth in the 1980s and 1990s. It is found that there is a substantial rise in the volume of international trade and financial flows to the developing countries from the industrial economies during the mid-1980s to 1990s (Kose, Prasad and Terrons, 2005). Private capital also has moved from developed economies to developing nations between these periods. Further, the HFI and LFI ones show high average government consumption growth and high volatility in average government consumption compared to the industrial economies.

The results for average private consumption growth and volatility show a similar pattern for HFI and LFI countries. They have the highest average private consumption growth rate compared to industrial economics, and at the same time, these countries experience the

Table: 2.3
Growth and Volatility
(Mean and Standard deviation for selected macroeconomic variables)

Countries groups	Full sample 1978-2017	Decade				Full sample 1978-2017	Decade			
		1978-1987	1988-1997	1998-2007	2008-2017		1978-1987	1988-1997	1998-2007	2008-2017
(5) Export Growth						(6) Import Growth				
Industrial Economies	5.18	5.11	7.11	5.26	2.90	5.01	4.42	6.83	6.07	2.74
Developing Economies [*]	5.49	5.81	6.50	6.25	3.53	4.91	2.43	6.88	6.10	4.23
HFI ^{**} Economies	588	5.63	7.38	7.17	2.87	5.59	3.46	9.38	6.42	3.11
LFI ^{***} Economies	5.11	6.00	5.16	5.35	4.18	4.23	1.41	4.37	5.79	5.35
Export volatility						Import volatility				
Industrial Economies	5.56	5.19	4.35	4.90	6.26	6.49	2.35	2.36	1.90	2.46
Developing Economies [*]	11.98	15.52	8.72	6.25	9.38	12.84	15.56	11.98	10.11	10.32
HFI ^{**} Economies	9.25	11.41	6.48	7.17	8.20	12.10	14.11	10.09	10.65	10.33
LFI ^{***} Economies	14.72	19.63	10.96	5.35	10.57	13.57	17.02	13.87	9.56	10.30

^{*}Developing economies (HFI+LFI) ^{**}HFI (High financial integrated) and ^{***} LFI (Low financial integrated)

highest volatility. Moreover, the LFI economies witness higher volatility, i.e. two times greater than its average growth, followed by HFI and industrial countries. The industrial economies show the highest average private consumption growth and the lowest volatility in 1980s and 1990s. Towards the end of the 2010, the growth rate of private consumption for industrial countries decreases to 1.62. Overall, volatility decrease for all three groups of the countries studied here.

The results for levels and volatility of investment growth reported in Table 2.2 also show that the average investment growth increase for the industrial economies in the 1990s and 2000s, followed by a decline in 2010s. The developing countries' average investment growth sees a slowdown in the 1980s and an increase from the 1990s. Further, investment growth in HFI and LFI increase since the 1990s. Interestingly, the volatility of investment growth also increases in 2000 for both LFI and industrial economies. But for HFI economies, both investment growth and volatility decline¹³.

In case of import and export reported in Table 2.3, growth and volatility relationship differs across all three countries. Over the full sample period, the highest average export growth and lowest volatility are seen in HFI economies, followed by industrial economies and LFIs. The highest average import growth and highest volatility is seen in LFI economies, followed by HFI and industrial countries. During the 1990s, HFI countries experience the highest average export growth and lowest volatility in the developing country group. Towards the end of 2010, LFI economies witness a high level of average export growth with high volatility in the developing country group.

2.5 Growth and Output Volatility Regression: Results

To further the growth-volatility analysis, cross-sectional regressions are run between output growth and its volatility in line with Ramey and Ramey (1995). The regression results are reported for the full sample of 67 countries, sub samples of 27 industrial countries, 20 high financial integrated economies, and 20 low financial integrated economies over 1978-2017. The cross-sectional regression results with GDP per capita as the dependent variable and output volatility as explanatory variable are presented in Table-2.4¹⁴. The estimated coefficient for the full sample yields a negative and significant association between economic

¹³ Kose, Prasad and Terrones (2004) find that industrial countries have high investment growth in 1980s and 1990s compare to HFIs and LFIs with less volatility.

¹⁴ The GDP per capita and its volatility are averages over 1978-2017.

Table: 2.4
Cross-Section Regression
GDP per capita growth and volatility (1978-2017)
(Volatility as Standard deviation of Output Growth)

Independent variable	Full sample	Industrial Economies	Developing Economies	HFI Economies	LFI Economies
Constant	-3.03 ($<.001$) ***	-3.95 (0.01) **	-2.97 (0.002) ***	-3.59 (0.007) ***	-0.61 (0.64)
Volatility	-0.318 (0.005) ***	0.232 (0.19)	-0.50 ($<.001$) ***	-0.32 (0.16)	-0.45 (0.009) ***
Average investment percentage of GDP	0.255 ($<.001$) ***	0.15 (0.01) ***	0.28 ($<.001$) ***	0.34 ($<.001$) ***	0.13 (0.04) **
Secondary Education (as human capital)	0.15 (0.2)	0.23 (0.03) **	0.19 (0.02) **	-0.20 (0.89)	0.31 (0.004) ***
Initial per capita GDP	-0.0007 ($<.001$) ***	-0.00022 (0.25)	-0.00001 ($<.001$) ***	-0.000007 (0.09) *	-0.00011 (0.001) ***
Number of observations	67	27	40	20	20
Adjusted R-squared	0.58	0.32	0.72	0.8	0.63

Notes: GDP per capita growth rate used as a dependent variable. All regressions run including intercept. Standard errors are presented in brackets are p-values and the character ‘*’ ‘**’ ‘***’ indicates ‘10’, ‘5’, ‘1’ per cent level of significance.

Table: 2.5
Cross-Section Regression
GDP per capita growth and volatility (1978-2017)
(Volatility as Standard deviation of Output gap HP λ -100)

Independent variable	Full sample	Industrial Economies	Developing Economies	HFI Economies	LFI Economies
Constant	-3.13 ($<.001$) ***	-3.92 (0.01) **	-3.18 (0.001) ***	-3.78 (0.005) ***	-0.82 (0.54)
Volatility	-0.31 (0.01) **	0.32 (0.14)	-0.57 (0.001) ***	-0.33 (0.24)	-0.51 (0.02) **
Average investment percentage of GDP	0.25 ($<.001$) ***	0.15 (0.008) ***	0.28 ($<.001$) ***	0.33 ($<.001$) ***	0.14 (0.05) **
Secondary Education (as human capital)	0.14 (0.02) **	0.21 (0.03) **	0.16 (0.05) **	-0.04 (0.74)	0.28 (0.01) **
Initial per capita GDP	-0.00006 ($<.001$) ***	-0.00019 (0.37)	-0.00009 (0.001) ***	-0.000006 (0.12)	-0.0001 (0.003) ***
Number of observations	67	27	40	20	20
Adjusted R-squared	0.57	0.33	0.71	0.79	0.60

Notes: GDP per capita growth rate used as a dependent variable. All regressions run including intercept. Standard errors are presented in brackets are p-values and the character ‘*’ ‘**’ ‘***’ indicates ‘10’, ‘5’, ‘1’ per cent level of significant.

growth and volatility, implying one-standard-deviation increase in macroeconomic volatility results in an average decline of 0.31 per cent point of annual per-capita growth of the economy. It is also evident that countries with higher volatility in growth rates tend to have systematically lower growth rates¹⁵ Figures 2.1(A and B). In different country groups, the 27 industrial economies yield a positive coefficient of 0.23 but not significantly different from zero at 5% level. This contrasts with Ramey and Ramey (1995), where the relationship is negative and significant for 24 OECD economies. One of the potential reasons for this difference could be that the positive association between output volatility and output growth among industrial economies might have become stronger over time. In the case of developing country groups, the relationship between growth and volatility is negative and highly significant.

Further, one standard deviation increase in output volatility leads to a decline of 0.5 per cent in the growth rate. The results indicate that HFI economies witness a positive but insignificant relationship between economic growth and volatility. However, LFI economies show a negative and statistically significant effect of output volatility on economic growth.

Next, the cross-section models are augmented with additional control variables taken from growth literature. The possible control variables are investment to GDP ratio, initial log GDP per capita (to account for transitional convergence effect), initial human capital (to account the human capital investment). In addition to this, variables such as government consumption expenditure as % of GDP, trade openness index, and indicator are also employed as control variables (Levine-Renelt, 1992; Barro and Lee ,2001). The results with the full set of control variables presented in Table-2.6 yield a negative and statistically significant coefficient of -0.31 for the full sample. In the case of the developing country sample, the coefficient is -0.39 and statistically significant. In both the cases, the inclusion of full set of controls results in lower negative coefficient of output volatility. This implies that the significant effect of additional control variables on the growth-volatility relationship.

Among the control variables, average investment as % of GDP is positive and highly significant, initial per capita income is negative and significant and human capital is positive but insignificant. The convergence is found to be slow in view of the low coefficient of initial per capita income. Similarly, the coefficients of human capital indicate a weak positive association. The policy variable, government consumption expenditure, shows negative and

¹⁵ We find the similar results when we used standard deviation of output gap as volatility.

Table: 2.6
Cross-Section Regression
GDP per capita growth and its volatility (1978-2017): (volatility as SD of output growth)
(Including Policy variables and variable)

Independent variable	Full sample	Industrial Economies	Developing Economies	HFI Economies	LFI Economies
Constant	-2.33 (0.02)**	-6.73 (0.003)***	-1.64 (0.15)	-1.89 (0.44)	-1.02 (0.49)
Volatility	-0.31 (0.01)**	0.12 (0.47)	-0.39 (0.006)***	-0.28 (0.31)	-0.37 (0.02)**
Average investment percentage of GDP	0.22 (<.001)**	0.05 (0.36)	0.25 (<.001)**	0.31 (<.001)**	0.13 (0.05)**
Secondary Education (as human capital)	0.16 (0.01)**	0.23 (0.01)**	0.17 (0.04)**	-0.03 (0.87)	0.26 (0.01)**
Initial per capita GDP	-0.0006 (<.001)***	-0.00003 (0.07)*	-0.00008 (0.01)**	-0.000001 (0.50)	-0.00011 (0.07)*
Trade openness (in log)	0.06 (0.78)	0.60 (0.02)**	-0.39 (0.25)	-0.67 (0.26)	0.38 (0.45)
(Private credit % of GDP)	0.23 (0.41)	0.82 (0.03)**	0.54 (0.14)	0.68 (0.52)	0.16 (0.7)
Government expenditure (% of GDP)	-0.08 (0.005)***	-0.20 (0.51)	-0.10 (0.02)**	-0.80 (0.65)	-0.12 (0.01)**
Number of observations	67	27	40	20	20
Adjusted R-squared	0.66	0.55	0.76	0.76	0.78

Notes: GDP per capita growth rate used as a dependent variable. All regressions run including intercept. Dummy variables taken for country group developed HFI and LFI. Standard errors are presented in brackets are p-values and the character ‘*’ ‘**’ ‘***’ indicates ‘10’, ‘5’, ‘1’ per cent level of significance.

Table: 2.7
Cross-Section Regression
GDP per capita growth and its volatility (1978-2017): (volatility as SD output gap)
(Including Policy variables and financial depth variable)

Independent variable	Full sample	Industrial Economies	Developing Economies	HFI Economies	LFI Economies
Constant	-2.31 (0.02)**	-0.68 (0.002)***	-1.76 (0.13)	-2.20 (0.36)	-1.03 (0.53)
Volatility	-0.30 (0.03)**	0.19 (0.37)	-0.41 (0.02)**	-0.24 (0.45)	-0.38 (0.08)*
Average investment percentage of GDP	0.22 (<.001)***	0.05 (0.34)	0.25 (<.001)***	0.31 (<.001)***	0.14 (0.05)**
Secondary Education (as human capital)	0.16 (0.02)**	0.21 (0.01)**	0.15 (0.08)*	-0.003 (0.98)	0.26 (0.03)**
Initial per capita GDP	-0.0006 (<.001)***	-0.00027 (0.09)*	-0.00006 (0.03)**	-0.000005 (-0.53)	-0.00006 (0.01)**
Trade openness (in log)	0.02 (0.91)	0.56 (0.04)**	-0.41 (0.25)	-0.69 (0.28)	0.34 (0.55)
(Private credit % of GDP)	0.23 (0.43)	0.87 (0.02)**	0.51 (0.20)	0.56 (0.56)	0.05 (0.90)
Government expenditure (% of GDP)	-0.08 (0.006)***	-0.17 (0.59)	-0.10 (0.03)**	-0.06 (0.74)	-0.12 (0.01)**
Number of observations	67	27	40	20	20
Adjusted R-squared	0.60	0.55	0.74	0.77	0.70

Notes: GDP per capita growth rate used as a dependent variable. All regressions run including intercept. Dummy variables taken for country group developed HFI and LFI. Standard errors are presented in brackets are p-values and the character ‘*’ ‘**’ ‘***’ indicates ‘10’, ‘5’, ‘1’ per cent level of significance.

significant impact on growth for full sample and developing countries. But for industrial economies it is negative and insignificant. Government consumption expenditure is negative and statistically significant for LFI economies. This may be because in developing countries, most of the government expenditure may have been on unproductive projects. The trade openness index shows a positive and significant relationship between trade and economic growth. But the relationship is not clear in case of developing countries. The reason may be import of more capital goods, export of primary goods and insufficient trade share to balance the budget in case of these countries (Kose, Prasad and Terrons, 2005). The indicator bears the expected sign implying that works smoothly in industrial economies compared to the developing economies (the coefficients are positive but not significant), as shown in Levine-Renelt (1992), Ramey and Ramey (1995) and Fatas and Mihov (2004) hypotheses. When re-estimated using volatility of output gap, the regressions in Table (2.5 and 2.7), do not show any difference compared to the regressions with standard deviation of output measuring volatility.

2.6 Growth and Out Volatility Results Using Panel Data

Next, the panel regression results are presented considering the change of growth-volatility relationship over time within a country group. Following some of the past studies, five-year non-overlapping annual averages of the variables, i.e., maximum of eight observations for each country, are used in the panel data estimation. The panel data set up accounts for both time-invariant country-specific effects and country-invariant time-specific effects. The obvious advantage of panel data lies in eliminating omitted-variable bias and getting more degrees of freedom and more efficiency in estimation. The following model is estimated for three different country groups.

$$Gr_{it} = \beta_0 + \beta_1 vol_{it} + \beta_2 X_{it} + \partial_i + \gamma_t + \varepsilon_{it} \dots\dots\dots(2.5),$$

where ‘i’ denotes country and ‘t’ denotes time, ∂_i stands for an unobserved country-specific effect, γ_t is the time fixed effect and ε_{it} is the error term. Hausman’s (1978) test is used to choose between fixed and random effect specification. The null hypothesis in Hausman’s test is that the selected model is random effects against the alternative of fixed effects. The approach tests whether the errors u_i are correlated with the regressors. For completeness sake, pooled, fixed effect and random effect regressions are run, and the best model is selected based on the Hausman’s test. The pooled, fixed, and random effect regressions presented in

Table 2.8 show a statistically significant negative contemporaneous relationship between economic growth and output volatility for the full sample of 67 countries. The above regressions are then augmented with full set of control variables. Three out of six control variables, namely log of initial income, investment as a percentage of GDP and government expenditure as a percentage of GDP, are statistically significant with theoretically expected signs across the pooled, fixed, and random effects regressions. It may be noted that among the other control variables, private credit as a percentage of GDP and human capital bear mixed signs and significance, yielding an ambiguous relationship with economic growth across all three specifications. Hence, the association between growth and volatility become stronger once we include a set of control variables. These results are like results obtained in some of the previous studies by Ramey and Ramey (1995), Levine and Renelt (1992) and Kose. et al. (2006).

Table: 2.8
Panel Regression (fixed vs. random effect)
GDP per capita growth and volatility (1978-2017)

Independent variable	Pooled OLS Full sample	Fixed effect Full sample	Random Full sample
Constant	4.80 (<.001)***	11.22 (0.002)***	4.82 (<.001)***
Volatility	-0.28 (<.001)***	-0.29 (<.001)***	-0.28 (<.001)***
Average investment percentage of GDP	0.16 (<.001)***	0.13 (<.001)***	0.15 (<.001)***
Secondary Education (as human capital)	0.04 (0.44)	-0.18 (0.07)*	-0.03 (0.63)
Initial per capita GDP	-0.55 (<.001)***	-0.79 (0.10)*	-0.40 (0.008)***
Trade openness (in log)	0.006 (<.001)***	0.009 (0.04)**	-0.005 (0.003)***
Financial depth (Private credit % of GDP)	0.22 (0.17)	-0.17 (0.51)	0.09 (0.63)
Government expenditure (% of GDP)	-0.07 (<.001)***	-0.13 (<.001)***	-0.08 (<.001)***
Number of observations	536	536	536
Adjusted R-squared	0.34	0.17	0.34
Hausman test			0.0000***

Notes: GDP per capita growth rate used as a dependent variable. All regressions run including intercept. Dummy variables taken for country group developed HFI and LFI. Standard errors are presented in brackets are p-values and the character ‘*’ ‘**’ ‘***’ Indicates ‘10’, ‘5’, ‘1’ per cent level of significance.

Further, panel regressions are estimated for the full sample and the four country groups i.e., developing, industrial, HFI, and LFI. The results are reported in Table 2.9, where Hausman's test favours the fixed-effect model for full sample, developing and industrial countries. The output volatility has a positive and significant effect on economic growth for the full sample. The higher the growth rate, higher is the output volatility. To be precise, one standard deviation increase in output volatility leads to 0.29 per cent increase in average GDP growth in the full sample. For the developing and industrial countries, the coefficients are -0.31 and 0.26. These results are like the findings of Kormendi and Meguire (1985), and Grier and Tullock (1989), where the higher standard deviation of GDP growth is associated with greater economic growth due to aggregate trade-off between risk and returns.

Table: 2.9
Fixed-Effect estimations of GDP per capita growth and volatility (1978-2017)

Independent variable	Full sample	Industrial	Developing
Constant	11.22 (0.002)***	7.84 (0.34)	12.01 (0.003)***
Volatility	0.29 (<.001)***	0.26 (0.001)***	-0.31 (<.001)***
Average investment percentage of GDP	0.13 (<.001)***	0.02 (0.51)	0.15 (<.001)***
Secondary Education (as human capital)	-0.18 (0.07)*	-0.29 (0.04)**	0.11 (0.42)
Initial per capita GDP	-0.79 (0.10)*	0.62 (0.47)	-1.16 (0.05)**
Trade openness (in log)	0.009 (0.04)**	0.002 (0.62)	-0.10 (0.19)
Financial depth (Private credit % of GDP)	-0.17 (0.51)	-0.50 (0.12)	-0.14 (0.72)
Government expenditure (% of GDP)	-0.13 (<.001)***	-0.38 (<.001)***	-0.08 (0.11)
Inflation	-0.01 (<.001)***	0.01 (0.11)	-0.02 (<.001)***
Number of observations	536	216	320
Adjusted R-squared	0.17	0.15	0.25
Hausman test	0.0000***	0.0000***	0.0001***

Notes: GDP per capita growth rate used as a dependent variable. All regressions run including intercept. Dummy variables taken for country group developed HFIs and LFIs. Standard errors are presented in brackets are p-values and the character '*' '**' '***' Indicates '10', '5', '1' per cent level of significance.

Similarly, the coefficient of volatility bears a negative sign and is statistically significant for developing economies. However, in industrial countries, one standard deviation increase in volatility leads to a 0.26 percent increase in economic growth.

After including control variables, one finds that the estimated coefficient on initial per capita GDP is negative as expected for developing countries. Thus, a significant convergence effect is confirmed for developing economies. One per cent increase in initial per capita GDP leads to 1.16 % decline in economic growth. Further, the coefficients of trade openness show negative but insignificant effect on growth. Among other control variables, government expenditure as percentage of GDP is negative for both developing and industrial country groups. But the effect is significant only for industrial countries. The reasons underlying such results may be that higher taxes induce more government spending. But the inefficient allocation of resources and unexpected economic fluctuations can reduce the output growth level (Kormendi and Meguire, 1985). Inflation has a significant and negative effect on economic growth for developing countries, as expected. The evidence goes against the Mundell-Tobin hypothesis¹⁶. But it supports that of Stockman's (1981), i.e., at higher inflation rates, money being relatively costly to hold, net return from investment becomes lower. As a result, steady-state capital stock also declines due to lower investment. This implies a reduction in investment, lower capital stock and lower economic growth (Kormendi and Meguire, 1985). Finally, private credit as a percentage of GDP shows a negative but insignificant relationship between economic growth.

Hence, the above results confirm that developing countries are highly volatile compared to industrial countries. It may be noted that the industrial countries are competent in stabilising their economy compared to the developing ones. The results in Table 2.10 with random effect regressions as favoured by the Hausman test for HFI and LFI yield that volatility coefficients are negative and significant with all the control variables. However, the HFI yield coefficients of higher magnitude compared to the LFI. The coefficients of control variables vary dramatically across the two subsamples. Investment as a percentage of GDP explains economic growth better for both the country groups. While the government expenditure percentage of GDP and Inflation is negative and significant for HFI, the same is insignificant for LFI. The coefficients on Private credit percentage of GDP are positive and significant

¹⁶ Mundell (1963) and Tobin (1965) argued that higher inflation leads to shifts away from real money balance to real capital assets, therefore higher investment and higher economic growth.

only for HFI countries. These results are consistent with Levine and Renelt (1992) and Kose.et.al (2006).

Table: 2.10
Random-Effect estimations of GDP per capita growth and volatility (1978-2017)

Independent variable	Low financial integrated (LFI)	High financial integrated (HFI)
Constant	6.18 (0.002)***	5.82 (0.03)***
Volatility	-0.19 (0.01)**	-0.53 (<.001)***
Average investment percentage of GDP	0.17 (<.001)***	0.13 (<.001)***
Secondary Education (as human capital)	0.18 (0.10)*	-0.19 (0.16)
Initial per capita GDP	-0.97 (0.004)***	-0.41 (0.18)
Trade openness (in log)	0.01 (0.13)	0.001 (0.87)
Financial depth (Private credit % of GDP)	0.02 (0.93)	0.75 (0.09)*
Government expenditure (% of GDP)	0.005 (0.93)	-0.14 (0.006)***
Inflation	-0.01 (0.22)	-0.009 (0.02)**
Number of observations	160	160
Adjusted R-squared	0.34	0.52
Hausman test	0.073	0.053

Notes: GDP per capita growth rate used as a dependent variable. All regressions run including intercept. Dummy variables taken for country group developed HFIs and LFIs. Standard errors are presented in brackets are p-values. and the character ‘*’ ‘**’ ‘***’ indicates ‘10’, ‘5’, ‘1’ per cent level of significance.

2.7 Conclusion

This chapter attempts to re-examine the relationship between output volatility as a proxy of macroeconomic volatility and economic growth for a select sample of 67 countries (40 developing and 27 industrial counties) over an annual data set spanning 1978- 2017. The main conclusion of this chapter is that output volatility has a negative effect on economic growth, and both cross-section and panel regression results confirm it. Further, the negative output volatility and growth relationship is found to be stronger for developing countries. These results support the theoretical insights given by Martin and Rogers (2000), Fatas and

Mihov (2003) and Loayza and Hnatkovska (2003). For industrial countries, we find a positive and significant relationship between growth and volatility, which contrasts with Ramey and Ramey (1995) but resonates with findings of Kormendi and Meguire (1985), Grier and Tullock (1989). Ramey and Ramey (1995) find a negative and significant effect of output volatility on growth for 24 OECD countries, and the underlying reason may be a different period of the study. The control variables in this study are consistent with growth theory, except human capital and trade openness. As a robustness check, the models for HFI and LFI groups are separately estimated. A negative and significant relationship between output volatility and economic growth is found. This might be due to the intermediate stage of financial market development or poor institutional setups resulting in poor management of unpredictable shocks. Overall, the results suggest a bit of ambiguity except for the clear negative relationship found for developing countries. The results of different samples of HFIs and LFIs speak of the role financial integration plays in defining the growth volatility relationship. However, further research in the future may focus on the channels causing such a negative relationship in financial integration. To substantiate the role of financial integration in bringing out the changing nature of volatility growth relationship, one may examine the impact of different financial flows.

Appendix 2.I

Table: 2.1
List of sample countries (67)

Industrial countries	High Financial Integrated (HFI)	Low Financial Integrated (LFI)
Australia	Chile	Malta
Belgium	Greece	Jordan
Canada	Korea, Rep.	Mauritius
Denmark	Brazil	Sri Lanka
Finland	China	Bangladesh
France	Colombia	Kenya
Germany	Malaysia	Morocco
Hong Kong SAR, China	Mexico	Senegal
Ireland	Peru	Tunisia
Israel	South Africa	Sierra Leone
Italy	Thailand	Niger
Japan	Turkey	Togo
Netherlands	Egypt, Arab Rep.	Belize
New Zealand	India	Benin
Norway	Indonesia	Bolivia
Portugal	Pakistan	Cameroon
Singapore	Philippines	Congo, Rep.
Spain	El Salvador	Gabon
Sweden	Gambia	Malawi
Switzerland	Iran, Islamic Rep.	Central African Republic
United Kingdom		
United States		
Panama		
Jamaica		
Uruguay		
Luxembourg		
Fiji		

Appendix 2.II

Figure: 2.1 (A) Full sample of countries
(Mean growth and SD of output growth)

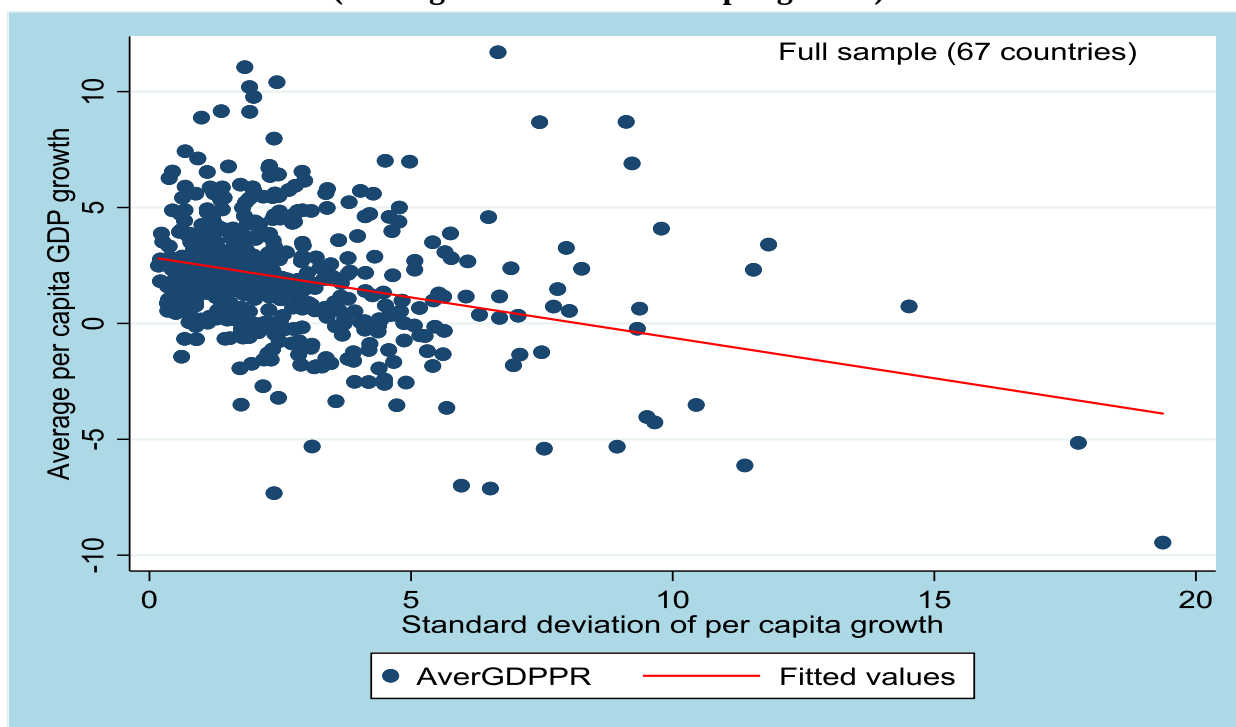


Figure: 2.1 (B) Full sample of countries
(Mean growth and SD of output gap HP ($\lambda=100$))

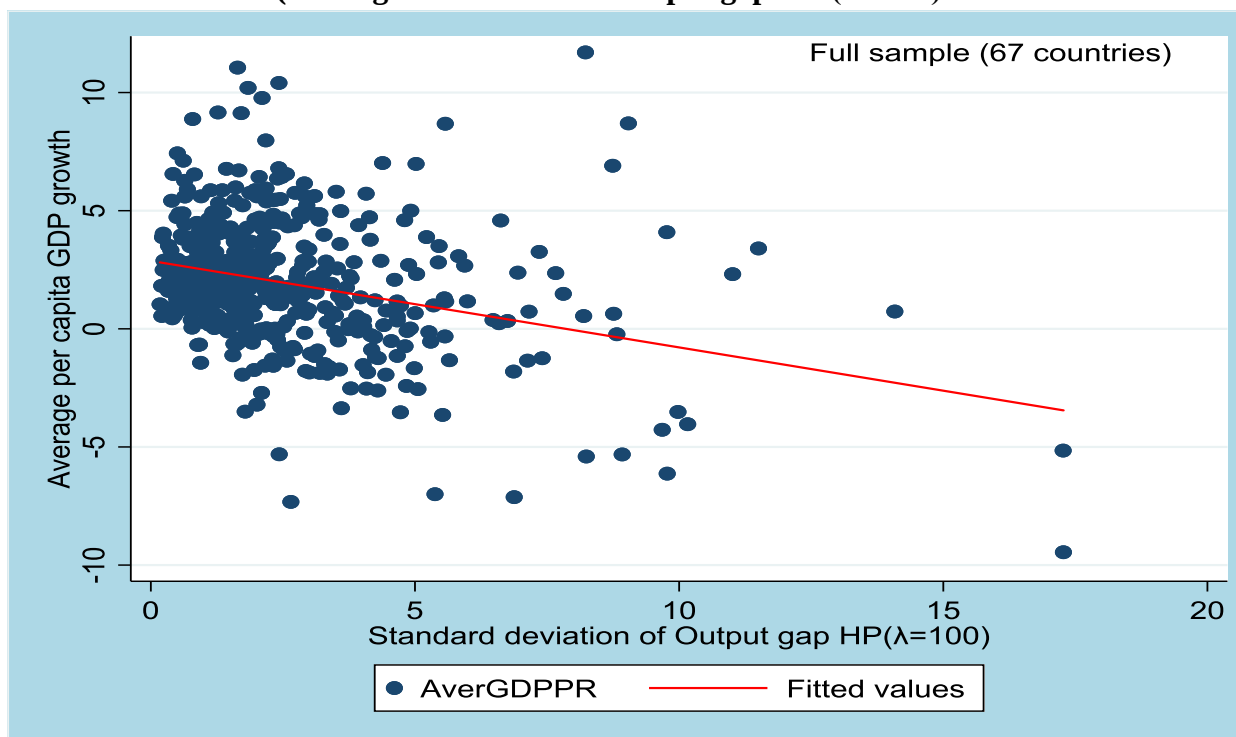


Figure: 2.2 Industrial countries
(Mean growth and SD of output growth)

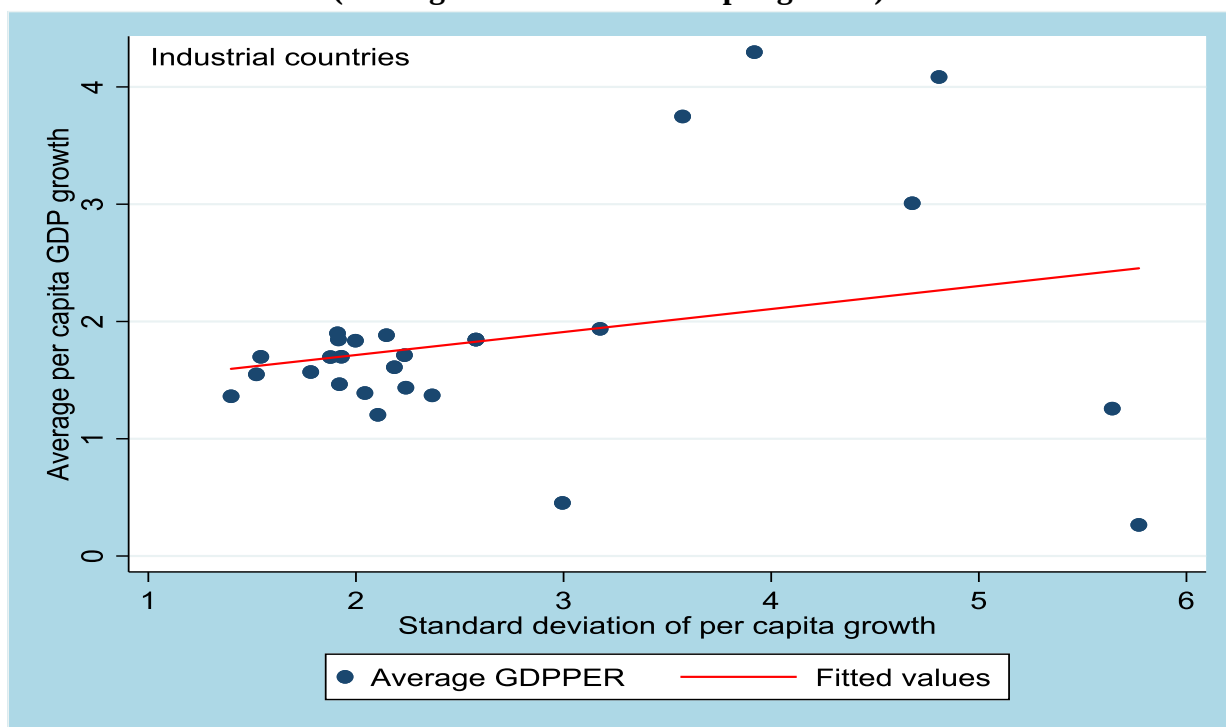


Figure: 2.3 Developing countries
(Mean growth and SD of output growth)

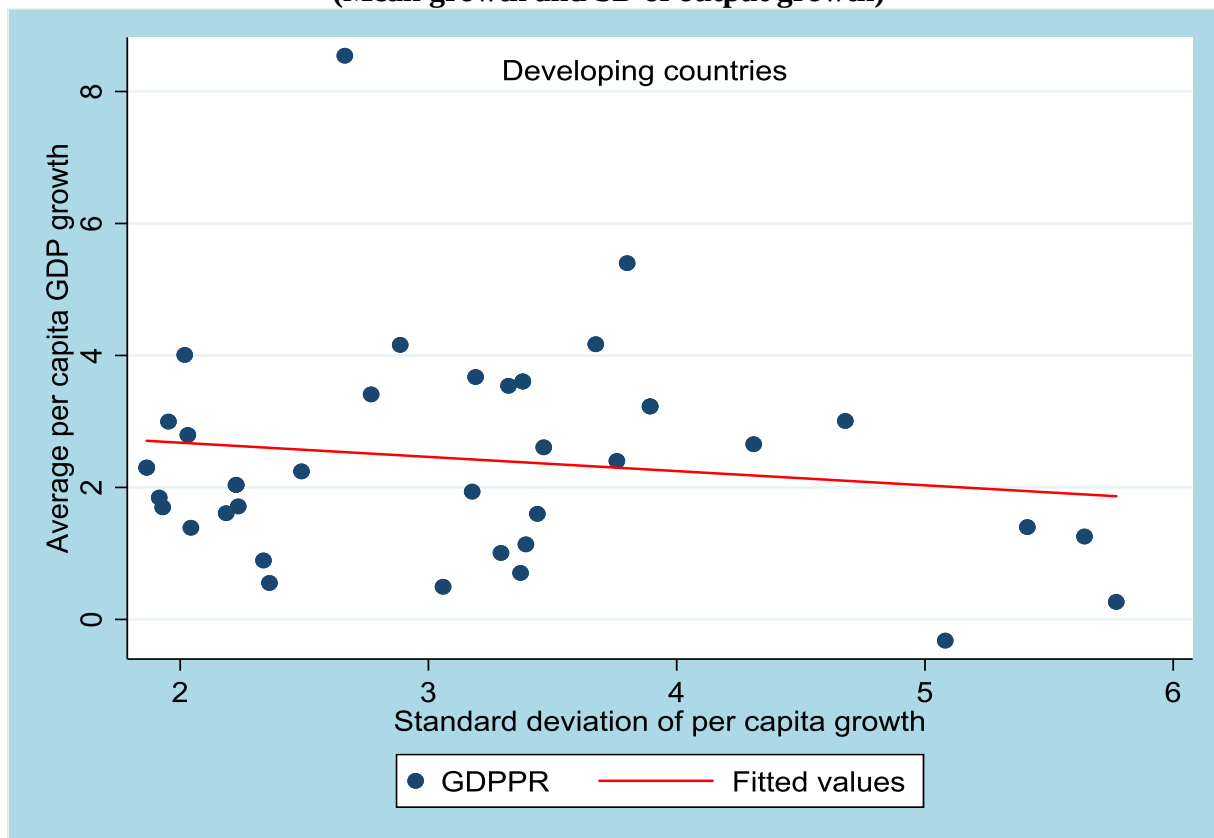


Figure: 2.4 High financial integrated (HFI)
(Mean growth and SD of output growth)

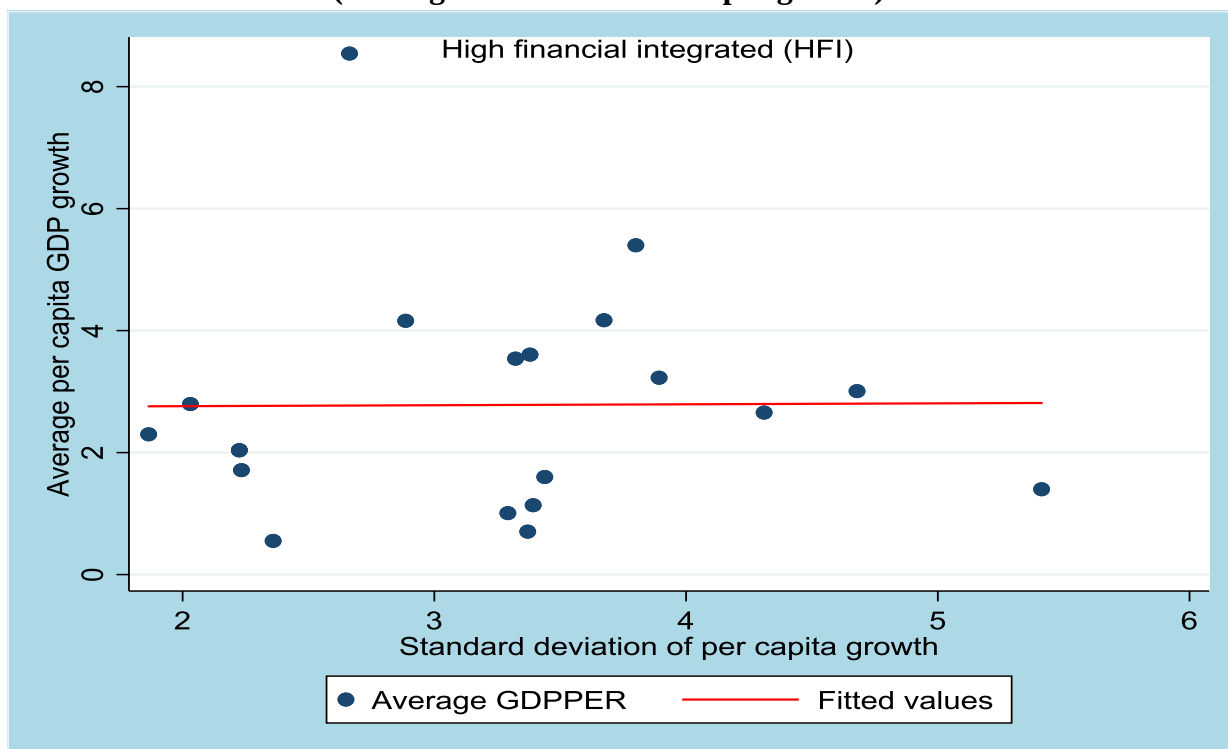


Figure: 2.5 Low financial integrated (LFI)
(Mean growth and SD of output growth)

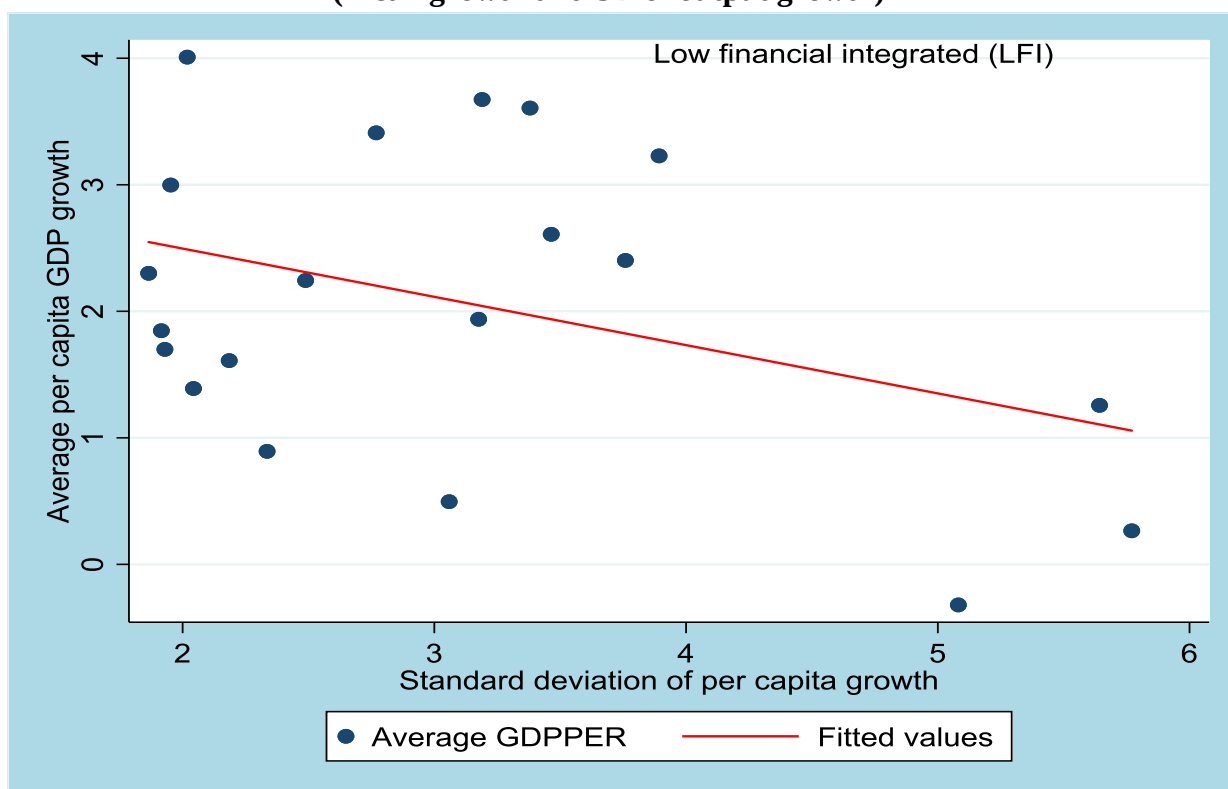
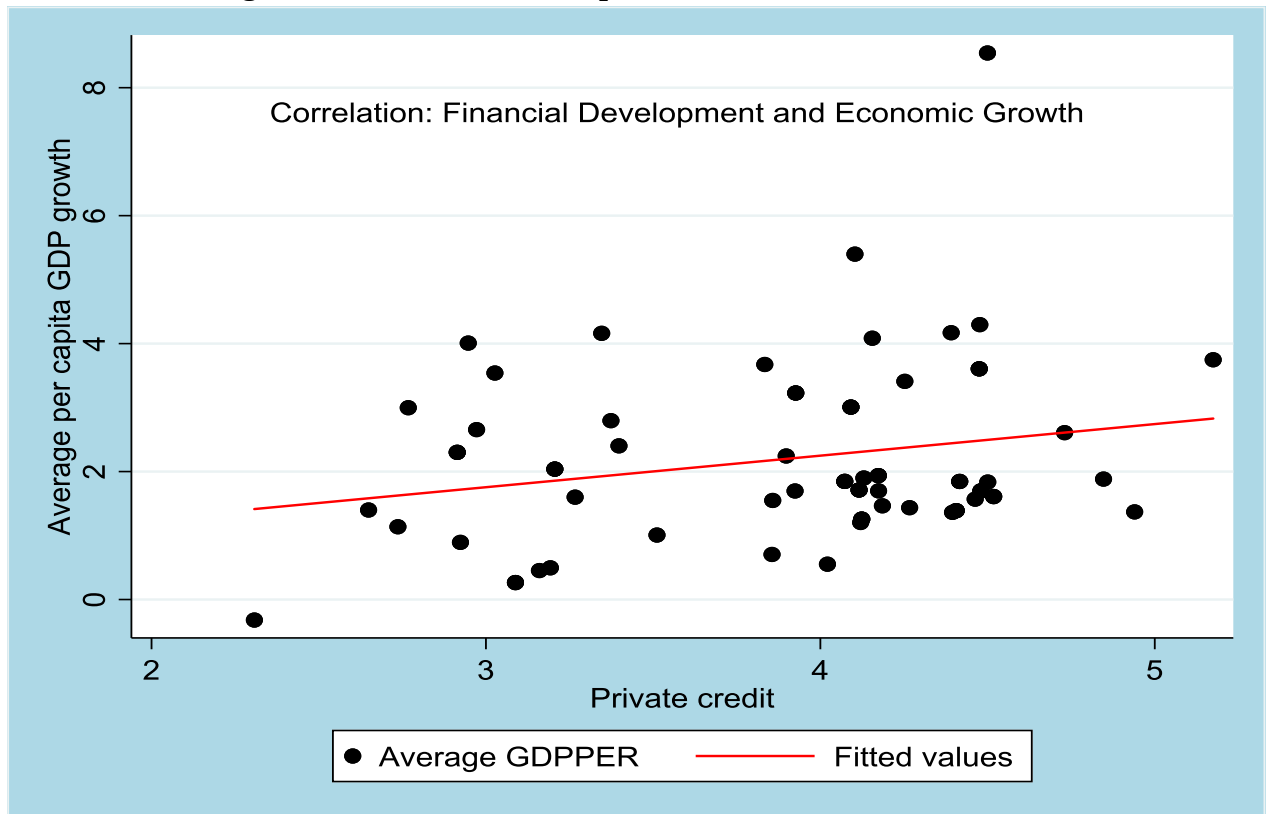


Figure: 2.6 Financial Development and Economic Growth



Chapter 3

Non-linearity Between Finance and Growth: A Threshold Approach

3.1 Introduction

The idea of financial intermediation emerges, in the economy, to facilitate borrowers and lenders to use their resources efficiently. Economists worldwide have been presenting different views about the relationship between financial development and real economic growth. Renowned economists of the 19th century, Joan Robinson (1952, p-86) and Robert Lucas (1988, p-6), argued that “where enterprise leads finance follows”. In these prospective financial intermediaries develop and respond according to the change in demand from the real sector. In the past, economists like Bagehot (1873), Schumpeter (1912), Gurley and Show (1955), Gold Smith (1969) and later McKinnon (1973), Greenwood, and Jovanovich (1990) and Merton Miller (1998) viewed that the financial market contributed to economic growth by improving resource allocation, facilitating *ex-ante* information for the betterment of future investment projects. It promotes savings, sound diversification of risk, and easing the exchange mechanism by reducing the transaction cost. A financial system is known by its institutions comprising of banks and financial markets such as stock exchanges and insurance companies. Financial intermediaries facilitate and channel the pension funds as well. All financial institutions are controlled, regulated, and supervised by the central bank. The financial sector gathers resources from the public for capital formation and productively utilizes them by deploying different financial tools. Financial intermediaries play a pivotal role to mobilise public savings for the productive sector contributing to economic growth.

According to the neoclassical theory, financial intermediaries function effectively, whereas financial factors are often abstract to study. For instance, in growth theory, technological innovation, human capital investment (R&D) and physical accumulation are the main components for economic growth. But little attention is paid to the financial system. However, financial sector development is an integral part of the strong economy; ignoring this sector completely results in a significant handicap for economic development. Hence, financial intermediaries and stock markets

have played a vital role in economic growth and seek attention from researchers and policy makers across the world. Thus, there is a need to study their position further.

The degree of financial infrastructure and its contributions to economic growth was theoretically postulated long ago. The theoretical work of Arrow-Debreu (1951), a model based on general equilibrium, was characterised entirely by a set of state-contingent claims. This model relies on unrealistic assumptions, where information and transaction cost are absent, and it indicates that financial intermediaries do not play any role in the economy. In the globalized world, financial intermediaries play a crucial role in reducing imperfect competition and frictions in the financial system. The economic cost of exchange in an imperfect market is more significant compared to expected. Theoretically, the financial intermediaries and economic growth relationship can be traced back to the early work of Walter Bagehot (1873) and followed by John Hicks (1969). They pointed out that the role of the financial intermediaries and their relationship with economic growth is one of the earlier pieces of evidence of industrialization in England that facilitates the mobilization of the capital across the countries. A considerable cost is allied with the information collection, evaluating firms, and analysing the market conditions before entering the new investment process. An individual saver observed an information asymmetry to undertake any investment decision and the ability to collect, process, and produce information associated with a considerable cost for him. Hence, the savers will be reluctant to invest their capital in such activities with little reliable information. This, in turn, increases the risk and reduces the rate of returns associated with the capital. Theoretical models predict that financial instruments, financial markets, and institutions emerged for reducing the asymmetric information and higher transaction cost. Furthermore, a substantial academic literature debates about the advantages of various financial systems for the economy. Some models represent that a bank-based financial system better explains financial development and long-term economic growth. In contrast, others try to stress the advantages of a financial system associated with exchange/securities markets.

The present study relies on a “bank-based financial system” to represent the strength of financial development. It’s essential to understand the financial sector development and its contributions to output growth of the economy, which is an unqualified assumption, and its validity requires an examination. This chapter is organised as follows. Section 3.2 assesses the finance and growth relationship. Section 3.2.2 describes the theoretical research on the mechanism and functioning of the financial system and its long-run impact on economic growth. Section 3.3 represents a review and critiques of a large body of empirical studies on the finance-growth nexus. Notably, the literature review comprises all the cross-country studies, time-series analysis, and panel growth regression. Including this, a broad review is presented on non-linearity in the finance-growth nexus.

Section 3.4 presents the data used and discusses the descriptive statistics. Section 3.5 briefly discusses the econometric methodology to find non-linearity between the variables. Sections 3.6 present the results and its discussion on nonlinearities. Finally, section 3.7 concludes the chapter.

3.2 Financial development and economic growth nexus: Theoretical overview

3.2.1 Financial development

Economic development is commonly discussed in terms of the role played by financial services in the economic growth process. The financial intermediaries serve as one of the critical factors in strengthening economic growth. Financial intermediaries handle information asymmetries and enhance the transaction facilities. However, the benchmark explanation here is rooted exclusively in recognition of informational asymmetries (Ramakrishnan and Thakor, 1986, Rose Levine, 1997). Intermediaries acquire and process the costly information. The coalition of information facilitates transaction that creates an incentive for the emergence of financial markets, contracts, institutions, and intermediaries (all types of financial services). Putting it differently, the words of Kenneth Arrow (1964) and Gerard Debreu (1959) argue that a complete set of state-contingent claim, with no information or transaction cost, there is no need for a financial system to brokerage the acquisition of the information and facilitate transactions. But, the financial intermediaries become essential once market imperfections are introduced. In the case of imperfect or less than perfect market condition, the economic exchange is costly to perform or may not occur at all. Hence, the financial intermediaries arise as brokers, where they reduce the cost of exchange and make it affordable. Once the financial intermediaries emerge, the next objective starts with how well these financial services perform their task (to ameliorate information asymmetries and transaction frictions). This argument is closely related to the financial intermediaries' functioning in allocating the scarce resource economically, where the social returns are maximised. It provides the risk-sharing platform to the economic agent and allows them to invest their capital more efficiently by eliminating idiosyncratic risk. The economic importance of financial intermediaries is rooted exclusively in information asymmetry, and information is intangible services not observed directly. The pioneering work is done by Ramakrishna and Thakur (1986) where they mention that some preformation surrogate must require the performance of the financial intermediaries. The 18th century environment witnessed the the financial intermediaries approaching financial innovation and adopting new technologies. Walter Bagehot (1873, p-3-4) argued that the success of England to be the greatest moneyed country in the world was due to the well-functioning of financial markets:

“We have entirely lost the idea that any undertaking likely to pay, and seen to be likely, can perish for what of money; yet no idea was more familiar to our ancestors or is more

common now in most countries. A citizen of Landon in Queen Elizabeth's time could not have imagined our state of mind. He would have thought that it was of no use inventing railways (if he could have understood what a railway meant), for you would not have been able to collect the capital with which to make them. At this moment, in colonies and all rude countries, there is no large sum of transferable money; there is no fund for which you can borrow; and out of which you can make immense work. Taking the world as whole-either now or in the past-it is certain that in poor states there is no spare money for new and great undertaking, and that in most rich states the money is too scattered and cling too close to the hands of the owners to be often obtainable in large quantities for new purpose" Bagehot (1873, p-3-4)

The importance of financial intermediaries is also explained by Merton and Bodie (1995, p-12)

““The primary function of the financial system is to facilitate the allocation and deployment of economic resources, both spatially and across time, in an uncertain environment”, Merton and Bodie (1995, p-12)”

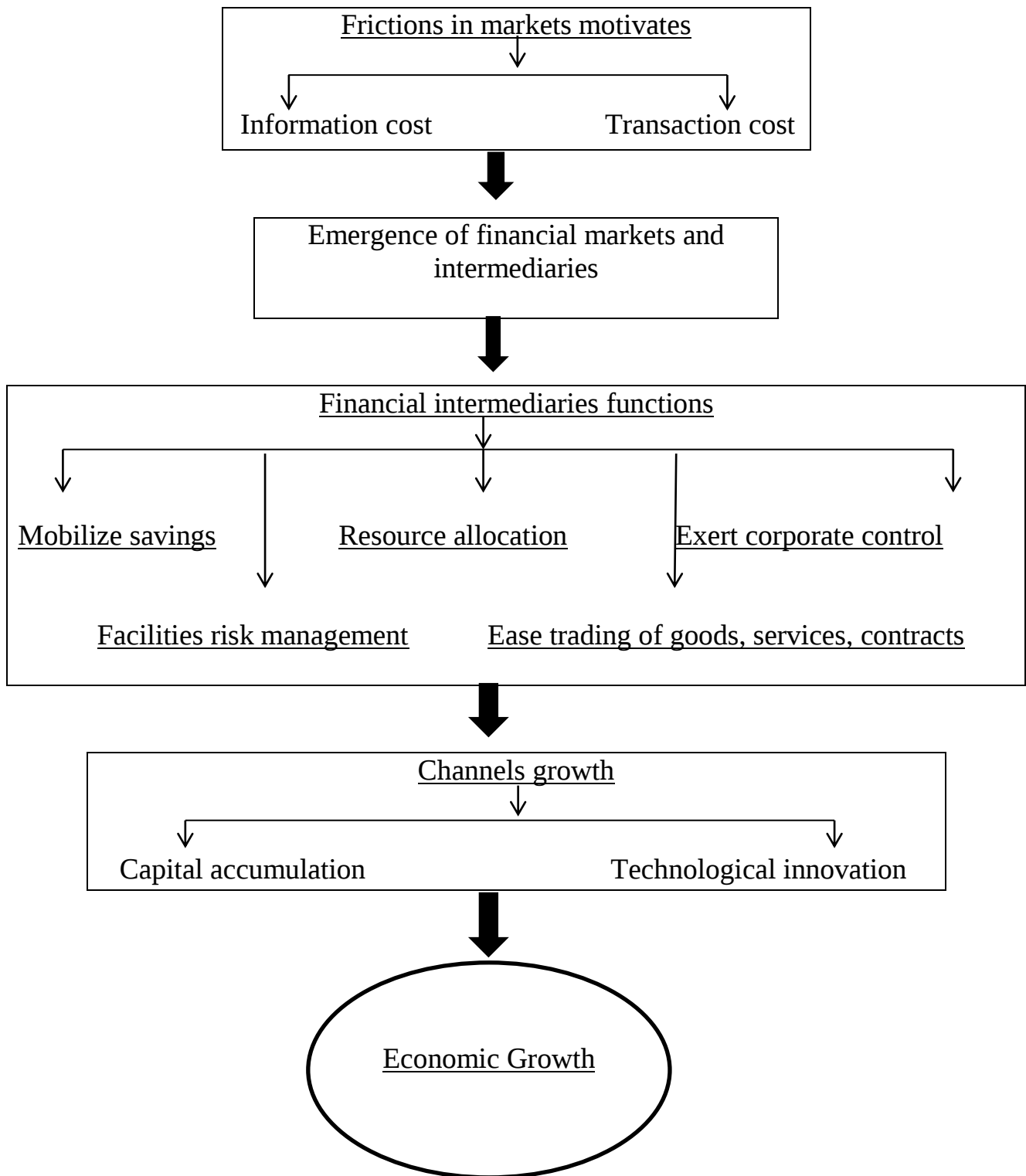
The importance of financial intermediaries as growth drivers, for instance, the emergence of banks, lies in improving the information acquisition and channelizing the household savings to the most profitable investment, where the investors quickly learn about the aggregate state of technology. Similarly, financial contracts have captured the investors' considerable attentions and permit them for new investment. Both the activities (Financial contracts and financial intermediaries) and the composition of social savings potentially stream to enhance the capital accumulation and make funds available to the potential entrepreneurs for future investment activities; that commonly noticed in the industrial economies.

3.2.2 Financial system: The five functions

According to the growth theories, both total factor productivity (TFP) and capital accumulation are the channels through which financial intermediaries can influence economic growth. The capital accumulation channel was explained by the “debt-accumulation hypothesis, ” which Gurley and Shaw (1995) introduced and often called a quantitative channel. It argues that a healthy financial system can mobilize society savings productively. By doing so, the considerable saving will make fund available to new investment projects. It ultimately increases capital accumulation and long-run

Figure: 3.1

Financial intermediaries and economic growth: A Synoptic view



Source: Adapted from Ross Levine (1997)

economic growth. Next, the total factor productivity (TFP) channel, often called a qualitative channel, represents the financial system's role in introducing innovative technologies in the financial sector to deal with information asymmetry and ameliorate market frictions. Hence, an efficient financial intermediary system can adopt innovative techniques to allocate financial resources and improves the quality of investment by monitoring it (Greenwood and Jovanovic, 1990; Ross Levine, 1997; Rajan and Zingales, 1998; Pagano, 1993; Ang, 2008). The present section gives a brief review of how financial intermediaries influence economic growth. For this, Levine's (1997) classification of five broad functions of the financial system and their impact on economic growth is (figure 3.1) followed.

i) Producing information and allocating capital efficiently

To understand the information asymmetry about firm values, formation of a market for information, Ramakrishna and Thakur (1984) identified the importance of financial intermediaries and their role in economic variable, ex-ante information and facilitate it. Later, followed by Bhattacharya and Pfleiderer (1985), Boyd and Prescott (1986) developed a model and defined how financial intermediaries emerged in the market to produce information and sell to the savers. A considerable cost is associated with the process of evaluating firms, managers and market conditions before entering into the new investment projects. It is challenging and sometimes impossible for a rational saver to collect and produce accurate information about a wide range of investments. The rational saver will be reluctant for any new investment activities where there is information asymmetry.

Consequently, high information cost may alter the capital allocation and direct the capital to unhealthy projects. Financial intermediaries' ways to the ex-ante assessment of the new investment opportunities for the firm, with efficient resource allocation, aims at minimum information cost. The Information production cost creates an incentive for the emergence of financial intermediaries based on how well they acquire and processes information at a lower cost [Diamond (1984), Boyd and Prescott (1986)]. For instance, information production is a process associated with huge fixed cost. It is very difficult for a rational investor to face the huge fixed cost in monitoring and evaluating the firm and economic conditions without the proper intermediaries system. In response to this, a group of participants emerge as financial intermediaries, and their coalition constitutes diversified information at the minimum cost and makes it available for others. Instead of each participant acquiring and monitoring costly information (that comes with a huge fixed cost) the intermediaries can do the same thing in economizing cost and provide it to all their members.

Joseph Schumpeter (1912) asserts that the well-functioning of the banking system plays a crucial role in economic growth. Banking systems act as financial intermediaries by funding the innovative

technologies to provide fresh credit to the entrepreneurs. This helps the entrepreneurs successfully implementation of innovation procedure.

There is a greater demand for financial services in prosperous economies than poor ones. At the same time, they are more affordable to deal with uncertain financial fluctuations in the system. Many growth models tried to explain the long-term economic growth based on the precise role assigned by the financial system to boost economic growth. However, specialized collection of aggregate information is beneficial for the firms and in understanding the market conditions for the investors (Bagehot, 1873, Greenwood and Jovanovic 1990).

Diamond (1984), Boyd and Prescott (1986) highlight how financial intermediaries emerge endogenously and function like banks, where they borrow from one subset of agents and lend to another set of agents in the economy (like accepting deposits and offers loans). Similar kinds of studies include Ramakrishnan and Thakor (1984), Williamson (1986), Allen (1990), Ross Levine (1997), where financial intermediaries play a vital role in the investment process by acquiring and processing information on the firm and sell this information to the required savers.

Diamond (1984) highlights the net cost advantage in collecting practical information about the firm. In the model, the author defines a bank as an intermediary who delegates the costly task of acquiring monitoring information on loan contracts and selling it to the borrowers. This process of collecting and monitoring information provides a net cost advantage to the intermediaries (such as banks) because individual lender collecting and evaluating information is too costly. Even it is difficult to monitor a free-rider problem. Theories on financial intermediaries argue that there is some cost advantage for the information trader. It gives rise to diversification within the intermediaries and makes the possibility of monitoring additional information on loan contracts. In Schumpeter's work these "delegated monitoring" role is assigned to banks. Schumpeter (1939 p-116) was quoted by Diamond (1984),

"..... the bankers must not only know what the transaction is which he is asked to finance and how it is likely to turn out but he must also know the customer, his business and even his private habits and get by frequently " talking things over with him" a clear picture of the situation." ,Schumpeter (1939 p-116)"

The model is developed and based on delegated monitoring entrepreneur's information. Financial intermediary collects funds from the individual lenders (depositors) and assures them certain returns in the future. This money is lent to entrepreneurs and spent on monitoring. Thus, loan contracts to the entrepreneurs come with the best cost (minimum), then the loan available without monitoring.

Hence, financial intermediaries acquire and monitor the costly information and sell it and receive payments for that information.

Another novel work by Greenwood and Jovanovic (1990) develops a model that presents the dynamic interaction between finance and growth. Financial services and economic growth get endogenously determined in the model. Financial intermediaries are better information producers, improve the efficiency of resource allocation and promote economic growth. A group of individuals to form as intermediaries can produce better information at minimum cost, which helps increase investment opportunities, identify, and monitor investment process and ultimately affect economic growth. They point out two themes in the growth and development process (1) economic growth, and financial structure are interlinked¹⁷ and (2) the link between financial development and distribution of income in economic development¹⁸. A good number of other studies conclude the same, i.e., “information production is the key task of the financial intermediaries that in turn improves the efficiency of the resource allocation and tends to foster the economic growth in the long run.” [see King and Levine (1993), Ross Levine (1997), Rajan and Zingales (1998), Pagano (1993), Arig (2007), Ross Levine (1992), Greenwood and Jovanovic (1997), Townsend (1978) and Williamson (1986)].

The stock market development also creates the market for information acquisition. The theories of Grossman (1978) and Grossman and Stiglitz (1980) imply that in more liquid markets, it is easier for the information traders to disguise the underlying information and make money out of it. Hence, a highly liquid stock market encourages more financial intermediaries and provides incentives for acquiring and monitoring accurate information. And this in turn, induces a more efficient allocation of capital and foster economic growth [Merton (1987), Kyle (1984)].

ii) Monitoring the firms and exercising the corporate governance

It is essential to understand the role of corporate governance and its interaction with financial markets. Recent financial researchers have shown that the degree of investor protection and its cost varies across the countries. The difference is pronounced for both capital market development and pattern of ownership structure of firms (La Porta et al, 1997, 1998). The argument emphasizes that proper legal protections regarding investor rights and strict law enforcement tend to reduce the risk associated with confiscation by managers. Financial arrangements monitor the firm’s managers and

¹⁷ Growth provides an opportunity for more financial structure, while financial structure helps to identify different investment opportunity and improve the quality of investment (through reducing risk associated with it). This leads to expansionary effect on growth.

¹⁸ “At the early stage of the development the financial intermediaries are unorganised and economy moves slowly. Once the income level rises, it encourages the further financial superstructure, economy grows at a faster level, and ultimately it increases the income inequality in the society and widens the gap between rich and poor”.

exercise corporate governance. Shareholders and creditors are part of financial arrangements and monitor the firms to optimize the firm's value. It turns to improve the allocation efficiency of the firm and encourage further investments. The case where the absence of ex-ante financial arrangements improves the power of corporate governance and may hamper mobilization of individual savings and the flow of capital, and also lead to impeding efficient investment projects (Stiglitz and Weiss 1981, 1983). Thus, the powers of corporate mechanism of governance have a direct impact on firm performance and the shareholders values. According to political economy approach, financial markets respond *via* political forces. Pagano and Volpin (2001) explain that the cost of corporatism tends to divert the productive resources and compel the firm to under-invest their resources. The corporate governance system tends to pressurize the management to extract maximum benefits and control, neglecting the shareholder value. Likewise, the lobby of social arrangement gives rise to ex-ante inefficiency, particularly in equity rationing. The shareholder fears diluting their cash at low rates by the management. The consequence of it limits the availability of funds to finance the companies by the controlling shareholders and non- controlling shareholders and ultimately reduces the size of the initial capital investment of any company.

iii) Mobilization of individual household savings:

The process of pooling and mobilization of saving involves huge cost. Mobilization of savings in a proper direction can help in the following ways: (1) overcome the transaction cost associated with collecting saving from the individual saver. (2) Reduce the problem associated with information asymmetry and make them (savers) more comfortable and assertive in relinquishing control on their savings. (3) Making easy access to multiple investors, the process of mobilization makes ways to create financial instruments of small denominations. It facilitates the individual householder to hold a diversified portfolio and select the efficient scale firms for investment. Thus, efficient investment further tends to enlarge the size of the firms and increases the asset liquidity. Hence, the mobilisation process enhances risk diversification and liquidity growth. Therefore, the process of pooling and mobilization creates a platform for individual households and improves resources allocations (Sirri and Tufano, 1995). The capital market provides more customised products and services, in which the opportunities of risk pooling and risk sharing mechanism tend to benefit both individual household and business firms. The basic cash flow cycle in an economy channelled through capital markets, where the individual household savings perform in productive capital investments. Business firms and households benefit from interest payments, dividends, and security purchases and motivate further consumption and new savings (Merton, 1992). The efficient financial systems are characterised by well-developed financial markets where it is easy to mobilise society savings by pooling the individual household savings. Moreover, mobilization of savings

associated with the huge transaction and information cost will coordinate decentralized decision making of many agents. In this process, financial intermediaries emerge with numerous financial agreements to help the agents (savers) pool their savings. In general, mobilization is the process that provides an opportunity for multiple bilateral contracts to raise the capital flows between the productive units (firms) and the agents (individual savers) with disparate savers. A joint-stock company being a voluntary association of individuals contributing capital to set up a particular business serves as an excellent example in this context. However, mobilization of savings depends on the “mobilizers” magnitude of concentration; this concentration defines how well they convince the individual saver about the soundness of the investment. The intermediaries also worry about establishing and maintaining stellar reputation or stamp of approval from a big organisation (for instance, in the pre-World War I era, the tag approved by Morgan and Company played as a trusty among the firms and investors) as assurance. So, the trust confirms that savers will feel free and comfortable about entrusting their savings to the intermediary (B De Long, 1991).

A well-developed financial system works more efficiently to pool individual savings and attract more capital inflow to propound economic growth. It implies that the better the mobilization of savings, the larger the availability of fresh capital. The result is increasing capital, economies of scale through efficient allocation of resources. Bagehot (1873, p.2-4) argued that England was considered as the greatest economic power at the time, it had a strong financial system and better mobilization of resources in the world. The rest of the world depended on England’s financial system.

“Everyone is aware that England is the greatest moneyed country in the world; everyone admits that it has much more immediately disposable and ready cash than any other country. but very few persons are aware how much greater the ready balance-the floating loan fund which can be lent to anyone or for any purpose-is in England than it is anywhere else in the world.....”. Bagehot (1873, p.2)

“There are very few civilised Governments that could not borrow considerable sums of us if they choose, and most of them seem more and more likely to choose. If any nation wants even to make a railway-especially at all a poor nations-it is sure to come to this country-to country of banks-for the money. It is true that England bankers are not themselves very great lenders to foreign sates. Buts they are great lenders to those who lend.....” Bagehot (1873, p.3)

“A citizen of London in Queen Elizabeth’s time could not have imagined our state of mind. He would have thought that it was of no use inventing railways (if he could have understood

what a railways meant), for you would not have been able to collect the capital with which to make them. At this moment, in colonies and all rude countries, there is no large sum of transferable money; there is no fund from which you can borrow, and out of which you can make immense works. Taking the world as a whole-either now or in the past-it is certain that in poor states there is no spare money for new and great undertakings, and that in most rich states the money is too scattered, and clings too close to the hands of the owners, to be often obtainable in large quantities for new purposes.....” Bagehot (1873, p-4).

Bagehot, long ago in 18th century, noticed not only mobilization of society savings but also how efficiently savings were mobilized. The effective mobilization of savings involves better allocation of society resources towards more productive investments. Furthermore, many economic activities required a massive injection of capital at a time, and it is beyond the reach of any single investor. Acemoglu and Zilibotii (1997) argue that financial intermediaries play a crucial role in mobilizing public resources. Intermediaries collect savings from diverse individuals and make it possible for small investor to hold diversified portfolios of risky projects. Risk diversification helps gradual increase in investment towards higher returns projects and automatically positively affect to economic growth.

iv) Facilitating Transaction:

The economic consequences of information asymmetry and the transaction cost associated with it motivate the economic agents to form financial intermediaries to mitigate this problem. Financial intermediaries emerge to lower the costs of transactions that will endorse “specialization, technological innovation and growth”. Improving transaction facilities, promoting production specialization, technological innovation, and economic growth all these factors are interlink with each other. Adam Smith (1776), in his book “Wealth of Nations”, mentions the core elements for economic growth such as improving transaction facilities, production specialization, and technological innovation and economic growth are interlinked. Adam Smith (1776, pp-7) argues on improvement in the productivity power of the labour-specialization- in the form of division of labour. The principal understanding is that the whole work is divided into greater number of parts and the combination of their different operations help to produce in large than before. Hence, greater the specialization, greater the proportionate increase in the productive power of the labour. Adam Smith (1776, pp-3) was quoted by Levine, R (1997).

“..... I shall only observe, therefore, that the invention of all those machines by which labour is so much facilitated and abridged, seems to have been originally owing to the division of labour. Men are much more likely to discover easier and readier methods of attaining any object, when the

whole attention of their minds is directed towards that single object, than when it is dissipated among a great variety of things” Adam Smith (1776, pp-3).

Lower transactional cost is associated with greater specialization and improvement in technological up-gradation.

Gurley and Shaw (1955) argue, “... that the primary function of financial intermediaries is to borrow loanable funds from the spending units (household) with surpluses and then issue the indirect securities in exchange”. These securities are in the form of currency and deposits. Financial intermediaries try to maximise their profits during this process through transmitting the borrowed funds by exploiting economies of scale in lending and borrowing. Adam Smith (1776) argued that economics with lower transaction costs promotes better specialization, and the specialization is not a one-time process as the transaction (information) cost drops, greater will be the specialization. It continues to fall in the transaction, and information costs will reflect in the form of better financial innovation. Thus, greater the degree of the financial system, lower the information production cost, and it automatically facilitates better transactions.

Greenwood and Smith (1996) employ two different models to illustrate the link between an exchange (transaction), specialization and innovation in the process of financial market expansion and economic development. The financial market formation is an endogenous process; market formation promotes investment opportunity through channelling investment capital to its higher rate of returns. On the other hand, the market also stimulates liquidity and advances the risk pooling and risk sharing mechanism that benefits individual household and business firms. This is true that both activities alter the composition of social savings and enhance capital accumulation and channel this capital to the high return projects that in turn foster specialization. Finally, financial markets facilitate greater specialization in entrepreneurship¹⁹, advancing new technologies (and these production technologies changes over time and tend to move more specialized inputs and increase greater specialized output). In this way, they make funds available to the new entrepreneurs for their upcoming activities and make financial arrangements lower the transaction cost and promote productivity gains. The productivity gains turned to be feedback effect on financial market development. Hicks (1969) and North (1981) suggest that the financial market formation is an endogenous process, and the establishment of a new market is associated with some fixed cost beforehand. These costs are unknown in advance of setting it up. Thus, market formation depends

¹⁹ Cooley and Smith (1992) presented a model in which they explained, in the absence of well financial markets structure, the active entrepreneur will delay to entry into the fresh entrepreneurial activity.

on the gains from specialization. However, economic development helps in the formation of financial markets, spurring further economic development.

v) Risk amelioration reduction

The presence of specific information and transaction costs, financial contracts, and financial intermediaries emerged to facilitate trading, hedging, and pooling the risk. The efficient financial markets permit fresh investors to diversify their portfolios and hedge against risks. Moreover, banks, securities markets and mutual funds are the channels that provide a platform for trading, pooling, and diversifying the risk associated with individual projects, firms and industries. The intuition is straightforward; a well-developed financial system can facilitate risk diversification services, altering the rate of savings and efficiency of resource allocation. More risk is associated with high returns projects than low return projects because individual savers are less likely to take the risk on their investment. Consequently, an efficient financial system makes investors involved in high return projects by diversifying the risk associated with the projects (Gurley and Shaw (1955), Obstfeld (1994) and Krebs (2003).

In terms of market incompleteness, Acemoglu and Zilibotii (1997) argue, "... that the early stages of economic development are associated with high risk, less diversification and slow growth". They applied the overlapping generation model to examine the relationship between risk, diversification, and economic growth. The model is constructed based on perfect market competition with an non-altruistic agents (households). The model based on assumptions such as; (i) projects with a high rate of return, (ii) people are risk-averse, (ii) prefers lower returns and safe projects and, (iv) shortage of capital. They conclude that financial intermediaries collect savings from diverse individuals and make it possible for the small investor to hold diversified portfolios of risky projects. Risk diversification helps gradual increase in investment towards higher returns projects and automatically positively affect economic growth.

3.3 Financial development and economic growth: Evidence

A humungous body of empirical literature deals with the impact of financial sector development on economic growth. An attempt is made to answer the following questions: whether the impact is positive or negative? Or whether the effect varies across the countries? Whether the type of financial system matters alone, e.g., the role of "bank-based or stock-market-based systems" to foster growth and long-term economic development.

The present section reviews econometric evidence on the finance-growth relationship. In the first sub-section cross-sectional studies on the association between financial system and growth are

reviewed. The second sub-section discusses time series and panel studies on financial development and growth nexus. The third sub-section presents evidence of nonlinearities in finance sector development and economic growth.

3.3.1 Finance and growth: Cross country evidence

The positive association between financial development and economic growth nexus goes back to Goldsmith (1969), where he attempts to assess whether financial development has any causal effect on the country's economic growth. It is important to decipher whether economic growth is determined by the mixture of markets and intermediaries mechanism. Goldsmith assumes a positive correlation between a country's financial intermediaries and real economic output growth. To investigate this relationship, he compiles a cross-sectional dataset of 35 countries for 1860 to 1963. By applying both Ordinary Least Square (OLS) regression technique and graphical representation to answer these questions, Goldsmith has asserted a positive relationship between the size of financial intermediary and the level of economic growth. However, the coefficients are statistically weak, and in fact, it shows a negative effect in developed countries. The positive correlation between financial development and economic performance is also not clear when it is graphically represented. Thus, Goldsmith has not taken a stand on the causal effect of financial development on economic performance. Further, Goldsmith's work is associated with several problems as follows.

- Lack of proper cross-sectional evidence, involving a very small sample of countries (only 35 countries).
- The study does not include any systematic controls of other factors that may impact economic performance.
- The study neglects to differentiate whether the structure of the financial system is related to productivity growth and the accumulation of capital.
- Inappropriate financial development indicator used in this study may not be an appropriate indicator to measure the size financial depth.
- The study also lacks to identify the direction of the causality between the financial intermediary and economic growth.
- The study does not include financial markets, non-banking financial systems, or a mixture of these two to examine the said relationship.

In another important work, Jung W. S. (1986) investigates the causal relationship between financial development and economic growth. The study extracts both the causality among the variables and the changes in its temporal behaviour. Two alternative measures are used to quantify financial market development, i.e., the narrow definition of money (M1) is the sum of currency and demand

deposit and broader money (M2) the ratio of M2 to nominal GDP indicates the size of the financial sector. Four regression models are run for 56 countries, two models with narrow money (M1) to real per-capita GDP growth and two with broad money (M2) to real per-capita GDP growth. The result for Granger causality confirms the existence of causality between finance and growth. Less developed countries (LDCs) exhibit a supply-leading causality more often than the demand-following one. A mixed result is noticed for temporal causality when M1 is used; first supply-leading and then demand following mechanisms are supported. For LDCs, the causality runs from financial development to economic growth, and for developed countries, it reverses the direction. On the other side, using M2 as financial development indicator, the causality infers no clear direction for both the countries. Finally, the study does not find any valid conclusion for their investigation.

Since the 1990s, the way of studying financial development and its impact on economic growth changed. Now the studies on finance-growth nexus have improved, and this begins with the seminal work of King and Levine (1993a) though primarily based on Goldsmith's (1969) work. Here, the authors covered a sample of 80 countries to examine the size of the financial system and its impact on long-term economic growth, taking all other factors that influence the long-run economic growth. Further, the study examines the impact of financial development on productivity growth and rate of physical capital accumulation. King and Levine, construct four different indicators to measure financial development. First is financial depth; it is equal to the ratio of liquid liabilities of the financial system over GDP. Second, the indicator BANK is used to measure the relative strength of financial institutions. The intuition here is that banks are more likely to facilitate all the five functions of the financial system mentioned above in the theoretical models. The third and fourth indicators of financial development, PRIVATE and PRIVY are used to determine the distribution of domestic assets and allocation of credit to private enterprise. All four financial indicators are averaged over the period 1960 to 1989 to assess the empirical relationship between finance-growth nexus and similarly, the same three growth indicators are followed. The empirical finding suggests that all the four indicators of financial performance strongly determine the economic growth, rate of capital stock per-person and efficiency of capital allocation. The results show no change despite including controlling variables that determine the growth, such as initial per-capita GDP, education, trade openness and political stability. The association between the financial system and growth indicators is found to be both positive and strong. Hence, they conclude by supporting the, "Schumpeterian idea about the relationship between the super financial structure and economic performance".

Instead of using direct banking indicators as a proxy of financial development, some studies investigate the role of the stock market in determining the level of economic growth. Atje and Jovanovic (1993),” examine the link between the operation of stock markets and economic growth”. The authors apply two different models Greenwood and Jovanovic (1990) and Mankiw, Romer and Weil (1992), to illustrate this relationship. Here, the study is conducted for 94 countries taking an annual average of each variable for each country over the period 1960 to 85. Their empirical results imply a positive and significant effect of stock markets on both levels and growth of economic activity.

A pioneering work by Atje and Jovanovic (1993) is followed by Levine and Zervos (1998a), where they try to examine the impact of both stock market and financial development on economic growth, productivity growth and rate of capital accumulation. The study is conducted for 47 countries over the period 1976-93 with various measures of stock markets development, such as size of a stock market, i.e., market capitalization, liquidity indicators, i.e., Turnover ratio and Value traded. Bank Credit is used to measure the overall size of the banking system. The CAPM and APT models are used to capture international integration and volatility of the stock return to measure overall volatility. The result indicates a positive and strong correlation between the stock market liquidity and bank credit with all three indicators of economic growth. The coefficients have no change even after controlling the initial income, human capital, black market premium exchange and political consistency. This implies a well-functioning financial system providing better services to the firms and stock markets facilitates various services from banks, and both will help to trigger growth. Finally, it shows that the size stock market, volatility, and international integration do not affect economic performance. Levine (1991), Holmstrom and Tirole (1993) also conclude saying that stock market liquidity will better explain long-term economic growth. A study by Pelgirm and Schich (2002) specifies the channel through which financial development will influence the long-run economic growth. They examine the link between financial development and the level of investment among 19 OECD countries in this context. According to them, co-integration between financial development and investment growth is the evidence for OECD countries. It shows a long-run co-movement between the two variables, financial development, and investment. Unfortunately, the estimates of this study seem be plagued by the problem of endogeneity bias and reverse causality.

Using pre-determined variables to estimate the finance-growth nexus may lead to an endogeneity problem. Anticipating the future economic growth based on pre-determined finance indicators may encounter causality issue. To solve simultaneity bias, one needs to apply an instrumental variable

approach to assess the cross-country differences. When we are using aggregate data, it is challenging to give an appropriate instrument that is truly exogenous. King and Levine (1993b) apply secondary school enrollment as the best instrument for financial development. They find that including secondary school enrollment rates accounted for an improvement in “physical capital accumulation” efficiency. Hence, greater financial development is associated with higher physical capital accumulation and future economic growth.

La Porta et al. (1998) work extensively on the country’s legal origin that determines the structure of the financial system. Countries following the common-law system provide better investor protection rights compared to the civil-law states. The country’s commercial/company law originates from British, French, German and Scandinavian law is centuries’ old obtained through occupation and colonization. It implies producing a law that protects the investor rights and enforces them efficiently, promoting the financial system. However, a large body of literature has accepted the country’s legal origins as exogenous to economic growth. Levine, Loayza and Beck (2000a), “introduce legal origin in their study to capture the exogenous component of financial development and use the generalized method of moments (GMM) for a dataset of 71 countries, and averaging from 1960 to 1995, such that one observation for one variable for each country”. The study extends the measure employed by King and Levine (1993a, and 1993b). This new proxy to measure financial development is the private credit divided by GDP, which is equal to the credit by financial intermediaries to the private sector. The finding suggests a positive and strong correlation between the level of financial development and long-run rates of GDP per-capita growth. Moreover, the legal origin instruments for financial development suggests that the instruments explain the exogeneity better. It implies that a strong association between financial development and per-capita GDP growth is not due to simultaneity bias.

In the same year, Levine, Loayza and Beck (2000b) trace the effect of financial development on four different sources of economic growth. The same set of financial development indicators are employed against the dependent variables such as, i.e. (1) growth rate of physical capital stock, (2) private savings rates, (3) total factor productivity growth (TFP) and (4) overall economic performance. The set of 63 countries are taken to estimate the relationship for the period of 1960-1995. The authors again noticed that the level of financial superstructure development is robust and positively correlated with both overall growth and total factor productivity (TFP) growth. The results are confirmed after using the instrumental variable approach by taking legal origin as an exogenous variable for financial development. This implies that a positive association between

finance and growth is established not due to simultaneity bias. In contrast, financial intermediaries' development shows an ambiguous effect on physical capital stock and private savings.

Demirgüç-Kunt and Levine (2001) illustrate how the financial system differs across the countries. Their studies aggregate the cross-section of up to 150 countries to analyse how different indicators of financial markets efficiency, size and activity affect the long-run economic growth. Further, they added the legal system to determine the exogeneity in the financial system. A conglomerate index is constructed to measure size, efficiency, and activity financial structure, which is (1) banking sector development and (2) stock market development indicators. The estimated results suggested that all the four indicators of financial market and intermediaries are highly correlated with GDP per-capita growth, and all are statistically significant at its conventional level. It implies higher financial sector development higher the income level. When they apply legal origins as instruments to measure the protection of shareholder rights, the levels of corruption and accounting standards are minimized. Common law countries provide vital protection to their investors' rights and increase an opportunity for better financial development and economic growth. Countries following French civil law, the low standards of protraction rights, poor financial development and low growth are observed. However, the study finally concludes that supports the aggregate measure of financial structure development matters more than an individual measure of financial market development (Demirgüç-Kunt Levine (2001b), (Demirgüç-Kunt and Levine, 2003a, 2003b) and (Demirgüç-Kunt Levine (2005a).

Another major study by Jayaratne and Strahan (1996) concludes that financial markets' development has a direct long-run growth effect when analysing the intrastate banking reforms in the United States (U.S.). The study conducted in 50 U.S. states with 21 years of data to examine the effect of intrastate branch deregulation on economic growth. The results show that intrastate branch deregulation accelerates per-capita GDP growth. The coefficient of branch deregulation indicates a positive and statistically significant effect on economic growth. Timing of deregulation in various states and the problem of state business cycle, the study reflects quasi-experimental evidence on the timing of deregulation and the local business cycle. More than half of the states (18 out of 35) experienced lower growth rate after bank branch reforms, whereas 17 states noticed higher growth after branch deregulation. The coefficient shows no strong correlation between the timing of bank branch reforms and the state business cycle. Next, they examined whether the change in intrastate bank reforms will induce the banking industry and make it possible to anticipate faster economic growth. It is observed that intrastate branching reforms have strong evidence of improvement in loan quality. However, no evidence supports the increase in lending following the change in

branching policy reforms. The authors attribute this as monitoring and screening of the banking industry will anticipate future economic growth.

The debate on the nexus between finance-growth by Jayaratne and Strahan (1996) also argues that the finance-growth relationship varies for different group countries. This relationship is weak for developing and underdeveloped countries. For OECD countries, the association is strong because of the strong and efficient bank-based and market-based system.

While substantial research examined the finance-growth nexus Beck, Demirgüç-Kunt and Levine (2004) investigate the same relationship into two different specifications. This study attempted to assess the impact of financial development on (1) change in income distribution and (2) change in poverty level with the help of cross-country comparison. The data averaged from 1980 to 1999 for the set of 52 countries. They employed the ordinary least square (OLS) technique to assess the association between financial development, change in income inequality and level of poverty. The study identifies three sets of findings; first, financial development intensifies the income growth rate of the lowest quintiles, and the relationship has no change after including GDP per-capita as the control for growth. This infers the more significant the financial development lowers the income inequality in the economy. Second, the financial development indicator has a direct impact on Gini-coefficient measure. Further, the negative correlation between financial development and growth of Gini holds after including the GDP per-capita as control. This result again emphasizes that as financial development increases, income inequality reduces, which shows the Gini-coefficient closer to zero. Third, the level of poverty gets diminished as the financial development of the economy lifted. The estimated coefficients specify a positive and statistically significant relationship between financial development and poverty alleviation. Their study also conducts a test for simultaneity bias and reverse causality in the relationship between finance-inequality-poverty. For this, they use instrumental variables to extract endogeneity in financial development. For Example, poverty reduction may lead to an increase in demand for more financial services. Here the authors applied exogenous national characteristics such as the legal origin of the countries as the instrumental variables. The outcome is that British common law countries perform better to protect their investors' risk by efficiently enforcing their property rights. Hence, it will lead to financial development further.

Favarra (2003) extended and re-examined the work of Levine, Loayza and Beck (2001) using a large and updated dataset. In line of their work, Favarra (2003) analyses the levels of financial development and its effect on economic growth for the set of 85 cross-countries from 196 to 1998.

Two regular measures used as a proxy for financial development, i.e., liquid liabilities of the financial system and private sector credit divided by GDP. Both the financial development indicators are deflated and expressed in percentage of real GDP. The cross-sectional evidence from OLS estimates suggests a positive and statistically significant relationship between banking development and economic growth, corroborating and reinforcing Levine, Loayza and Beck (2001) findings. It implies that countries with a robust financial system are more efficient in mobilising their savings, reducing information asymmetry, and providing risk-sharing opportunities to their firms. However, after including instrumental variables such as national legal origin to address reverse causality and endogeneity bias, the OLS results are negligible, and its statistical significance is tenuous. This result contrasts with Levine, Loayza and Beck (2001), despite taking a same set of instruments as used in their study.

According to Levine, Loayza and Beck (2000), financial intermediary development triggers steady-state growth, taking this as a challenge Aghion Howitt and Mayer-Foulkes (2005) studies the effect of financial constraints on economic growth based on Schumpeterian model of growth with technology transfer. They first construct a multi-country version of Schumpeterian growth model and test the hypothesis that financial accessibility is the reason to prevent technological transfers in poor countries. The model is predicted that financial development of the countries above the threshold level experienced successful convergence in growth rate. Thus, the likelihood of rate of convergence in these countries is positively associated with the financial development, but the effect is diminishing on steady-state real GDP per-capita output. To test this implication, they estimated cross-sectional regression for 71 countries for the period 1960 to 1995. The cross-country growth regression with an interaction term (legal origin as instruments) shows a negative and significant effect of financial development on initial per-capita GDP. The hypothesis of financial development as the direct effect of steady state growth is rejected because the coefficients are not significantly different from zero.

Deidda (2006) examines the financial development-growth relationship, assuming that the financial sector consumes real resources. Incorporating costly financial intermediation in standard overlapping generation model where households and firms are the investors. Three main findings of this study, (1) the impact of costly financial development on growth performance is ambiguous. (2) The possibility of growing uncertainty due to unsustainable endogenous financial development. This could be the reason for the immature financial system and its decision on policies making. (3) lack of financial development in the competitive economy, higher the competition higher the requirement of financial services and country with lack of financial intermediation (number of

banks) unable to exercise their function. Finally, endogenous financial development may or may not be a better option for economic growth.

Supporting the above conclusion, Ram (1999) mentioned that the preponderance of the huge empirical evidence observed a positive impact of a financial intermediary on economic growth is not always true. In this context, he analyzed 95 countries data over the period from 1960 to 1989. The superiority of the study is that instead of considering cross-country, the author examined individual country behaviour of financial-growth nexus. The empirical evidence concludes four points, first, it indicates a weak and negative correlation between financial intermediaries and economic growth for a set of 95 individual countries. Second, the respective country's correlation between financial development and growth is positive and highly significant. It contrasts when the same variables are used to cross-country estimates. Third, when estimating the multiple-regression form a simple growth model for an individual country, the results reveal the same bivariate correlation between financial development and growth. Fourth, the multiple-regression results for cross-country average data may contain structural heterogeneity problem. Predication based on average cross-country dataset considers constant-parametric across the sample country or a subgroup which neglects the structure heterogeneity bias in the estimation. Again, this indicates a weak and negative association between financial intermediaries and growth performance. Hence, the statement of positive finance-growth relationship by many studies using cross-sectional data might be not valid when we estimate for the individual country dataset.

Arcand, Berkes and Panizza (2015) show, “a positive and statistically significant correlation between financial depth and economic growth when it is below the threshold level and significantly negative above the threshold level from 1970 to 2000”. When credit to the private sector above 80-100 percent of GDP than financial depth (as a proxy by a credit to the private sector) has a negative effect on economic growth. This non-linearity in the finance-growth relationship is confirmed by a semi-parametric regression estimate that suggests a non-monotonic and concave relationship among the size of the financial system and output growth. They mentioned three reasons for the negative effect of financial development and output growth first, macroeconomic volatility has a negative correlation with output growth. That is a repaid growth in the credit market that might increase volatility and negatively affect the banking sector, leading to banking crises and economic slowdown. Second, the higher the quality of institutions (taking ICRG index) the financial depth has a positive and significant effect on economic growth. This effect is when credit to the private sector percentage of GDP is below the threshold of 20 %, and it will be negative when it reaches 70 % of the GDP. Third, bank supervision and regulation, strong bank regulation and monitoring

facilitate better allocation of resources. In this context, financial depth shows a positive impact on economic growth when the threshold credit to the private sector over GDP is less than 55 %, and above 81 %, it turns to be a negative effect on growth. Finally, they conclude that the non-monotone relationship is confirmed between finance-growth even after including the indicators like macroeconomic volatility, institutional quality, and bank regulation.

Beck, Degryse and Kneer (2014) point out that financial services are a business where all intermediation and non-intermediation activities are conducted in this financial center. With this belief, they tried to analyze the effect of the financial industry on economic performance. Specifically, their study sheds light on the “relationship between the size of the financial system and the degree of financial intermediation to per-capita GDP growth and growth volatility”. The empirical results suggest a positive relationship between financial intermediation and economic growth, and it is negative for growth volatility in the long run from 1980 to 2007 for 77 countries. The effects of both indicators are weaker over the period when it is estimated for the period 1995 to 2007. It is observed that the size of the financial system has no effect on economic growth or its volatility once they include controls for intermediation. This implies the non-intermediation activities might not affect the long-run growth or growth volatility over the period. Another side when they used an average of five-year data, the empirical estimates neither support the size of the financial system nor the degree of intermediation related to growth or growth volatility over the medium run. Despite this, the result shows a positive association between the size of the financial system and economic growth for advanced countries. Both intermediation and non-intermediation activities are inversely related to growth volatility. In high-income group countries, the size of the financial sector indicates a positive and statistically significant relationship with growth volatility which is driven by non-intermediation activities. On the other hand, intermediation shows a negative and significant impact on volatility for low-income group countries. Overall, their study confirmed that both the size of the financial sector and degree of intermediation (non-intermediation) activities vary according to their state of economic development.

Ductor and Grechyna (2015) attempt to explain how the development in the real sector of the economy will affect the finance-growth relationship, using OLS regression to estimate the relationship between the cross-sections of 101 countries from 1970 to 2010. They found that a negative interaction between the financial system and economic growth. Acceleration in a financial system unable to attend the growth in the real sector and the positive effect of the financial sector on growth performance averse after certain threshold limits. Hence, the positive association between finance-growth is unambiguous if the steady-state growth in both private credit and real output.

After controlling simultaneous bias (using the legal origin as instruments) the results observed similar findings after certain threshold value development in the financial sector will inversely affect economic growth.

3.3.2 Time series and panel studies on financial development and growth nexus:

To understand the relationship between finance-growth, the present section engrossed on times series studies. Many time-series studies are examined to capture the finance–growth nexus using a variety of time series technique. These studies especially apply the “Granger-causality” type test to establish the direction of causality, vector autoregressive (VAR) technique to control the presence of endogeneity between the finance-growth relationship multivariate co-integration technique, and many more. It is not easy to find a long span of a data set for some countries, and the power of recent time series better examines the individual countries in greater depth.

Some initial time-series studies on finance-growth nexus start with the issues raised by Patrick (1996) to understand the problem related to the direction of causality running between the two variables, financial development, and economic growth. Later the empirical work is done by Gupta (1986) for the first time to examine the causality issues. The study utilized quarterly industrial output data to measure the level of economic performance for the sample of 14 developing countries. The finding concludes that development in the financial sector enhances economic growth performance and the direction of causality confirms from financial development to economic growth. However, the study involves several limitations. First, using the industrial output as a measure of economic development level is insufficient to establish the overall development because it represents only a small part of the total output. The second limitation is related to the power of the time-series test that is applied in the limited span of the data.

After that, several studies have been conducted to stress the importance of financial sector development, more precisely, the measure of financial development and its impact on the economic process. One of the critical studies by Demetriades and Hussein (1996) re-examined the causality issues with a set of 16 developing countries. Especially the direction of causality from the time series perspective is based on two broad measures of financial development. These measures are the ratio of money to GDP (broad money, M2) and private sector credit to GDP, where the increase in these ratios represents the great financial deepening. They find the following things: (1) very little evidence established supporting the growth-enhancing impact of financial development. (2) The bi-directional causality is obtained between economic growth and financial sector development for these countries. Third, and (3) financial reforms are the preconditions to financial deepening that

may also further contribute to economic growth. Like Jung (1986), his finding also supports the supply leading hypothesis; more precise financial sector development promotes economic growth.

Based on Schumpeterian conjecture, Neusser and Kugler (1998) examine the role of the financial system in promoting long-run economic growth with an improvement in the manufacturing sector. Their study investigated 14 OECD countries using both the manufacturing GDP and manufacturing total factor productivity (TFP) instead of using simple national GDP to measure economic growth. Another hand financial sector development is measured based on financial sector GDP instead of the size of the financial system. Their model estimates confirm the positive association between manufacturing TFP and financial system within the framework of VAR. The direction of causality supports the supply leading view that financial sector activity boosts the economic growth for some countries.

Rousseau and Wachtel (1998) explicitly model the long-run association between financial intermediation and economic growth in five selected industrialized countries from 1870 to 1929. To measure the intensity of financial intermediation, they combined assets of both banks and non-banks of all five countries. In vector autoregressive (VAR) framework, they test the time-series and causality direction of financial intensity and economic performance. Finally, their results concluded that financial intermediation Ganger-cause output per-capita growth while there is no feedback effect from output to financial development.

Rousseau (1998) describes the importance of financial deepening to explain the real side of US economic growth for the period from 1872 to 1929. Financial innovation includes “interest rate-setting” decisions of lenders and application decisions of loan seekers. Precisely, the financial intermediary can monitor the activities of the loan recipient and reduce the risk of defaults associated with it for lenders. This will allow lenders to reduce the interest rate on loan, and these actions pave the way for high-quality borrowers. Finally, the empirical result supports the permanent reduction in interest spread which has a positive and significant effect on the finance system. Following the above study, Rousseau and Sylla (1999) expanded the work done by Rousseau’s (1998) and tested the hypothesis of “finance-led” US economic growth between the periods of 1790 to 1850. The time was set like that; it was examining the US economic condition and their financial system just after achieving independence from Great Britain. They applied multivariate time-series models to explore the dynamic relationship between the real sector and financial sector development. Financial development measures include banks activities, money market, and equity market to investment, import and business incorporation. Their finding strongly

supports the supply-leading hypothesis that implies the financial sector development well explains the remarkable economic growth in the US.

Further, Rousseau and Sylla (2001) study the historical data from 1850 to 1997 for the set of seventeen countries to investigate the finance-growth-globalization nexus over the period. With the ratio of the same measures of the money stock to output proxy for financial development, the sum of import and export ratio to GDP to proxy globalization and real per-capita income to measure economic performance. They also conclude that financial development promotes economic growth through the channel of globalization.

Xu (2000) applied multivariate VAR models to identify the dynamic interaction between financial development, domestic investment, and output growth for the group of 41 countries over the time of 1960 to 1993. The result rejects the null hypothesis that financial sector development simply follows economic growth. Further, the work supports the effect of financial development on economic growth in both short-run and long-run. Moreover, financial development affects the per-capita GDP growth through the investment channel. On the contrary, Christopoulos and Tsionas (2004), “find a strong causality runs from financial development to economic growth in the long-run for the sample of ten developing countries”, but no evidence of bi-directional causality was found. Similarly, no panel or time-series evidence supports the short-run causality between financial development and output growth.

Rioja and Valev (2004) examined the effect of different financial development levels (bank-based) on economic growth. To identify and test the above relationship, they employed a generalized method of moments (GMM) technique with a set of 74 countries for the 1961 to 1995 period. Their results observed the existence of non-linearity between financial development and economic growth. The coefficients show a positive effect of finance on growth but not always, and its magnitude varies for different indicators. These results are explained in three levels; first, the growth effect of financial development is solid and positive. Once it reaches a certain level of threshold, it is called the middle region. Second, below this threshold level, the effect of financial development on growth is uncertain suggest no effect or positive effect, which is called “low region”. Third, “high region” is the level at which the growth effect of finance is high, and once it crosses this level, it is the effect that reaches the highest decline.

Habibullah and Eng (2006) tested the “supply-leading hypothesis” proposed by Patrick (1966) for the selected Asian countries. For this, they employed the Generalized Method of Moments (GMM) technique from 1990 to 1998. The study finds a strong association between financial depth and

economic growth in Asian countries. The direction of causality supports the contribution of the financial sector to economic growth. Finally, the “supply-leading hypothesis” confirmed in nine Asian countries that imply financial intermediation can help to trigger economic growth.

Some country-specific studies have applied time-series methods to examine individual countries. Liang and Jian-Zhou (2006) examine the finance-growth relationship in case of China over forty years from 1952 to 2001. Specifically, they tried to know the importance of the financial sector for economic growth, including its nature and direction of the effect. To analyse this, they employ the standard techniques such as the multivariate VAR framework to capture the long-run and short-run association by controlling endogeneity. The authors observed a unidirectional causality running from economic growth to financial development. According to the theoretical expectations, all the other variables, physical capital stock, trade openness, real interest rate, are significant.

Khan (2008) applied the ARDL (autoregressive distributed lag) approach to test the finance- growth nexus in Pakistan from 1961-2005. Six different measures of financial development are used, such as broad money to GDP ratio, liabilities to GDP ratio, currency to M2 ratio, currency to GDP ratio, private sector credit relative to GDP and private sector credit to total credit. The results obtained indicate that in the long run simultaneously, the effect of financial development is significantly larger than interest rate policy which suggests that the availability of fund explained growth better than the cost of fund. When it comes to short run, the growth effect of the finance system, real deposit rate and investment ratio are positive and significant, but the response is minimal. The error correction coefficient shows very slow speed of adjustment in long-run. In support of this, Jalil and Feridun (2011) constructed a composite financial depth index using principal component analysis (PCA). Then it was applied with ARDL bound test of co-integration to test the impact of finance structural on economic growth in Pakistan. They find financial intermediation has a positive and significant effect on economic growth over the period. In contrary to this, Adu, Marbuah and Mensah (2013) observed, “the effect of financial development on economic growth is sensitive to the choice of variables used to proxy financial development”. Annual time-series data, from 1961 to 2010, are analyzed to capture this finance-growth nexus in Ghana. They confirmed a positive and significant growth effect of private credit to GDP, whereas it was negative with broad money to GDP ratio. These findings confirm the sensitivity of the proxy used.

Jedidia, Boujelbène and Helali (2014) concentrate on both bank-based and stock market-based indicators to measure financial development in Tunisia. To assess the finance-growth relationship, they apply a pre-liberalization dataset from 1973 to 2008, which shows high growth in the Tunisian economy. Their study supports long-run association between financial development indicator and

per-capita GDP growth. Precisely, intermediary financial size is more important to boost the economic growth in long-run. It is also noticed a bi-directional causality running from banking sector development to economic growth. This shows the importance of the banking sector in financial development to enhance economic growth.

3.3.3 Nonlinearities in finance and growth nexus: Review of past studies

Deidda and Fattouh (2002) present a non-linear relationship between financial depth and economic growth. Their study is two-fold; first the study explains the non-linear relationship in a theoretical framework with the help of the overlapping generation model (OLG). The model shows the behaviour of the risk-averse agent and costly financial transactions. The agent would be able to diversify the risk if the financial transactions are feasible and help channelize the saving towards productive investment. The growth effect of financial intermediation is vague in the case of a low level of financial development, whereas it will be positive as the financial development proceeds. The second, the model, tested the non-monotonic relationship economic growth and financial depth empirically, using the King and Levine's dataset of 119 countries for the period from 1960 to 1989. They applied Hansen, 1999 and 2000 panel threshold regression model (PTR) to estimate the growth and finance relationship. The real growth of per capita income is taken as a dependent variable. The ratio of liquid liabilities to GDP (a proxy for financial development), initial real income per capita, and initial secondary enrollment rate (as human capital) is the independent variable. The conditional variable set is trade openness, the ratio of government expenditure to GDP, average inflation rate and civil liberty index and several revolutions included in the regression. The estimated finding reveals that after controlling the initial secondary schooling ratio, the rich countries grow slowly, which implies higher the human capital investment higher the economic growth. The coefficient of financial depth indicates a positive and significant relationship between financial depth and economic growth for the higher income per capita countries.

In contrast, for low-income per capita countries, the relationship is insignificant. This reflects the presence of a non-monotonic relationship underlying the finance and growth nexus. Finally, they conclude that the relationship between the two variables (finance-growth) holds firmly to higher income group countries.

Falvey, Foster and Greenaway (2006) employ a panel threshold regression (PTR) model to investigate whether an increase in Intellectual Property Rights (IPR) protections may have any benefit to the economic growth. Here is the importance of the innovation for growth and its protection considering its IPR for the country. The strength of the IPR protraction differs across the countries, depending upon innovation (technologies). Also, the impact of IPR protection on

economic growth will differ across the economies. The study begins with estimating simple linear regression between IPR protection and economic growth and concludes a positive but marginally significant link between IPR protections. For more clarification, they run regression with the square term of the IPR and interaction term between initial per capita GDP and IPR protections, which confirms the non-linearity between IPR protection and economic growth. Then they estimate the IPR protection threshold between the IPR protection-growth nexus. Their results indicate that IPR protection has a positive and significant effect on economic growth, which implies that the country will benefit more from strengthening IPR protection. When initial GDP per capita was used as a threshold, it proved that high-income economies grow faster as stronger the IPR protections. Finally, they conclude that IPR protection and growth behaves non-linearly. For high and low-income economies, stronger IPR protection considered a growth generating technique. When it comes to middle-income, IPR protection does not affect economic growth. One of the reasons according to the author is that the middle-income group concentrates more on imitation rather than carrying out innovation, which shows IPR protection likely not to benefit the economy.

Saini, Law and Ahmad (2010) tried to examine the role played by the financial market to explain the FDI- economic growth relationship. To observe this, they employ a threshold regression technique allowing the relationship between FDI flows and economic growth to be piecewise linear. The financial development indicators are considered a regime-switching variable. The sample dataset consists of 91 cross-country observations for the period from 1975 to 2005. The model took the banking sector as a proxy of financial market development and applied it as a sample splitting variable in the regression. These variables include private sector credit to GDP, which is equal to the value of credit issued by the financial intermediaries to the private sector, bank credit percentage of GDP, and commercial bank assets (ratio of commercial bank assets to both commercial bank and central banks assets and liquid liabilities) reflecting the size of the banking system. The finding explains that taking private sector credit as a threshold variable, the sample is split into two groups; highly developed financial markets (above the threshold 0.49) and less developed financial markets (below the threshold 0.49). The coefficient of FDI indicates a positive and significant relationship between foreign direct investment and economic growth for more developed financial markets. In contrast, it is not significant in the case of low developed financial markets. The finding supports the existence of finance threshold in the relationship between FDI and economic growth when they use two other financial development indicators of bank assets and bank credit. However, no effect is captured when they use liquid liabilities as a threshold variable. Finally, it is concluded that a positive effect of FDI on economic growth kicks only after attending the 49.7 % threshold level.

Huang, Lin, Kim and Yeh (2010) re-investigate the inflation threshold in the relationship between financial development and economic growth. In exploring this relationship, the study covers a large cross-sectional dataset of 71 countries averaging from 1960 to 1995 (one observation for each country). It applies the panel threshold regression with instrumental variable approach (that help control the endogeneity in the model). Taking inflation as a threshold variable for the finance-growth relationship, the coefficient indicates that the inflation rate below threshold point is beneficial for economic growth through financial development. This implies financial development has a positive and significant effect on growth when inflation is below the threshold.

Similarly, when inflation is below the threshold, financial development positively and significantly impacts total factor productivity growth. And this suggests the country with a lower inflation environment will pronounce more benefits of financial development on total factor productivity that helps to contribute to economic growth. Finally, they conclude the presence of non-linear inflation threshold between the finance-growth nexus. When inflation is below the threshold development in the financial system, it contributes to higher economic growth and shows negligibility once it crosses the inflation threshold.

Vinayagathan (2013) calculates the potential threshold level of inflation and its impact on economic growth and claims that the estimated inflation threshold point for Asian countries is 5.43 % , which is lower and significant compared to the previous studies. The study investigates the inflation threshold and the level of inflation that hampers economic growth in 32 Asian countries from 1980 to 2009. The econometric technique used here is the forward orthogonal deviation operator for the dynamic panel threshold models that help deal with country-specific heterogeneity and endogeneity problems. The inflation variable is averaged over two years to eliminate the business cycle fluctuations and used log-transformed inflation variable in the model instead of level (because log transformation can help to eliminate the asymmetry in the distribution of inflation). The semi-log transformation is followed to deal with negative values of inflation. The author conducts the empirical estimation in three-fold; first applying the forward orthogonal deviation transformation to remove the country-specific fixed effect. Second, to deal with endogeneity problem instrumental variable approach or say SLS estimator and third, computing the inflation threshold value using conditional least-square estimator. Once the threshold value is estimated GMM is used to capture the impact of covariates. The calculated results confirm the existence of a non-linear relationship between average inflation and economic growth. That implies inflation above the threshold 5.43 % have a negative and significant impact on economic growth. Another side below the threshold inflation has no significant effect on growth, which means once the

threshold point crosses the inflation hamper the growth. Finally, the author introduces the new inflation threshold of 5.43% for Asian economies that indicate above this threshold level inflation have a strong effect on growth.

Kourtellos, Stengos and Tan (2013) scrutinize the non-linear effect of public debt on economic growth using the dataset of 82 countries over throughout 1980-2009. The study on the Solow growth model with public debt and tried to investigate the growth regimes using structural threshold regression model (to capture parameter heterogeneity in the model), taking public debt as a threshold variable. They found that the public debt threshold is not that effective to determine the non-linearity between public debt and economic growth. Next, they try to capture these relationships including some more threshold indicators such as institutionalized democracy, ethnolinguistic fractionalization, geographical land area and trade openness. Including the alternative threshold, the finding suggests that the link between public debt and economic growth were pronounced more through the quality of the county institutions. It shows that the institutions' quality is below the threshold, level then acquiring more public debt must pull down the country's economic growth. Similarly, the country with high institutional quality, above the institutional threshold explains public debt was growth neutral.

R.Falvey, N.F.McGregor and A.Khalid (2013) identify four important channels; 1) Capital formation (investment), 2) Government share of GDP, 3) Trade openness and black-market premium (BMP) and 4) The timing of that liberalization affecting economic growth. To analyse this, they use simple panel threshold regression with a sample size of 52 countries from 1970 to 2005. The estimations, including individual threshold, show that the trade liberalization has a positive and significant effect on growth taking investment. Moreover, the trade share has a threshold, and the results are stronger after seven years of liberalization. Government share and BMP as a threshold indicates a negative effect on growth in a different period after the trade liberalization. When they group the sample in different regions, the findings advocate that the investment channel has the strongest indicator that contributes long term economic growth in all regions, especially for Latin America and Asia. The government share as channel shows significant effect on growth in the groups like Africa, Latin America, and others, in short, run up to seven years of the trade liberalization and entirely beneficial for OECD country group. However, for the Asian countries, government share shows a negative effect on economic growth in the long run through trade liberalization.

Law and Singh (2014) investigate a threshold effect in the relationship between financial development and economic growth. Their study applies panel threshold regression model proposed

by (Hansen, 2000) and the extension of this technique called the dynamic panel threshold model to capture the non-linear relationship between finance and economic growth. They use banking sector development as a proxy for financial development. This financial development is measured based on three indicators. They are namely private sector credit (value of financial intermediary credit to the private sector), domestic credit (private credit as well as credit to the public sector including central, local government as well as public enterprises) and liquid liabilities (it is considered as the size of the banking system related to the economy, which means how smoothly the banks are mobilizing the fund in the system). The exercise is done with the help of an annual dataset of 87 countries for the period of 30 years from 1980 to 2010. The data is averaged over five-year period to smooth the business cycle effect that is useful for both panel regression and GMM technique. First, they estimate simple panel threshold regression and find a finance threshold in the finance and economic growth relationship. Among the three financial development indicators, private sector credit shows a significant and strong positive effect on economic growth below the threshold level. This implies economic growth will trigger the improvement in the financial development in the country below the threshold. On the other side, the financial development above the threshold will have an inverse impact on economic growth and financial development turn to a negative relationship with economic growth. This suggests that further development in the financial sector will be unable to translate into higher economic growth after a certain threshold. Like private credit, domestic credit also reveals that the impact of domestic credit on economic growth is negative after the threshold. All the set of conditional variables are significant, and expected signs except human capital and population growth. This result confirms the existence of a non-linear relationship between financial development and growth. For robustness, they applied some additional determinants of the growth like trade openness, government expenditure, institutions and inflation and find all these additional determinants such as statistically significant and consistent with theory.

Lastly, they apply the system generalized method of moments (GMM) technique to check the strength of the estimator. The estimator includes the square term of finance for more specification. The findings explain that both coefficients of the financial indicators and the square terms of the financial indicators that are statistically significant with positive and negative signs explain there is an existence of non-linearity in the financial development and economic growth nexus.

Aydin, Esen and Bayrak (2016) carried out a study on five transition economies of Turkish republics from 1992 to 2013. Their objective is to investigate the presence of a non-linear relationship between inflation and economic growth in these 5 Turkish countries. They try to show how inflation influences economic growth over time, whether there is any non-linearity presence in

their relationship. To conduct the test, they apply a dynamic panel threshold model of Kremer et al. (2013), an extension of Hansen (1999) and took initial income level as an endogenous predictor of the model. The inflation rate is calculated based on the annual percentage change in the consumer price index (CPI), and it regressed on annual per capita GDP with some macroeconomic variables, which are extensively used in growth literature as control variables. The authors conclude an inflation threshold in the non-linear relationship between the inflation and growth process in these five Turkish transition economies. Inflation plays a prominent role in the economic growth in these transition economies. It is predicted that above the threshold of 7.97 per cent of inflation has a negative effect on growth. In contrast, inflation below the threshold is considered good for the economies that positively influence economic growth.

Alimi (2016) prove the existence of non-linearity between macroeconomic volatility and economic growth. The study uses the cross-sectional data for the sample of 47 countries over the time of 1980 to 2013. Such a graphical method denotes that the locally weighted scatterplot smoothing technique examines the relationship between output volatility and economic growth. Then, for the more clarity Hansen (2000) threshold model was applied to test this relationship empirically, the result indicates a reverse Laffer curve relationship between output volatility and economic growth. This implies that as long as volatility below the threshold has a positive and significant effect on economic growth once it crosses the threshold (above) level, the output volatility has a negative impact on growth but not significantly. The growth controls investment, and initial GDP also has a significant effect on growth. For robustness, the model includes one more variable private sector credit as detrainment of the growth and confirmed the non-linearity between the macroeconomic volatility and economic growth is maintained. Hence, it confirms the presence of a strong non-linear relationship between volatility and economic growth.

3. 4 Data and Variables

To examine the level of financial development and its impact on economic growth, the present study uses a panel dataset of 82 countries comprising industrial, developing, and underdeveloped countries from 1978 to 2018. The choice of the countries is entirely based on the availability of data for a long time of 40 years. The list of countries is presented below. Data is collected from different sources including *World Development Indicators* (WDI) of the World Bank, *International Financial Statistics* (IFS), *World Bank Financial Development and Structural* database, *World Economic Outlook* (WEO) and *Barro and Lee Educational Attainment* dataset. After extracting data from various sources, the full sample of 40 years is divided into eight equal five-year non-overlapping annual averages, 1978-1982, 1983-1987, 1988-1992, 1993-1997, 1998-2002, 2003-

2007, 2008-2012 and 2013-2018, with a maximum of eight observations for each country. By taking five-year non-overlapping averages, one can smooth out the business cycle fluctuations. This procedure has been followed to find out the averages of each variable in this study.

3.4.1 Financial development variables

In line with standard growth literature, this study uses real GDP per-capita growth at 2010 US\$ constant prices to measure economic performance. Various measures are used to proxy financial development based on banking sector development indicators. They are given below.

- i) **Private sector credit:** This variable is defined as the value of credit issued by financial intermediaries to the private sector divided by GDP. This proxy is widely used the finance-growth literature (Levine et al., 2000; Law and Singh, 2014; Ductor and Grechyna, 2015). The higher the ratio of private sector credit to GDP, the higher the financial development, which indicates a well-functioning banking-sector as discussed earlier.
- ii) **Liquid liabilities:** This variable measures the strength of the banking-system and its ability to mobilize funds efficiently. It is expressed as “currency plus demand, and interest-bearing liabilities of banks and non-banking financial intermediaries divided by GDP” (Levine et al., 2000, p-37). A higher liquid liabilities ratio indicates greater intensity in the banking system. It assumes a positive relationship between the size of the financial sector and services providing by them.
- iii) **Gross domestic savings:** it measures the ratio of the gross domestic saving percentage of GDP. The relationship between savings and investment is well known. Pagano (1993), in his model, suggested that steady-state economic growth directly depends on the fraction of saving channeled to investment. The savings-investment channel measures the depth of the financial sector and its impact on economic growth. In other words, a healthy financial system is expected to mobilize its gross domestic savings efficiently and consequently increases the level of investment. It is observed that financial suppression and credit control result in negative real interest rates and expected domestic savings, which is a common feature for developing countries. Hence, domestic saving increases because of a positive interest rate, which may further lead to higher investment and higher economic growth (Shaw, 1973; Ductor and Grechyna, 2015).

3.4.2 Set of control variables

Following the empirical growth literature, this research used a set of control variables to strengthen the model. These are the initial level of per capita income; investment as a percentage of GDP; population growth rate, and average human capital. The initial level of per capita income is used to

explain the transitional convergence effect and expected to negatively influence growth, and investment rate is defined as gross fixed capital formation percentage of GDP (obtained from WDI, 2010). This variable is expected to be a positive effect on growth; the average population growth rate measures the size of the country. It is expected to negatively impact growth. Finally, the average years of total schooling, age 25 plus total, is taken as human capital and this variable indicates the strength and skill of the individual to generate new ideas and understanding the underlying technological progress. Thus, it indicates a growth of human capital.

3.4.3 Set of threshold variables

The assumption of a linear functional form between finance-growth is not always justifiable; most of the studies have rejected the existence of linearity in finance-growth nexus. More specifically, to assess the presence of contingency effects in the finance-growth relationship, this research uses six threshold variables, including three leading financial development indicators. They are as follows:

- 1) Initial income: This indicator measures the real per-capita GDP in the previous year of the period to assess each country level of income.
- 2) Output volatility: it measures the standard deviation of per capita GDP growth.
- 3) Trade openness: The country's level of trade openness is measured by the sum of export and import of goods and services divided by GDP.
- 4) Government expenditure: It expresses as government consumption expenditure ratio of GDP to measure the size of the government, fiscal stability, and distortions in the economy.
- 5) Inflation rate: it expressed as an annual percentage change in consumer price index (CPI) and it measures the macroeconomic stability (represents the effectiveness of the monetary policy).
- 6) Private sector credit percentage of GDP
- 7) Liquid liabilities percentage of GDP
- 8) Gross domestic savings percentage of GDP

3.4.4 Descriptive Statistics

Table 3.1 presents descriptive statistics for the list of variables taking five years non-overlapping average for 1978 to 2018. The average real per-capita GDP growth is 1.90 per cent and means volatility of 2.78 percent. The highest growth of 14.04 percent and negative growth of -9.45 percent and similarly high output volatility of 30.77 percent and low volatility of 0.17 in some countries reveals that much of the variations in income and volatility across the countries. The average initial income is about 9 percent with a low standard deviation of 1.61 percent across the countries relative to investment, which has an average of 22.2 percent with 6.50 percent standard deviation.

Concerning population growth, it shows that an average growth of population is about 1.64 percent relative to 6.57 percent of human capital. It implies an average year of total schooling (age 25 plus total) is higher than the growth of the total population. In all the three macroeconomic policy variables, the average government expenditure is 15.28 percent of the GDP. The maximum government expenditure shows that the present study contains some countries which spend more than 45 percent of GDP. The average trade share shows 4.75 percent of GDP and registers much difference in minimum and maximum trade share. The maximum trade share is 60 percent of GDP, which reiterates the fact that some of the countries in the sample experience a huge trade share to their GDP. There is heterogeneity across the countries. The average rate of inflation is observed to be 1.83 percent, with a volatility of about 1 percent.

Similarly, all the three indicators measuring financial development, such as private credit, liquid liabilities and domestic savings show an average of 4 percent of the GDP with less variation. It is observed that the minimum gross domestic saving is -3.69, which implies that some countries in the sample have a negative saving rate. It is clear from the above discussion that per-capita GDP growth, investment as percentage of GDP, and government expenditure as percentage of GDP display considerable variation in both mean and standard deviation.

Table: 3.1
Descriptive Statistics

5 years average (Non-overlapping) for 82 countries over the period 1978 to 2018

Variables	Observation	Mean	Std. Dev.	Min	Max
Growth	656	1.90	2.66	-9.45	14.04
Volatility	656	2.78	2.59	0.17	30.77
Initial Income	656	8.58	1.61	4.94	11.58
Population growth	656	1.64	1.09	-0.62	5.89
Investment %GDP	656	22.26	6.50	-5.51	54.36
Human capital	656	6.57	3.26	0.45	13.53
Macroeconomic policy variables					
Government Expenditure %GDP	656	15.28	5.26	3.05	46.30
Trade openness %GDP	656	4.17	0.60	2.57	60.1
Inflation	656	1.83	0.99	-1.49	6.01
Financial development variables					
Private Credit % GDP	656	3.52	0.98	0.30	8.13
liquid liabilities %GDP	656	3.80	0.77	1.94	8.43

Domestic Savings %GDP	656	3.35	1.28	-3.69	4.77
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3.4.5 Correlation matrix:

The pairwise correlation coefficients reported in Table 3.2 shows that all the three indicators of financial development show positive and significant correlation with per-capita GDP growth. Strong correlations exist between private credit, and liquid liabilities percentage of GDP with a coefficient of 0.87, but it is not the case with gross domestic saving. It implies that both the proxy of financial development, private credit and liquid liabilities better explain economic growth than gross domestic saving. In terms of human capital, all the financial development proxies are highly correlated and significant. Volatility exhibits a negative and significant correlation with all the variables except population growth and inflation. The correlation between trade openness and economic growth is positive at 0.08. Thus, trade openness is much less correlated with per-capita GDP growth. Finally, it is to be noted that investment is the only variable in the set, which is positive and highly correlated with per-capita GDP growth.

Table: 3.2 Correlation Matrix

Variables	Growth	Volatility	Initial Income	Investment %GDP	popgrw	Human capital	GovtExp %GDP	Trade Openness %GDP	Inflation	Private Credit % GDP	liquid liabilities %GDP	Domestic Savings %GDP
Growth	1.00											
Volatility	-0.24***	1.00										
Initial Income	0.04	-0.26***	1.00									
Investment	0.33***	-0.10***	0.24***	1.00								
Population growth (popgrw)	-0.20***	0.24***	-0.58***	-0.05	1.00							
Human capital	0.11***	-0.35***	0.84***	0.14***	-0.61***	1.00						
Govt Exp	-0.16***	-0.06***	0.44***	0.07***	-0.19***	0.34***	1.00					
Trade openness	0.08**	-0.03	0.27***	0.20***	-0.06**	0.29***	0.21***	1.00				
Inflation	-0.04***	0.23***	-0.33***	-0.10***	0.19***	-0.41***	-0.31***	-0.34***	1.00			
Private Credit % GDP	0.23***	-0.22***	0.67***	0.31***	-0.50***	0.65***	0.34***	0.31***	-0.48***	1.00		
liquid liabilities %GDP	0.22***	-0.15***	0.57***	0.25***	-0.45***	0.57***	0.24***	0.38***	-0.46***	0.87***	1.00	
Domestic Savings %GDP	0.10***	-0.33***	0.49***	0.36***	-0.23***	0.38***	-0.02**	0.11***	-0.11***	0.27***	0.18***	1.00

Growth: real per-capita GDP growth, volatility: Std.dev of real per-capita GDP growth; initial income: real per-capita GDP in the previous year of the period; Investment: gross fixed capita formation % GDP; GovtExp: Government expenditure % GDP. Signification level at **P < 0.05 and ***P < 0.001

3.5 Empirical strategy: Panel threshold regression (PTR) to identify the non-linearity:

Panel threshold regression (PTR) models are used to capture the non-linearity in the variable of interest and explain the difference in coefficients and their magnitude, below and above the threshold level. For instance, the level of financial development and its impact on growth could also depend on the change in other variables. The above mentioned theoretical and empirical studies confirm the existence of non-linearity in the finance-growth relationship. At the same time, this is also affected by some other variables. After reviewing the earlier studies, some important variables are found to be moderating the financial and growth relationship in a discontinuous manner. The findings in the second chapter observed that output volatility and financial development had a positive impact on growth for industrial countries. While the growth effect of output volatility was negative, financial development showed mixed results for developing countries. However, the not so clear finance-growth link leaves some gap to study this relationship again.

The present chapter investigates the relationship between financial development and economic growth with the help of panel threshold regression (PTR) methodology to fill the said gap. Here, five potential intermediary threshold variables are identified that have possible growth effect through financial development, as suggested by some of the economic theories (Kose et al., 2004, 2010 and Muazu et al., 2018). The identified threshold variables are the level of initial per capita income, output volatility, government expenditure, inflation rate and the degree of trade openness, including three financial development variables. However, very few studies have used panel threshold regression to identify the non-linearity between the finance and growth relationship. Therefore, this chapter follows the new methodology developed by Hansen (2000) to investigate the existence of threshold effect in the financial development and growth relationship. Hansen (1996, 2000) developed the panel threshold regression (PTR) model as an excellent alternative to other linear models to observe breaks or asymmetries in most of the macroeconomic time series variables that are frequently used in business cycles theory. These threshold regression models use the conditional least square estimator technique to estimate the parameter of the panel threshold regression. The threshold regression technique has an advantage over the regression-tree methodology (a special case for estimating multiple threshold regression) applied by Durlauf-Johanson (1995), which is based on asymptotic distribution theory. Unlike traditional regression tree approach, Hansen (2000) methodology is more superior to estimate non-linearities and test the statistical significance of the variables according to the selected regimes.

In line with the growth literature, we begin by specifying the following base line regression equation:

$$y_{it} = \beta_0 y_{it-1} + \beta_1 FDV_{it} + \beta_2 VC_{it} + \alpha_{it} + \varphi_t + \varepsilon_{it} \dots\dots\dots (3.1)$$

where, y_{it} is per capita GDP growth for country “ i ” at time “ t ”, y_{it-1} indicates per capita GDP growth depending on its one period lag (to represent the initial condition) to check countries conditional convergence, FDV_{it} indicates the level of financial development, VC_{it} is a vector of set of control variables (following Levine and Renelt (1992), α_{it} represents the country-specific fixed effect, φ_t represents time effect and ε_{it} is idiosyncratic random disturbance term.

In order to identify the threshold in the financial-growth relationship, Hansen (2000) threshold regression model is used that splits the sample into two regimes such as,

$$y_i = \Psi'_1 x_i + v_i \quad \{\Phi_i \leq \gamma : \text{Regime 1} \dots\dots\dots (3.2)$$

$$y_i = \Psi'_2 x_i + v_i \quad \{\Phi_i > \gamma : \text{Regime 2} \dots\dots\dots (3.3)$$

Where Φ_i indicates threshold variable (in our case, four variables), and the sample split into two groups called regimes (depending on the context we are using). So, the regime 1 indicates the subset of observation (countries) in which the estimated value of Φ_i is less than the value of the threshold “ γ ”. However, regime 2, the subset of the observation in which the estimated value of Φ_i is greater than the value of the threshold “ γ ”. Hence, inference is that the nuisance threshold value is difficult due to asymptotic distribution.

Based on the above equations (3.2 and 3.3), we estimate specifically two regimes threshold model, and the equation is the following:

$$y_i = \{\beta_{11} + \beta_{21} FDV_i + \beta_{31} THS_i + \beta_{41} VC_i\} d_i(\Phi_i \leq \gamma) + \{\beta_{12} + \beta_{22} FDV_i + \beta_{32} THS_i + \beta_{42} VC_i\} d_i(\Phi_i > \gamma) + \varepsilon_i \dots\dots\dots (3.4)$$

Where in the equation 3.4, for each country “ i ”

- y_i , represents the real GDP per capita growth over the period.
- FDV represents the financial development indicator of the country.
- THS is a vector of threshold parameters.
- $d_i\{.\}$ is the indicator function of the dummy variable, which equals to “0” when, Φ_{it} is below certain threshold parameter “ γ ” and 1 in the other case, this observed transition mechanism between two extreme regimes.
- Φ_i is the threshold variable (four variables in my case).

- γ this is the estimated threshold value.

Our analysis selects five threshold variables: level of initial per capita income, output volatility, government expenditure, inflation rate, and the degree of trade openness, including three financial development variables.

According to Hansen (2000), the observed sample in equations (3.2 and 3.3) is, $\{y_i, x_i, \Phi_i\}_{i=1}^n$, where y_i and Φ_i are real values and x_i is an m -vector. However, the threshold variable Φ_i is also an element of x_i , where x_i is assumed to follow a continuous distribution. Moreover, the estimated regression parameters vary based on the change in the value of Φ_i .

The equations 3.2 and 3.3 can be presented in a single equation as follows:

$$y_i = \beta' x_i + \Psi' x_i(\gamma) + \varepsilon_i \dots\dots\dots (3.5),$$

“Where in (equation: 3.5), $\Psi_n = \beta_{i2} - \beta_{i1}$, therefore $\beta = \beta_{i2}$, it is imperative to note that $\Psi_n \rightarrow 0$, as $n \rightarrow \infty$, while β_{i2} is fixed. Hence, $\beta_{i1} \rightarrow \beta_{i2}$ as $n \rightarrow \infty$. For further clarification, we can express the above model in matrix notation, say $(n \times 1)$ vector of Y and ε by stacking the variable y_i and ε_i , than $(n \times 1)$ matrixes X and X_γ by stacking the vectors X'_i and $X'_i(\gamma)$ respectively. Based on the matrix notation, we can rewrite the equation: 3.5”,

$$Y = X\beta + X_\gamma\Psi_n + \varepsilon_i \dots\dots\dots (3.6)$$

The parameters of the threshold regression model (β, Ψ, γ) can be estimated using the conditional least square (LS) and the Sum of squared residuals (SSR) function:

$$SSR_n \{\beta, \Psi, \gamma\} = \{(Y - X\beta - X_\gamma\Psi)'(Y - X\beta - X_\gamma\Psi)\} \dots\dots\dots (3.7)$$

The least square (LS) estimators $(\hat{\beta}, \hat{\Psi}, \hat{\gamma})$ jointly minimize the equation 3.7. However, to minimize the threshold value “ γ ” is assumed to be restricted in a bounded set $[\gamma, \bar{\gamma}] = \tau$. the easiest way to compute least square (LS) estimate of the threshold parameter $(\hat{\beta}, \hat{\Psi}, \hat{\gamma})$ through concentration approach where “ γ ” in equation: 3.6, is conditional linear in β and Ψ , that is estimating the $\hat{\beta}(\gamma)$ and $\hat{\Psi}(\gamma)$ after regressing Y on $x_\gamma^* = [x, x_\gamma]$. Now we can estimate the concentrated sum of squared residuals (SSR) for the below function:

$$SSR_n(\gamma) = SSR_n\{\hat{\beta}(\gamma), \hat{\Psi}(\gamma), \gamma\} = Y'Y - Y'x_\gamma^* (x_\gamma^{*'}x_\gamma^*)^{-1} x_\gamma^{*'}Y \dots\dots\dots (3.8)$$

If “ $\hat{\gamma}$ ” is the value that minimizes $SSR_n(\gamma)$ function, where $SSR_n(\gamma)$ takes on less than “ n ” distinct values and “ $\hat{\gamma}$ ” will be uniquely estimated as,

$$\hat{\gamma} = \underset{\gamma \in \tau_n}{argmin} SSR_n(\gamma) \dots\dots\dots (3.9)$$

Where, $\tau_n = \tau \cap \{ \Phi_1 \Phi_2 \Phi_3 \Phi_4 \dots \dots \dots \Phi_n \}$, once $\hat{\gamma}$ is obtained, and the vector of the slope is estimated through $\hat{\beta} = \hat{\beta}(\gamma)$ and $\hat{\Psi} = \hat{\Psi}(\hat{\gamma})$. Then one requires to test the hypothesis $H_0: \gamma = \gamma_0$, using the below test:

- **Maximum Likelihood Ratio test:** a standard approach to test the null hypothesis of the threshold value γ to achieve the asymptotic distribution of the statistic. The hypothesis is $H_0: \gamma = \gamma_0$ under the assumption ε_i is iid $N(0, \sigma^2)$.

$$LR_n(\gamma) = n \frac{SSR_n(\gamma) - SSR_n(\hat{\gamma})}{SSR_n(\hat{\gamma})} \dots\dots\dots (3.10)$$

After estimating threshold values, we have to test the null hypothesis based on likelihood ratio test. The null H_0 is rejected for large value of $LR_0(\gamma_0)$.

- **Threshold estimation:** once the estimator can be found, if we start a statistical testing the hypothesis, maybe we will get a biased result for this because of procedure of equation (3.3) which is different from the traditional statistical test. The traditional method practices to constructs the confidence intervals for γ through inversion of Wald or t-statistic, Dufour (1997) argued that when asymptotic sample distribution depends on the unknown parameters. In such case, the Wald test performs weak finite sample behaviour especially when the required parameters have a regions occurs where the identification are failed. In the panel threshold regression (PTR) model the threshold value is not identified when the $\Psi_n = 0$ to encounter this problem Hansen (2000) developed the new threshold regression technique based on the likelihood ratio test $LR_0(\gamma_0)$ through constructing an asymptotic confidence level (C) for the threshold(γ).
Set
- **Simulation criteria:** Simulation techniques are used to compare the different convergence probabilities for the prepared confidence intervals for the threshold γ going back to the linear model, the regression equation (3.5) with *iid* properties where

$$\left\{ \begin{array}{l} x_i = (1, z_i)' \\ \varepsilon_i \sim N(0, 1) \\ \Psi_i \sim N(2, 1) \end{array} \right\} \dots\dots\dots (3.11)$$

And $\gamma = 2$, in which the regression z_i follow either, $iidN(0,1)$ or $z_i = \Psi_i$. The LR_n statistic is invariant to β parameter. Partitioning $\Psi_i = (\Psi_1, \Psi_2)'$ After setting $\Psi_i = 0$ and try assessed the convergence probability for the prepared confidence intervals $\hat{\tau}$ that varies between Ψ_i and n . the results implies the small sample size, smaller will be threshold effect (Hansen 2000).

3.6 Empirical Results

The present section discusses the threshold values for economic growth based on three different proxies of financial development. Hansen's (1999) panel threshold models (PTR) are used to estimate the effect of different threshold variables on finance-growth nexus. Our second row in the table represents the estimated threshold values for the respective threshold variables at a 95 percent confidence interval in the following tables. It implies the level of accuracy at which threshold values are estimated and the test statistics with their *bootstrap p-values* to check the significance of the variable (given in the third row). The threshold model confirms the signal threshold for this study since the threshold is not identified under the condition of the null hypothesis of no threshold effect. For this, we adopt the bootstrap technique suggested by Caner and Hansen (2004) to calculate the asymptotic p-value, which lends relevance to the sample split. Next, to compute the P-values, the model is run with 1000 replications and 15 % trimming percentage. The fourth row represents the effect of financial development on economic growth under the "Low regime (1)" of the threshold. The estimated results show how financial development influences the growth below the threshold values for the set of countries.

Similarly, row five shows the "Upper regime (2)" of the threshold and indicates how the effect of financial development on growth changes once it exceeds a certain level of threshold. The impact of control variables in the model is represented in row six to ten, and the value of R^2 and F-statistic shows the overall model fit. Finally, the last two rows represent the number of observation (an approx. number of countries) below and above the threshold values.

Table 3.3 reports the estimated results using initial income as threshold variable with three banking sector development indicators, Model 1 (Private sector credit), Model 2 (liquid liabilities) and Model 3 (Domestic Savings). Model 1 reports the result when financial development is measured by private sector credit. The estimated threshold for initial per capita income is 9.533, approx. \$953.30; it lies within a corresponding 95 percent confidence interval of [9.50--9.54] with Heteroskedasticity-adjusted bootstrap p-value of 0.000, where it was about 60 countries fall below this threshold. The next question is about how private sector credit affects economic growth. The estimated results confirm the statistical significance of two regime-dependent financial coefficients 1 and 2.

Table: 3.3
Panel Threshold Regression (PTR) Results
Using Income as Threshold Variable

Dependent variable Per capita real GDP	Financial development variables (FD)		
	Model (1) Private sector credit	Model (2) liquid liabilities	Model (3) Domestic Savings
Threshold estimates ($\hat{\gamma}$) 95% Confidence Interval	9.53 [9.50 – 9.54]	8.12 [8.03 – 8.14]	7.67 [7.670 – 7.673]
Bootstrap p -values	($<.001$) ***	(0.02) **	(0.09) *
	Financial development (Slope parameters)		
Low regime ($\hat{\beta}_1$) (Initial Income $\leq \hat{\gamma}$)	0.002 ($<.001$) ***	0.002 ($<.001$) ***	0.02 (0.25)
Upper regime ($\hat{\beta}_2$) (Initial Income $\leq \hat{\gamma}$)	-0.02 ($<.001$) ***	-0.02 ($<.001$) ***	0.05 (0.004) ***
	Impact of covariates		
Initial Income _{it}	-0.72 (0.10) *	-0.59 (0.22)	-1.68 ($<.001$)***
Investment Rate _{it}	0.12 ($<.001$) **	0.13 ($<.001$) ***	0.12 ($<.001$)***
Population Growth _{it}	-0.53 (0.002) ***	-0.58 ($<.001$) ***	-0.71 ($<.001$)***
Human Capital _{it}	0.28 (0.003) ***	0.23 (0.01) **	0.20 (0.03)**
Constant	4.88 (0.15)	3.44 (0.03)**	12.2 ($<.001$)***
F-stat	17.78***	15.47***	12.60***
R-squared	0.13	0.12	0.10
Number of countries	82	82	82
Number of observations	656	656	656
Number of countries below regime	60	39	31
Number of countries above regime	22	33	51

Notes: “GDP per capita growth rate used as a dependent variable. Standard errors are presented in brackets are P-values and the character”. *P < 0.1, **P < 0.05 and ***P < 0.001 per cent level of significant. In estimation each regime contains at least 5% of observation. I applied bootstrap 1000 replications to get P-values to test and identified the number of thresholds of the equation.

The private sector credit is a positive and statistically significant determinant of economic growth if it is less than the threshold. This means a percentage increase in private credit increases economic growth by 0.002 percent for countries with an initial per capita income below \$953.30. On the other hand, a negative and statistically significant effect of private sector credit on economic growth above the threshold value is

observed. Specifically, a percentage decrease in private credit reduces economic growth by 0.021 percent.

Model 2 presents the same analysis with liquid liabilities as a proxy for financial development. The threshold value is 8.120, approx.—\$ 812.00, where about 39 countries are below this threshold level. Again the estimated coefficients below the threshold promote the economic growth as we saw the private sector credit. The liquid liabilities in the country below the threshold will exert a positive effect on growth. However, above the threshold, the liquid liabilities show negative and statistically significant impact on economic growth. In Model 3, where the finance is proxied by gross domestic saving, the estimated results reveal positive effect in both the regimes. The effect is substantial and statistically significant in upper regimes. It implies after the threshold value 7.67, greater domestic savings (an increase of one percent) will boost economic growth by 0.05 percent. In other words, higher savings results higher economic growth, where 51 countries are noticed above this threshold.

In all the three models, the coefficients of investment rate, population growth, and human capital meet theoretical expectations. The coefficients for investment rate and human capital are positive and statistically significant determinant of economic growth at the conventional level. In contrast, the coefficient for population growth and initial income is negative and significant, except private sector credit and liquid liabilities.

To sum up, the empirical estimations suggest that there is an existence of a non-linear relationship between financial development and economic growth. Both the proxies of financial development, Private sector credit and liquid liabilities are positive and strongly affect economic growth below the threshold. Whereas the gross domestic savings seem to have a strong positive effect on growth once it's cross the threshold level and these findings are consistent (Levine et al. 2000, Beck and Levine 2004).

Assuming that the relation between growth and volatility is linear, we have confirmed the negative relationship between growth and volatility. The estimated result in Table 3.4 indicates there is an existence of two different regimes for all the three measures of financial development. The threshold estimations in model-1, the macroeconomic volatility stands with a threshold of 7.80 percent at 95 percent confidence interval of [6.99 – 7.97] and a significant bootstrap p-value of 0.005. This indicates the estimated coefficients for financial development are negative and statistically significant when macroeconomic volatility is less than the threshold and it is positive above the threshold of 7.80 percent. This implies that as long as the macroeconomic volatility is below or equal to the threshold of 7.80 percent, a percentage decreases in private credit will reduce the economic growth of 70 countries by 0.02 percent. However, for countries with macroeconomic volatility above the threshold level of 7.80, a percentage increase in private sector credit will spurs economic growth by 0.002 percent. In case of

model-2 the threshold value for macroeconomic volatility is 2.40 percent where about 28 countries are below this threshold range.

Table: 3.4
Panel Threshold Regression (PTR) Results
Volatility (Std. dev of per-capita GDP) as a Threshold Variable

Dependent variable Per capita real GDP	Financial development variables (FD)		
	<u>Model (1)</u> Private sector credit	<u>Model (2)</u> liquid liabilities	<u>Model (3)</u> Domestic Savings
Threshold estimates ($\hat{\gamma}$)	7.80	2.40	9.37
95% Confidence Interval	[6.99 – 7.97]	[2.39 – 2.41]	[9.22 – 9.43]
Bootstrap p -values	(0.005) ***	(0.09) *	(<.001) ***
	Financial development (Slope parameters)		
Low regime ($\hat{\beta}_1$) (Volatility $\leq \hat{\gamma}$)	-0.02 (0.000) ***	-0.008 (0.002) ***	0.43 (0.01)**
Upper regime ($\hat{\beta}_2$) (Volatility $\leq \hat{\gamma}$)	0.002 (0.002) ***	0.01 (<.003) ***	-0.13 (<.001) ***
	Impact of covariates		
Initial Income _{it}	-0.78 (0.09) *	-1.37 (0.003) ***	-0.67 (0.15)
Investment Rate _{it}	0.14 (<.001) ***	0.13 (<.001) ***	0.14 (<.001)***
Population Growth _{it}	-0.60 (<.001) ***	-0.71 (<.001) ***	-0.62 (<.001)***
Human Capital _{it}	0.28 (0.004) ***	0.13 (0.15)	0.33 (0.34)
Constant	5.51 (0.11)	10.52 (0.002) ***	4.55 (0.73)
F-stat	15.16***	13.98***	19.35***
R-squared	0.12	0.10	0.26
Number of countries	82	82	82
Number of observations	656	656	656
Number of countries below regime	70	28	75
Number of countries above regime	82	54	07

Notes: “GDP per capita growth rate used as a dependent variable. Standard errors are presented in brackets are P-values and the character” *P < 0.1, **P < 0.05 and ***P < 0.001 per cent level of significant. In estimation each regime contains at least 5% of observation. I applied bootstrap 1000 replications to get P-values to test and identified the number of thresholds of the equation.

It is observed that the country with volatility below the threshold level of 2.40 percent, the liquid liabilities of the country have negative impact on its economic growth and vice-verse. It shows that a percentage decrease in liquid liabilities will reduce the economic growth by 0.008 percent. In both models 1 and 2, we find that above the threshold value for macroeconomic volatility of 2.40 percent, the

measurements of financial development have positive and significant effect on growth. Sandmo (1970) highlight the importance of the saving behaviour under the income uncertainty. “*An aggregate risk return trade-off in technology (black, 1979)*” will have positive effect on per-capita growth due to growth in income variability. The above arguments suggest that the financial development (banking sector) has a positive effect on growth at a higher level of growth volatility.

In contrast, model-3 reports the volatility threshold of 9.37 percent, where the domestic savings will influence economic growth above this threshold. It thus suggests that domestic saving have negative effect on economic growth once it's crossed the level of macroeconomic volatility of 9.37 percent. Specifically, a percentage decreases in domestic savings will reduces economic growth by 0.13 percent once it is greater than threshold. In contrast, below the threshold percentage increases in domestic savings will lead to rises economic growth by 0.43 percent, where 75 countries come under this range. These results confirm the positive association between savings and growth as mentioned by Pagano's (1993). A well-developed domestic financial system contributes a significant increase in domestic saving and investment levels, which ultimately enhances economic growth (Becsi and Wang, 1997). In all three models, the estimated coefficients of covariates on initial income, investment rate and population growth are in line with the theory. The coefficients of investment rate positively affect growth whereas initial income and population growth have a negative and statistically significant determinant of economic growth at the conventional level. In contrast, the coefficient of human capital is positive but insignificant except private sector credit.

The results in Table: 3.5 confirm the existence of two regimes for all three measures of financial development. The result shows that on average 3 percent of trade openness to GDP ratio is the threshold value in both models 1 and 2. More than 64 (78 percent of countries in the sample) countries are above this threshold value. The threshold value lies between 3.35 to 3.62 percent with 95% confidence interval along with highly significant bootstrap p-values.

Below the threshold value 3 per cent of both the financial development indicators such as private sector credit and liquid liabilities are strongly negative and statistically significant at 1 per cent. This implies below 3 percent threshold level of trade openness, a percentage decrease in private sector credit and liquid liabilities will lower the economic growth around 0.005 and 0.004 per cent in total. Once the trade openness ratio attains the estimated threshold level, the coefficients on financial development become positive and significant at conventional level. Thus, the evidence suggests that trade openness can ease the accessibility of productivity-enhancing technology from the international market and encourage technology diffusion. This could occur through a well-developed domestic financial system, which may facilitate the availability of funds to the domestic market. Hence, high openness to trade and financial

development contributes to high economic growth (Huang and Lin 2009, Falvey, Foster-McGregor and Khalid, 2013). With model-3 the estimated coefficients of domestic saving as proxy for financial development are positive but insignificant when trade openness is above the threshold level. It reveals that above the threshold level greater domestic saving will not translates into higher investment and in turn higher economic growth.

Table: 3.5
Panel Threshold Regression (PTR) Results
Trade Openness as Threshold Variable

Dependent variable Per capita real GDP	Financial development variables (FD)		
	Model (1) Private sector credit	Model (2) liquid liabilities	Model (3) Domestic Savings
Threshold estimates ($\hat{\gamma}$)	3.61	3.49	4.47
95% Confidence Interval	[3.35 – 3.62]	[3.29 – 3.50]	[4.43 – 4.48]
Bootstrap p -values	(<.001)***	(<.001)***	(0.08) **
	Financial development Slope parameters		
Low regime ($\hat{\beta}_1$) (Trade Openness $\leq \hat{\gamma}$)	-0.005 (<.001)***	-0.004 (<.001)***	0.07 (<.001)***
Upper regime ($\hat{\beta}_2$) (Trade Openness $\leq \hat{\gamma}$)	0.003 (<.001)***	0.002 (<.001)***	0.02 (0.82)
	Impact of covariates		
Initial Income _{it}	-1.48 (<.001)***	-1.46 (<.001) ***	-1.41 (<.002)***
Investment Rate _{it}	0.13 (<.001)***	0.14 (<.001)***	0.12 (<.001)***
Population Growth _{it}	-0.78 (<.001)***	-0.77 (<.001)***	-0.67 (<.001)***
Human Capital _{it}	0.18 (0.05) **	0.19 (0.04) **	0.21 (0.02)**
Constant	11.5 (<.001)***	11.2 (<.001) ***	9.94 (0.004)***
F-stat	17.48***	18.08***	14.47***
R-squared	0.10	0.11	0.10
Number of countries	82	82	82
Number of observations	656	656	656
Number of countries below regime	18	15	58
Number of countries above regime	64	67	24

Notes: “GDP per capita growth rate used as a dependent variable. Standard errors are presented in brackets are P-values and the character” *P < 0.1, **P < 0.05 and ***P < 0.001 per cent level of significant. In estimation each regime contains at least 5% of observation. I applied bootstrap 1000 replications to get P-values to test and identified the number of thresholds of the equation.

In contrast below the threshold value of trade openness 4.47 percent, domestic saving becomes significant variable to promote economic growth. This indicates on average 1 percent increase in gross domestic saving will contribute 0.07 percent economic growth.

Again, the in all models indicate that the estimated coefficients on investment rates, human capital, initial income and population growth are consistent with theory. The coefficients on investment rate and human capital are positive and statistically significant. On the other hand, coefficients on initial income and population growth are negative and statistically significant determinants of economic growth. In summary, my results show that private sector credit and liquid liabilities are important indicators of financial development that promotes economic growth above the threshold of 3 percent trade openness. When inflation and government spending are used as proxies of macroeconomic policies variables, the results yield evidence that sound macroeconomic policies also play an important role in conditioning the direct benefits to financial development.

It is evident from all the three regressions in Table 3.6 that when financial development in lower regime of the government expenditure is less than 2.6 to 2.9 percent of GDP or say below this threshold level, all the three indicators of financial development have a positive effect on economic growth. This implies a percentage increase in private sector credit, liquid liabilities and domestic saving will boost the economic growth on average 0.02 percent in total, when it is below the threshold level. On the other hand, above the threshold value, all three indicators have an adverse effect on economic growth and significance. The coefficients are somewhat different in magnitude, contrary to what a quadratic specification would impose. Some possible explanations about this relationship put forward by the past studies. The share and composition of government spending are captured in two competing hypotheses:

(1) The efficiency hypothesis argument states that financial globalization affects government spending by raising the pressure on governments for a tax cut. As tax rates become lower, it is supposed to avert the exodus of mobile capital. This is because of financial integration across the countries, the market threatens to penalize deficit spending (for high rates of interest), ultimately putting pressure on the governments for expenditure retrenchment (Garrett 1998a, Adam et al. 2013, Bussemeyer, 2009).

(2) The compensation hypothesis works on opposite predication. The argument here is that the internationalization of financial markets responds to the expansion of government spending. Similar to the argument of Garrett (1998a) “for ‘virtuous circle’ under this government expands the social welfare programmes to compensate individuals for the increased uncertainty associated with higher exposure of internationalization of financial markets”. Hence, it results an increase in share of government in GDP (Cameron 1978, Adam et al. 2013, Bussemeyer, 2009).

Table: 3.6
Panel Threshold Regression (PTR) Results
Government Expenditure as Threshold Variable

Dependent variable Per capita real GDP	Financial development variables (FD)		
	<u>Model (1)</u> Private sector credit	<u>Model (2)</u> liquid liabilities	<u>Model (3)</u> Domestic Savings
Threshold estimates ($\hat{\gamma}$)	2.64	2.66	2.90
95% Confidence Interval	[2.62 – 2.65]	[2.55 – 2.65]	[2.87 – 2.91]
Bootstrap p -values	($<.001$) ***	($<.001$) ***	($<.001$) ***
	Financial development Slope parameters		
Low regime ($\hat{\beta}_1$) (Government Expenditure $\leq \hat{\gamma}$)	0.003 ($<.001$) ***	0.002 ($<.001$) ***	0.04 (0.01) **
Upper regime ($\hat{\beta}_2$) (Government Expenditure $\leq \hat{\gamma}$)	-0.007 ($<.001$) ***	-0.005 ($<.001$) ***	-0.4 (0.05) **
	Impact of covariates		
Initial Income _{it}	-1.30 (0.003) ***	-1.32 (0.003) ***	-1.39 (0.002) ***
Investment Rate _{it}	0.132 ($<.001$) ***	0.136 ($<.001$) ***	0.12 ($<.001$) ***
Population Growth _{it}	-0.74 ($<.001$) ***	-0.73 ($<.001$) ***	-0.71 ($<.001$) ***
Human Capital _{it}	0.23 (0.01) **	0.21 (0.02) **	0.23 (0.01) **
Constant	9.97 (0.002) ***	10.22 (0.002) ***	10.20 (0.002) **
F-stat	21.82 ***	20.89 ***	18.42 ***
R-squared	0.13	0.12	0.12
Number of countries	82	82	82
Number of observations	656	656	656
Number of countries below regime	36	37	59
Number of countries above regime	46	45	23

Notes: GDP per capita growth rate used as a dependent variable. Standard errors are presented in brackets are P-values and the character *P < 0.1, **P < 0.05 and ***P < 0.001 per cent level of significant. In estimation each regime contains at least 5% of observation. I applied bootstrap 1000 replications to get P-values to test and identified the number of thresholds of the equation.

Taking inflation as threshold variable, in the estimated result reported in Table 3.7, the data confirms the signal threshold for all the three models after rejecting the no-threshold hypothesis. The empirical results observed that for countries with lower inflation rate of 2 to 3 percent, there is a significant effect of financial development on economic with 95% confidence interval of [2.365 – 4.034] and significant bootstrap p -value of 0.005.

Table: 3.7

Panel Threshold Regression (PTR) Results
Inflation as Threshold Variable

Dependent variable Per capita real GDP	Financial development variables (FD)		
	Model (1) Private sector credit	Model (2) liquid liabilities	Model (3) Domestic Savings
Threshold estimates ($\hat{\gamma}$)	2.72	2.69	3.94
95% Confidence Interval	[2.36 – 2.72]	[2.39 – 2.73]	[3.79 – 4.03]
Bootstrap <i>p</i> -values	($<.001$) ***	($<.001$) ***	(0.02) **
	Financial development Slope parameters		
Low regime ($\hat{\beta}_1$) (Inflation $\leq \hat{\gamma}$)	0.026 ($<.001$) ***	0.002 ($<.001$) ***	0.05 ($<.002$) **
Upper regime ($\hat{\beta}_2$) (Inflation $\leq \hat{\gamma}$)	-0.005 ($<.001$) ***	-0.006 ($<.001$) ***	-0.06 (0.06) *
	Impact of covariates		
Initial Income _{it}	-1.47 ($<.001$) ***	-1.46 ($<.001$) ***	-1.47 ($<.001$) ***
Investment Rate _{it}	0.14 ($<.001$) ***	0.14 ($<.001$) ***	0.11 ($<.001$) ***
Population Growth _{it}	-0.78 ($<.001$) ***	-0.79 ($<.001$) ***	-0.71 ($<.001$) ***
Human Capital _{it}	0.17 (0.06) *	0.17 (1.85) **	0.15 (1.57)
Constant	11.48 ($<.001$) ***	11.3 ($<.001$) ***	11.15 ($<.001$) ***
F-stat	17.56***	18.63***	14.98***
R-squared	0.11	0.10	0.11
Number of countries	82	82	82
Number of observations	656	656	656
Number of countries below regime	57	55	75
Number of countries above regime	25	27	07

Notes: “GDP per capita growth rate used as a dependent variable. Standard errors are presented in brackets are P-values and the character” *P < 0.1, **P < 0.05 and ***P < 0.001 per cent level of significant. In estimation each regime contains at least 5% of observation. I applied bootstrap 1000 replications to get P-values to test and identified the number of thresholds of the equation.

This means a percentage increase in private sector credit, liquid liabilities and domestic saving will spur economic growth by 0.02 to 0.05 percent. In contrast inflation threshold in upper regime has negative and significant effect on growth for all three case. The estimated results of threshold inflation in the present study are statistically different from the past empirical studies. Bruno and Easterly (1998) find 40 per cent of inflation in their study, Khan and Senhadji (2001) report inflation threshold range from 11 to 12 per cent, Huang et, al (2010) estimate 7.3 to 7.6 per cent level of inflation threshold. While this study finds the inflation threshold of 2 to 3 percent less than all the previous studies, it ensures consistency in our results. It thus, suggests that a low rate of inflation allows an economy to take advantage of the financial system (through reducing the information cost) on productivity growth which will further increase

economic growth. However, when inflation rates are high and volatile, it will alter the information cost and suppress the power of the financial system. Moreover, less developed financial infrastructure discourages the domestic financial sector to integrate with global markets. Hence, it reduces the ability of the financial system to allocate capital efficiently and productively, which in turn lower the economic growth Huang et, al (2010).

In both Tables 3.6 and Table 3.7 the coefficients of all the covariates like investment rate and human capital are positive and statistically significant. Economic growth and initial income, and population growth have negative and statistically significant determinants of economic growth.

Moreover, financial development indicators are used as both threshold and regime-switching variables. Table 3.8 confirms the non-linearity in finance-growth nexus, where the Model 1 uses private sector credit as threshold and regime-switching variables. The estimated threshold value is 4.52 per cent of GDP with a 95 per cent confidence interval of $[4.50 - 4.52]$. This value is quite close to the threshold of 5 per cent computed by Cecchetti and Kharroubi (2012). The results show that private sector credit is a positive and statistically significant determinant of economic growth below the regime. The coefficients are not significant once it crosses the threshold. This implies below the threshold level of 4.52 percent the private sector credit is the better indicator to promote economic growth. However, 70 countries are comes under this threshold range.

Model 2, with liquid liabilities as threshold variable, the threshold value is 4.53 percent of GDP. The estimated coefficients are positive in both the regime but it significant only in lower regime. The findings are similar to the private sector credit and 68 countries are under the threshold level that encourages the economic growth.

Model 3, I find an inverse effect of domestic savings as threshold variable, it is observed that in upper regime of 3.65 percent domestic saving to GDP promotes economic growth. Such as a percentage increase in gross domestic savings will significantly increases growth by 0.10 percent respectively. The numbers of countries are large, that is 45 countries are benefited from domestic saving to GDP above the 3.65 percent.

In summary, among all these three banking development indicators, private sector credit and liquid liabilities have the strongest positive effect on economic growth in lower regimes. It is found that private sector credit and liquid liabilities are the most important banking development indicators that can proxy the strength of financial sector. It reflects the efficiency of the institutions in providing the credit sources. The process of growth tends to deteriorate if the enterprises owned by states channel credit to

unproductive investment and wasteful activities. The liquid liabilities measure the actual size of the banking sector also helps to promote the growth (Levine et al, 2000 and Back and Levine 2004).

Table: 3.8
Panel Threshold Regression Results
Financial Development as Threshold Variable

Dependent variable Per capita real GDP	Financial development variables (FD)		
	Model (1) Private sector credit	Model (2) liquid liabilities	Model (3) Domestic Savings
Threshold estimates ($\hat{\gamma}$)	4.52	4.53	3.65
95% Confidence Interval	[4.50 – 4.52]	[4.46 – 4.53]	[3.64 – 3.65]
Bootstrap <i>p</i> -values	(<.002) ***	(0.02) **	(<.002) ***
Financial development Slope parameters			
Low regime ($\hat{\beta}_1$) (Private sector credit $\leq \hat{\gamma}$) 0.42 (0.05)**	Low regime ($\hat{\beta}_1$) (liquid liabilities $\leq \hat{\gamma}$) 0.63 (0.02) **	Low regime ($\hat{\beta}_1$) (Domestic Savings $\leq \hat{\gamma}$) -0.23 (0.05)**	
Upper regime ($\hat{\beta}_2$) (Private sector credit $\leq \hat{\gamma}$) 0.03 (0.84)	Upper regime ($\hat{\beta}_2$) (liquid liabilities $\leq \hat{\gamma}$) 0.28 (2.26)	Low regime ($\hat{\beta}_1$) (Domestic Savings $\leq \hat{\gamma}$) 0.10 (0.40)	
Impact of covariates			
Initial Income _{it}	-0.98 (0.03) **	-1.11 (0.01) **	-1.43 (0.002)**
Investment Rate _{it}	0.11 (<.001) ***	0.12 (<.001) ***	0.12 (<.001) ***
Population Growth _{it}	-0.56 (<.001) ***	-0.63 (<.001) ***	-0.62 (<.001) ***
Human Capital _{it}	0.23 (0.01) *	0.19 (0.05) *	0.21 (0.02)**
Constant	5.89 (0.08) *	6.47 (0.06) *	11.09 (<.001)***
F-stat	15.26***	13.77***	15.03***
R-squared	0.15	0.11	0.11
Number of countries	82	82	82
Number of observations	656	656	656
Number of countries below regime	70	68	37
Number of countries above regime	12	14	45

Notes: “GDP per capita growth rate used as a dependent variable. Standard errors are presented in brackets are *p*-values and the character” **P* < 0.1, ***P* < 0.05 and ****P* < 0.001 per cent level of significant. In estimation each regime contains at least 5% of observation. I applied bootstrap 1000 replications to get *P*-values to test and identified the number of thresholds of the equation.

All other variables, such as income, output volatility, government expenditure, and inflations, will positively enhance economic growth at below the threshold levels and slow down the economic growth at

the above the threshold levels. Thus, trade openness benefits the economy above the threshold level and it is consistent with the theory.

3.7 Conclusion

The growing body of empirical literature discovered a non-linear relationship between financial intermediary development and economic growth. However, the theoretical models failed to account for this nonlinear relationship between finance-growth and espoused a simple linear analysis. The general conclusion of the empirical studies confirms a strong positive association between financial intermediary functioning and long-run economic growth. Goldsmith (1969) found a strong positive correlation between financial depth and output growth. He argued that the positive effect of finance on growth was due to strong financial infrastructure that will improve the allocative and efficiency of the investment rather than volume of the investment. Although this argument of positive role was supported by past literature (Levine, 2005), in some countries the financial sector being “too big” exceeding the domestic size of the economy, financial depth no longer contributed to the growth process after reaching the threshold point of financial development, (De Gregorio and Guidotti, 1995). Some studies question the robustness of the finance-growth relationships²⁰. Thus, the point estimation in table 8 shows that below certain level of domestic saving financial depth has negative effect on growth and consistent with the past studies such as, Minsky (1974), Kindleberger (1978) and Rajan (2005), where they strongly believe that “too much finance” have negative effect on growth. Surprisingly, very few studies are done considering a non-monotone association between the financial system and economic growth. So, it’s important to understand the financial sector development and its contributions to output growth of the economy, which is an unqualified assumption, and its validity is required to be examined.

To assess the presence of contingency effects in the finance-growth relationship, three proxy measures for financial development (based on banking sector indicators) such as private sector credit, liquid liabilities, and gross domestic savings percentage of GDP are used here.

A set of five different threshold variables are used to check whether finance-growth nexus is potentially intermediated by these factors beginning with structural characteristics such as country’s initial level of income and output volatility. Next, macroeconomic policy factors like trade openness, government expenditure percentage of GDP, and inflation rate (as proxy for monetary policy) are considered. This analysis is conducted with a set of 82 countries comprising industrial, developing and underdeveloped countries over the period of 1978 to 2018. The choice of the countries is entirely based on the availability of data for a long time period of 40 years.

²⁰ Some of the highly sighted studies, “Levine (2005), Robert Lucas (1988), Rodrik and Subramanian (2009), Panizza (2001)”.

The estimated panel threshold regression (PTR) confirms non-linearity in a finance-growth relationship for all the three models. It provides new evidence that financial intermediary development could facilitate long-term economic growth when the countries satisfy certain financial threshold levels, regarding initial level of income, output volatility, trade openness, government expenditure, and inflation rate. The findings suggest that all three financial development indicators, private sector credit, liquid liabilities, and gross domestic savings are positive and statistically significant in economic growth when initial income is used as a threshold variable. It implies financial development promotes economic growth for the countries with an average initial per capita income below \$848. When output volatility is taken as threshold variable it interprets that above the threshold of macroeconomic volatility, both the private sector credit and liquid liabilities show positive and significant effect on growth. It is a known fact that large financial intermediary is supposed to have higher volatility, but the statement does not mean larger financial development is bad. Ranciere et al (2008) argue that countries with highly developed financial system will be able to manage their instability by paying the price in terms of volatility and gain the benefit in terms of a higher rate of growth. Sandmo (1970) highlights the importance of saving behaviour under the income uncertainty “*An aggregate risk-return trade-off in technology (black, 1979)*” will have a positive effect on per-capita growth due to growth in income variability. All these above studies support the argument the growth effect of financial development (banking sector) is positive when it is above the threshold of output volatility. In contrast, domestic saving has negative effect on economic growth once it exceeds the level of macroeconomic volatility. These results are consistent with the theories and previous literature Pagano’s (1993). A well-developed domestic financial system contributes a significant increase in domestic saving and investment levels, which ultimately enhances economic growth (Becsi and Wang, 1997). The point estimation suggests that financial development indicators such as private sector credit and liquid liabilities are strongly negative and statistically significant when it is below the threshold of trade openness. Once the trade openness ratio attains the estimated threshold level, the coefficients on financial development become positive and significant at the conventional level. Thus, the evidence suggests that trade openness can ease the accessibility of productivity-enhancing technology from the international market and encourage technology diffusion. Hence, high openness to trade and financial development contributes to high economic growth (Huang and Lin 2009, Falvey, Foster-McGregor and Khalid, 2013). But in the case of domestic saving is positive but insignificant when trade openness is above the threshold level. It reveals that above the threshold level, the greater domestic saving will not translate into higher investment and in turn, higher economic growth. It is evident that in all the three regressions, financial development in lower regime of the government expenditure and inflation rate as threshold shows beneficial for economy to boost long-run economic growth. On the other hand, above the threshold these indicators show adverse effect on economic growth. It thus, suggests that low rate of inflation allows an economy to make an advantage of financial system (through reducing the information

cost) on productivity growth which will further increases economic growth. These findings are consistent with the past studies where the authors find the similar conclusion (Cameron, 1978; Garrett, 1998a; Adam et al, 2013; Busemeyer, 2009; Bruno and Easterly, 199; Khan and Senhadji, 2001; Huang et, al, 2010; Vinayagathan, 2013).

Moreover, financial development indicators are used as both threshold and regime-switching variables to confirm the growth effect. The point estimation confirms the non-linearity in finance-growth nexus. The results show that private sector credit and liquid liabilities are positive and statistically significant determinants of economic growth below the regime. The coefficients are not significant once it exceeds the threshold. This implies private sector credit and liquid liabilities are reliable banking sector indicators that can better explain economic growth. However, it is observed that in upper regime, domestic saving plays an essential role in promoting economic growth.

According to Greenwood and Jovanovic (1990), “the conjecture to justify these findings is that financial intermediary has a strong and significant impact on economic growth at a lower stage of financial development”. Where banking sector make an advantage of economic of scale and specialization. Once the financial intermediary system reaches to the point of development (certain threshold), further improvement in this will result in a smaller benefit to economic growth. The logic is that simple diminishing returns to specialization operate at a higher level of economic development. The financial system structure becomes stronger as the economy moves toward development, which is a common feature of advance economies. Particularly, the transition process from low-income countries to high-income category, such regime switching, resulted from modern stock market development. Moreover, developed economics are supposed to increase equity financing as instrument rather are than the debt financing (Boyd, and Smith, 1998; Blackburn, Bose and Capasso, 2005; Bose, 2005; Huang and Lin, 2009). Boot and Thakor (1997) observed that the gap between bank-oriented and market-oriented system raises as the financial system develops. In such a case capital markets may rapidly capture the market at the expense of banks. Sabani (1992) noticed that market-orientated systems are better to restructure financially distressed borrowers than bank-oriented systems. Similarly, Allen and Gale (1995, 1999) documented that the competition among the markets increases once the capital market becomes stronger. This in turn, reduces the banks’ ability to operate and monitor inter-temporal risk sharing. A model developed by Deidda and Fattouh (2008), tested the importance of the bank-based and market-based financial system in allocation of financial resources. They also analyse how market-oriented financial system dominates the banking system to decline over economic development. They find that *“if a market characterized by a disclosure law is established such that entrepreneurs wishing to raise the market finance can credibly disclose their source of financing, this might undermine banker’s incentives to screen even when screening is efficient”* (Deidda and Fattouh, 2008 p-6).

Finally, all these three banking development indicators, private sector credit and liquid liabilities have the strongest positive effect on economic growth in lower regimes. It confirms that private sector credit and liquid liabilities are the most important banking sector indicators that can proxy the strength of financial sector. It reflects the efficiency of the banking institutions in providing the financial sources. However, the policy makers need to frame the policies such that it can optimise the level of income, enhance trade openness and improve the financial system architecture. Similarly, the policies should be like that it can encounter the pre-business cycle's volatilities, monitoring the inflation targeting and improve potential public spending.

All other variables, such as income, output volatility, government expenditure, and inflations, will positively enhance economic growth at below the threshold levels and slow down the economic growth at the above the threshold levels. Thus, trade openness benefits the economy above the threshold level, and it is consistent with the theory.

Appendix: 3.I

List of Countries Used in This Chapter

S.L	Country Name				
1	Australia	28	Gambia	55	Netherlands
2	Bangladesh	29	Germany	56	New Zealand
3	Barbados	30	Ghana	57	Niger
4	Belgium	31	Greece	58	Norway
5	Belize	32	Guyana	59	Pakistan
6	Benin	33	Hong Kong SAR, China	60	Panama
7	Bolivia	34	India	61	Paraguay
8	Brazil	35	Indonesia	62	Peru
9	Cameroon	36	Iran, Islamic Rep.	63	Philippines
10	Canada	37	Ireland	64	Portugal
11	Central African Republic	38	Israel	65	Rwanda
12	Chile	39	Italy	66	Saudi Arabia
13	China	40	Jamaica	67	Senegal
14	Colombia	41	Japan	68	Sierra Leone
15	Congo, Rep.	42	Jordan	69	Singapore
16	Costa Rica	43	Kenya	70	South Africa
17	Cote d'Ivoire	44	Korea, Rep.	71	Spain
18	Cyprus	45	Luxembourg	72	Sri Lanka
19	Denmark	46	Malawi	73	Sudan
20	Dominican Republic	47	Malaysia	74	Sweden
21	Ecuador	48	Malta	75	Switzerland
22	Egypt, Arab Rep.	49	Mauritania	76	Thailand
23	El Salvador	50	Mauritius	77	Togo
24	Fiji	51	Mexico	78	Tunisia
25	Finland	52	Morocco	79	Turkey
26	France	53	Mozambique	80	United Kingdom
27	Gabon	54	Nepal	81	United States
				82	Uruguay

Appendix: 3.II (A)

Confidence interval structure for threshold Taking first indicator of financial development (Private sector credit)

Figure 3.2: Confidence Interval Using Initial Income as Threshold variable

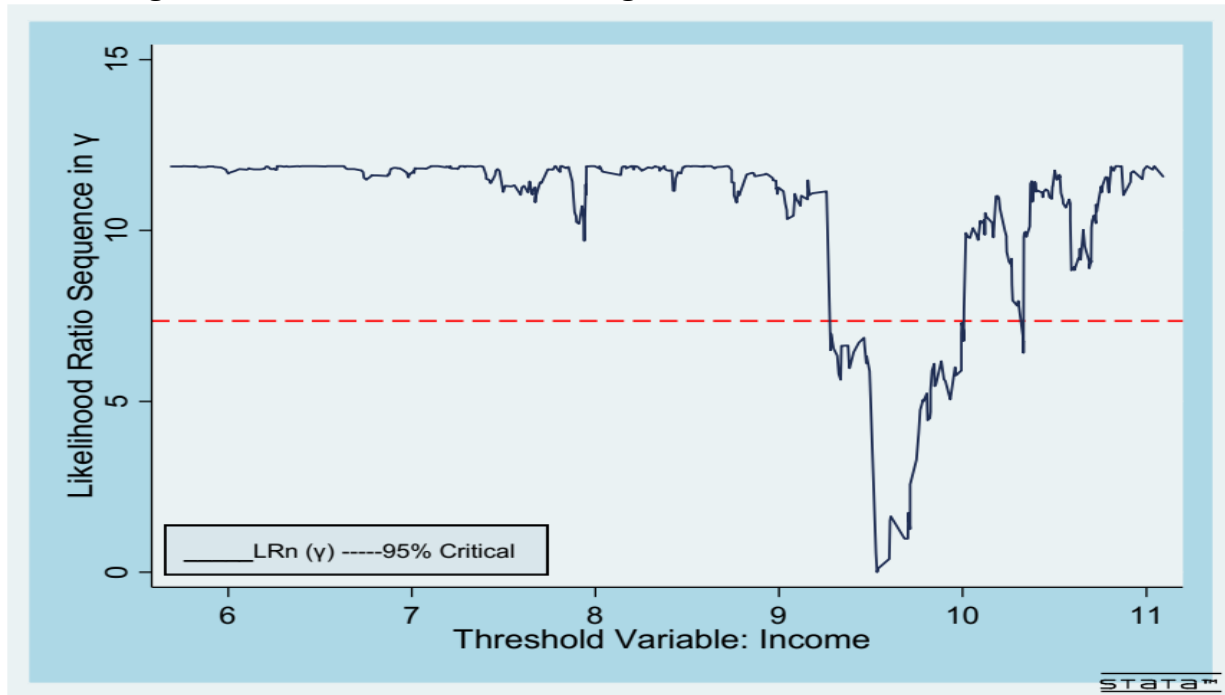


Figure 3.3: Confidence Interval Using Volatility
(Standard deviation of per capita GDP growth) as Threshold variable

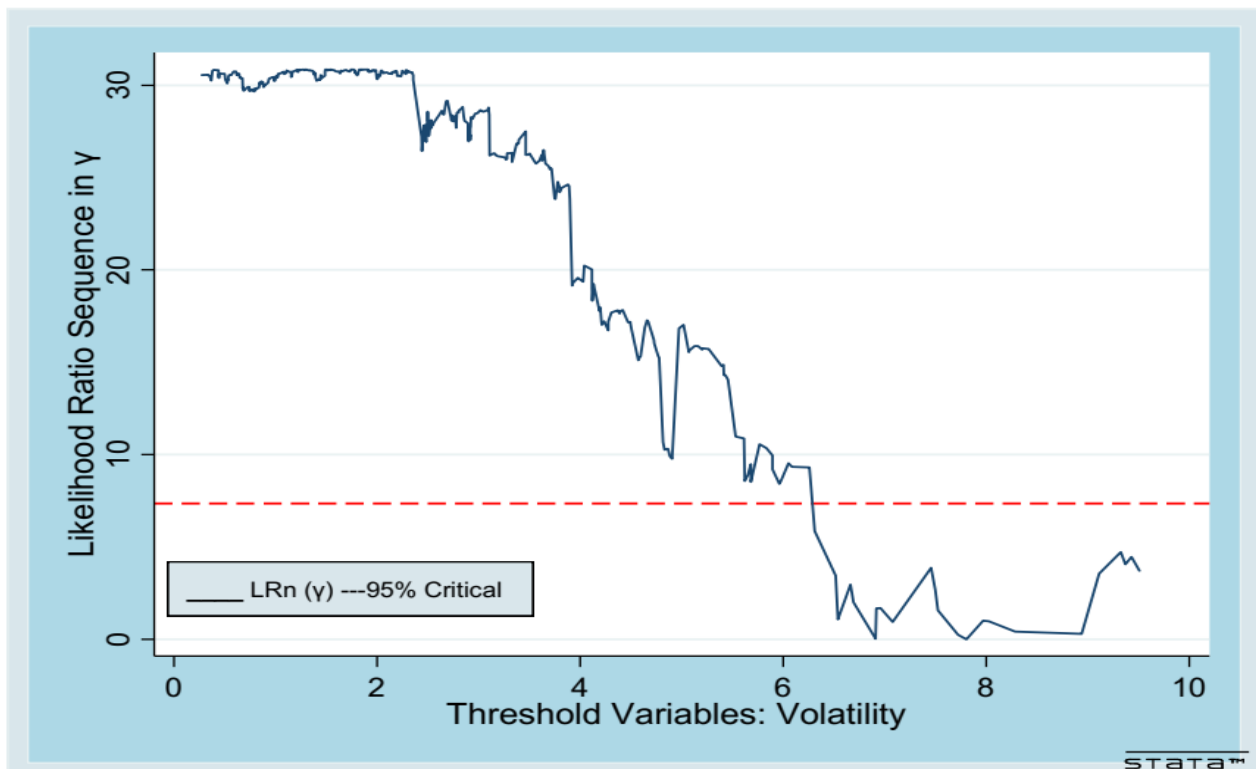


Figure 3.4: Confidence Interval Using Trade openness as Threshold variable

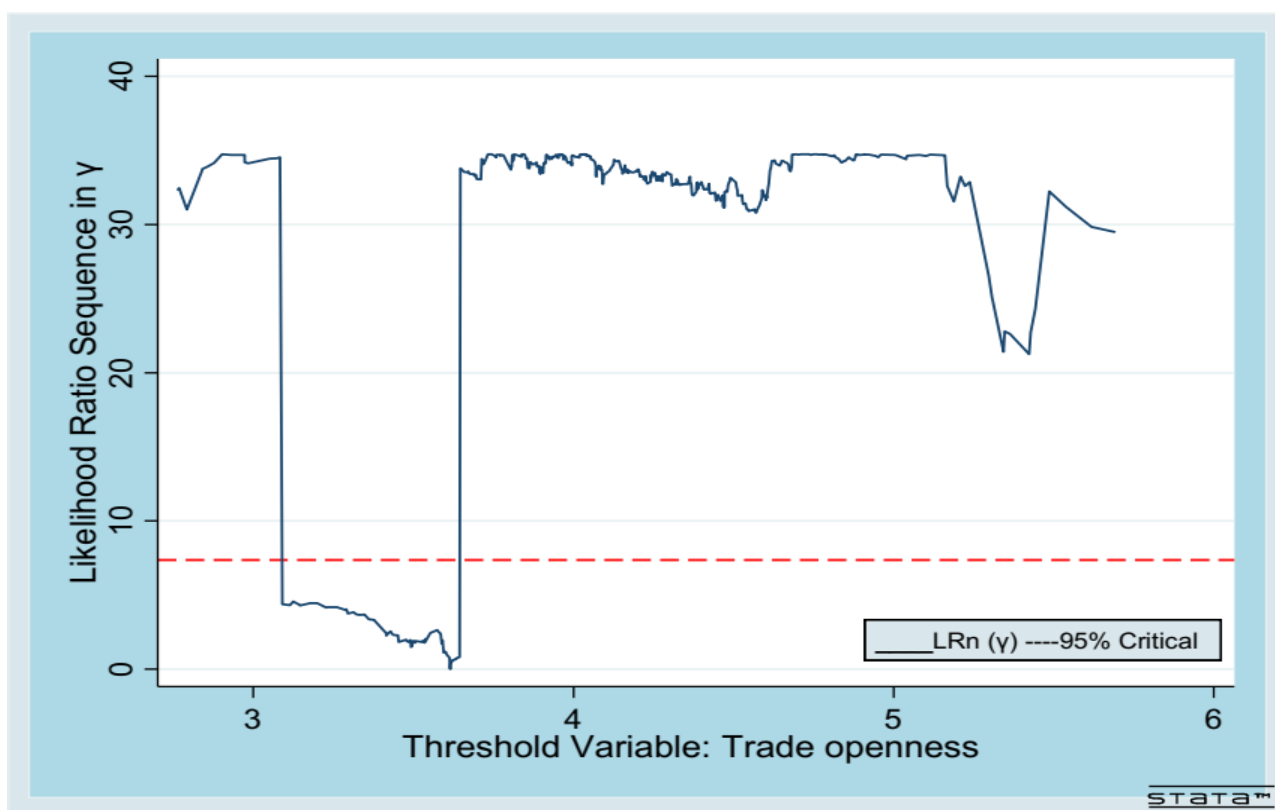


Figure 3.5: Confidence Interval Using Government Consumption as Threshold variable

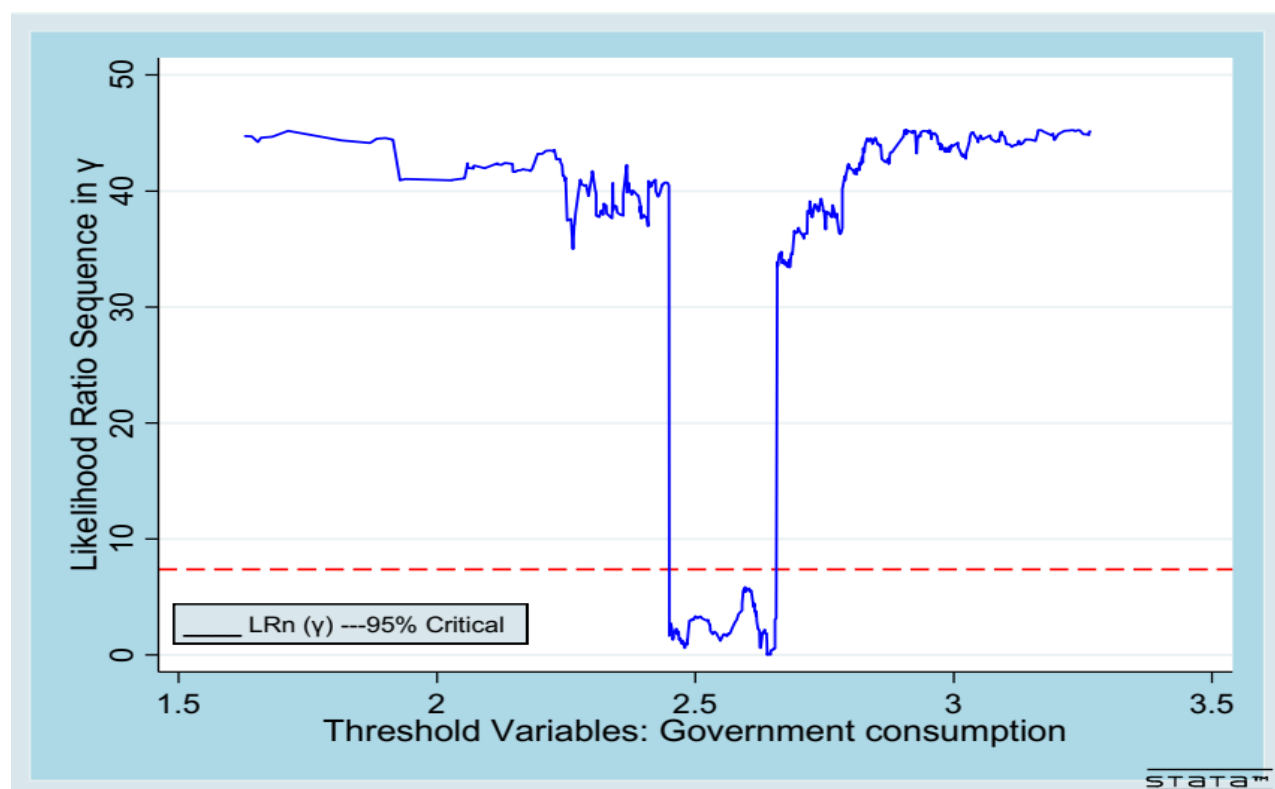
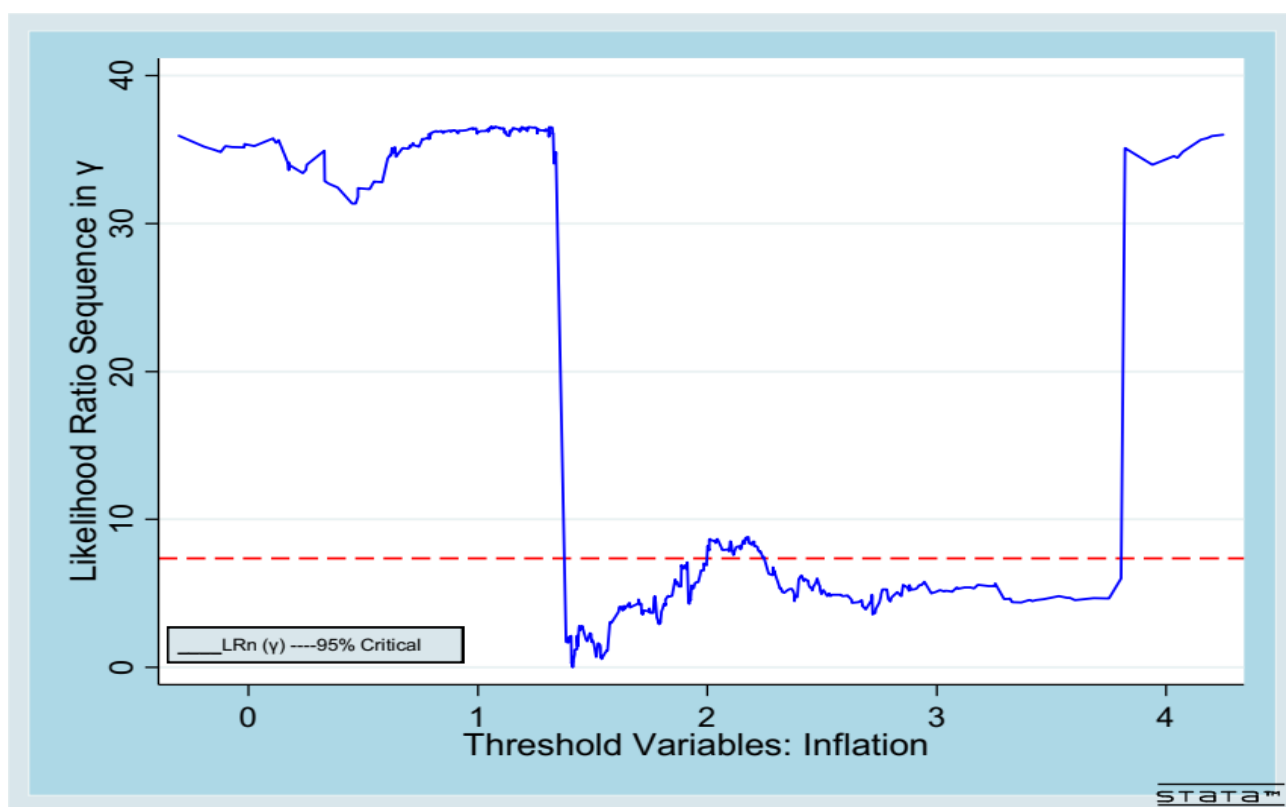


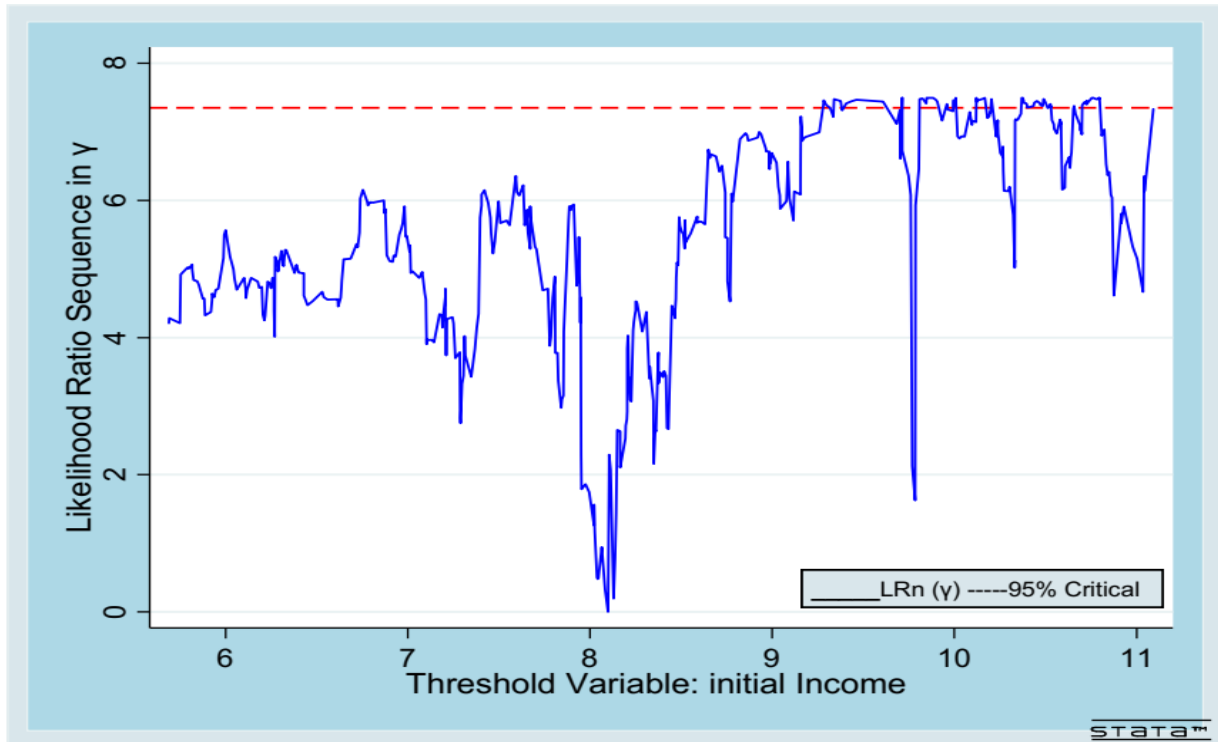
Figure 3.6: Confidence Interval Using Inflation as Threshold variable



Appendix: 3.II (B)

**Confidence interval structure for threshold
Taking Second indicator of financial development (Liquid liabilities)**

Figure 3.7: Confidence Interval Using Initial Income as Threshold variable



**Figure 3.8: Confidence Interval Using Volatility
(Standard deviation of per capita GDP growth) as Threshold variable**

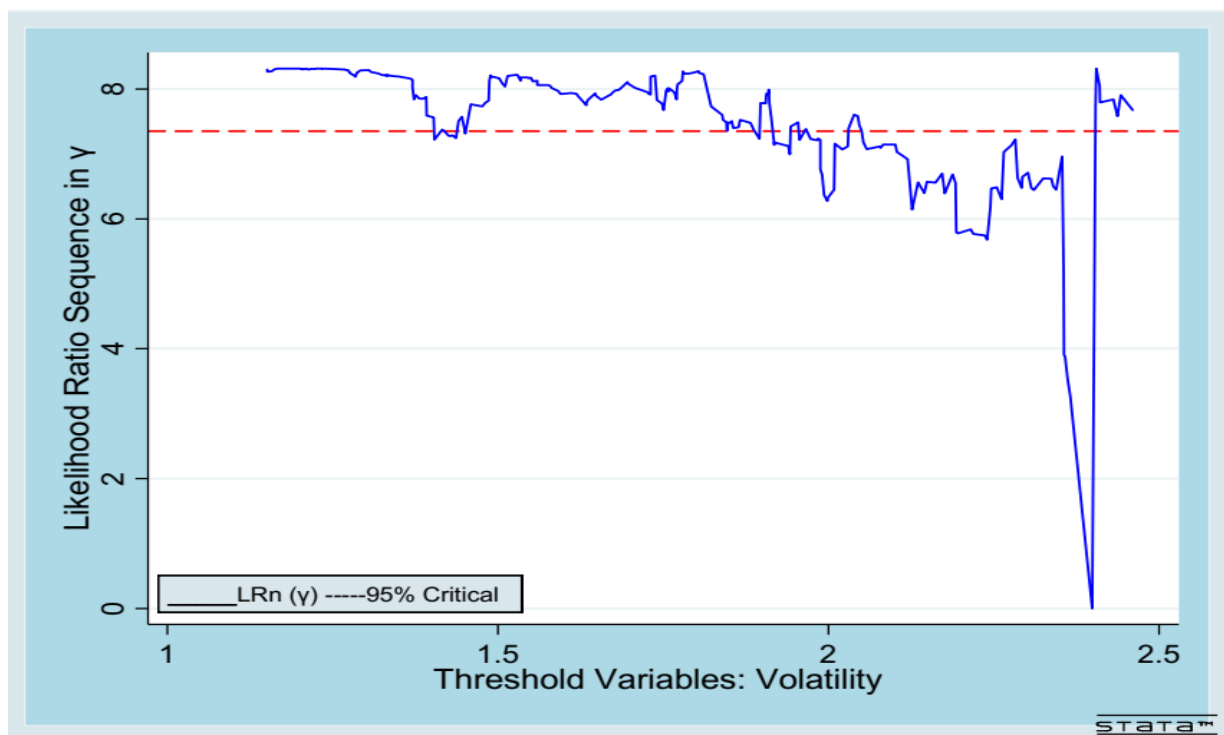


Figure 3.9: Confidence Interval Using Trade openness as Threshold variable

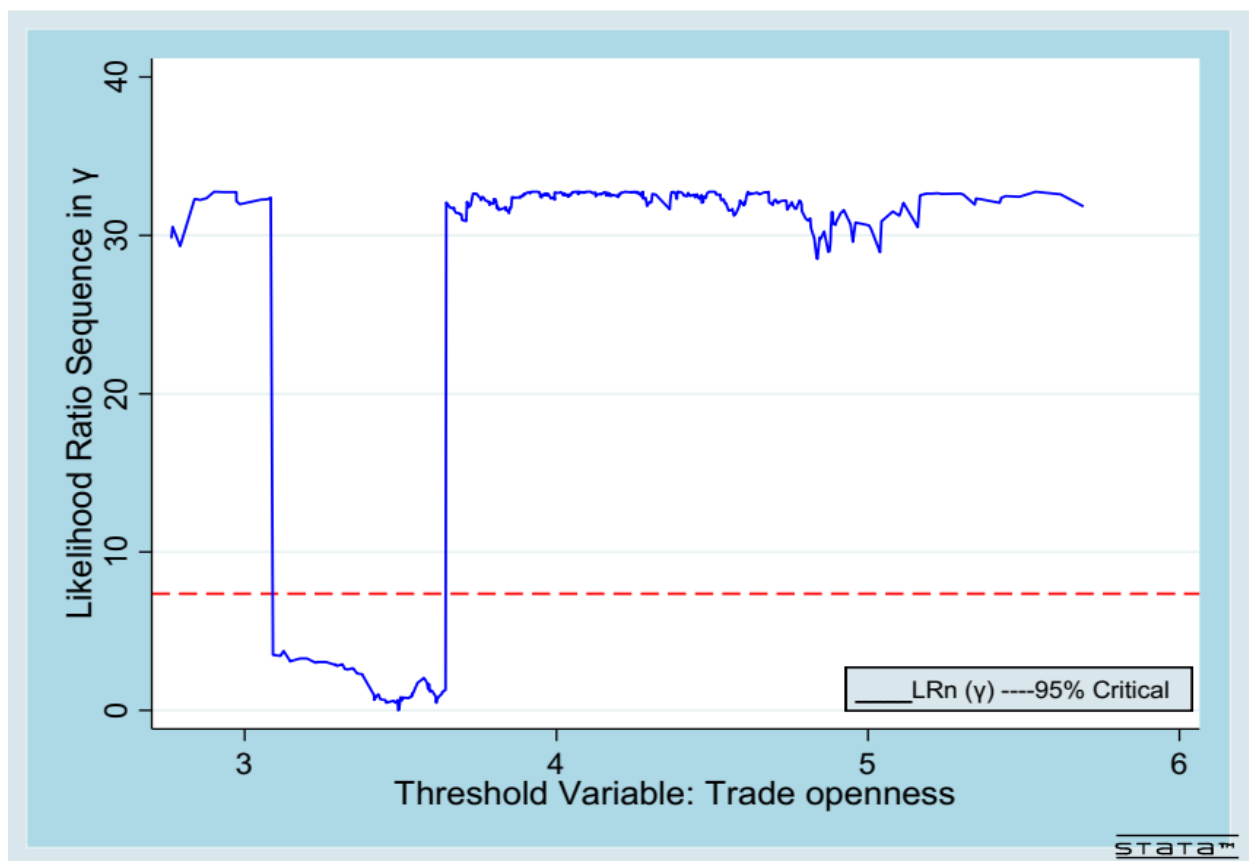


Figure 3.10: Confidence Interval Using Government Consumption as Threshold variable

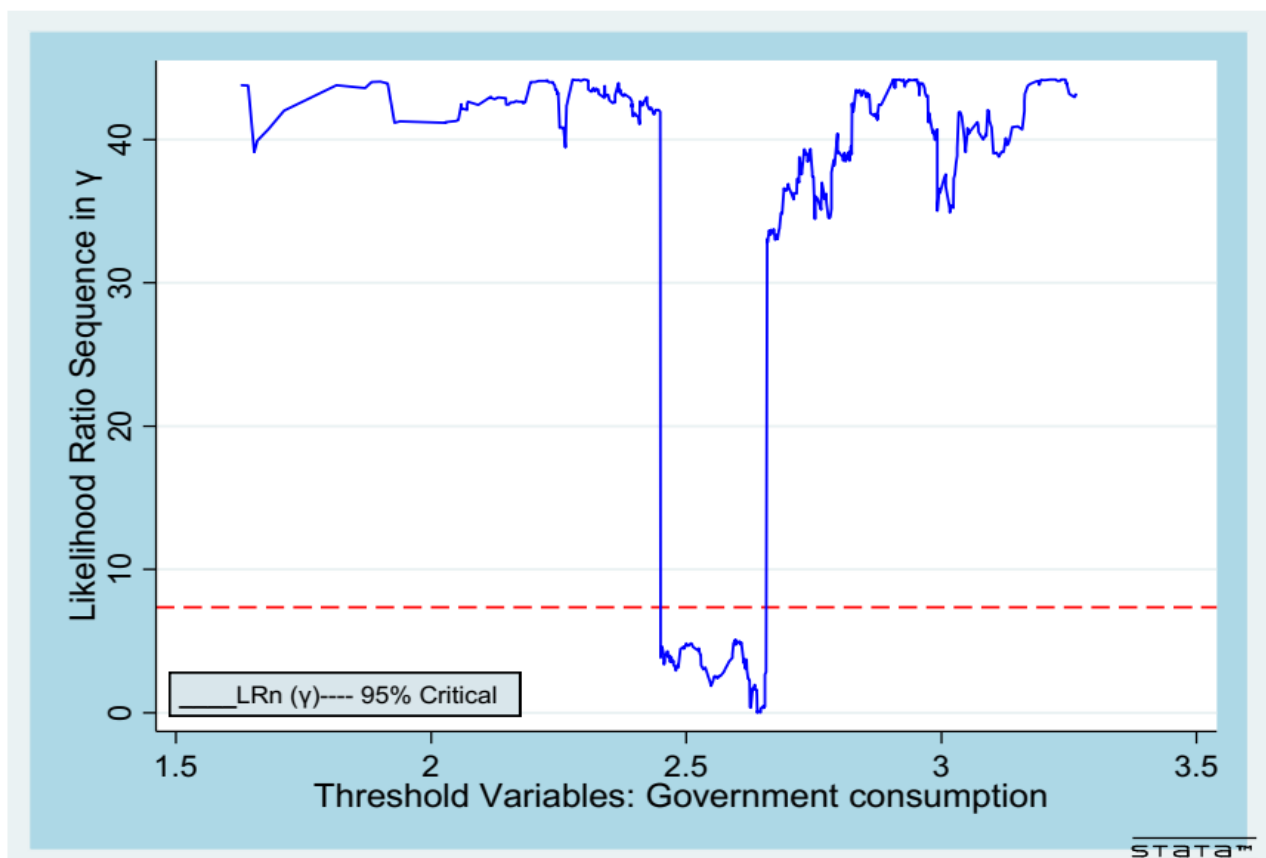
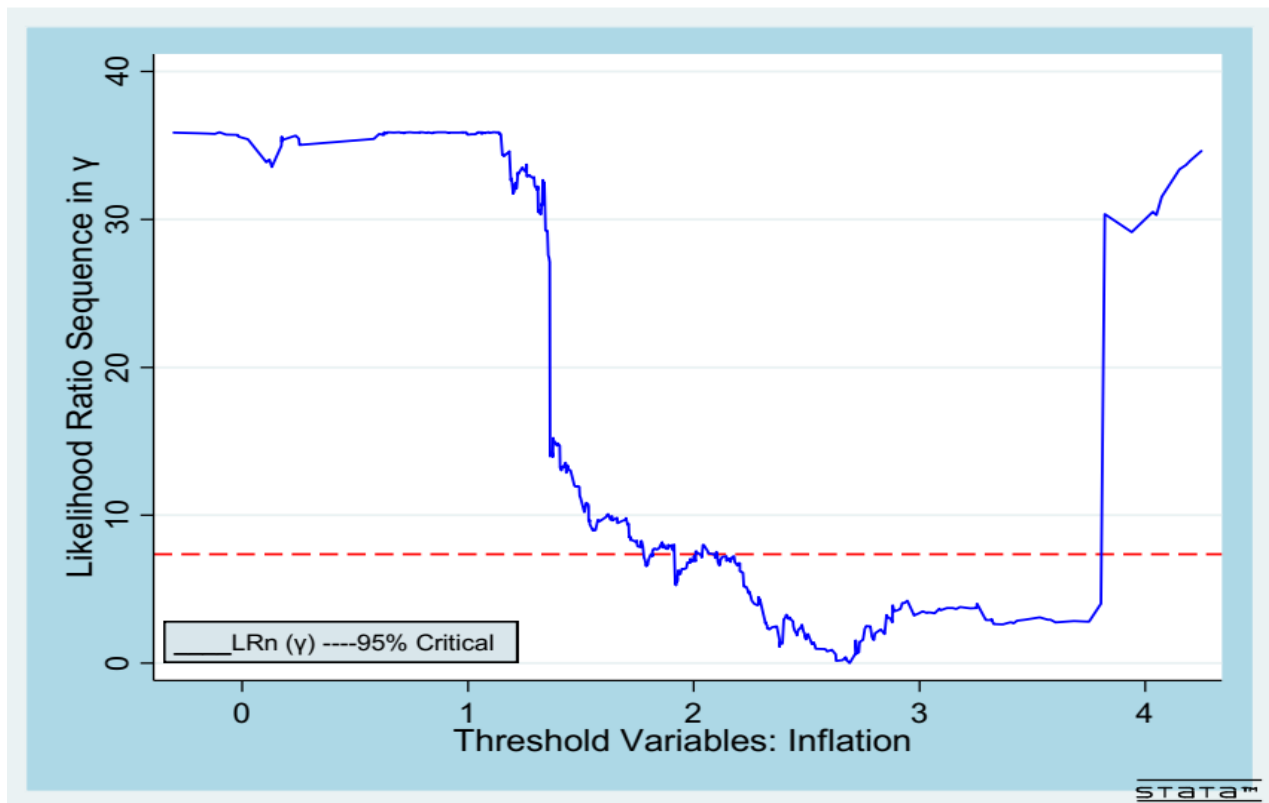


Figure 3.11: Confidence Interval Using Inflation as Threshold variable



Confidence interval structure for threshold Taking Third Indicator of Financial Development (Gross Domestic Savings)

Figure 3.12: Confidence Interval Using Initial Income as Threshold variable

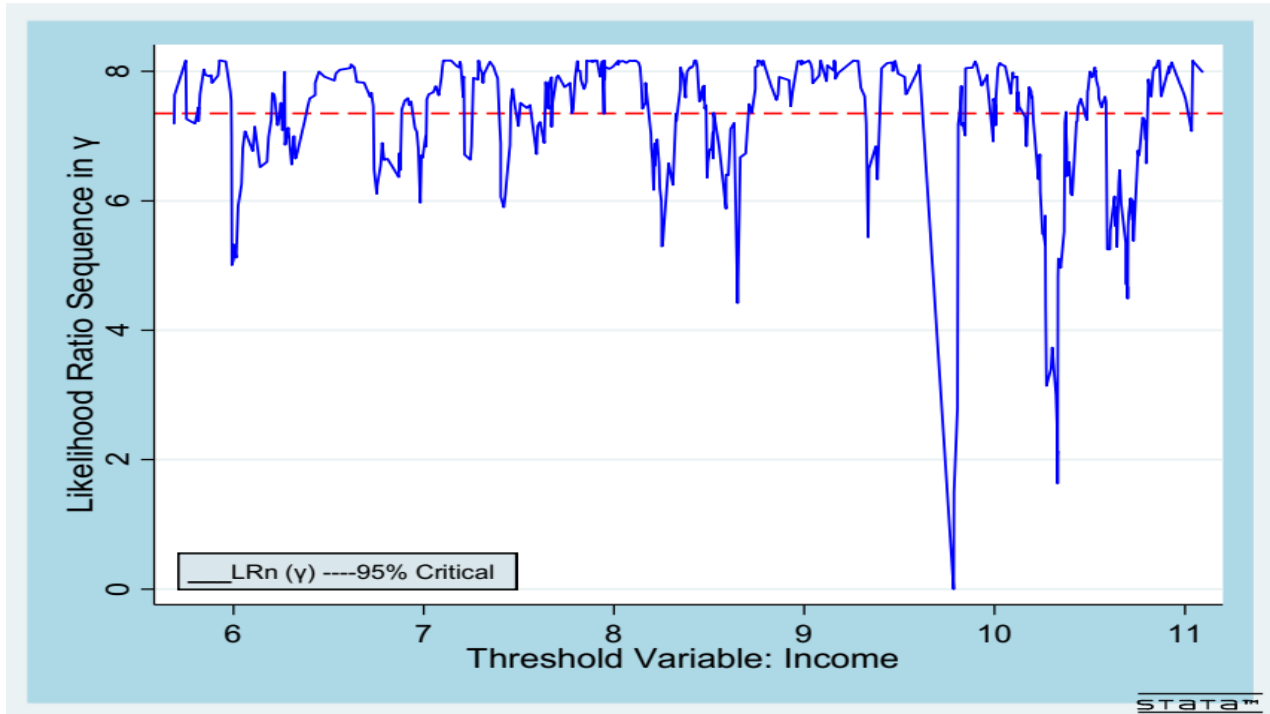


Figure 3.13: Confidence Interval Using Volatility
(Standard deviation of per capita GDP growth) as Threshold variable

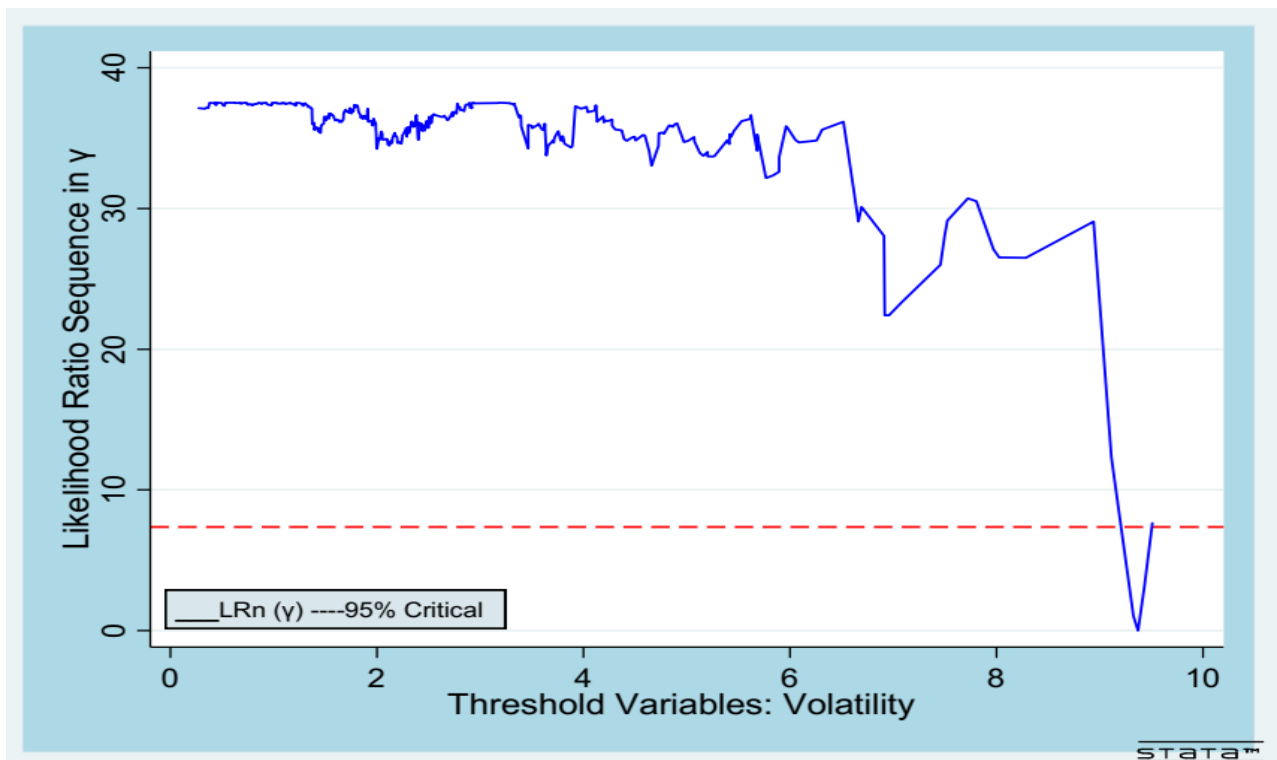


Figure 3.14: Confidence Interval Using Trade openness as Threshold variable

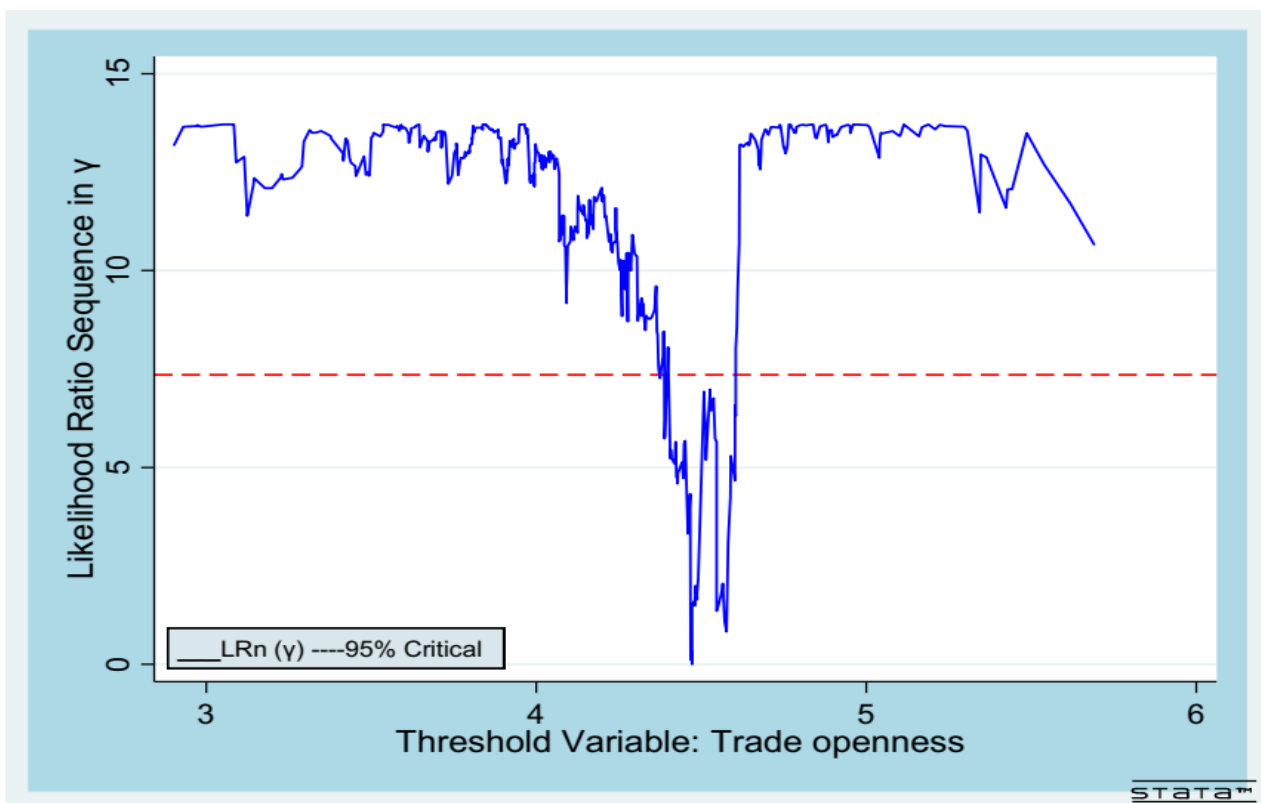


Figure 3.15: Confidence Interval Using Government Consumption as Threshold variable

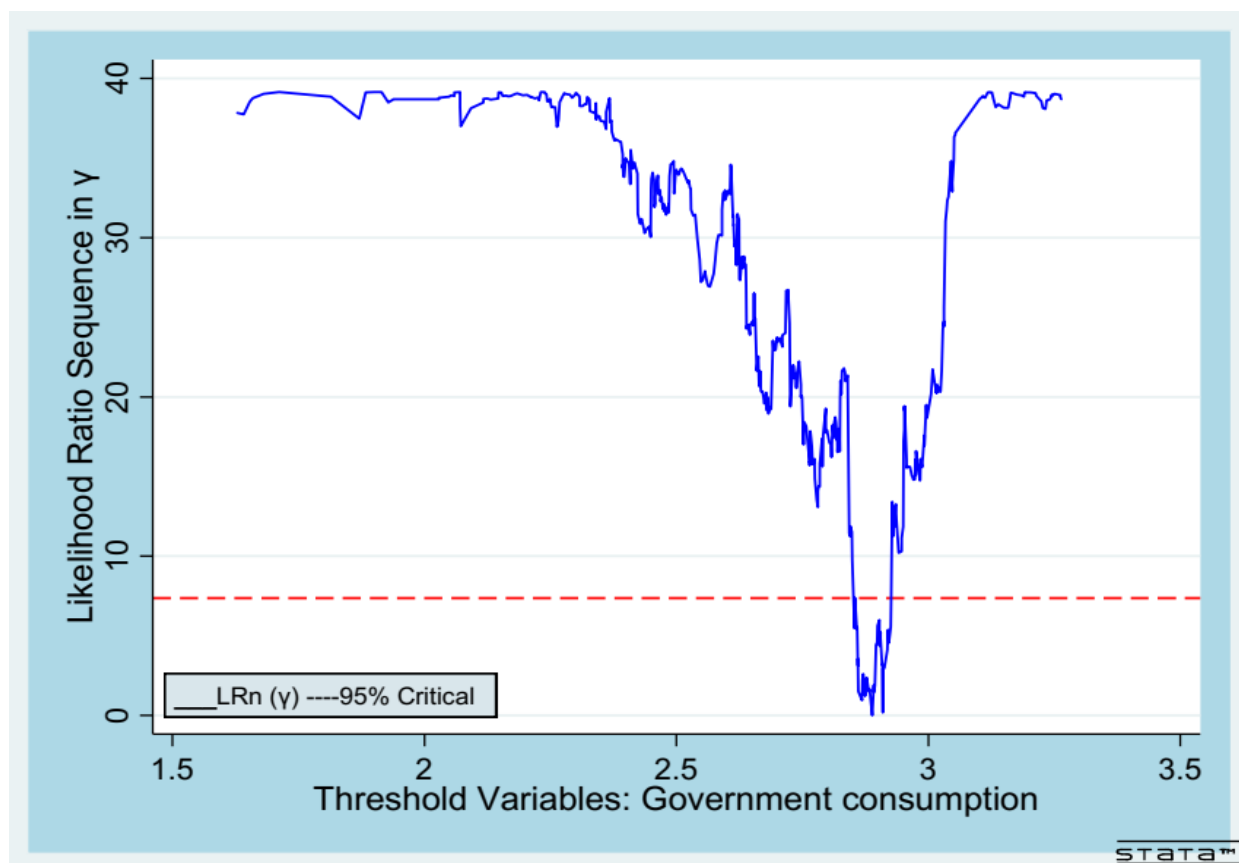
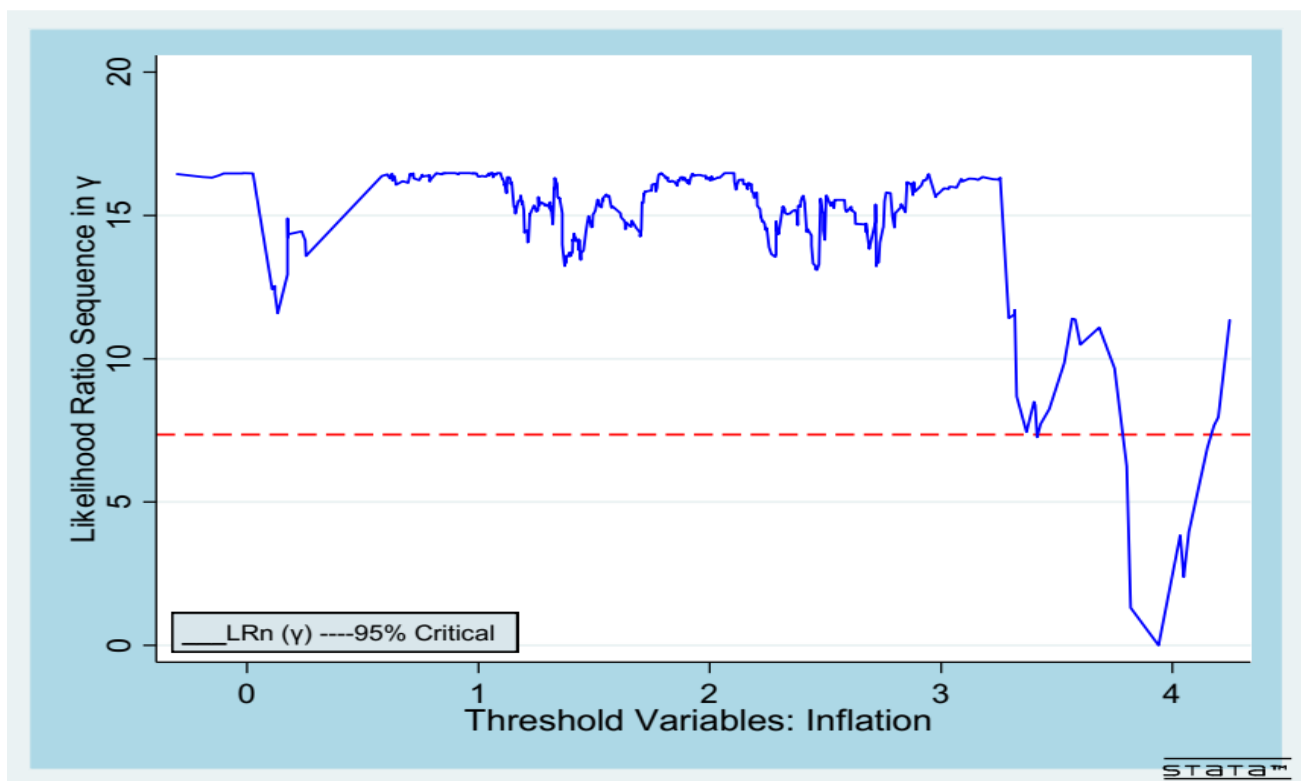


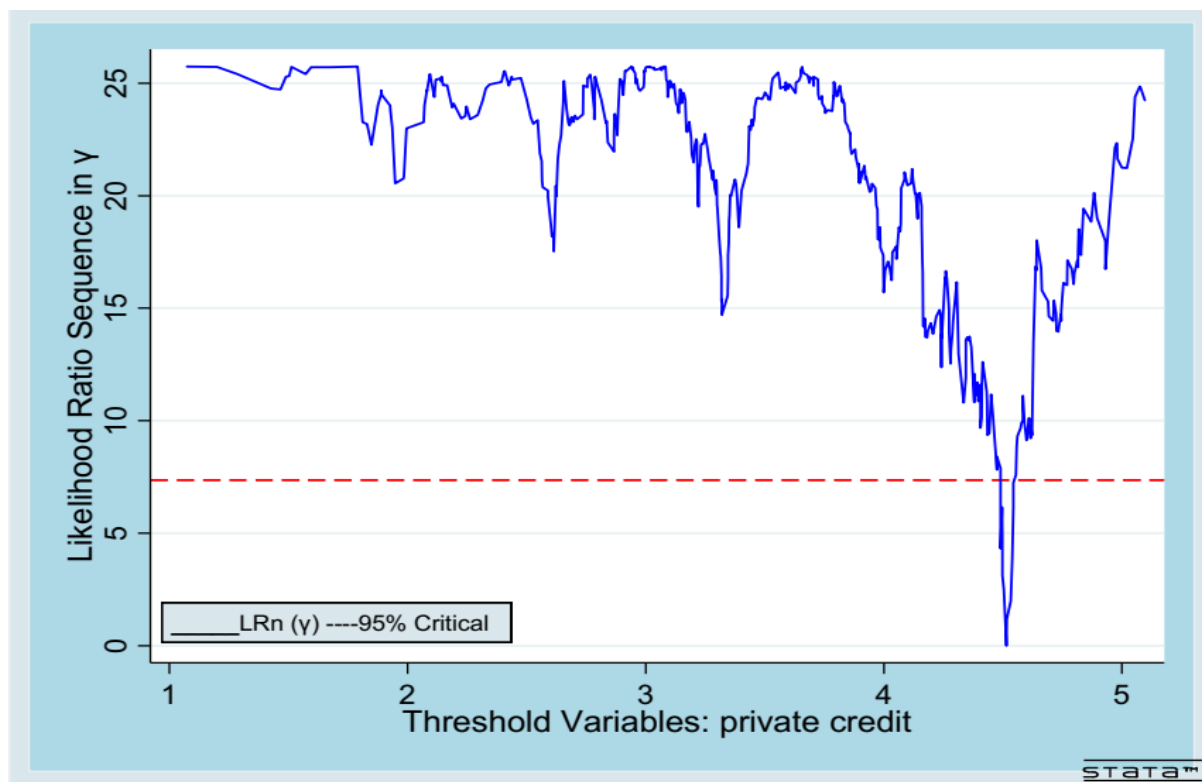
Figure 3.16: Confidence Interval Using Inflation as Threshold variable



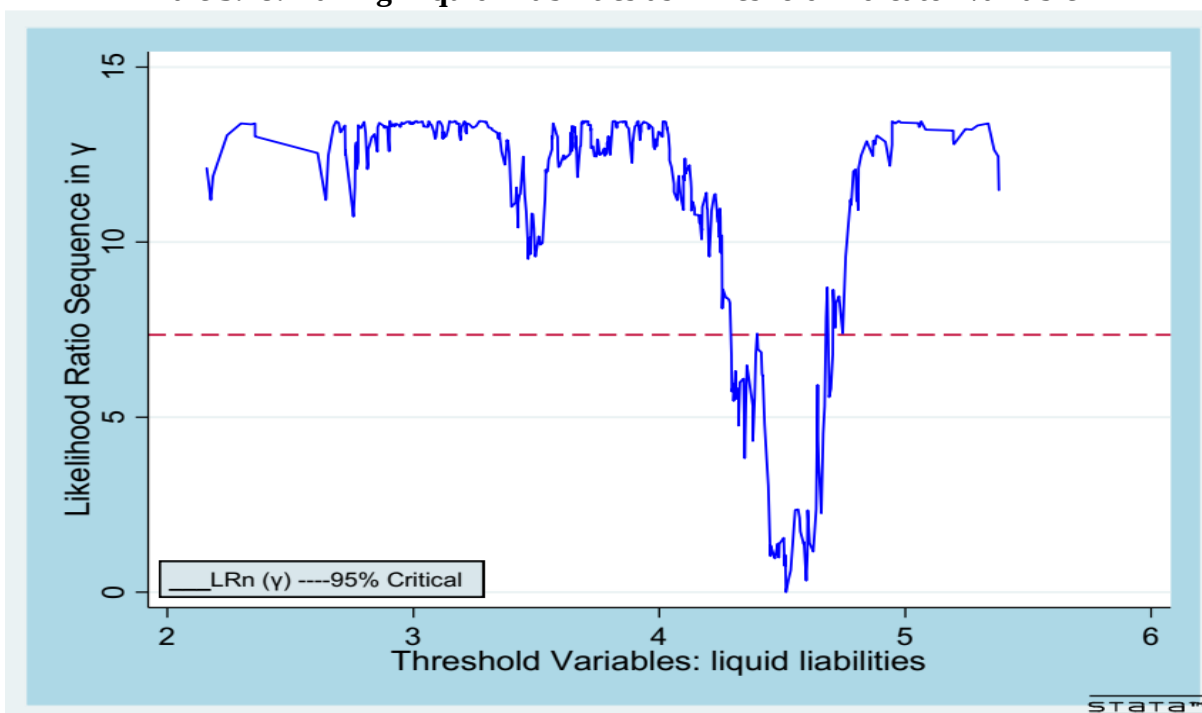
Appendix: 3.II (D)

Confidence interval structure for threshold

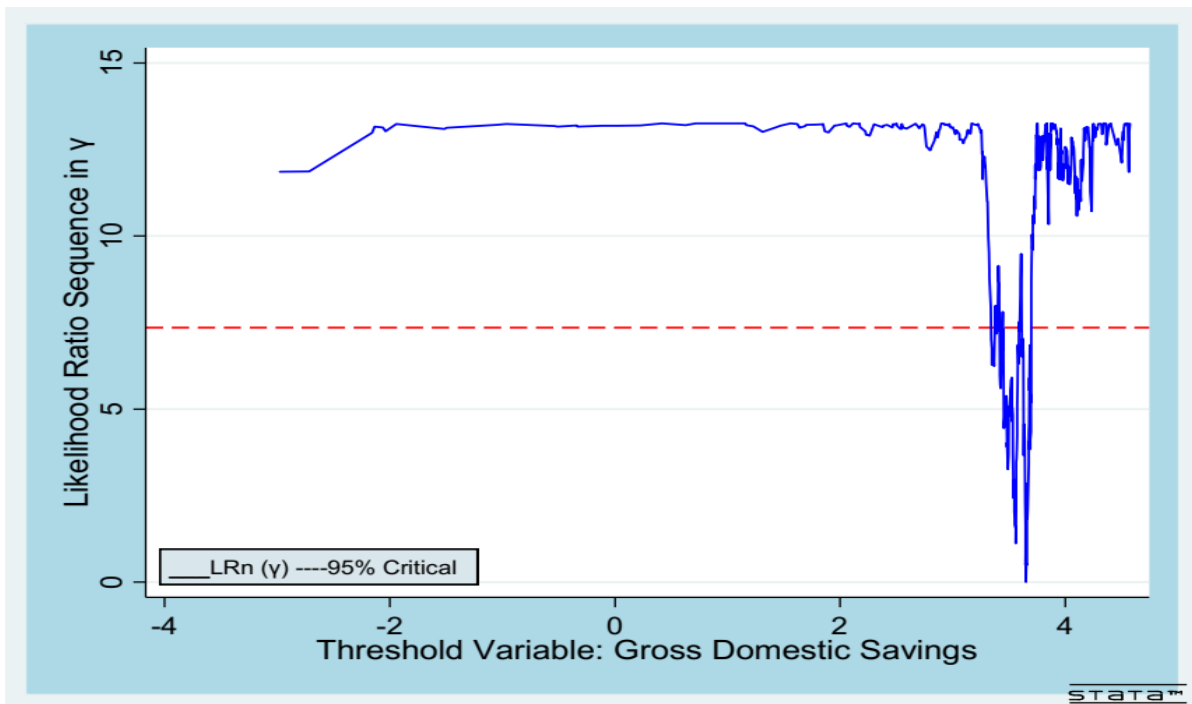
Tale 3.17: Taking Private sector credit as Threshold Indicator variable



Tale 3.18: Taking Liquid Liabilities as Threshold Indicator variable



Tale 3.19: Taking Gross Domestic Saving as Threshold Indicator variable



Chapter-4

Trade, Financial Integration, and Growth: Some Cross-Country Evidence

4.1 Introduction

This chapter essentially concentrates on trade-financial integration and its relationship with economic growth. It examines the role played by trade integration and international financial integration in determining economic growth. In other words, the objective is to assess the impact of trade and financial integration on the economies that have undergone global integration. The questions are as the following. Does trade integration alone elevate growth performance? Or whether financial integration better explains economic growth? Or whether both trade and financial integration together stand beneficial and growth-promoting for the economy? From the theoretical point of view, integration of the financial markets implies easy accessibility of a large reservoir of capital from global markets. If this capital is invested prudently and productively, then it will turn to endeavour the economic growth. The driving forces of global integration (which involves the close connection between trade and international financial integration) varied over the period with the evolution of economic philosophy regarding policymaking and adopting globalization. The idea of global integration is compelling of both trade and international financial integration. There are benefits of a country undertaking these policy agreements and the global economy. Gilmore et al. (2008) point out that internationalization of the financial markets is strongly directed by the increase in trade openness, increases in capital flows, and removal of cross-border capital restrictions. In this regard, trade and financial integration are essential for a country to achieve its targeted economic growth. These aspects of trade and financial integration have drawn strong attention from economists and policy makers from the last four decades. Understanding the mechanism and properly managing the trade-finance-growth linkages is a primary objective for the policymakers at the international level (Montinari and Stracca, 2016). Indeed, it is evident that international financial integration expanded across the countries since most of these countries removed restrictions on capital flow. Developing and less-developing countries are highly volatile, and the internationalization of domestic financial markets appears to be beneficial for these countries. Moreover, the continued increase in goods trade and trade in financial assets is common in trade-finance theory, where the uneven market shocks can easily be transmitted between countries. Similarly, global integration of the financial market and international trade induces change in basic economic structure by raising the standard of living in

emerging markets (Gourinchas and Jeanne, 2006). This is true from the figure-1 (in appendix 4.II), that financial integration in industrial countries rose from 1988 to 2017. The external assets and liabilities ratio to GDP has increased by a factor of 5 from 60 per cent to 300 per cent for 1988 to 2017 for industrial countries. The gradual increase in financial integration was noticed from 1988 to 2005, but a sudden acceleration took place after 2005, and it came down to 250 per cent in 2008. The scale was different for emerging economies, where the financial integration was broadly stable with no change over the period. This indicates that financial integration is stronger in industrial countries than the emerging economies. The equity integration in figure-2 (in appendix 4.II) shows a reasonably similar pattern. An increase in cross-border equity flows is much stronger in industrial countries than in emerging economies. To understand the trends in external capital structure, figure-3 (in appendix 4.II) shows two phases until 1998, the equity share in external liabilities increased steadily for both the group of countries. Later from 2000 to 2008, it gradually increased, and the gap between the two country groups widened. When it comes to comparing international trade and financial integration, figure-4 (in appendix 4.II) displays an increase in asset trade outstrip the rise in goods trade from the beginning of 1988 to 2002, and the ratio was higher in industrial countries. For emerging economies, trade integration performs better than financial integration, with the rise in goods trade much rapidly than the growth in asset trade over the period. When one observes the net external position between two country groupings, figure-5 (in appendix 4.II) indicates a greater improvement in net foreign assets for both the country groups; however, emerging economies are little better in the net external position. Regarding the evolution of trade and financial integration based on de-facto and de-jure measures of integration, the cross-country averages used to measure integration figure-1 (in appendix 4.III) show that industrial countries have adopted financial integration since the 1990s. Both the joint measures confirm the repaid growth in financial integration over the period. For emerging economies, the average de-facto (the actual flows) measure of integration shows that after liberalization in 1988, it increased slowly, and it tended to reverse in the late 1990s. Again, it increased from 2000 to 2008. In contrast, the restriction measure shows a repaid increase in financial integration in late 1990s to 2000 and mid-2008 to 2015. The increase in international financial integration was observed in industrial countries than in emerging economies. However, for industrial countries, both measures confirm greater integration over the period, which is not for emerging economies. Similarly, trade integration experienced by both the country groups is similar, that reflects more repaid increase in trade openness after 1990s and continued till 2008, thereafter at a slow pace. However, from the above discussion dynamics in international trade and financial integration and its response to economic growth over the time is observed. Therefore the motivation of this chapter is to study and understand the process of global integration and its impact on growth. This chapter gives broad understanding on global integration and its benefits to the country, with the help both theory and empirics.

4.2 Economic and Financial integration

4.2.1 The basic definition of financial integration

In general, “financial integration” is how the segregated markets are opened up and combined to facilitate the participants to enjoy the same, unhampered and equal market accessibility. This is possible only when the participating country removes all domestic and international controls on trading in assets, goods and services. In other words, the participating countries remove the control over the market. The process of market integration may come from the prospect of the private interest of the consumer or the particular interest of the investors, or maybe an interest of the financial institutions. Thus, integration of markets implies rising capital flows on both sides with the same tendency.

The markets for financial instruments and services are said to be fully integrated “if the market participants follow the same characteristics like facing a single set of rules to deal with financial instruments and services, equality in accessing the market, and treating them all equally (Baele et al. 2004)”.

4.2.2 Potential benefits of financial integration in promoting economic growth:

Theoretical models on international financial integration identified different channels through which financial globalization influences economic growth. Figure: 4.1 provides a brief understanding of growth benefits from such direct and indirect channels of financial globalization. However, these direct and indirect channels are somehow interrelated to each other, reviewing and understanding the mechanism separately. The schematic summary of these channels are presented in two groups.

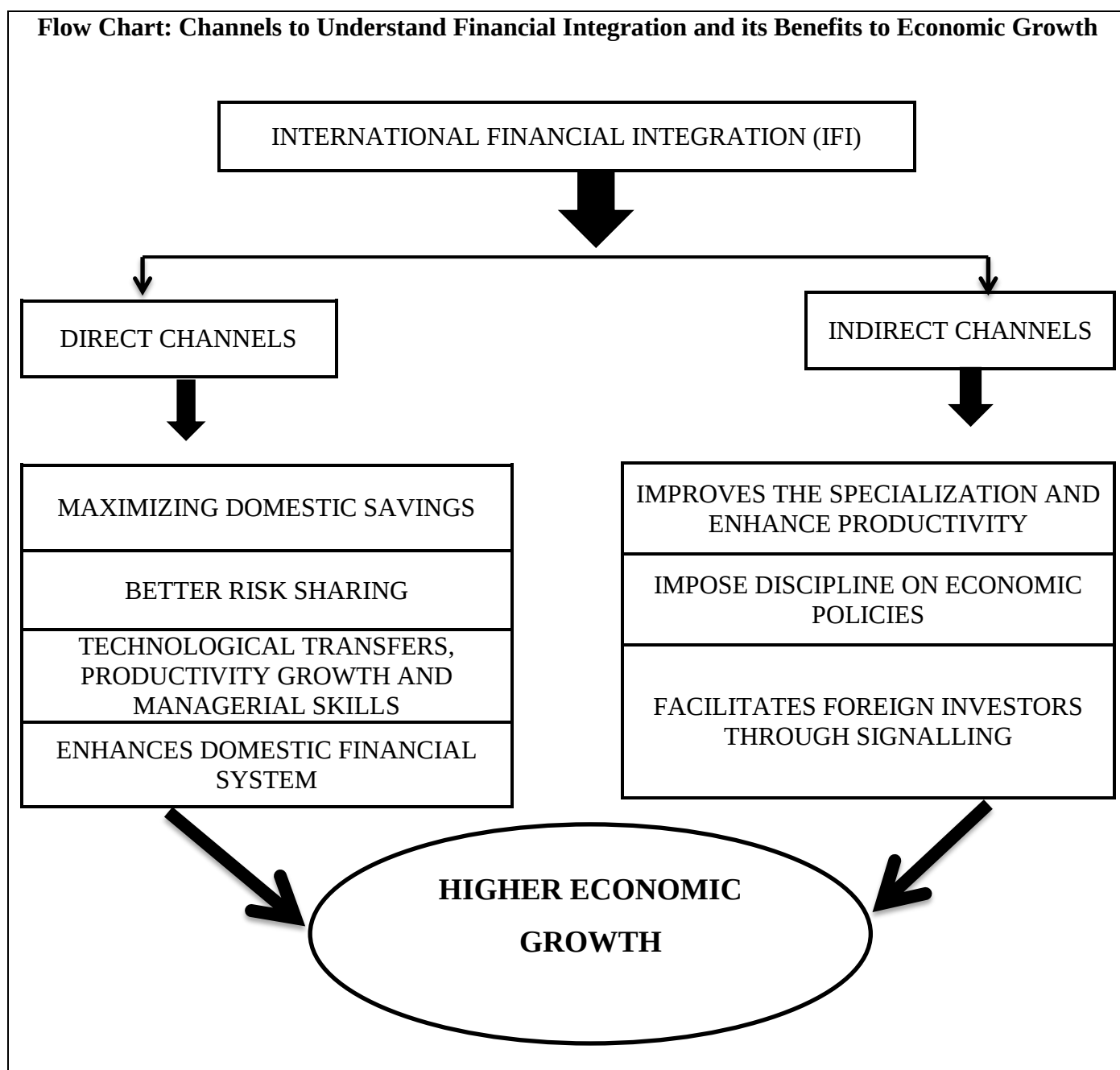
i) Direct Channels through which financial globalization influence growth

- **Maximizing domestic savings:** financial integration motivates the country to participate in the global capital market and access foreign capital. These indeed benefit both the participated countries by raising the level of investment and rate of returns on the capital such as “...*North-South capital flows .allow for increase investment in capital-poor countries while they provide a higher return on capital than is available in capital-rich countries*” Prasad et.al p-13, 2005. Financial integration help to eliminate the quantitative restriction associate with capital flows. The work done by Bacchetta (1992) was the first that analyse the simultaneous liberalization of capital account and domestic financial sector for a small open economy, and this dynamics was model based on inter-temporal optimization. Integration of domestic financial market and capital account will modify the domestic interest rates with world interest rates, altering the inter-temporal choice made by firms and individual investors. Finally, the analysis confirms the potential collateral

benefits of joint liberalization, in the form of a rise in foreign capital inflow, the level of domestic savings and investments, which could further boost the economic growth in developing countries.

- **Risk sharing:** the process of financial integration provides an opportunity to share risk among the agents and helps to consumption smoothing inter-temporally. With the help of international asset pricing models (IAPM) Henry (2000) predicted that stock market integration reduces the cost of equity capital through risk-sharing mechanism. Similarly, Kalemli-ozean et al. (2001) conclude that the risk distribution across the regions improves and facilitates the economy's new production. Thus, financial market integration offers an opportunity for the agents to diversify their portfolios and share risk among the individuals and across the regions. Prasad et al. (2005) argue that the domestic market becomes more attractive to foreign investors, resulting in an increase in capital inflows. Moreover, the increase in foreign capital flows might increase stock market liquidity which in turn lowers the equity risk
- **Technological transfers, productivity growth and managerial skills:** as more and more the country gets fully integrated with the world economy, capital allocation increases. Financial openness attracts a large share of FDI inflows, and the positive externality of these foreign investment derives in the form of technological transfers and spillover effect. The influential study by Romer (1993) argued that the lack of innovative technology in poor economies make a big difference with affluent counties. However, these “idea gaps” will be a bridge through enhancing foreign investments that can facilitate technological transfers and business know-how (Carkovic and Levine (2005). The positive growth effect of foreign investments in adopting new technology, advanced managerial skills and innovative ideas (a human capital) was also emphasized by Borensztein, Gregorio and Lee,1998; Hermes and Lensink, 2003. The benefits of financial integration to enhance technological changes. In addition, an individual investor is more interested in investing the funds on such projects where the returns are up to his/ her expectations.
- **Enhances domestic financial system:** financial integration acts as a channel to boost economic growth through greater financial development. As described above, greater financial integration is expected to provide a better financial intermediary system to the domestic market. That could be in the form of promoting foreign banks participation and accessing foreign stock markets. Introducing foreign banks into the domestic financial system will raise the competition among the banks, enhance the regulatory and monitoring framework in the local banking system, and provide an opportunity to deal with new financial instruments where it creates a new space in technological promotion in the domestic banking system.

Figure: 4.1



Source: Prasad, Rogoff, Wei, and Kose, (2005)

ii) Indirect channels

- Improves the specialization and enhance productivity:** per-capita output growth increases with the change in factor productivity. A simple mechanism that financial integration improves the production specialization and allocation efficiency, which increases productivity and investment growth. Gourinchas and Jeanne (2006) point out that the greater the financial integration the higher the specialization in production and have a direct effect on factor productivity. Similarly,

Galindo, Schianterelli and Weiss (2007) argue that the degree of financial openness is detected through the efficiency of investment allocation. The standard “neo-classical growth model” views that financial market liberalization will lower the cost associated with additional investment. As described above, greater financial integration is expected to provide large investment opportunity to the agents across the regions and the world. When it comes to regional space, the process of financial integration raises competition between two different regions. The region with less financially developed economies tries to improve their financial system by eliminating intermediate cost and increasing market efficiency. This process attracts other regions to participate in the market for better allocations of their resources. With this mechanism, a country can allocate the resources more efficiently, this point will be taken again to the risk-sharing and production specialization which in response promote growth rate. The logic behind this is well explained by Ruffin (1974), Levine and Renelt (1992), Kose et al. (2009), Imbs and Wacziarg (2002).

- **Impose discipline on economic policies:** As mentioned before, financial integration could increase efficiency, production specialization, and factor productivity of the country through the government’s ability to formulate and implement sound macroeconomic policies. Particularly, country with full financial integration will have a greater response towards the change in macroeconomic policies. Therefore, financial globalization will help manage domestic investment dynamics, which could minimize risk and reallocate the capital to most productive activities. Prasad et, al (2003 p-14) argue that *“National governments are occasionally tempted to institute predatory tax policies on physical capital. The prospect of such policies tends to discourage investment and reduce growth. Financial opening can be self-sustaining and constrains the government from engaging in such predatory policies in the future, since the negative consequences of such actions are far more severe under financial integration”*.
- **Facilitates foreign investors through Signalling:** countries under the process of financial integration will signal to the foreign participants for their friendly policies towards capital investment in future. A pioneer work by Bartolini and Drazen (1996) suggest a regime of free capital movement will signal that there is less likelihood of capital control in future; more generally, in future, the government policies will be favourable for investors. Lifting a restriction on capital outflow will be a favourable signal for future investment, ultimately providing a remarkable capital inflow in the country. The mechanism *“investors have imperfect information on governments’ intentions and constraints, and may therefore use the observation of current policies toward investment to infer the course of future policies. This gives governments an*

incentive to allow free capital mobility to provide a favourable signal on future investment policies. If the signal is successful, capital flows in” (Bartolini and Drazen, 1996 p-2). However, the choice of eliminating capital control is good news that signals the future investment through rapid and massive increase in capital inflows (Dooley, 1996; Laban and Larrain, 1997; Eichengreen, 2001).

4.3 Financial Integration and Growth Theories

4.3.1 Law of one price

The Law of one price was proposed by Augustin Cournot (1927) and Alfred Marshall (1930). The law implied that in the absence of administrative restrictions on the capital market, risk-adjusted returns on the identical asset are easily comparable across the market segments. In simple words, the law explains that identical securities must have an identical price across the market segments. In the absence of the law, some smart investors may raise their profit margin by buying cheap securities and selling them at high prices. This implies that it is not at all required for agents to act rationally. Only very few investors may be able to identify the arbitrage benefits and thereby misuse the market in their favour (Lamont and Thaler, 2003). According to the standard assumption, the law of one price holds in the capital market because the expectations of an individual investor who believed that odd number share of some of the stock are much better than even number shares. The rational behaviour prevents them from driving the asset price up. Hence, the law works efficiently where the market integration with the global capital market is large.

4.3.2 Gravity model to analysis international trade activates:

The gravity model is used in international trade to forecast the trade flows between the two economies based on the size (per capita GDP level) and geographical area (transport cost etc.). The theory is adopted from the physics “Newton’s universal law of gravitation”. The gravitational attraction among the two objects is proportional to their masses and opposite to square of their distance. The model is:

$$F_{ij} = G \frac{M_i * M_j}{D_{ij}^2}$$

Where, F_{ij} represents the gravitational attraction (trade flows between the two countries). $M_i * M_j$ indicates the mass of the two objects (Economies mass of the countries). D_{ij} shows the distance between the two objects (distance between the trading countries) and G , represents gravitational constant. Timbergan was the first economist who applied Newton’s gravitational model to international trade to capture the bilateral trade flows between the two participating countries in 1962. In his model, he used trade flows between the two nations A and B as a dependent variable and per-capita GDP including geographical area as an independent variable. He concluded that larger the economic size and closer the

distance, the trade between the two countries A and B benefitted each other by increasing the bilateral trade and financial flows. Hence, development in regional financial integration tends to improve the cross border financial flow over the period.

4.3.3 Capital Asset Pricing Model (CAPM)

The model was introduced by Harry Markowitz (1952) when there was a huge debate on how to understand the risk of the portfolios and take decisions under uncertainty. CAPM explains how risky securities are priced in the market. The model explains the individual investment choice going to the portfolio at the period $t-1$ that gives stochastic returns in the period t . Firstly, the model assumes that the investors are risk-averse and prefer portfolios where more significant returns are accrued. Secondly, the investment decision of an individual investor depends on the expected return and variance of that security. According to the assumption, investors are more focused on mean and variance efficient portfolio that minimises the variance of the portfolio returns and maximizes the expected return on portfolios. The extension of the CAPM model was developed by Sharpe (1964) and Linner (1965) where they added the new assumptions to investigate the relationship between variance on expected returns and anticipated systematic risk.

4.3.4 International Capital Asset Pricing Model (I-CAPM)

In the international context, the extension of CAPM model, I-CAPM model explains the expected excess return on all asset is proportional to the excess expected return on the global market portfolio and represent the proportional factor. The world CAPM works appropriately when capital market around the world is integrated and follow the purchasing power parity (PPP) condition. Since the deviation in PPP means individual investors have different prices for consumption goods in different countries, change in exchange rate produces different inflation rates in different countries (Datilquist and Sallstrom 2002). The available literature explains that capital market openness gives rise to volatility and reduces the country's GDP. In such cases, the risk in investment increases and the investor demand higher risk premium for their asset and alters the discount rate. The systematic risk premium is that of the standard CAPM, i.e., the covariance of stock returns of a particular country compared to world market portfolio. The idiosyncratic risk premium measures portion of country-specific idiosyncratic risk that cannot be diversified away due to imperfect cross border risk sharing. Hence, I-CAPM explains that when there are changes in cross border risk sharing, the change in the discount rate for the country is driven by the idiosyncratic risk premium.

4.4 The history behind the global financial integration

Economic globalization has a long history starting from the ancient period to Modern times. This section explains the historical emergence of financial globalization from ancient times to the Modern era of globalization.

- **Financial globalization in ancient periods:**

Globalization and trade openness has a long history and came into the picture in the early 7th and 8th centuries. It began with Arab countries and then spread worldwide and noted as the period of ancient globalism known for the Islamic golden era. Globalization creates an amicable climate among the countries and helps them exchange their ideas, technology, commerce, and knowledge. Marco Polo was the first trader who travelled around the world and explored many new market places and there demand for new products, further encouraging the global market. In the same line, ‘Columbus’ and ‘Vas-cod-Gama’ took further steps for explored the markets (trading) for different products. During this period, advanced technology was used in ship building, port constructions, and navigation systems to easily trade between partners to make an amicable economic and political relationship between the countries.

- **Financial globalization: The first era**

The first phase of financial globalization was before ‘World War-I’ during the mid-19th century, where a large number of countries integrated their domestic financial markets with the global economy. Economic historians and researchers considered these periods a “contemporary era of globalization” that allowed the countries to exchange their consumer goods, labour power, capital goods, innovative ideas, and technology. Gold accepted as monetary value for exchange, and the global economy operated under this monetary regime (Mundell, 2000, p-329). Global market experienced ‘classical gold standard’²¹ across the world and integration of capital markets stand at the impressive growth during the 1870s to 1900s. London was one of the major financial centres for the large business firms to carry all their financial and trade activities under European exchange. During this period, private markets played a vital role in enhancing trade and development globally. The role of government interference (period of economic *laissez-faire*) is less than before.

²¹ It was the first standard system in which the value of country currency is measured based on certain fixed weight of gold as a medium for exchange. This fixed exchange rate in the form of gold is considered more stable and credible conversation system. The gold standard monetary system headed by British leadership played an ideal role for ‘the rule of game’ to control and allow the unrestricted gold movement across the countries. Example: Bank of England control the capital market and facilitate investors through providing a convertibility options to promote the gold standard movement across the countries. Late 19th and early 20th century, the gold standard becomes the universally accepted currency for exchange and promotes the global financial integration.

- **Financial globalization after World War II:**

The proliferation of global financial integration was at the high peak before World War-I. During this period, capital market performance was impressive with greater financial integration, and gold standard continued as a 'seal of approval' for monetary exchange (Bordo, and Eichengreen, 1999). Government interventions in financial markets were limited to the gold standard system, and international institutions adopted the power to control the capital market. Transport revolution in international trade was noticed as another shift in globalization during this period. Development in marine technology replaced the old wooden ship with new steel hull ships that was much larger in space and container capacity, steam propulsion to save travelling. These technological innovations in the marine sector contributed to positive growth in trade with the reduction in transportation cost and tariff rates.

Moreover, the period also witnessed sharp increases in new financial services. The transnational corporations (TNCs) and their activities increased during the end of 19th and early 20th century to promote market economy through financial integration. The new world economies emerged based on the expansion of trade and financial integration. Industrially advanced economies of Europe were major exporters of manufactured goods and importer of raw material and agricultural products from third world nations. Global investment declined during World War II and II because of de-globalization, i.e.; foreign assets to world GDP were recorded 8 percent in 1930. It declined to 6 per cent in the year 1960. After the 1970s financial expansion saw 25 per cent rise in foreign assets to GDP. Later, the decade of the 1990s recorded as the highest foreign assets to GDP of 49 per cent (Das, 2010 p-13).

- **The period of de-globalisation:**

The period of de-globalization began with World War-I, which was a significant shift in global economic history. De-globalization destroyed the global economic structure and ruined the benefits of financial integration. Big economies that were involved in World War paid less attention to trade and financial integration. The history behind the cataclysm was still an unsolved question for social scientists. However, some believe that democratic policies and legislative actions are the strong reasons for de-globalization. Also, the period noted for a prevailing attitude of British leadership and their ruling on global economy. However, the restrictions on international capital flow become rampant during the interwar period and caused disintegration in global markets.

Moreover, the classical gold standard regime (as global fixed exchange rate) was abolished and replaced with the flexible or floating exchange rate system. From early 1931, the global power Britain shifted with the speculative motive of pound sterling by abandoning the classical gold standard regime. Contest to this, US continued with the same gold parities (of the fixed exchange rate) as the standard measure for

their currency until 1933. The instabilities in exchange management and policies failures blighted the global economy.

The trauma of the great depression came into the picture with the Wall Street crash in 1929, named 'black Tuesday' in economic history. The outbreak of the inter-war situation changed economics by dividing them into market-oriented, centrally planned and capitalist economies. Further, de-globalization and disintegration among the economies created a space to implement high tariffs and strong trade barriers to protect the domestic economy for the global market. The episode of the Great Depression witnessed the failure of the American monetary system. However, the policy implementation made by American monetary authority has an adverse effect on the global economy and triggers aggregate demand. Moreover, the rise in aggregate demand reduces price and output levels (Crafts, 2000). Also the factors, like financial instability in the form of banking system failures, the stickiness of wages and adopting an independent exchange system (not significant effect of floating exchange system) by replacing gold standard are the and negative money supply shocks.

- **Bretton Woods System and Emergence of Eurodollar Market:**

Economic historians have pointed that both World War I and II led to significant destruction in the world economy, and later the countries also experienced the Great depression and high stagflation. This period is considered the worst phase in economic history, where there was an intense rivalry between the large industrial countries termed as 'non-cooperation among the nations' (Das, 2010 p-17).

Later the world war-II, the 'Bretton wood system' emerged with the New Hampshire negotiation of 1944. The countries gathered under one umbrella to heal and strengthen their economies from unprecedented political and financial crises. Under this new monetary system, two major institutions, International Monetary Fund (IMF) and World Bank, were set up to monitor and strengthen the financial system. Primarily these institutions worked to strengthen the currency regulations and their effectiveness. After that, a significant change were observed in the global economy; United States emerged as dominant powerhouse that influenced the policies and functions of the Bretton wood system. The dollar became the new measure for exchange, and US Federal Reserve System confirmed the exchange parity of national currency in terms of the dollar. This new experiment of inconvertible paper currency as an exchange mode was observed as the training point in the history of money (Chown and Chown; 1994, p-213). All countries favour using discretionary paper money for exchange (Bernholz; 2003, p-8). Under the Bretton wood regime, the exchange rate was largely dominated by US policies that ultimately paved the way for the demise of this system. The post-War period witnessed an unstable exchange rate (from fixed to floating exchange rate) followed by the monetary authority. Later the instability of the exchange rate created a huge reduction in global investment and trade participation across the countries. After that, the

Bretton wood system adopted pegged exchange rate system. The IMF members and policymakers did support capital control, meaning ‘no free capital movement’ to avoid currency crises. By doing so, governments could use their degree of autonomy to restrict domestic and foreign capital flows, following their monetary policy. In support of this, Rajan and Zingales (2003) argue that due to bad monetary policies restricting capital flows were the major cause for the Bretton Woods collapse. The global economy witnessed smooth functioning of the Bretton Woods system over the two decades. The downfall came after the unorthodox choice made by the system to restrict capital flows. Between 1971 to 1973, the period was observed as greater turbulence in Bretton Wood system. On the one hand, the US monetary system failed to maintain and manage the single currency instrument and the emergence of the Eurodollar market. Finally, on February 1973 Bretton Wood regime collapsed, and most countries favoured free and floating exchange rates. However, later floating exchange rate was largely accepted across the countries because of its nature that favoured all the three dollar, deutsche and yen .

- **Financial Globalization in Post Bretton Woods Era**

In the post-1973 era, most countries, including industrial economies, accepted free and managed floating exchange rates. According to Eichengreen (1999) post-Bretton woods period countries were more comfortable with independent monetary policy as an instrument to development. During this period central banks emerged as an autonomous body to stabilize the economy from external shocks i.e., inflation targeting was used to condition the inflation rate. The economy in the early 2000s experienced lower macroeconomic volatility and a better functioning financial system. The past literature witnessed a sharp decline in output volatility and high growth performance during the 1980s, especially in industrial economies (Simon, 2001; Stock and Watson, 2002; Kose et al. 2005). Industrial economies maintained their stability and enjoyed the benefits of this to achieve full employment, stable output, and interest rates. A new research paradigm called “Business Cycle” emerged for measuring supply shocks in an economy. However, the post-Bretton woods ear was well recognised in economic history with the more remarkable improvement in monetary policy, which was a key foundation for the emergence of the ‘Great Moderation’ era. Finally, great moderation created a favourable and nurturing atmosphere for the global economy.

4.5 Economic Growth and the Process of Trade Integration

The theory of global integration emerged since the end of the Second World War. Significantly, the years between late 1970s and 1995, witnessed a remarkable change in the global economy. This phase of transformation is noticed as institutional harmonization and economic integration (bringing nations together) among the world nations. The process of international economic integration increased significantly in since of 1970s. The feasibility of actual economic integration came into the picture after

the end of cold war in the second half of 1980's. Ali M and El-Agraa (1989) exclusively discussed in their book that economic integration had emerged in the formation of numerous schemes with a set of arrangements. European Community (EC), as one of the most power full and significant arrangements came into existence that comprised six Western European countries: Belgium, France, West Germany, the Netherlands, Italy and Luxembourg. It was founded under the Treaty of Rome in 1957. However, the Preamble "Treaty of Rome" stated that under Article-3, a Common Commercial Policy would apply to its member countries, and it followed a uniform principle²². It implied creation of customs union and common market for the member frontiers to continue their trade relationship in terms of accepting free factor (such as capital, labour and enterprises) mobility among the member nations. The member nations of the European community were very much comfortable with this process of complete economic and political cooperation between themselves.

European Free Trade Association (EFTA) is another group that emerged in the same era from the Western Europe. The UK's conflict with European Community (EC) gave rise to the formation of EFTA. The conflict arose as UK was not satisfied with some of the economic and political commitments with the EC. Nevertheless, the UK favoured adopting the EC idea of free trade with the member counties only in industrial products. The main motive of the UK was to capture the benefits of Commonwealth preference (that is, preferential access of common markets of the member frontiers) and easy trade of their industrial products with free-market mechanism. Thus, the formation of EFTA reported in 1960 by the Stockholm Convention with the same objective of free trading of the industrial goods among the member nations. However, by the year 1973 UK had joined European Community (EC) again and left EFTA as a smaller group of Western Europe.

The socialist scheme of economic integration also came into existence that was different from the free trade notion. Under the socialist integration, the members of Eastern Europe maintained their agreement, which was function by Council for Mutual Economic Assistance (CMEA) and known as COMECON in the West. The formation of CMEA took place in 1949 with a group of seven countries Bulgaria, the German Democratic Republic, Hungary, Czechoslovakia, Romania, Poland and the USSR. CMEA adopted measures based on planned coordination among the members' countries and worked on a jointly planned activities, unlike free market. The main motive behind the integration was to achieve super power and form a uniform system for the economic block. Several economic integration schemes were introduced from the African regions, but East African Community (EAC) was one of the pioneers. Later

²² The objective of this Treaty is creating a strong economic union with common market policies. The development of European union to promote; balanced growth over the period, maintain the competitiveness among the industries, assurance of protection, high level of employment, equal participation by men and women, improvement in living standard and quality of life, protracting quality of environment, social inclusion and maintaining unity among the member nations El-Agraa (1989).

it is converted to Preferential Trade Area (PTA). In 1981 the drafting treaty of PTA was signed by fifteen members from the Eastern and southern part of Africa: Angola, Zambia, Mozambique, Swaziland, Zimbabwe, Comoros, Malawi, Tanzania, Mauritius, Djibouti, Kenya, Lesotho, Ethiopia, Uganda and Botswana. The formation of PTA was to decipher their existing political disputes with Sahara Deserts rather than cooperation and the free market.

Although Asia consists of big and large (in population size and in GDP) economies like India, China and Japan, but could not figure out any prominent scheme for international economic integration over the same period. In 1976 a small group with six member nations, Malaysia, Brunei, Philippines, Indonesia, Thailand and Singapore, come into consideration to form an ASEAN group. ASEAN started with the aim to drive economic cooperation among the member frontier.

The free trade agreement was signed between Australia and New Zealand in the Pacific Basin. This agreement was named New Zealand Australia Free Trade Area (NAFTA). Like other organisations, these countries also introduced a policy to remove all significant trade barriers and expand their markets by commercial integration. Later the organisation was renamed by Australia New Zealand Closer Economic Relations and Trade Agreement (ANZCERTA) with some new policy agreements.

While discussing the Arab League (AL), economic integration covers a large geographical area more than a continent, a confederation of twenty-two independent African and Middle East countries (mainly Arabic speaking areas). The Arab League (or League of Arab States) was founded on 22nd march 1954 in Cairo with six founder members as Egypt, Iraq, Syria, Transjordan (later known by Jordan), Saudi Arabia and Lebanon. Later on, Yemen joined the group in 1954. The concept of integration of Arab nations is based on their cultural and historical practises. All these seven countries of Arab where under control of Ottoman Empire (those tried to imposed Turkic cultural, religious and language practises on Arabs). After defeating the Ottoman (Turkish) rulers in World War II with the support of British forces, they become an independent state. The intention to organise the Arab League (AL) was to strengthen the “close cooperation” among the Arab states, to harmonize their economic development policies, social health, and social welfare. They took a step to renounce violence on the ground of political conflicts and make settlement among them. The Arab League employed special offices to mediate the disputes between the league members. The Arab League (AL) took the investigation to included Palestinian people into their group and the Palestinian Liberation Organization (PLO) proposal was accepted in 1964. Moreover, the Arab League is considered one of the powerful and strongest economic and political integration areas in the Arab sphere.

Like this number of small schemes of economic integration also noticed such as the “Organisation of Petroleum Exporting Countries (OPEC), Organisation of Arab Petroleum Exporting Countries (OAPEC),

North Atlantic Treaty Organisation (NATO), Organisation for African Unity (OAU) and Organisation for Economic Cooperation and Development (OECD)". These organisations are works with the same objective of economic and political cooperation among the member groups.

However, the rationality behind the integration schemes among the economies stated with a non-economic motive such as i.e. first, the formation of the European Community (EU) as a major integrated zone to ensure the maintenance of peace and cooperation between France and Germany²³, through economic means and the process of integration was just a tool to bring these countries together (especially at the war time). Second, the wave of international economic integration came into the picture after the signature of Treaty of Rome (1957). It drove economists and policymakers to quantify the benefits of economic integration to the participating countries.

4.5.1 The concept of international economic integration

The first rigorous step to understanding the idea of economic integration and its relationship with economic development was presented by A.J. Brown (1961), B. Balassa (1961, 1962). Further, Johnson (1965a) extended the work and Cooper and Massell (1965b) to understand the gains and losses of such a process of association between two countries.

The word "integration" in general means that bringing all the parts together as a whole. Authors have different views on "economic integration". The cooperation itself is one form of integration, which means that through international cooperation, the country has better trade relationships. Hence, it is a sign of integration. The process of economic integration between the nations is well defined by B. Balassa (1961)

"Economic integration as a process and as a state of affairs Regarded as a process, it encompasses measure designed to abolish discrimination between economic units belonging to different national states; viewed as a state of affairs, it can be represented by the absence of discrimination between national economies" B. Balassa (1961).

But there is a significant distinction between economic integration and economic cooperation. Here "cooperation" means the action that reduces discrimination in trade with the partner country, and the word "economic integration" measures the complete elimination of discrimination with the partner nation.

²³ The conflict between Germany and France; after Germany was defeated in World War II by Allied group were France was the part of this group. France tries to take an advantage over Germany by discredited it politically and economically. The major motive of the France was to control German heavy industries (Coal, Coke and Steel). The UN, Economic Commission came into the action and order French government to present detailed report on steel production of European zone. A senior officer of planning department in government of France, Jean Monnet prepared draft to form organization called "European coal and Steel community ECSC". The foreign minister of French government, Robert Schuman passed this agreement 9th May 1950. The rationality behind the formation of ECSC is, M. N. Jovanovic cited the work of Jansen M, 1975 pp-36,

"..... in the words of Robert Schuman's: the solidarity in the production thus established will make it plain that any war between France and Germany become not merely unthinkable, but materially impossible (Jansen, M. (1975))"

The latter is considered more important in eliminating trade barriers between the countries' approaches to economic integration.

A J Brown (1961) argues that the program of economic reforms will be realised when there is misallocation or under-allocation of resources in the domestic market. The theory of protectionism, which argued in favour of protecting the infant industries, led to the under-allocation of the domestic resources. Going back to, Heckscher-Ohlin theorem (1919), which states that country will export their abundant resources and import scarce resources from a foreign country. By doing this, both the country could benefit through trade. The trade game with protectionism and free trade among the nations will result in other direction to the trade policy: trade diversion (TD) and trade creation (TC). Viner (1950) confirmed the welfare effect of trade creation (TC) and trade diversion (TD), where TC is beneficial for the country to improve their trade balance, whereas TD is harmful and hamper the trade. El-Agraa (1989) argued that:

“There would be more scope for trade creation (TC) if the countries concerned were initially very competitive in production but potentially very complementary, and a custom union (CU) would be more likely to be trade creating if the partners conducted most of their foreign trade amongst themselves El-Agraa pp-89 (1989)”.

It is witnessed that the process of industrial development is mainly dependent on the markets size. In contrast, in developing countries ((less developed countries, LDCs), there is a problem of economies of scale: the inadequate size of their markets. Hence, it is crucial to increase the individual market size to approach new and large plant installations. This will encourage the developing countries to integrate with the world economies. Here it stands the importance of economic integration.

Economic integration is of several forms based on their degree of integration. There are five different forms of economic integration, namely, free-trade area (FTA), customs unions (CU), Common markets (CM), economic unions (EU) and complete economic integration (CEI). In a Free trade area (FTA), the member countries remove all trade barriers (tariffs) among themselves, but each country maintains their tariffs against the nonparticipants (to the outside world). In Custom union (CU), which is similar to free trade area (FTA), facilitates their member nations by eliminating the trade restrictions on commodity movements within the group. Still, the union must conduct and adopt some common external tariffs (CETs) in trade with the outside world (non-member countries). Common market (CM) is a higher order of economic integration, they abolish trade restrictions among the member nations and allow free factor movements (i.e. capital and labour) between members. An economic union (EU) removes the impediments on trade in both commodity market and factor markets among the union members. Finally, complete economic integration (CEI) is similar to common markets that presupposes the complete

unification of monetary, fiscal, political and social policies. According to Sachs, Jeffrey and Andrew Warner (1995), most of the economic reforms witnessed in the developing world (less developed countries, LDCs) and the strategy of integrating their own country with the world economy are of primary importance. They interpret the definition of economic integration in the following ways:

“Integration means not only increased market-based trade and financial flows, but also institutional harmonization with regard to trade policy, legal code, tax system, ownership patterns, and other regulatory arrangements. In each of these areas, international norms play a large and often decisive role in defining the terms of the reforms policy” Sachs, Jeffrey D and Andrew M. Warner (1995)

Somewhere the process of economic integration is also related to “location theory”²⁴ that shows the relationship between the geographical location (distance), space dimension (land) and transport cost with the economic activity. The level of integration among the countries increases as lower as the trade restrictions between them. It is hypothesized that the higher the integration higher will be the trade share of the participated country. Sector integration also plays a vital role in overall integration for the country. Sector integration comes into the picture in the Second World War period, where different industries are integrated. The “Stikker plan”²⁵ documented internal cooperation between the industries or, say sector integration would enhance national production. But the schema of sector integration failed in the ongoing process. Integrating various sectors simultaneously may raise the problem of compensating changes. The concentration of readjustment in resource allocation in one particular sector will impede the other sectors of the economy. Putting differently, the relative price adjustment and resource allocation process maybe not similar for all the sectors. Also the time of integration varies from sector to sector. As a result, some industries expand their production and some sectors contracts. Lack of coordination in government policies (monetary and fiscal) may mislead resource allocation in various sectors. For example, at a given point when one country adopted inflationary policies and the other follows deflationary policies, the problem of readjustment arises. In such a case, the integration approach leads to conflict among commodity producers and commodity users and will ultimately reduce overall production among the integrated sectors.

4.5.2 Why do countries need integration?

Countries with Economic integration will boost their trade share in participating with the outside world. The welfare gain due to economic integration accrues only in the medium or long-run. Whether it is a

²⁴ Spatial economics is nothing but “location of production” which state that the geographical area to setup an economic unit. In the absence of market imperfections, the spatial location theory does not work (specially the transportation a cost varies according to the distance of plant location area). Ohlin. B (1933 p589) stated in is theory that “international trade is nothing but *Internationale Standortslöhe*” which tells about the importance of location for trade. Isard argued that location and trade are interrelated and simultaneously determined, so it is two sides of the same coin (Isard. W 1956, pp207)

proposed or political agenda, economic integration aims to quantify the distribution gains and losses from this integration. Now it is important to know some of the economic gains from the process of economic integration:

- ❖ Integrated countries have the advantage of accessing the market easily with the member nations.
- ❖ Induce investment opportunities with a high degree of security. A strong integration between the nations will provide safe and secure returns on their investments.
- ❖ Increases production efficiency by enhancing the efficiency of resource allocation. It allows the participatory country to adopt new production technology at a lower cost.
- ❖ Elimination of all tariffs and quantitative trade barriers will improve the trade flows among the partner countries and increase overall trade share in the global market.
- ❖ Integrated economies can enlarge their market size by utilising the economies of scale. Expanding the plant size and production specialization will increase production, which paves the way for industrialization of less developed economies.
- ❖ Economic integration facilitates competition in the domestic market. The economics behind this is the overcome of monopoly power in the domestic market. The integration allows the country to have access to the product at a cheaper cost from the partner countries. Hence, the integration will increase the competition between the local market and foreign market, resulting in the fall of product price.
- ❖ Secure and easy accessibility of technical information; acquiring, processing and monitoring information is costly for a small country. Information asymmetries may limit the foreign flows and reduce capital available for the county. Integration makes it easy to access information at a cheaper cost from the partner countries.
- ❖ Economic integration necessitates technological change and improvement in market structure. The production efficiency of the firm is subject to specialization and market structure. Technical efficiency is more common in industries than in small economies. An integrated group can easily exchange their ideas and technology (factor movement) among themselves.
- ❖ Economic integration increases the potentiality of monetary and fiscal policies. Through integration, countries can follow better policy implications according to their market condition. The economic stability and effectiveness are determined by strength of integrated.
- ❖ International trade always stands with the bargaining power of the trading country. The bargaining power will improve once the countries come closer and form integration. The trading partners will benefit from this process with better terms of trade, where the exports gains will be accountable from the preferential trade agreement.

- ❖ The resulting effect is the enhancement in the research and development (R&D) activities. The research and innovation driven growth features with incentives to invest in R&D. The scale effect presumably creates a tough competition among the trading partners, and investments in R&D is made possible to better participation in the international market.
- ❖ The consumer will get benefited through integration. The markets in the integrated countries are more competitive, which tends to lower the price. It provides an opportunity for consumers to access variety of goods and services from the partner countries. Hence, due to this competitive effect, consumers' real income will increase, resulting in an improvement in individual choice and utility function.
- ❖ X-inefficiency²⁶ phenomenon; Theory of X-inefficiency tells us about the underutilization of resources. The integration process reduces the allocative inefficiency and shifts the firm's production activities in a better direction.
- ❖ Integration enhances institution quality and encourages financial deepening; in every country, the top business groups are indirectly supported by political bodies. It is very much difficult to adopt any new reforms because of poor institutional quality. As the countries get integrated, it promotes competition among them. Compel the countries to go for external capital to expand their production capacity. This in turn, endorses financial deepening and institutional quality.
- ❖ Contributes to social inclusion; integration benefits the society indirectly through strengthen the overall economic performance. Competition between the firms/ industries will improve the ability of market participation by these groups. At the same time, this increases the labour participation ratio and reduces wage discrimination in the market (in sample words, better income distribution in the society). It also reduces the gender wage gap by raising female participation ratio with equal income distribution. Hence, the gaol of inclusive growth will achieve.

4.5.3 Definitions and its classification

The major problem in international economics in the present day is the lack of clarity in the definition of economic integration, trade liberalization (liberalism) and trade openness. The story starts with free trade. The notion of free trade has historical evidence from classical economic theory. Comparative advantage and its benefits to the country is the foundation of the view. Free trade is ideological (classical liberal theory) cum political framework to open the economy. The international relations theory articulates that free trade improves the association between the two countries (states) and endorses a peaceful conflict

²⁶ The term X-inefficiency defines, use of resources less the full efficiency, for instances the raw materials, labour power, machineries were either misused (in a wasteful manner) or not used up to full capacity level creates a problem of X-inefficiency. Example; production inefficiency in public firms are more common compare to private. The limited government policies and their regulations are often altering of the quality a firm activates. In case of private firms resource allocation efficiency is very high because their strong regulation and better management.

resolution. Precisely, free trade assures cosmopolitanism²⁷ but not the coercion of individualistic thinking that emanates from narrow interests of groupism²⁸ in international relations. This mechanism facilitates an agreement of the common principle between the cross-boards and attains the benefits from free trade. In contrast to this, the notion of Isolationism²⁹ and Hawkishness³⁰ perhaps downturn the projection of free trade. The concept of free trade was envisioned by both liberalism and libertarianism ideological philosophy.

The ideological philosophy of liberalism provides an assurance of equal rights and reverence to all society irrespective of religion and race. At the same time, it ensures that no one has the right to interfere with other personal life for their benefit (individual's autonomy). In a political context, no state intervention will privilege some over others (ensure their freedom). From a policy perspective, liberalism is related to cosmopolitanism credos of welfare society as a whole, not individual or groups or organization well-being. The doctrine of economic liberalism stresses the free market mechanism, where community needs economic freedom to take their personal decision on consumption, the willingness to invest and take risk taking. Libertarianism, by contrast, believes that every individual of the society is free to choose their path of success, and no government intervention be allowed. Crudely, individuals can maximise their freedom without any social and legal constraints. In general, libertarianism is associated with free-market mechanism, or we can also say it, like a pro-free market attitude. The aspects of free market are collectively premised on the optimal distribution of resources (Rathbun B p-5, 2014).

4.5.4 The history of international trade integration

The history of economic development and its determinants again reignited the debate on trade openness and the economic growth of a nation. In particular, the role played by international trade policy in economic growth and its development. It had to do much with the role of government intervention in overall economic performance. The question that everyone was struggling to answer was whether liberal trade policy is optimal for promoting growth? Can the country with the lower international trade barriers experience greater economic growth? The history of economic thought has debated these questions.

Going back to Adam Smith, the idea of international trade is considered the engine of economic growth. The arguments about international trade policy and economic growth are among those that witnessed

²⁷Cosmopolitanism the word taken from the Greek “Kosmopolities” which defines a view of socio-political-moral philosophy that Postulates all human being as “citizens of the world” rather than single community, nation, or a single state (Benning J F 2014).

²⁸Group centered thinking (sociocentrism) is a form of critical thinking that creates group bias, which implies the pre-disposition of giving an importance to any culture or group than the others. This creates a biasedness among the society.

²⁹Isolationism is a national policy that keeps country out of the economic and political entanglements with another cross-border world. This often followed by the United States after failure of Pres. Woodrow Wilson's idea of internationalism. The policy of Isolationism was continued to the end of second World War and no international development activities are undertaken (Duignan B, 2019)

³⁰Hawkishness is a behavioural attitude to display of coercion rather than using diplomacy to attain the target of foreign policy goals. Sometimes Hawkishness is also called “militant internationalism”.

radical changes over the period. In the early days, international trade policy was dominated by protectionist theories. Many developing countries widely accepted such protectionist policies to transform themselves from the traditional economy to the industrial economy by limiting trade liberalization. Edwards S(1993) gave a brief explanation about the emergence of import-substitution strategies, *“.....Policies, which comes to be known as “import substitution industrialization (ISI)” strategies, had their origins in the thinking of Raul Prebisch (1950) and Hans Singer (1950) and were based on two fundamental premises: (1) a secular deterioration in the international price of raw materials and commodities would results, in the absence of industrialization in the LDCs in an ever-growing widening of the gap between rich and poor countries; and (2) in order to industrialize, the smaller countries required (temporary) assistance in the form of protection to the newly emerging manufacturing sector. This reasoning was closely related to infant industry argument for industrialization.” (S Edwards, 1993)*

For every economy, foreign inputs were considered an important resource to enlarge their scale of production, and restricted trade policies will hamper economic growth by reducing the availability of foreign resources. It is observed that government distortions in foreign transactions will adversely affect the productivity of the capital and overall economic growth. Even in a small economy, the trade distortions will significantly lower the economic growth rate by limiting trade openness. This implies that the trade distortion will have a severe repercussion on country economic growth facing a scarcity of resources. The same was explained above by Prebisch and Singer (1950).

During the 1950s to beginning of the 1980s, many well-known development economists were supportive of the idea of import-substitution strategies. The policymakers across the world was influenced by these protectionist views of economic development and devoted their huge time to design policies based on import-substitution trading mechanism. Many advanced and developing countries experienced a pleasant economic growth rate with the implementation of import-substitution policy during the 1960s, 1970s and early 1980s. On one hand, the protectionist paradigm dominating across the countries. On the other hand a small group of academics and researchers were trying to assess the consequence of this trade regime.

4.6 Trade, financial integration and economic growth: Review of past studies

4.6.1 Financial integration and growth nexus

The evidence on the nexus between international financial integration and growth nexus is straightforward, where it predicts a positive gain from financial globalization. This opinion has been challenging over the years, especially after the big financial crises. According to the neoclassical growth models, financial integration will facilitate access to foreign capital market easily enhancing the confidence of domestic investors to participate in the global market. Thus a developing country can come out of the constraint of capital shortage and economic growth (Prasad et al., 2003). Theories that support

the ‘second best argument’ tell that eliminating the restrictions on capital flows will positively affect growth. In addition, unstable financial system, trade barriers and weak domestic institutional setup are the pre-existing factors for negative growth (Eichengreen, 2001). Theoretical models that applied financial frictions in open economy structure to know the effect of financial globalization on economic growth. They concluded mixed results that greater financial integration, large capital inflow, high saving-investment ratio and high growth on one hand. On the other hand, ‘uphill’ capital flow from poor to rich economies, market failure and volatility in capital flows have been common factors of economic slowdown (Gertler and Rogoff, 1990; Aghion et al., 2004)

A similar study by Abiad, Leigh and Mody (2009) analysed the pattern of international capital flows across the countries and how it was different from the European countries. They argued that in general foreign flows would ‘uphill’ from poor to rich economies, but it was reversed in European countries. To examine this, they used a five-year non-overlapping average technique for 1975 to 2004 for the broad samples of countries. The study confirmed the paradigm that financial integrated countries like Europe had strong ‘downhill’ capital flow from rich to poor countries. The logic behind this is that the greater the financial integration, the greater the portfolio diversification and risk sharing ability. Investors are more interested in holding high-yield risky portfolios in safe low-yield investments (Obstfeld, 1994), and this diversification creates downhill capital flows. An increase in the process of downhill capital flows tends to accelerate income convergence. Further, once the income reaches its threshold, the downhill capital flows slow down. Hence foreign flows have a self-limiting transitory effect on country. The empirical analysis confirms the existence of ‘downhill capital flow paradigm’ in European countries above a certain level of institutional threshold and degree of integration. To the extent, Europe is still different from others countries even after including the threshold effect.

Here, the argument arises which types of capital flows are essential to maximize the growth and the role of financial globalization to channel these flows smoothly. For instance, Reisen and Soto (2001) technically try to explore the effect of private capital inflows on economic growth and especially to examine the influence of inflows of different type of capital flows (FDI, portfolio equity investment, bond flows, short term and long term bank lending) on economic growth. The sample of 44 developing countries was investigated for the period of 1986-1997. The results were threefold. First, a country should maintain a certain level of domestic financial stability to maximise foreign savings. Consequently, it results in the reduction of the risk of reversibility and amplified misallocation of capital flows. Second, equity investments are much better than debt instruments. However, both FDI and Portfolio equity investment have a positive and significant influence on economic growth. Third, abolishing the limits and controls on shareholder rights, strengthening the financial institutional infrastructure to better regulations,

monitoring, transparency, accountability, and new policy instruments to hedge the risk associated with foreign exchange, where all these factors will help raise the portfolio equity inflows and promotes growth. Hence, a country must encourage foreign saving to stimulate long-run growth rather than domestic saving. Thus, attracting more FDI inflows and portfolio equity inflows can automatically increase foreign saving (Balasubramanyam et al, 1996; Borensztein et al, 1998; De Mello, 1999).

The potential benefits of financial integration are accessing new types of capital that are scarce in developing countries, which might help them diversify their production base and increase the specialization of production base. Moreover, production specialization may enhance productivity and stimulate growth. However, higher productivity without a proper risk adjusting mechanism might lead to higher output and consumption volatility (Razin and Rose, 1994). The theoretical models suggest that financial globalization will help mitigate the problem associated with output and consumption volatility. O'Donnell (2001) use data for 93 OECD and non-OECD countries to examine the effect of financial globalization on output volatility. The author finds that a higher degree of financial integration lowers the output volatility for OECD countries and vice-versa for non-OECD countries. The ability to manage and reduce the consumption volatility has a direct effect on economic welfare (Obstfeld and Rogooff, 1998; Prasad et al., 2005)

Notwithstanding the importance of financial integration and its potentially large welfare gains, Epaulard and Pommeret (2005) also studies significant welfare gains from financial integration for the set of 32 emerging and developing economies using simple stochastic endogenous growth models for a small open economy. In addition, they also construct an upper bound for this welfare gain from financial integration. It is measuring the benefits of financial integration comparing the economy with financial autarky and economy with fully financial integrated. Specifically, the study measures the welfare gains in terms of actual growth. An increase in financial openness will bring about 0.4 per cent additional growth for the economy, then the country under autarky.

Moreover, including above benefits, the authors also pointed out that the actual financial integration was took place through FDI and debt flows. Capital flows in foreign direct investment benefit the country to adopt advanced technology at lower cost and enhance productivity growth. At the end, they concluded the gain form financial integration was not that huge what it required in general (Gourinchas and Jeanne, 2004). In contrast to this (Obstfeld, 1994; Athanasoulis et al, 2000), the integration of financial markets benefits the country with greater risk-sharing opportunity.

Similarly, Gourinchas and Jeanne (2006) empirically analysed the effect of welfare gain from the international financial integration using calibrated neo-classical growth models. Particularly, the study

examines the benefits financial integration from another direction, such as how the financial integration benefits from capital scarcity of developing countries. Two different types of neo-classical models are applied. 1) Ramsey-Cass-Koopman model³¹, which experimented the state of financial integration on the basis of physical capital accumulation. 2) Macro-Mincer model³², which experimented the degree of financial integration based on human capital accumulation. The authors find that developing countries do not benefit much from international financial integration. As expected industrial countries seem to be taking advantage of international financial integration. Some capital scarce countries get benefited through financial integration but not all. Thus, an increase in domestic welfare from financial openness is limited to some countries and that to less than average. Typically for non-OECD countries, domestic welfare from financial openness is noticed with an increase in their consumption level around 1 when they switch from autarky to perfect capital mobility. Finally, they concluded the magnitude of welfare gain from financial integration is very small and less than the policymakers expected rate for development.

Fratzscher and Bussiere (2004) argue that there is strong inter-temporal trade-off between financial liberalisation and economic growth. Particularly, their study focused on time-varying concept in liberalization, whether the financial openness varies over time such as in the short-run, medium and long-run. To analyse the inter-temporal trade-off, they applied panel approach with GMM technique for 45 developed and emerging countries groups over the time period of 1980-2002. The findings confirm the existence of such an inter-temporal trade-off between financial openness and economic growth. Especially, the growth boost at a very fast rate at the beginning of liberalization for a short period, then grows at a slow rate and finally comes down in the long-run. Finally, the authors explained the key reasons for this trade-off in financial openness and growth, such as investment boom (due to over-borrowing), large portfolio and debt inflows. That ultimately creates bubbles in the market and turns to severe bust and collapse of the financial system, which could further pave the financial crises.

On the other hand, many authors believe that international financial integration will have an adverse effect on economic growth. It was harmful to the country to open up their domestic market to the global competitor in the presence of weak institutional setups, low absorptive capacity and strong information

³¹ Ramsey-Cass-Koopman model: the model used small economy and it accumulates physical capital from domestic savings. To assess the benefits of financial integration, they conduct an experiment in two cases; 1) economy with “complete financial autarky (that depends purely on domestic savings of their residents)”. 2) Economy in the state of “perfect financial integration” (attracting the foreign capital flows into the country)

³² Macro-Mincer framework introduces accumulation of human capital into the model to experiment the level of financial integration. The accumulation of human capital measures the level of labour productivity and explains the income differences across the country.

asymmetry. More generally, we can think of a country with poor absorptive capacity in terms of depth of the financial system, domestic governance to monitor, and ability to absorb human capital and macroeconomic policies design (Prasad et al. 2003). Some of the past studies evidenced that international capital flows might affect productivity spillover to the domestic firm, particularly for those with weak absorption capacity. On the opposite side, a country with a strong absorption capacity would generate a positive spillover effect (Haddad and Harrison, 1993; Djankov and Hoekman, 2000; Smarzynska, 2004). Hence, a country needs to maintain a certain level of absorptive capacity to enter into the global market to take advantage of financial integration (Prasad et al. 2003).

The disagreement regarding increasing financial globalization and its benefits is also seen in some of the empirical literature. Grilli and Milesi-Ferretti (1995) examine the determinants of capital control and its impact on economic growth, especially to analyse the restrictions on capital flow in terms of long-run prospective. They adopt IMF designed measure of restriction based on the “*Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*” report. The authors argue that restrictions on capital flows, current account transactions, and adopting multiple exchange systems will result in high inflation and lower interest rates. Moreover, no significant relationship between capital control and long-run economic growth is found. In the same line Kraay (1998) studies the effect of capital account liberalization on investment, inflation and economic growth. The study applies both cross-sectional and event study approaches to analyse 117 countries for 1985 to 1997. In addition, here the author uses three different measures of financial openness (1) IMF based AREAER report, (2) based on Quinn (1997) measure (that used quantitative indicators by taking rules governing presented in AREAER report) for financial integration and (3), based on volume of actual financial openness such as total capital inflows and total capital outflows to the share of GDP. The paper concluded that there is no significant macroeconomic benefit of financial globalization. This is because the benefit of financial globalization comes at the cost of high volatility. The notion of financial globalization and its benefits to the country will only realise when there are strong macroeconomic policies and institutional setups.

Similarly, Rodrik (1998), in his paper entitled “*who needs capital account convertibility?*” raises many questions to challenge the mission of financial globalization. He argues that eliminating capital control is not the only solution to answer all these questions. Moreover, there is no robust relationship between financial globalization and its growth benefits. Levine and Edison (2002) conclude that the data doesn’t support the benefits of financial globalization to promote economic growth. Their study utilizes both IMF and Quinn’s measure of restriction (de-jure) and Lane and Milesi-Ferretti, 2002 index (de-facto) of capital account openness to predict the growth effect of financial integration in 57 countries. They find that each indicator has different effect on growth. Furthermore, they explore whether the financial integration and

growth nexus depend on a particular economic development level, depth of financial system, institutional setups, and strong macroeconomic policies. Finally, they conclude that financial integration doesn't have any beneficial effect on economic growth, even after controlling the above factors like economic, financial, institutional and macroeconomic policies.

At the same time, Boyd and Smith (1992) construct a model to test the financial intermediation efficiency to allocate investment capital. They observe that the emergence of intermediaries system is due to information asymmetry and demand for information acquisition. Finally, it is concluded that a positive and significant growth effect of financial integration was possible when a country has strong 'rule of law' and greater financial development. Quinn (1997) investigates the impact of financial liberalization on four economic and policy variables, i.e. economic growth, income distribution, corporate taxation and government spending. For this, the author constructs an openness index based on the IMF-AREAER report and assigns scores for capital restriction for the set of 64 economies over 1958 to 1989. The empirical results show that capital account openness has a positive influence on economic growth.

Moreover, capital account openness tends to increase government spending, but the results are not supporting the increase in corporate taxation. Also, the degree of financial integration is positively associated with higher income inequality. The study as a whole suggests that financial liberalization spurred economic growth because the process of integration enhances the domestic market "investment efficiency".

Edwards (2001) empirically tries to analyse the economic performance of the world economy with free capital mobility. The paper focuses on two issues: first, to know whether high capital mobility positively affects long-run economic growth; second, whether the nexus between international capital mobility and growth performance varies among emerging and industrial economies. Quinn's "*CAPITAL*" restriction index is applied for the set of 20 industrial and emerging economies to measure the capital account openness for 1975 to 1989. The estimated results suggest that the greater the degree of capital account openness, the country's growth performance. In addition, the author also confirms that country with a developed financial system will take advantage of capital account openness for better capital mobility and greater economic growth. Schindler (2009) constructs a new data set based on countries "*disaggregated de-jure restrictions*" to measure the degree of financial integration among 91 countries. This disaggregated de-jure measure is more informative that allows structural changes and forms an index that is a subset of individual assets, capital inflows and capital outflows etc. The author applies same technique used in AREARA and codes in binary form '0' for free from capital control and dummy '1' restriction on foreign capital flows. It is also argued that using this index; someone can better predict financial globalization than others.

Bekaert et al. (2001) argue on a positive growth effect of equity market liberalization in emerging market economies. The study employs time series and cross-sectional data of 30 emerging or frontier economies and utilizes GMM technique to capture the effect of equity market openness on growth performance. The estimates confirm the positive association between equity market liberalization and real per-capita GDP growth. However, economic growth increases on average 1 to 2 per cent per annum for emerging countries just after financial liberalization. In addition, education plays a vital role since countries with higher levels of education could possibly take more advantage of financial liberalization than other countries. Similarly, Bekaert, Harvey and Lundblad (2005) further extend their research and examine the growth effect of equity market liberalization and capital account openness. The sample size covers 95 countries from 1980 to 1997. The results observe that equity market liberalisation has a positive and significant effect on per-capita GDP growth. The equity market liberalization increases around 1 per cent of real annual GDP growth. There is a 2.2 per cent difference of growth between fully liberalized and not yet liberalized or autarky economies. Edison and Warnock (2003) propose a simple measure to identify the “intensity of capital control” based on restrictions imposed on foreign equity ownership. Their results show that financial liberalization reduces the cost of capital, appreciates the exchange rate, lower the inflation volatility and increase the net capital inflows significantly in all the 29 emerging countries. However the effect varies to the extent of liberalization.

Lane and Milesi-Ferratti (2003) show how the international financial integration changed over the last two decades. Specifically, the change in the size of foreign assets and liabilities relative to GDP, the composition of cross-border holdings and its effect on international trade in goods and services, and the rate of returns associated with external asset and liabilities. The data is taken for 18 OECD countries from 1970 to 2001, and the authors employ time series, cross-sectional and panel approach to study the change in financial integration. Financial integration is measured based on the country’s portfolio assets and liabilities. The empirical results show that the cross-border holding (total assets and liabilities) in industrial countries grows faster than the GDP because of greater financial integration. The degree of international financial integration and its variation over time is explained well by dismantling capital account restriction, a rise in trade openness, financial superstructure, and an increase in per-capita GDP and privatization programs.

Further, the same study is extended for 145 countries, including industrial, emerging and developing, from 1970 to 2004. The finding highlights a substantial increase in external portfolios in emerging countries. However, financial integration does not show much benefit in developing countries regarding cross-border asset trade (Lane and Milesi-Ferretti, 2006).

Shin and Sohn (2006) explore how trade and financial integration in East Asia changed from 1971 to 1996. Primarily, they examine the effect of trade and financial integration on business cycles co-movements, risk-sharing across countries in terms of consumption and output co-movements, and the effect on price co-movements across countries. The results show that trade integration might increase output co-movement but not consumption, and similarly higher trade integration enhances price co-movement. On the other hand, financial integration shows a weaker effect on price co-movements but not for others. In contrast to this, Chen and Quang (2014) find that international financial integration will enhance economic growth once the country achieves a certain threshold in income, private credit, financial depth, level institution quality, degree of trade openness, and government expenditure.

Vithessonthi and Kumarasinghe (2016) test the hypotheses 1) that greater the financial development higher the integration of stock market with the global market 2) trade integration is influenced by stock market integration and global market integration. A simple panel OLS regression technique is applied to test the hypotheses. They find that countries with a strong financial system can promote stock market integration with the global market. In contrast, there is no significant relationship between trade integration and stock market come global market integration. Moreover, their results was also not supports the bilateral relationship between the stock market integration and trade integration hypotheses. Hence, financial development has a strong effect on stock market integration with the world market.

4.6.2 Trade integration and growth nexus

Rathbun. B (2014) focuses on the ideological difference in free trade mechanism. The analysis is constructed based on two different ideologies; liberalism and libertarianism views on free trade. In this regard, the foreign policy design based on both mass and elite levels is structured in two dimensions: cooperative internationalism (CI)³³ and militant internationalism (MI)³⁴. Both the concepts contradict each other. The notion of liberalism in foreign policy is about a strong cooperative internationalism coupled with a low degree or no militant internationalism. The principal components to analyse this attitude are cosmopolitanism, dovishness and multilateralism. He uses survey data of 1200 samples that comprise both mass public and elite Americans. The author finds that the idea of free trade is supported by the mass public, those with libertarianism views. The notion of isolationism is always opposed to free trade. The classical liberal thinkers view that neither cosmopolitanism nor hawkishness supports the free trade attitude of elite and mass public. At mass level, the collective stance of cosmopolitanism,

³³ Cooperative Internationalism emphasizes the attachment and common concerned towards the fellow country. The foreign policy precisely focused on the sense of international obligation in free trade and makes it more inclusive. This is combined of both cosmopolitanism and multilateralism, this is nothing but strengthen the international relationship between the countries, Rathbun, B. (2014 p-9).

³⁴ Militant Internationalism defines the structure of foreign policy that is more supportive to a hostility and hawkish attitude. The militarism and dogmatic unilateralism takes the privilege of control over the society and deterrence the international relationship, Rathbun, B. (2014 p-9).

dovishness and multilateralism that constitutes foreign policy posture of liberalism does not show any effect of free trade. At the elite level cooperative internationalism (cosmopolitanism) has a negative correlation with the free trade approach. Hence, it is confirmed that the free trade foreign policy was not supported by the elite with an ideology of liberalism. In contrast, free trade foreign policy was supported by the mass public with libertarian.

Grossman and Helpman (1989) developed a dynamic general equilibrium (DEG) model for multi-country where they modelled product innovation and global trade to analyse the comparative advantage through investment in research and development (R&D). They concluded the firm would benefit by introducing new products, which will be possible through investment in research and development. The R&D ensures innovation in the form of product differentiation. The potential producer in the market come forward to invest in R&D with an expectation of profits maximization. Investment in R&D, production of new goods (with product differential) increases the firm's production capacity. As the level of production increases, the market size increases, more commodities are available to consume, and this ultimately changes the pattern of trade over time. Both intra-industry and inter-industry participation facilitate more trade opportunities. An incentive to produce depends on saving and investment decision made by the agents (varies by countries). Finally, a result of dynamics in the trade gives rise to multi-national corporation and choice of inter-temporal trade.

Coe and Helpman (1995) examine the variations in total factor productivity (TFR) of the country concerning variations in domestic and foreign R&D capital stocks. Domestic R&D is not always sufficient to explain variation in TFR because intermediate inputs also trade in the global market. For every country, total factor productivity (TFR) is a function of cumulative R&D. To estimate this relationship, the study uses 21 OECD countries, including Israel, for the period of 1971 to 1990. The authors observe that domestic and foreign R&D stocks better explain total factor productivity (TFR) efficiency. However, the productivity benefits from foreign R&D are more to the open economies compared to close economies. Moreover, for small countries, the elasticity of TFP is equally explained by domestic and Foreign R&D, while for larger economies (such as G7), domestic R&D capital stocks are more important to improve the total factor productivity (TFR). Finally, they conclude that the rate of return on is very high for domestic and international spillover.

To understand the impact of trade reforms on economic growth, Harrison and Hanson (1999) attempt to solve three trade reform puzzles. First, they examine the relationship between trade openness and long-term economic growth. Secondly, to analyse the impact of trade policies on the labour market (typically employment and wage). Finally, to analyse the link between trade performance and the rise in wage inequality (with respect to Mexico). They apply the highly cited work of Sachs and Warner (1995) trade

openness index to identify this relationship. The results based on Sachs and Warner index suggest that there is no evidence that more open trade policies will be associated with long-term economic growth. The second puzzle observes very large changes in trade policies associated with small employment and output performance changes in Mexico and Morocco. Finally, the third puzzle witnesses that the existence of wage inequality is high after 1985 trade reforms. However, during the 1980s Mexico experienced high wage inequality between skilled and unskilled workers.

Harrison (1995) adopts seven different openness measures, i.e., trade liberalization index based on exchange rate and commercial policies, an index based on country tariffs and non-tariffs barriers measured the black-market premium³⁵, trade share percentage of GDP³⁶, price distortion index³⁷, movement towards international prices (MTIP)³⁸, industrial protection and overvalued exchange rate. All these measures test the relationship between trade openness and the economic growth of 51 countries for the period from 1960-1988. The author estimates three regression models such as pure cross-section; i.e. period average, one observation for each country over time, fixed effect model using annual data and regression with five years averages to reduce cyclical fluctuation. The findings suggest the correlations between different openness measures are not always strong. The regression results support the positive association between trade openness and economic growth. The impact varies with the choice of the time period with pure cross-section data; one out of seven openness measures positively impacts economic growth. Regressions results using five years' average, three out of seven openness measures reveal a positive association between trade openness and economic performance. Using annual data, six of seven openness measures are found to be positive with significant impact on growth. Finally, there is a significant bi-directional causality between trade openness (with trade share as proxy) and economic growth.

Yanikkaya (2003) has also applied two sets of openness measures to examine the growth effect of trade openness with a sample size of 100 countries from 1970 to 1997. These two sets of measures, one based on trade volume consisting of exports plus imports as percentage of GDP, participating country's total bilateral trade with the US to its GDP. The second is based on trade restrictions that comprise import duties (tariffs), total export duties, taxes imposed on international trade, bilateral payment arrangements and payment restrictions for current transactions. Including this, he also used trade with OECD and non-OECD countries to capture the trade intensity, population density, percentage of the total population to total area. When openness is measured in terms of trade volume the estimated results confirm a positive and significant association between trade openness and a country's economic growth. The same results

³⁵ It is calculated simple deviation of black market exchange rate to official exchange rate.

³⁶ Export plus import percentage of GDP.

³⁷ Modified version of Dollar trade openness index

³⁸ Index is constructed based on relative prices (Using current and constant price index) of a country's tradable.

are captured using population density and trade intensity (trade with OECD and non-OECD countries). Turning to trade restrictions as a measure of openness, the author finds some contradicting results that indicates trade restrictions have a positive and significant impact on growth.

Ben-David (1993) argues that movement towards liberalization of trade will reduce the income disparity among the European countries. The focus is on six member countries of European Economic Community (EEC) in the episodes of postwar period of World War II. The results show that a strong income convergence in EEC during the postwar period is noticed due to a significant increase in trade liberalization. However, removing trade barriers among the EEC members group might exhibit a fall in income differentials. Comparing the EEC with the United States, the rate of income convergence replicates the same.

The above empirical review on trade and financial integration and its impact on economic growth remains inconclusive. Some of the studies reveal a positive association between trade, financial integration and growth. The others have argued the negative and significant growth effect of trade and financial integration. The subsequent survey on trade and financial globalization and its benefits to economic growth deepens the puzzle. On the whole, the above literature reveals that a very small number of studies confirms the strong and robust evidence on the “causal relationship between trade, financial and growth nexus” across the country. This chapter examines the causal relationship between trade, financial integration, and economic growth among two different country groups: industrial countries and emerging ones from 1988 to 2017.

4.7 Measuring Trade and Financial Integration

4.7.1 Measuring international financial integration (IFI)

To examine the relationship between economic growth, trade integration, and financial integration, the country's economic performance is measured by its real per-capita GDP. There is no precise measure of financial integration, and it has remained a challenge till today. The existing measures to quantify the extent of integration are riddled with some complicated issues. Two major proxies widely used in financial integration literature to measure international integration are the following; (i) The government restrictions over cross-border capital flows and (ii) actual measures that define the international capital flows. The first one is the traditional approach to measure international financial integration based on legal restrictions executed by the government on cross border capital flows. Especially, restrictions on capital inflows and outflows, quantity restrictions, price controls and limits on cross-border equity holdings, etc., to account for these restrictions. Three of the existing indices to measures for financial integration are following:

First is the IMF restriction measure to capture the financial integration. The International Monetary fund's (IMF) widely used measure as proxy to capture the government control on international financial transactions provides 60 different types of controls. The IMF-restriction measure is constructed on the basis of "IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)". The classification of the countries is based on the presence or absence of government restrictions in that particular time. The measure equals one for the country in that particular year where the government restrictions impose on capital account transactions. If there is no restrictions on capital movement in that specific year it is considered as zero. Appendix-I summarises the categorical enumeration report on different capital controls by AREAEA.

Some issues arise in the literature regarding whether to use measurement in the form of binary variables 0/1 to capture the capital account liberalization. The IMF based measure is too aggregated to take into account the sensitivity of actual capital restrictions. The movement of capital flows varies depending on its flow, i.e. inflow of capital and outflow of capital and its financial transactions targeting. The IMF restriction measure fails to account for the magnitude, intensity and effectiveness of actual capital control.

As regards the second measure for financial integration, with the information of AREAER, Quinn's (1997) , "constructs capital account openness measure based on the text of annual volume published by the International Monetary Fund (IMF) on Exchange Arrangements and Exchange Restrictions (AREAER)". Unlike the IMF's binary measure, Quinn's openness measure assigns score from 0 – 4 to account for the intensity of actual capital flows (both inflows and outflows) in half-integer units 4 represents a fully open economy. Hence, the measure yields a more nuanced view of capital account openness that improves the IMF constructed index. Quinn capital account openness index captures the magnitude of the restriction rather than simply ranking the countries as close or open. However, there is a high correlation between IMF-restriction measure and Quinn measure (Edison et al., 2002). Moreover, the available information for emerging and underdeveloped is concise, which is insufficient to examine financial integration.

The third measure of financial integration is due to Chinn-Ito (2007), called KAOPEN based on a zero-one type dummy variable. The variables are coded based on Exchange Arrangements and Exchange Restrictions (AREAER) tabulation of cross border international financial transactions to measure the financial integration. The KAOPEN index looks at capital account regulations and the intensity of capital control. The index constructed with four different categories of restrictions on capital flows, and these variables are:

- 1) Presence of multiple exchange rate (k_1)
- 2) Restrictions on current account transactions (k_2)

- 3) Restrictions on capital account transactions (k_3)
- 4) Requirement of the surrender of export proceeds (k_4)

The principal component analysis (PCA) method was used to develop the index of capital openness $KAOPEN_t$. It was constructed based on the first standardized PCA component of all the four variables k_{1t} , k_{2t} , $SHAREk_3$ and k_{4t} . Then the attributes of the index measured as higher the values greater the openness for the country to perform the cross border capital flows. However, the indicator, $SHAREk_3$ ³⁹ is dropped because the variability of $KAOPEN$ is not explained by the series of $SHAREk_3$.

Later, the index $KAOPEN$ is constructed using $k_{1,t}$, $k_{2,t}$ and $k_{4,t}$ indicators, which are more appropriate to capture the intensity of capital restrictions. The construction of the $KAOPEN$ ⁴⁰ index is considered as a better proxy to measure the financial integration based on intensity of capital control. The study used $KAOPEN$ index as a *de-jure* measure of financial integration.

All the three measures of financial integration mentioned above capture the capital account restrictions.

➤ **The *de-jure* measure for financial integration:**

Chinn-Ito (2007) $KAOPEN$ index looks into the extent and intensity of capital controls, which focuses on potential financial integration rather than simply describing countries as close or open. The $KAOPEN$ index is improved upon both the IMF-restriction measure and Quinn measure and covers large numbers of countries for a long time. This study uses Chinn-Ito (2007) $KAOPEN$ index as a proxy to measure *de-jure* international financial integration (IFI), as discussed above.

➤ **The *de-facto* measure for financial integration:**

The next approach to measuring the extensive array of international financial integration (IFI) considers the actual integration of the international capital market in practice. The alternative measure for financial integration (IFI) used in the P-VAR model and so-called *de-facto* measure of financial integration draw upon the pioneering work of Lane and Milesi-Ferretti (2007). The authors construct an extensive dataset containing estimates of the stock of gross external assets and liabilities for 210 economies for the time of 1970 to 2015. The international financial integration (IFI) measure used in this section is based on Lane and Milesi-Ferretti (2007) approach, which is discussed in greater details below:

³⁹ To measure the restriction on capital transactions (K_3) constructed based on the share of 5-years window (taking year t and the preceding 4 years) that capital restrictions were not in effect, that follows:

$$"SHAREk_{3,t} = \left[\frac{k_{3,t} + k_{3,t-1} + k_{3,t-2} + k_{3,t-3} + k_{3,t-4}}{5} \right]$$

“The first eigenvector for $KAOPEN$ is found to be ($SHAREk_3$, k_{1t} , k_{2t} , and k_{4t} = 0.57, 0.25, 0.52, 0.58)”

⁴⁰ The author Chinn-Ito (2007), compare the $KAOPEN$ index with Quinn (1997) measure and finds the correlation of 83.9 percent. It shows $KAOPEN$ index is good proxy to measure for financial integration based on intensity of capital control.

Lane and Milesi-Ferretti (2007) have classified holdings and transactions into the following broad categories:

- Portfolio investment subdivided into equity securities and debt securities. (Portfolio Investment, net (BoP, current US\$))
- Foreign direct investment, which refers to equity participations above 10% (Foreign direct investment, net inflows (BoP, current US\$))
- Other investment (includes debt instruments such as loans, deposits, and trade credits).
- Financial derivatives and
- Reserve assets.

Capital inflow = Sum of foreign direct investment, portfolio flows and other investments.

Capital outflow = Sum of foreign direct investment, portfolio flows and other investments.

Financial openness index = the ratio of gross capital flows to GDP (sum of capital inflows and outflows/GDP).

Furthermore, the above *de-facto* measure of international financial integration (IFI) is expressed in two ways:

a) Volume-based measure of international financial integration (IFI)

$$IFIGDP_{it} = \frac{FA_{it} + FL_{it}}{GDP_{it}}$$

FA refers to the total stock of aggregate foreign assets and FL refers to the total stock of aggregate foreign liabilities, *i* indicate to country and *t* stands for time. The IFIGDP ratio indicates the scale of Volume-based measure of international financial integration (IFI).

b) Equity-based measure of international financial integration (IFI),

$$EQGDP_{it} = \frac{PEQA_{it} + FDIA_{it} + PEQL_{it} + FDIL_{it}}{GDP_{it}}$$

PEQA and *PEQL* indicate the total stock of portfolio equity assets, and *FDIA* and *FDIL* refers to the stock of direct investment assets and stock of direct investment liabilities. Further, one can separate on equity base as short-term oriented PEQ to measure financial integration and long-term oriented FDI measure for financial integration.

4.7.2 Measuring trade integration:

The large body of empirical analysis has used different measures to examine the relationship between trade integration and economic growth. Measuring the country's openness index is preferable when it includes all the average tariffs and non-tariff controls that distort international trade. Anderson and Neary (1992) concentrated on the effect of both tariffs and non-tariffs controls on economic performance and constructed a trade restrictiveness index to measure openness. However, their index is limited to very small countries. Some researchers used the available trade data to analyse the relationship between openness and growth, and some others followed the index construction of Leamer (1988), Dollar (1992), Sachs and Warner (1995), Ben-David (1993) and Rodriguez and Rodrik (2001). Here, the existing openness measures are divided into four categories from which two are applied here. The brief construction of these indices are reviewed below:

One widely used approach in trade literature measures trade openness based on volume of trade, which is the ratio of exports plus imports to GDP. Another measure of trade openness highlights the direct effect of trade restrictions and real GDP growth. This measure includes average tariff rates, non-tariff barriers, taxes on exports, and total taxes on foreign trade. These measures have full limits, the collected tariff, which is the ratio of tariffs to import values, and these tariff rates will be misjudged when it comes to actual tariffs. Pritchett and Sethi (1994) examine the divergence in official tariff rates and collect tariff rates by studying three developing economies. They explain two facts about the relationship between actual tariff and collected tariff. First, a weak relationship exists between actual tariff and collected tariff. The reason is that the countries adopted different official tariff rates for different products, which explains only a small quarter of the variation in total tariff collection. Secondly, as the official tariff rates increase, the collected tariff rates (tariff revenue) also increase. Still, it is evident that beyond a certain limit an increase in official tariff does not show much improvement in collected tariff rates. Hence, the number of studies try to understand the link between average tariff rates and output growth and conclude mixed empirical results. Lee (1993), Harrison (1996), Pritchett (1996) and Edwards (1992) stated that average tariff had negative and significant effect on long-run economic growth. Another set of studies such as Rodriguez and Rodrik (2001) concluded that average tariff rates had a positive and significant impact on total factor productivity growth. However, some authors find a weak and mixed relationship between average tariff rates and long-run economic growth, Edwards (1999), Sala-i-Martin (1997) and Clemens and Williamson (2001).

The third measure considers bilateral payments arrangements (BPA) to describe trade participation between the countries. In general, this method tells about the trade payment settlements between the two participating countries. Historical evidence suggests that the first bilateral payments arrangements (BPA) negotiation were in the 1930s, and it became popular in the 1940s and 1950s. After that, it decreased due

to limited active agreements, but it exists even today. Auguste(1997) analyses the impact of BPA on economic growth based on customs union theory. The findings suggest that BPA has a welfare effect among member countries, but it discriminates against non-members countries. The positive effect of BPA on economic welfare is due to the relative size of trade creation and trade diversion effect.

The fourth category describes the change in the exchange rate to measure trade orientation between the countries. The frequently used measure to quantify the trade restrictions on economic growth is the black market premium (BPM) representing the extent of rationing in the market for foreign currency. Rodriguez and Rodrik (2001) argue that exchange rate restrictions act as a trade control under certain conditions. Most of the studies suggested that BPM has negative and significantly affect the economic growth, such as Harrison (1996), Pritchett (1996), Edwards (1999), Sala-i-Martin (1997). However, some studies like Levine and Renelt (1992) and Rodriguez and Rodrik (2001) find mixed results in their work⁴¹. Consequently, the emerging conclusion from the above methods is that all of these indices have their shortcoming in measuring the actual openness. Hence, all these openness measures seem not robust to explain the economic growth as suggested by previous studies.

➤ **The *de-facto* measure for trade integration:**

This chapter uses two different trade openness measures in the P-VAR model to explore the association between trade integration and economic growth. The first measure used is the ratio of exports plus imports to GDP, which measures the trade intensity and it is the *de-facto* measure for trade integration.

➤ **The *de-jure* measure for trade integration:**

The second measure is the index of freedom to trade internationally, which is collected from the ‘Economic Freedom of the World’ 2019 Annual Report. This index is used as a substitute of the Sachs and Warner (1995) index⁴² discussed above and it is the *de-jure* measure for trade integration. The construction of this index is discussed briefly below:

⁴¹ The reason for this due to bad policies implications (which results high inflation), problem of debt trap, lack of reliable bureaucracy, high level of corruptions and inefficient law enforcement. All this factors will makes it difficult to capture the actual effect of BPM on economic growth (Yanikkaya 2002).

⁴² “Trade integration based on Sachs and Warner (1995) index, where they explained trade liberalization is an engine that drives the broad define global integration. This SW index used direct approach to measuring the trade openness based on the extent of country’s restrictive trade policies and constructed a dummy indicator. They classified a country is close to foreign trade in a particular year if it meets one of the following features.

1. Average tariff rates of 40 percent or more.
2. Non- tariff barriers covering 40 percent or more trade.
3. A socialistic economy system.
4. A state monopoly on major exports.
5. A black market exchange rate depreciated by 20 percent or more relative to the official exchange rate, on average during the 1970s or 1980s (SW looking at growth from 1965 to 1990)” Sachs and Warner (1995).

The “Freedom to Trade Internationally” has four sub-components, “

1. Tariffs
 - i) Revenue from trade taxes (% of trade sector)
 - ii) Mean tariff rate
 - iii) Standard deviation of tariff rates
2. Regulatory trade barriers
 - i) Non-tariff trade barriers
 - ii) Compliance costs of importing and exporting.
3. Black-market exchange rate
4. Restriction on movement of capital and people
 - i) Foreign ownership/investment restrictions
 - ii) Capital controls
 - iii) Freedom of foreigners to visit”

The averages of each sub-component rating are taken to construct an individual component rating to construct the index. In this manner, each individual component ratings are averaged for all five areas. Finally, each five areas rating are averaged together to derive a summary index of freedom to trade internationally for each country. For the higher rating of the area, there should be low tariff rates, fewer restrictions on the movement of both physical and human capital, easy convertible currency, strong law and order, efficient administration and lower corruption. The index is set between the scale of 0 to 10 that reflects higher the rating more will be the country open for trade, and the rating decline towards zero means the country is closed for trade. The details of methodology, index construction and explanatory notes presented in the “Economic Freedom of the World” 2019 Annual Report⁴³ are utilized here.

4.8 Data and Empirical methodology:

4.8.1 Data description

In this chapter, an annual dataset is employed for a sample of 90 countries (including 34 industrial countries, 56 emerging and developing economics) for 1988 to 2017. GDP per-capita growth is used to measure the economic performance, collected from World Bank Development Indicators at 2000 constant prices. Inflation measured as a proxy of monetary policy is calculated as the log first difference of CPI (consumer price index), and the data are obtained from World Bank Development Indicators. Two different proxies are used for both trade and financial integration. First, the ratio of

⁴³ Economic Freedom of the World: The details of methodology and explanatory notes are presented in page-219-221. <https://www.fraserinstitute.org/sites/default/files/economic-freedom-of-the-world-2020.pdf>

exports plus imports to GDP as proxy for trade openness and the ratio of gross capital flow to GDP (sum of capital inflows and outflows/GDP) as a proxy for financial integration. This is called as *de-facto* measure for trade and financial integration. The second measure is based on policy restrictions. The index of freedom to trade internationally is proxy for restricted trade openness. Chinn-Ito (2007) KAOPEN index looks into the extent and intensity of capital controls that focus on potential financial integration. This is called as *de-jure* measure for trade and financial integration. The data sources for financial integration (IFI) is the Lane and Maria Milesi-Ferretti (2015) dataset and Chinn-Ito (2007) KAOPEN index. For trade integration (IT) the dataset is collected from World Bank Development Indicators at 2000 constant prices. For restricted trade the data is obtained from ‘Economic Freedom of the World’ 2019 Annual Report. The list of countries used in this chapter are presented in the appendix 4.I.

4.8.2 Econometric methodology

To investigate the relationship between financial integration, trade integration and economic growth, this study adopts panel-vector autoregressive (PVAR) model with GMM framework, which was developed by Arellono and Bond (1991) and Arellono and Bover (1995). The advantage of this P-VAR is twofold , “i.e., it applies the same traditional VAR approach by treating all the variables in the system as endogenous. Secondly, the panel data method allows for the unobserved individual heterogeneity in the data by taking a fixed effect, which improves the consistency of the estimates (Love and Zicchino 2006)”.

The panel VAR with N countries for T time periods, and 4 variables can be written as:

$$y_{i,t} = \sum_{j=1}^k \alpha_{1,j} y_{i,t-j} + \sum_{j=1}^k \beta_{1,j} IFI_{i,t-j} + \sum_{j=1}^k \gamma_{1,j} TI_{i,t-j} + \sum_{j=1}^k \delta_{1,j} INF_{i,t-j} + \partial_{1,i} + \vartheta_{1,t} + \varepsilon_{1,i,t} \dots \dots \dots (4.1)$$

$$IFI_{i,t} = \sum_{j=1}^k \alpha_{2,j} y_{i,t-j} + \sum_{j=1}^k \beta_{2,j} IFI_{i,t-j} + \sum_{j=1}^k \gamma_{2,j} TI_{i,t-j} + \sum_{j=1}^k \delta_{2,j} INF_{i,t-j} + \partial_{2,i} + \vartheta_{2,t} + \varepsilon_{2,i,t} \dots \dots \dots (4.2)$$

$$TI_{i,t} = \sum_{j=1}^k \alpha_{3,j} y_{i,t-j} + \sum_{j=1}^k \beta_{3,j} IFI_{i,t-j} + \sum_{j=1}^k \gamma_{3,j} TI_{i,t-j} + \sum_{j=1}^k \delta_{3,j} INF_{i,t-j} + \partial_{3,i} + \vartheta_{3,t} + \varepsilon_{3,i,t} \dots \dots \dots (4.3)$$

$$INF_{i,t} = \sum_{j=1}^k \alpha_{4,j} y_{i,t-j} + \sum_{j=1}^k \beta_{4,j} IFI_{i,t-j} + \sum_{j=1}^k \gamma_{4,j} TI_{i,t-j} + \sum_{j=1}^k \delta_{4,j} INF_{i,t-j} + \partial_{4,i} + \vartheta_{4,t} + \varepsilon_{4,i,t} \dots \dots \dots (4.4)$$

The four variables are economic growth, international financial integration, trade integration and inflation. The above empirical model specifies $y_{i,t}$ that measures the economic growth (log of per-capita real GDP), $IFI_{i,t}$ is international financial integration, $TI_{i,t}$ measures the trade integration and $INF_{i,t}$ is control variable, which measures the inflation index, ∂_i includes the country-specific fixed effect, ϑ_t is the time fixed effect, $\varepsilon_{i,t}$ is the stochastic error term, k indicates the lag order. The subscripts i and t represent country and time period respectively. In the equations (4.1), (4.2), (4.3), and (4.4) the assumption is that the error term $\varepsilon_{i,t}$ is orthogonal to the fixed effect and time effects and lagged value of the endogenous variables. It is also assumed that the errors have positive variance and no serial correlation (Love and Zicchino 2006). The estimations in this chapter chooses the fixed effects model as an alternative to the random-effects model because “the ∂_i are likely to represent omitted country specific characteristics correlated with the other explanatory variables” , Rousseau and Wachtel (2000). Hsiao (1986) expressed that estimating individual effect taking lagged dependent variables might lead to biased estimates in the standard least squares dummy variable (LSDV) approach, especially when N is larger than the time dimension T . Taking into the consideration above problems, Arellano and Bond (1991) developed the first-difference generalized-moments-of-method (GMM)⁴⁴ estimator, which helps to eliminate the country-specific effect ∂_i by taking the first difference of the above VAR Eq. (4.1). Following this one can get:

$$(Y_{i,t} - Y_{i,t-1}) = \sum_{j=1}^k \alpha_{1,j} (Y_{i,t-j} - Y_{i,t-j-1}) + \sum_{j=1}^k \beta_{1,j} (IFI_{i,t-j} - IFI_{i,t-j-1}) + \sum_{j=1}^k \gamma_{3,j} (TI_{i,t-j} - TI_{i,t-j-1}) + \sum_{j=1}^k \delta_{1,j} (INF_{i,t-j} - INF_{i,t-j-1}) + (\vartheta_{1,t} - \vartheta_{1,t-1}) + (\varepsilon_{1,i,t} - \varepsilon_{1,i,t-1}) \dots (4.5)$$

⁴⁴ “Generalized-moments-of-method (GMM) technique is used to estimate the dynamic panel models with the introduction of the first difference GMM estimator proposed by Arellano and Bond (1991) and then system-GMM estimator developed by Arellano and Bover (1995) and also Blundell and Bond (1998).

Let start with the simple growth equation:

$$\Delta y_{i,t} = \alpha + (\delta - 1)y_{i,t-1} + \beta X_{i,t} + \eta_i + \varepsilon_{i,t} \dots \dots \dots (1)$$

Here, y is logarithm of real per capita GDP, X indicates the set of explanatory variable, η is the time invariant individual specific effect, ε is the error term, and the subscripts i and t represents country and time period, respectively.

Now, Eq. (1) can be rewrite as:

$$Y_{i,t} = \alpha + \delta Y_{i,t-1} + \beta X_{i,t} + \eta_i + \varepsilon_{i,t} \dots \dots \dots (2)$$

Estimating the above Eq. (2), noticed two important econometric issues. The first, with the introduction of both lagged dependent variable and unobserved country-specific effect. Hsiao (1986) conformed that omitting the individual country fixed effect in a dynamic panel

model will potentially lead to biased and inconsistent using simple ordinary least squares estimation. Example a positive correlation between lagged dependent variable, Eq. (2), $Y_{i,t-1}$ and the omitted fixed effect η_i , in this case the OLS estimation of $\hat{\beta}$ leads to biased upwards. On other hand Nickell (1981) referred within group estimator in the panel model, an alternative estimation technique that takes fixed effect in account and the estimating $\hat{\beta}$ in this manner tends to biased downwards in short panels. Hence, in panel context it is observed that the consistent and unbiased estimate of $\hat{\beta}$ results between the OLS level estimate and the within group estimates. The second issue in the panel model is potential endogeneity of the explanatory variable. The above the growth regressions in Eq. (2) where the right hand side variables are associated with some degree of endogeneity. Estimating the panel model neglecting this tends to raise a simultaneity problem and results in biased coefficients. So one must control the endogeneity problem in the explanatory variable to avoid the potential biased estimation”.

The other equations of the VAR model follow a similar differencing technique. Here, the difference Eq. (4.5) defines $(Y_{i,t-1} - Y_{i,t-2})$ and $(\varepsilon_{i,t} - \varepsilon_{i,t-1})$ is correlated. Estimating Eq. (4.5) applying the OLS technique will give biased and inconsistent estimates of the parameter. Hence, one must find a suitable instrument for $(Y_{i,t-1} - Y_{i,t-2})$ and this instrument will help to deal with (1) endogeneity of the explanatory variables and (2) the problem that arises by the construction of the new error term

$(\varepsilon_{i,t} - \varepsilon_{i,t-1})$ Correlated with lagged dependent variable $(Y_{i,t-1} - Y_{i,t-2})$. Under the assumption of,

(a) The idiosyncratic error term, ε should not be serially correlated,

$$E(\varepsilon_{i,t}\varepsilon_{i,s}) = 0 \quad \text{for, } i, \dots, N \text{ and } j \neq t$$

(b) The initial conditions $Y_{i,1}$ are predetermined.

$$E(Y_{i,1}\varepsilon_{i,t}) = 0 \quad \text{for, } i, \dots, N \text{ and } t \geq 2$$

, Or say the explanatory variables X are weakly exogenous.

The following moment conditions are proposed by Arellano and Bond (1991) for the first-differenced GMM estimator⁴⁵:

$$E[Y_{i,t-j}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } j \geq 2; \quad t = 3 \dots T. \dots \dots \dots (4.6)$$

$$E[IFI_{i,t-j}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } j \geq 2; \quad t = 3 \dots T \dots \dots \dots (4.7)$$

$$E[TI_{i,t-j}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } j \geq 2; \quad t = 3 \dots T, \dots \dots \dots (4.8)$$

$$E[INF_{i,t-j}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } j \geq 2; \quad t = 3 \dots T \dots \dots \dots (4.9)$$

Here, the value of $Y_{i,t}$ lagged twice or more are correlated with $(Y_{i,t-1} - Y_{i,t-2})$ but not with

$(\varepsilon_{i,t} - \varepsilon_{i,t-1})$, they are valid instruments for Eq. (4.5).

However, the situation is different with regard to the explanatory variables which may follow three possible conditions: Chen (2006) explained, (1) suppose, if the explanatory variables are strictly exogenous (the case where the explanatory variables assumed to be uncorrelated with all the past, present and future values of the error terms) then all of this three past, present and future values of explanatory are considered as a valid instruments for the above Eq. (4.5).

⁴⁵ Here, the conceptual and statistical weakness with the first difference estimator, in the present study the moment conditions implies that the two or more lagged values of the real GDP per capita, the financial development indicators and the set of conditional variables can be used as instrument variables to estimate the first-differenced GMM estimator.

(2) Suppose, if the explanatory variables are considered as predetermined (the case where explanatory variables are assumed to be correlated with past values of the error term but not correlated with present or future error term) then the values of explanatory variable lagged one period or further are considered as a valid instruments for the Eq. (4.5) in above.

(3) Suppose, if the explanatory variables are considered as endogenous (assume that if the explanatory variables are correlated with the past and current values of the error term, but not with the future) then the values of explanatory variable lagged two period or further are considered as a valid instrument for the Eq. (4.5).

However, Blundell and Bond (1998), “argue that when the lagged dependent and the explanatory variables are persistent over time, lagged values of these variables are considered weak instruments for the regression equation in first-differences”. Weak instruments influence the asymptotically and small sample performance of the first-difference estimator. The variance of the coefficients rises asymptotically. Blundell and Bond (2000) confirm this by presenting the case of weak instruments, the regression equation in first-differences GMM estimator will turn biased towards the within-group estimator. To deal with the potential bias and imprecision association with the first-difference GMM estimator, Arellano and Bover (1995) and Blundell and Bond (1998) introduce some additional moment condition for an equation presented at the level. When an equation in the first-differences (E.q (4.5)) and an additional set of the equation in the level (E.q (4.1)) are combined as a system, this equation estimates based on the additional moment condition associated with this combined system is defined as “system GMM estimator”. The instruments for the regression equation in differences are the same as above. The instruments for the regression in the level are suitably lagged differences of the corresponding explanatory variables. One additional assumption required to ensure the validity of the additional instruments used, (a) assuming the first-differences of the independent variables in the E.q (4.1) are uncorrelated with the individual country specific effect ϑ_i . Then the following moment condition for the regression equation in level⁴⁶ is;

$$E[(Y_{i,t-j} - Y_{i,t-j-1})(\vartheta_i - \varepsilon_{i,t})] = 0 \quad \text{for } j= 1; \quad t = 3 \dots T \dots \dots \dots (4.10)$$

$$E[(IFI_{i,t-j} - IFI_{i,t-j-1})(\vartheta_i - \varepsilon_{i,t})] = 0 \quad \text{for } j= 1; \quad t = 3 \dots T \dots \dots \dots (4.11)$$

$$E[(TI_{i,t-j} - TI_{i,t-j-1})(\vartheta_i - \varepsilon_{i,t})] = 0 \quad \text{for } j= 1; \quad t = 3 \dots T \dots \dots \dots (4.12)$$

$$E[(INF_{i,t-j} - INF_{i,t-j-1})(\vartheta_i - \varepsilon_{i,t})] = 0 \quad \text{for } j= 1; \quad t = 3 \dots T \dots \dots \dots (4.13)$$

⁴⁶ Arellano and Bover (1995), “mentioned that only the most recent difference is used as instrument variable in the level specification. Using the other lagged difference can redundant moment conditions, since the lagged variable are already used as instruments for the equation at first differences”.

If, the explanatory variables are strictly exogenous (or predetermined) then $\Delta Y_{i,t-1}, \Delta IFI_{i,t}, \Delta TI_{i,t}$ and $\Delta INF_{i,t}$ are valid instruments for the regression equation in level. On the other hand, if the explanatory variables are endogenous then $\Delta Y_{i,t-1}, \Delta IFI_{i,t-1}, \Delta TI_{i,t-1}$, and $\Delta INF_{i,t-1}$ is considered as valid instruments for the equation in level. Thus, using the moment condition presented above in the Eq. (4.6), (4.7), (4.8), (4.9) (4.10), (4.11), (4.12), (4.13), and applying the system GMM technique to the growth regression to generate consistent and efficient parameter estimates. Hence, P-VAR is estimated with the help of system GMM technique, and one can test the Granger causality between international financial integration, trade integration and economic growth.

➤ **Model selection**

Before going into the empirical analysis, the first step is to determine the optimal lag order of P-VAR and the moment condition. A work done by Andrews and Lu (2001) suggested a consistent moment and model selection criteria (MMSC) for generalised method of moment (GMM) based on Hansen's (1982) test statistic. Two more standard procedures are such as Akaike information criteria (AIC) proposed by Akaike in 1961 and Bayesian information criteria (BIC) jointly proposed by (Schwarz, 1978 and Rissanea, 1978) to determine the optimal lag order. Hannan-Quinn information criteria (HQIC) is proposed by Hannan and Quinn 1979.

➤ **Impulse response function (IRF)**

The VAR model has two unique features; first impulse responses function (IRF) and second variance decomposition of the error (FEVD). Impulse response function (IRF) describes one variable's reaction to the change (innovation or impulse) in another variable in the system keeping other shocks equal to zero. Here, we know that an actual error variance-covariance matrix is unlikely to be diagonal. To isolate shocks to one of the variables in the system, it is essential to go for decomposition of the residuals using some method so that it will turn orthogonal. The usual convention is to adopt a particular ordering and allocate any correlation among the residuals of any two elements to the variables that come first in the ordering place. The identifying assumption is that the variable that comes earlier in the ordering affects the following variables contemporaneously and with a lag. It is inferred that variable comes later will have effect on previous variable and that to only with a lag. This means that the variable that comes earlier is recognised as more exogenous and the variable that appears later is considered more endogenous (Andrews and Lu's, 2001). To analyse the impulse response function (IRF) one must estimate their confidence interval based on the estimated VAR coefficients. To study the response of the variable one needs to construct a matrix of impulse response function in which the standard errors are taken into the consideration. It means we have to estimate the standard error of the IRF and construct the confidence interval using Monte Carlo simulation.

➤ Forecast-error variance decomposition

It derives the per cent change in variation of one variable, due to shock in another variable over the period in a panel VAR system. The forecast error variance decomposition measures the attributes of every shock to the forecast error of each endogenous variable in the system for the particular forecast range. In the present study, a 10 year forecast horizon is used to capture variation in the variable, in which short-run period is considered as 2 years and the long-run is of 10 years range. (Boubtane, Coulibaly and Rault, 2003).

4.9 Empirical results and discussion

Before estimating P-VAR model, it is important to check the data stationarity of the variables, which is presented in subsection 4.9.1. Then the P-VAR results are discussed in subsection 4.9.2 The Forecast error variance decomposition results are explained in subsection 4.9.3 Then, impulse responses are presented in subsection 4.9.4 for all the four proxy of trade and financial integration measures.

4.9.1 Panel unite root test

To examine stationary properties three different unit root tests such as IPS, ADF and PP are employed for all the seven variables (transformed into log from) in the system. The results are reported in Table 4.1, which shows at a level out of seven only two variables i.e. GDP per-capita growth and inflation are stationary at 5 per cent level of significance. The rest of the five variables such as value based (IFI), equity based (IFI), capital account openness index, trade openness and freedom to trade internationally contain unit root in the series at the level. The null hypothesis of unit root is not rejected at 5 percent level of significance for all these variables. However, they are rejected at the first difference, and all the five variables now become stationary at 5 per cent level of significance. In the next step before estimation of P-VAR the optimal lag order needs to be determined. Some standard approaches such as AIC, BIC and HQIC (which was explained detailed above) determine the optimal lag order for P-VAR model. In this section all the three criteria confirm one optimal leg length for the P-VAR (1) model.

Table: 4.1
Panel Unite Root Test

Panel: A						
At level						
Variables	Pesaran and Shin (im)		Fisher (ADF)		Fisher (PP)	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	Intercept	Intercept and Trend
Lngdppc	-12.85 (0.000)***	-8.99 (0.000)***	-13.72 (0.000)***	12.64 (0.000)***	-28.36 (0.000)***	-24.30 (0.000)***
Inflation	-7.92 (0.000)***	-6.00 (0.000)***	-12.44 (0.000)***	-6.91 (0.000)***	-16.73 (0.000)***	-19.84 (0.000)***
Financial integration (variables)						
Value Based (IFI)	1.77	3.26	2.40	3.58	2.31	2.46

	(0.961)	(0.999)	(0.991)	(0.999)	(0.989)	(0.993)
Equity Based (IFI)	6.96 (1.000)	5.30 (1.000)	8.10 (1.000)	4.21 (1.000)	-3.33 (0.999)	1.98 (0.02)
Capital Account Openness index	-6.01 (0.000)***	1.22 (0.890)	-5.88 (0.000)***	2.40 (0.991)	-3.20 (0.000)***	-3.02 (0.998)
Trade integration (variables)						
Trade openness	0.12 (0.557)	-2.15 (0.015)	0.82 (0.79)	-3.07 (0.001)***	-0.36 (0.35)	-2.29 (0.011)
Freedom to trade internationally	-6.85 (0.001)***	3.41 (0.989)	-6.47 (0.000)***	4.20 (0.885)	-7.55 (0.000)***	1.20 (0.885)
Panel: B At first difference						
Financial integration (variables)						
Value Based (IFI)	-9.84 (0.000)***	-4.98 (0.000)***	-10.98 (0.000)***	-3.66 (0.000)***	-36.38 (0.000)***	-32.39 (0.000)***
Equity Based (IFI)	-10.20 (0.000)***	-5.07 (0.000)***	-11.40 (0.000)***	-5.47 (0.000)***	-42.78 (0.000)***	38.80 (0.000)***
Capital Account Openness index	-13.1 (0.000)***	-12.16 (0.000)***	-14.10 (0.000)***	-13.90 (0.000)***	-38.82 (0.000)***	-36.27 (0.000)***
Trade integration (variables)						
Trade openness	-17.5 (0.000)***	-13.33 (0.000)***	-18.46 (0.000)***	-13.37 (0.000)***	-40.52 (0.000)***	-36.26 (0.000)***
Freedom to trade internationally	-18.06 (0.000)***	-16.64 (0.000)***	-19.76 (0.000)***	-40.31 (0.000)***	-42.39 (0.000)***	-39.40 (0.000)***

Maximum lag are set as 2 to allow for serial correlation in the error.

P-values are reported below the test statistic *** P < 0.001 percent significance level.

4.9.2 Panel VAR causality results

The objective of the study is to analyse the impact of trade and financial integration on economic growth. The four VAR models as mentioned above Equation; (4.1) to (4.4) with three different measures for international financial integration (IFI) and two measures for trade integration (IT) are estimated.

The full sample of 90 countries is split into two groups, industrial economies (34countries) and emerging economies (44 countries to investigate this relationship)⁴⁷. For the sake of comparability, all the three groups are arranged in one table corresponding to each group. The estimated results for these four models are presented in table 4.2 to table 4.7, respectively. The unitroot⁴⁸ circle for model stability are also presented in the Appendix IV.

Table 4.2 reports the causal relationship between GDP per-capita, value based financial (VBIFI) integration and trade openness index. The cumulative coefficients of value based financial integration (VBIFI) equation are positive and statistically significant for all the groups, full sample, industrial economies and emerging countries. It indicates that the financial globalization is beneficial to all three

⁴⁷ The selection of the countries are based on income groups (as per World Bank classification, 2019), in which higher income group countries are considered here as industrial economies and upper middle and lower middle income countries are considered as emerging economies. I dropped 12 low income group countries because of small numbers in group.

⁴⁸ To satisfy the PVAR model stability, all the eigenvalues should lies with the unit root circle.

groups. The implication is that the total capital flows have a significant effect on industrial and emerging markets. The magnitude of the coefficient estimated for the VBIFI is large in case of industrial economies than emerging countries

Table: 4.2
Estimated panel VAR causality results
With GDP per-capita, VB (IFI) and Trade Openness, 1988-2017

Panel: A				
Full Sample of 90 Countries				
Dependent variables	Independent variables			
	LnGDPPC _{t-1}	LnVBIFI _{t-1}	LnTOPEN _{t-1}	LnINF _{t-1}
LnGDPPC	0.33 (0.000)***	3.59 (0.000)***	0.94 (-0.49)	0.006 (-0.72)
LnVBIFI	-0.003 (0.01)**	0.04 (0.04)**	0.09 (0.09)*	-0.001 (0.02)**
LnTOPEN	0.002 (0.01)**	0.03 (0.04)**	0.18 (0.000)***	0.001 (0.07)*
LnINF	0.008 (-0.94)	-7.55 (-0.36)	-8.24 (-0.14)	0.56 (0.000)***
Observations	2430	2430	2430	2430
No. countries	90	90	90	90
Panel: B				
44 Emerging Countries Sample				
LnGDPPC	0.36 (0.00)***	3.85 (0.00)***	1.32 (0.43)	0.02 (0.40)
LnVBIFI	-0.0008 (0.63)	-0.02* (0.08)	0.10 (0.07)*	-0.001 (0.11)
LnTOPEN	0.004 (0.01)**	0.04 (0.64)	0.21 (0.00)***	0.002 (0.07)*
LnINF	-0.21 (0.36)	-8.31 (0.59)	0.85 (0.91)	0.56 (0.00)***
Observations	1188	1188	1188	1188
No. countries	44	44	44	44
Panel: C				
34 Industrial Countries Sample				
LnGDPPC	0.38 (0.00)***	5.74 (0.000)***	-3.87 (0.08)*	0.09 (0.000)
LnVBIFI	0.004 (0.10)*	0.11 (0.07)*	-0.079 (0.32)	-0.0001 (0.94)
LnTOPEN	0.002 (0.19)	0.075 (0.000)***	-0.049 (0.29)	0.001 (0.34)
LnINF	0.10 (0.01)**	-0.11 (0.88)	-3.54 (0.00)***	0.71 (0.00)***
Observations	816	816	816	816
No. countries	34	34	34	34

VB (IFI): value based international financial integration, proxy to measure for financial integration Heteroskedasticity robust standard error in parenthesis *P < 0.1, **P < 0.05 and ***P < 0.001

. This suggests that the growth in industrial economies will increase by 5.74 per cent with one per cent increase in financial integration (VBIFI). A one per cent increase in financial integration will lead to 3.38

per cent increase in economic growth for emerging countries. The coefficient of trade openness (ratio of exports plus imports to GDP) shows a positive but insignificant effect on economic growth in the full sample and emerging countries. While for industrial economies, this coefficient is negative and statistically significant. Thus international trade integration does not fairly explain growth in the presence of financial integration in the model. The trade-off between economic growth and trade openness might be the reason of high financial integration in industrial economies. The growth of asset trade outstripped the expansion of goods trade for the industrial economies. Inflation as a control variable shows the expected sign for growth but not statistically significant for any group. Taking value based financial integration (VBIFI) and trade integration as dependent variables in equation 4.2 and 4.3; real GDP per-capita has a negative and significant effect on financial integration for the full sample. There is no evidence of feedback from GDP to financial integration for emerging countries. While a positive and significant feedback is observed from GDP to financial integration for industrial economies. Next, trade openness (TOPEN) shows a positive and significant effect on financial integration for both full sample and emerging countries, respectively. This suggests that a one per cent increase in trade share of emerging countries is associated with a 0.10 percentage point rise in their financial integration. Estimating equation 4.3, with trade openness as dependent variable, the results indicates GDP per-capita has positive and significant effect on trade openness for full sample and emerging countries. This implies one per cent increase in growth would increase 0.002 and 0.004 per cent increase trade integration in full sample and emerging countries. However, the feedback effect from financial integration (VBIFI) to trade openness is observed for both full sample and industrial economies. No causal effect seems to be running from financial integration to trade openness for emerging countries. In equation 4.4, inflation as dependent variables shows mixed results for all the three groups. However, the relationship is somewhat better for industrial countries.

In Table 4.3, the analysis is repeated for the equity based international financial integration (EQBIFI), which is stock of portfolio equity assets and liabilities and stock of FDI assets and liabilities. International financial integration plays a leading role in promoting economic growth for all the three groups, full sample, industrial economies and emerging countries. The growth effect of equity-based financial integration indicates that a one percent increase in EQBIFI will rise to rise 6.58, 11.3 and 2.52 percent GDP growth in full sample, emerging countries, and industrial economies, respectively. This clearly indicates the emerging countries are the group that makes large benefit of financial integration. Other studies in literature support this evidence. The effect of financial globalization is based on type of capital flows such as FDI and portfolio equity flows which are more stable and less prone to reversal compare to debt flows (Wei, 2005). Portfolio equity flows are much pronounced to emerging countries and it has significant positive effect on output growth. Bekaert, Harvey and Lundblad (2005) argue that equity

market liberalization has a positive effect on economic growth. Reisen and Soto (2001) identify that FDI and portfolio equity flows increase output growth.

Table: 4.3
Estimated panel VAR causality results
With GDP per-capita, EQB (IFI) and Trade Openness, 1988-2017

Panel: A Full Sample of 90 Countries				
Independent variables	Dependent variables			
	LnGDPPC _{t-1}	LnEQBIFI _{t-1}	LnTOPEN _{t-1}	LnINF _{t-1}
LnGDPPC	0.32 (0.000)***	6.58 (0.02)**	1.61 (0.27)	0.005 (0.08)*
LnEQBIFI	0.002 (0.02)**	0.06 (0.03)**	0.08 (0.08)*	-0.001 (0.01)**
LnTOPEN	0.003 (0.008)***	-0.0005 (0.91)	-0.17 (0.000)***	0.001 (0.08)*
LnINF	0.07 (0.57)	-16.20 (0.32)	-9.10 (0.10)*	0.57 (0.000)***
Observations	2430	2430	2430	2430
No. countries	90	90	90	90
Panel: B 44 Emerging Countries Sample				
LnGDPPC	0.35 (0.00)***	11.13 (0.00)***	1.91 (0.29)	0.02 (0.28)
LnEQBIFI	0.005 (0.70)	-0.27 (0.02)**	0.06 (0.03)**	0.0001 (0.15)
LnTOPEN	0.00 (0.03)**	-0.04 (0.81)	0.16 (0.00)***	0.00 (0.08)*
LnINF	-0.23 (0.21)	-33.28 (0.24)	6.63 (0.20)	0.53 (0.00)***
Observations	1188	1188	1188	1188
No. countries	44	44	44	44
Panel: C 34 Industrial Countries Sample				
LnGDPPC	0.55 (0.000)***	2.52 (0.000)***	-8.53 (0.000)***	0.01 (0.55)
LnEQBIFI	0.0007 (0.96)	0.10 (0.05)**	0.01 (0.08)*	-0.003 (0.000)***
LnTOPEN	-0.001 (0.21)	0.076 (0.000)***	0.095 (0.01)**	-0.001 (0.41)
LnINF	0.06 (0.26)	-2.76 (0.38)	-5.00 (0.01)**	0.75 (0.000)***
No. countries	816	816	816	816
Observations	34	34	34	34

EQB (IFI): equity based international financial integration, proxy to measure for financial integration Heteroskedasticity robust standard error in parenthesis *P < 0.1, **P < 0.05 and ***P < 0.001

Like portfolio equity flows, FDI flows also have a positive impact on growth. Blonigen and Wang (2005) find that the crowd in domestic investment is more for developing countries than developed ones through FDI. FDI flows are less volatile than other types of capital flows, even the sudden stop of capital. Hence,

from the above discussion it is clear that equity-based financial integration benefits both the group of countries, but the magnitude of effect is greater for emerging countries. These results are similar to the Reisen and Soto (2001), Bekaert, Harvey and Lundblad (2005), Kose et al. (2006), Lane and Milesi-Ferretti (2017). As the results obtain in table 4.2, trade openness has expected sign for full sample and emerging countries, but it's not significant.

From the equations 4.2 and 4.3, EQBIFI and trade openness as dependent variables in table 4.3, indicate that GDP per-capita growth has positive and significant effect on value based financial integration. There is no evidence of feedback effect from growth to EQBIFI in emerging and industrial countries in the full sample. Trade openness plays a vital role in explaining financial integration for all three groups, indicating that one per cent increase in trade integration will improve 0.6 and 0.1 percentage point of financial integration for emerging and industrial countries. Trade integration appears to have better cost-benefit trade-off than the financial integration Kose et al. (2006). In equation(4.3), with trade openness as the dependent variable, it is seen that GDP per-capita enters with a positive sum of coefficient for the full sample and emerging countries. This result suggests that the level of international trade integration concerning import concentration is associated with the level of growth. This supports growth-led trade instead of trade-led growth, similar to Soukhakian (2007) and Chimobi (2010). However, trade openness has no feedback from value-based financial integration for emerging countries, but it is positive and highly significant for industrial economies. In equation 4.4, inflation as dependent variables shows a positive but insignificant effect on growth and trade openness, but the effect is negative and significant for financial integration in all the three groups. However, the relationship is stronger in industrial countries.

Table 4.4 reports the results of international financial integration proxy by capital account openness (KAOPEN). The growth effect of KAOEPN report a significant and positive relationship between capital account liberalization and economic growth for the full sample and industrial economies, but they are not significant for the emerging countries. The coefficient of KAOPEN, 7.8, implies that a 10 percentage increase in KAOPEN would increase the growth rate of per-capita GDP by 7.8 per cent for industrial economies. The theoretical literature discussed the possibility of capital account openness are likely to be beneficial to economic growth. Klein (2005) finds a significant growth effect of capital account openness among counties with more financial development and better institution quality. Ishii et al. (2002) conclude that the responsiveness of growth effect of capital account openness in the countries with better macroeconomic policies. Eichengreen (2000) conform that capital account liberalization is more likely to be successful among the countries that follow strong fiscal, monetary and exchange policies. All this above qualities are common feature of industrial economies. However, there is a feedback effect from

GDP growth to KAOPEN in full sample and industrial economies, but the impact is negative and minimal towards capital account openness.

Table: 4.4
Estimated panel VAR causality results
With GDP per-capita, KAOPEN (IFI) and Trade Openness, 1988-2017

Panel: A Full Sample of 90 Countries				
Independent variables	Dependent variables			
	LnGDPPC _{t-1}	KAOPEN _{t-1}	LnTOPEN _{t-1}	LnINF _{t-1}
LnGDPPC	0.28 (0.000)***	2.52 (0.03)**	1.92 (0.10)*	-0.01 -0.51
KAOPEN	-0.003 (0.007)***	0.13 (0.10)*	0.11 (0.008)***	0.0004 -0.47
LnTOPEN	0.007 (-0.51)	0.09 (-0.23)	-0.09 (0.007)***	0.0004 (-0.46)
LnINF	-0.18 (0.03)**	14.8 (0.10)*	3.63 -0.23	0.5 (0.000)***
Observations	2430	2430	2430	2430
No. countries	90	90	90	90
Panel: B 44 Emerging Countries Sample				
LnGDPPC	0.33 (0.00)***	0.80 (0.45)	1.53 (0.38)	0.01 (0.64)
KAOPEN	-0.001 (0.45)	0.14 (0.14)	0.05 (0.09)*	0.001 (0.12)
LnTOPEN	0.003 (0.03)**	0.068 (0.47)	0.161 (0.00)***	0.001 (0.24)
LnINF	-0.26 (0.05)	15.05 (0.22)	5.02 (0.17)	0.52 (0.00)***
Observations	1188	1188	1188	1188
No. countries	44	44	44	44
Panel: C 34 Industrial Countries Sample				
LnGDPPC	0.51 (0.000)***	7.82 (0.002)***	-5.90 (0.003)***	-0.005 (0.83)
KAOPEN	-0.0011 (0.08)*	0.19 (0.08)*	0.008 (0.85)	0.0003 (0.68)
LnTOPEN	0.0001 (0.96)	0.42 (0.11)	0.09 (0.16)	-0.002 (0.15)
LnINF	0.15 (0.000)***	5.84 (0.05)**	-2.91 (0.01)**	0.71 (0.000)***
No. countries	816	816	816	816
Observations	34	34	34	34

KAOPEN (IFI): restrictions based financial integration, proxy to measure financial integration based on government restriction of capital inflow and outflow. Heteroskedasticity robust standard error in parenthesis *P < 0.1, **P < 0.05 and ***P < 0.001

This negative effect might be the reason for a sudden increase in capital flows. A mixed result is observed between trade openness and growth, where it shows positive growth effect of trade for the full sample and emerging countries with very low significance. It implies that these countries are likely to benefit less

from international trade due to lack of access of new goods and technologies, which is not crucial for growth compared to access markets⁴⁹ (Yanikkaya, 2003 and Kali, Mendez and Reyes, 2007). Abramovitz (1986) and Hawitt (2000) document that lack of investment in human and development (R& D) may lead to miss allocation of resources and failure to exploit the technology transfers, which results in low productivity growth. Hence, technological spillovers, knowledge transmission, better allocative efficiency, and high absorptive capacity are the common detriments of an open trade regime that adversely affects growth. A unidirectional causality runs from trade openness to growth for industrial economies, and the relationship is negative and significant. It suggests that a liberalized trade regime might have a counter effect on growth.

For equation 4.3, KAOPEN as dependent variable, the results show a unidirectional causality running from trade integration to financial integration (KAOPEN). Trade and financial integration together better explain the macroeconomic outcome. While trade integration reduces the probability of the occurrence of financial crisis due to sudden stop and current account reversals. It implies that more open economies are less volatile to a sudden stop of capital flows due to less chance of defaults (Kose et al. (2006), Desai and Mitra (2004), Edwards (2005). In emerging countries, the feedback hypothesis is confirmed where the bidirectional causality runs between trade openness and KAOPEN (financial integration). No strong evidence for inflation with respect to trade and financial integration determinants is found.

In this section, the same analysis is done with de-jure measure of trade integration, which is an index of nine variables describing the country's trade restriction. Tables 4.5, 4.6 and 4.7 report the results of trade integration (index of trade restriction), financial integration, and GDP growth. All three tables report a significant and uncommonly positive association between trade restrictions and economic growth for industrial economies. The theoretical growth literature witnessed no straightforward or unambiguous association between trade barriers and economic growth. The likelihood of positive effect of trade barriers on growth are reported for certain group of countries, especially in developed countries. These countries benefit from trade control under certain conditions, strategic trade policy, argument of infant industry trade protectionism and development economies hypothesis that higher trade control will promote growth in certain countries (Yanikkaya, 2003), (Pigka-Balanika 2013). The estimated results imply that industrial economies with higher trade barriers will grow faster than the emerging countries with low trade control. The causal effect from GDP to trade barriers is supported when we used equity-based measure of financial integration. This result suggests that the likelihood of reverse causation between trade barriers and growth might be the reason for flexibility in trade regulations and policy changes of the host country (Edison, Levine, Ricci, Sløk, 2002), (Yanikkaya, 2003). The periods of high GDP growth are more likely

⁴⁹ New trade theory

to provide an impetus for more open markets (Harrison, 1996). For emerging countries, it is observed that trade has a positive but insignificant effect on growth. However, the reverse causality is observed from growth to trade barriers for emerging countries in all three cases (in all three tables 4.5, 4.6, and 4.7). This result contradicts the previous studies, which emphasized that as growth increases, trade restrictions also increase, which is unfavourable for emerging countries.

Table: 4.5
Estimated panel VAR causality results
With GDP per-capita, VB (IFI) and Restricted Trade Openness, 1988-2017

Panel: A Full Sample of 90 Countries				
Independent variables	Dependent variables			
	LnGDPPC _{t-1}	LnVBIFI _{t-1}	LnRSTOPEN _{t-1}	LnINF _{t-1}
LnGDPPC	0.32 (0.000)***	5.25 (0.000)***	1.57 (-0.23)	-0.009 (-0.64)
LnVBIFI	-0.005 (0.10)*	0.004 (-91)	0.04 (0.03)**	-0.001 (0.007)***
LnRSTOPEN	0.003 (0.04)**	-0.003 (-0.96)	0.003 (0.09)*	0.002 (0.02)**
LnINF	-0.11 -0.22	-7.52 (-0.13)	3.08 (0.04)**	0.53 (0.000)***
Observations	2430	2430	2430	2430
No. countries	90	90	90	90
Panel: B 44 Emerging Countries Sample				
LnGDPPC	0.38 (0.00)***	4.63 (0.00)***	0.99 (0.31)	0.00 0.995
LnVBIFI	-0.002 (0.20)	-0.05 (0.44)	0.02 (0.54)	0.00 (0.06)*
LnRSTOPEN	0.005 (0.07)*	-0.14 (0.18)	-0.03 (0.00)***	0.005 (0.02)**
LnINF	-0.12 (0.48)	-13.62 (0.19)	2.36 (0.45)	0.52 (0.00)***
Observations	1188	1188	1188	1188
No. countries	44	44	44	44
Panel: C 34 Industrial Countries Sample				
LnGDPPC	0.44 (0.000)***	4.41 (0.000)***	8.73 (0.000)***	0.05 (0.02)**
LnVBIFI	0.001 (0.50)	0.07 (0.39)	1.33 (0.000)***	-0.0003 (0.86)
LnRSTOPEN	0.0008 (0.45)	-0.04 (0.12)	-0.52 (0.000)***	0.001 (0.35)
LnINF	0.03 (0.50)	-1.86 (0.44)	-10.7 (0.000)***	0.75 (0.000)***
No. countries	816	816	816	816
Observations	34	34	34	34

VB (IFI): value based international financial integration, proxy to measure for financial integration RSTOPEN: Restricted trade openness index as a proxy to measure trade integration. Heteroskedasticity robust standard error in parenthesis

*P < 0.1, **P < 0.05 and ***P < 0.001

Next, trade integration and its effect on all three measure of financial integration such VBIFI, EQBIFI and KAOPEN are examined. The regression results for equation 2 where financial integration is taken as a dependent variable presented in tables 4.5, 4.6 and 4.7 report a positive and significant relationship between trade integration and financial integration in case of industrial economies only. The results are not clear for emerging countries. The estimated coefficients are positive but not significant (table 4.5, 4.6 and 4.7). Again the findings do not support the effect of trade control on financial integration for emerging countries. Finally, taking inflation as control, the estimates have no strong evidence for growth and trade openness. But inflation shows a positive and significant effect on trade barriers for all three groups of countries.

Table: 4.6
Estimated panel VAR causality results
With GDP per-capita, EQB (IFI) and Restricted Trade Openness, 1988-2017

Panel: A Full Sample of 90 countries				
Independent variables	Dependent variables			
	LnGDPPC _{t-1}	LnEQBIFI _{t-1}	LnRSTOPEN _{t-1}	LnINF _{t-1}
LnGDPPC	0.32 (0.000)***	7.11 (0.009)***	-0.23 (0.08)*	-0.004 -0.84
LnEQBIFI	-0.005 (-0.28)	-0.09 (0.007)***	-0.007 (0.01)**	-0.0008 (0.000)***
LnRSTOPEN	0.005 (-0.11)	0.08 (0.07)*	-0.03 (0.06)*	0.009 (0.003)***
LnINF	-0.03 (0.65)	-11.1 (-0.22)	0.26 (-0.79)	0.5 (0.000)***
Observations	2430	2430	2430	2430
No. countries	90	90	90	90
Panel: B 44 Emerging Countries Sample				
LnGDPPC	0.36 (0.00)***	13.59 (0.00)***	1.40 (0.16)	0.01 (0.54)
LnEQBIFI	-0.0005 (0.56)	-0.22 (0.20)	0.03 (0.17)	-0.001 (0.04)**
LnRSTOPEN	0.005 (0.07)*	-0.14 (0.38)	0.00 (0.98)	0.003 (0.02)**
LnINF	0.01 (0.96)	-18.25 (0.21)	6.89 (0.20)	0.54 (0.00)***
Observations	1188	1188	1188	1188
No. countries	44	44	44	44
Panel: C 34 Industrial Countries Sample				
LnGDPPC	0.48 (0.000)***	7.74 (0.001)***	8.87 (0.000)***	0.04 (0.17)
LnEQBIFI	-0.00004 (0.97)	-0.13 (0.000)***	0.004 (0.89)	-0.003 (0.000)***
LnRSTOPEN	0.002 (0.02)**	0.056 (0.02)**	-0.34 (0.003)***	0.003 (0.01)**
LnINF	0.01	-4.31	-8.17	0.75

	(0.89)	(0.03)**	(0.002)***	(0.000)***
No. countries	816	816	816	816
Observations	34	34	34	34

EQB (IFI): equity based international financial integration, proxy to measure for financial integration RSTOPEN: Restricted trade openness index as a proxy to measure trade integration. Heteroskedasticity robust standard error in parenthesis

*P < 0.1, **P < 0.05 and ***P < 0.001

Table: 4.7
Estimated panel VAR causality results
With GDP per-capita, KAOPEN (IFI) and Restricted Trade Openness, 1988-2017

Panel: A Full Sample of 90 countries				
Independent variables	Dependent variables			
	LnGDPPC _{t-1}	KAOPEN _{t-1}	LnRSTOPEN _{t-1}	LnINF _{t-1}
LnGDPPC	0.29 (0.000)***	1.92 (0.02)**	0.24 (0.03)**	-0.01 (-0.55)
KAOPEN	-0.002 (0.006)***	0.08 (-0.15)	0.004 (-0.54)	0.0006 (-0.14)
LnRSTOPEN	0.02 (0.05)**	0.82 (-0.12)	-0.02 (-0.44)	0.004 (-0.24)
LnINF	-0.09 (0.02)**	11.9 (-0.21)	0.93 (-0.23)	0.466 (0.000)***
Observations	2430	2430	2430	2430
No. countries	90	90	90	90
Panel: B 44 Emerging Countries Sample				
LnGDPPC	0.33 (0.00)***	-0.18 0.87	0.71 0.47	0.00 0.98
KAOPEN	0.0001 (0.78)	0.17 (0.06)*	0.02 (0.43)	0.001 (0.03)**
LnRSTOPEN	0.003 (0.19)	0.25 (0.05)**	0.020 (0.03)**	0.001 (0.25)
LnINF	-0.14 (0.27)	18.80 (0.07)*	4.09 (0.21)	0.50 (0.00)***
Observations	1188	1188	1188	1188
No. countries	44	44	44	44
Panel: C 34 Industrial Countries Sample				
LnGDPPC	0.44 (0.000)***	6.65 (0.003)***	1.63 (0.08)*	-0.01 (0.56)
KAOPEN	-0.001 (0.30)	0.13 (0.12)	0.22 (0.000)***	0.0007 (0.39)
LnRSTOPEN	0.001 (0.59)	0.11 (0.45)	-0.69 (0.000)****	0.002 (0.21)
LnINF	0.07 (0.26)	4.38 (0.63)	-22.01 (0.000)***	0.76 (0.000)***
No. countries	816	816	816	816
Observations	34	34	34	34

KAOPEN (IFI): restrictions based financial integration, proxy to measure financial integration based on government restriction of capital inflow and outflow. RSTOPEN: Restricted trade openness index as a proxy to measure trade integration. Heteroskedasticity robust standard error in parenthesis *P < 0.1, **P < 0.05 and ***P < 0.001

4.9.3 Forecast error variance decomposition (FEVD)

In this section, forecast error variance decomposition test is conducted to assess the importance of change in one variable due to the shock given by another variable, using a 10-year forecast horizon. The first 2 years fluctuations is considered as short-run variance and last 10 years as long-run variance. Table 4.8, reports the variance decomposition for full sample, which shows a one unit shock to the financial integration (VBIFI) accounts for 1.42 per cent of variance in GDP growth and 2.32 per cent of variation in trade openness in short-run. It accounts for 1.54 per cent and 2.23 per cent variation in long-run for the respective variables. Likewise, a one unit shock in trade openness explains 0.07 per cent variance in growth and 0.48 per cent variance in financial integration in short run. In contrast, in long-run it increased to 0.8 for GDP growth and 0.5 for financial integration. It is observed that greater trade and financial integration enhance the GDP growth in long-run for full sample. These results are similar to the previous studies, including Obstfeld (2009) and Kose et al. (2011) that documented rapid increase in cross border flows are the results of high financial globalization, increasing the output growth.

In case of emerging countries Table 4.9, reports a one unit shock to the financial integration (VBIFI) explaining GDP growth by 1.39 per cent in short run and 1.53 per cent in long-run. Similarly, it affects 3.48 per cent in short-run and 3.46 in long-run to trade openness. This implies financial integration explains growth better than trade in long-run. Next, one unit shock in trade openness will lead to 0.23 per cent of variation in GDP growth in short-run and 0.29 per cent in long-run. While the response to financial integration with one unit shock in trade openness accounts for 0.89 per cent in short-run and 0.99 per cent variation in long-run. These results indicate that trade integration has negligible effect on economic growth in future and the interaction between trade and financial integration is weakly reacting to emerging countries in future.

In Table 4.10, financial integration (VBIFI) accounts for 3.69 per cent variance (in short-run) and 4.23 per cent variance (in long-run) in GDP growth rate for industrial economies. In the same way, it explains 5.68 to 5.72 per cent variation from short-run to long-run in trade openness. The impact of financial integration will be significant in the long-run than in short-run. In other words, in future financial integration will respond better to growth in industrial economies. However, financial integration becomes less beneficial from trade integration in the long-run. Similarly, a unit shock to trade openness will result in 1.11 per cent of forecast error variance in GDP growth in short-run and 1.25 per cent in long-run. Here also trade integration stands beneficial for these countries to expand and facilitate their financial market and enhance growth in future times. Overall, these results suggest that international trade and financial integration better explain the GDP per-capita growth in industrial economies than in emerging countries, where the magnitude of the coefficient is large for industrial economies. These results are evident and consistent with the causality test what I find in the PVAR estimations above. The combined

benefit of trade and financial integration are much stronger in industrial economies than emerging countries.

Taking two other measures of international financial integration (IFI) i.e. EQIFI and KAOPEN, it is seen that a one unit shock to the financial integration (EQBIFI) accounts for 4.20, 3.96 and 1.79 percent of fluctuation in GDP growth for full sample, emerging countries and industrial economies (Table 4.8, 4.9 and 4.10) in the long-run. And it explains 0.01, 0.21 and 2.98 per cent of the variation in trade openness. The results observe a strong growth effect of financial integration in emerging countries, two times more than the industrial economies. This suggests that portfolio equity flows and FDI flows presume to be more stable in emerging countries. One of the examples of growth effect of equity market liberalization is argued by Bekaert, Harvey and Lundblad (2005), Kose et al. (2011). An alternative measure for financial integration based on IMF's binary capital account restrictiveness shows that a one-unit shock to KAOPEN captures 0.45, 0.11 and 5.04 per cent of fluctuation in GDP growth and 0.78, 0.36 and 19.95 per cent variance in trade openness for the full sample, emerging countries and industrial economies (Table 4.8, 4.9 and 4.10) in the long-run. The forecasting error variance decomposition suggests that the EQBIFI (equity-based measure for financial integration composition of equity and FDI flows shows larger benefits to economic growth in emerging countries than in industrial economies. But this growth over the period decreased for both the countries groups.

Using trade restriction index as a proxy for trade integration, it is observed that a one unit shock to the trade integration (RSTOPEN)⁵⁰ accounts for 0.06, 0.47 and 11.46 per cent of variance in GDP growth and 0.47, 0.24 and 39.29 per cent variance in financial integration (VBIFI) for full sample, emerging countries and industrial economies (Table 4.8, 4.9 and 4.10) in the long-run. Similarly, a one-unit shock to the trade integration explains 0.11, 0.22 and 0.62 per cent fluctuations in growth and 0.10, 0.35 and 11.52 per cent variation in financial integration (KAOPEN) for all the three groups (Table 4.8, 4.9 and 4.10). In both cases, the forecast error variance decomposition predicates long-run growth and strong financial openness for industrial economies than emerging countries. These results confirm a strong trade restrictions drive future growth and financial integration. Nevertheless, trade integration measures based on trade control explain growth better than simple trade share for industrial economies. These findings are similar to Arrison (1996), Dwards (1992), Edwards (1998), Rodrik (2001) and Vithessonthi and Kumarasinghe (2016). Here the results suggest the domination of industrial economies to control the global trade and financial market. However, the growth effect of trade control is large in industrial economies. These findings are evident with the PVAR causality test what was observed in the previous section.

⁵⁰ RSTOPEN: here the measure for trade integration is based on trade restrictions (commonly used average tariff, non-tariff barriers, and black market premium) followed by the countries, this variable is in composite index.

4.9.4 Impulse response functions

This section presents the impulse response function (IRF), which was computed using Monte Carlo simulations with 200 repetitions. Notice that the IRF is set for 95 percent confidence interval band, where the solid line shows the impulse response. The shaded area indicates one standard error band around the estimate for the forecasting period of 10 years horizon. The impulse response function is drawn for the three financial integration measures and two trade integration variables, including one control variable for all three counties. The graphs of Impulse response functions are separately presented for trade integration and financial integration. First, three different measures of financial integration and their response to per-capita GDP growth and trade integration are explained. Then approaches to trade integration measures and its response to per-capita GDP growth and financial integration are discussed

❖ Impulse response function with financial integration to GDP growth and trade integration

Figure 4.1 (A and B) in appendix 4.V reports the results for the full sample. It shows a positive shock in value based financial integration (VBIFI), first increases the per-capita growth and later decreases up to 4th periods and finally stabilizes in the long-run. Meanwhile, positive shock in value-based financial integration initially decreases the benefit of trade integration (using both the proxy) but later after the 3rd period it stabilizes in long-run. For emerging countries in figure 4.2 (A and B), it is seen that a positive shock to VBIFI tends to increase GDP growth up to 4 points in short-run and later it decreases and stabilize in long-run. In the initial period the benefit of trade integration (using both the proxy) decreases to the shock in VBIFI and later it becomes constant towards the long-run. In Figure 4.3 (A and B) a positive shock in VBIFI increases GDP growth in the short-run and later, it decreases and continues for 4 years before stabilizing in long-run. While a unit shock to financial integration (VBIFI) initially increases the benefit of trade integration (in both the figure 4.3, A and B) but after 2nd year it starts to decrease and gets stabilized in 3th year. This suggests that both the measure of financial integration confirm a positive effect on output growth, but the impact is large and persistent only for industrial economies. Similarly, it is observed that financial integration shows a positive and significant effect on the industrial economies' trade integration measures.

Figures 4.1, 4.2 and 4.3 (C and D) in appendix 4.V display the impulse response function for equity-based financial integration to GDP growth and both the measures of trade integration. Notably, all the three figures imply that a positive shock in equity-based financial integration (EQBIFI) produces a positive effect on economic growth at the beginning of the period. It shows a sharp decline in the effect after 2 years and after that it stabilizes in long-run. On the other hand, a positive shock in equity-based financial integration has no significant effect on trade openness for full sample. While for emerging countries it initially decrease and later increase marginally and stabilize from 4th year. For industrial economies, a

sharp increase in trade openness in first two years and there after it decreases and becomes stable in the long-run. Although the magnitude of the effect and its level of significance varies across the country groups, it better explained industrial countries' growth than the emerging countries. These results are consistent with the PVAR estimations and justify that the model is well specified.

Turning to KAOPEN, another proxy of financial integration, reported in Figures 4.1, 4.2 and 4.3(E and F) in appendix 4.V, it indicates the response of GDP per-capita to one unit shock in capital account openness (KAOPEN) is substantial. Specifically, the cumulative effect increases quickly for 2 years and then it declines and continues for 5 years before levelling off in the long-run for the full sample (figure 4.1, E). In addition, the response of GDP per-capita to a positive shock in capital account openness in industrial economies seems large and sustained longer than the response for the emerging countries (figure 4.3 and 4.2, E). Likewise, a positive shock in capital account openness positively affects both the measures of trade openness positively for the full sample in the initial period and its decline gradually and levelling after 3 year (figure 4.1, E and F). However, a shock in capital account openness does not significantly affect both the trade openness measures for the emerging countries (figure 4.2, E and F). Similarly, a unit shock in capital account openness positively affects trade openness for industrial economies (figure 4.3, E and F). The findings suggest that the integration between international trade and financial integration affects industrial economies better than emerging countries.

❖ **Impulse response function with trade integration to GDP growth and financial integration**

The impulse response function reported in figures 4.1 and 4.2 (A) in appendix 4.V represents the effect of trade integration (measured as the volume of trade) on GDP growth. The per-capita GDP growth responds positive but less significant to one unit shock in trade integration. In first 2 years it rises and after that a decline is observed. Its minimum is seen by 4th year for the full sample and emerging countries. For industrial economies, a unit shock in trade openness (measured as the volume of trade) has an adverse effect on economic growth. The negative effect of trade integration on growth continues for 4 years and later it stabilizes figures 4.3(A).

The impulse response function in Figures 4.1 and 4.2 (A) in appendix 4.V shows that all three measures of financial integration VBIFI, EQBIFI and KAOPEN respond positively to one unit shock in trade integration (measured as volume of trade) for both full sample and emerging countries. The positive effect is significantly in the first 3 years and latter it's started falling and become gradually levelling off in long-run. However the magnitude is differs across different indicates. Especially the magnitude of the effect of trade integration is more on capital account openness (KAOPEN). Once again, its shows greater trade integration increases capital account openness and helps raise growth. While for industrial countries

a one unit shock in trade openness (measured as volume of trade) responds negative and significant effect on all the three financial integration measures

The response of GDP growth to the shock in trade integration (a measure based on trade restriction) are displayed in figures 4.1, 4.2 and 4.3 (B) in appendix 4.V. Basically GDP per-capita growth responses are positive to the shock in trade integration in which the effect is highly significant for industrial and less significant for emerging countries. On average, the effect ranges from 0.1 to 0.5 for both full sample and emerging countries. However, this effect is around 0.8 to 1.0 in the case of industrial countries. It indicates that high trade restriction stands beneficial for industrial economies to enhance GDP growth through barriers on trade in the form of high tariff and non-tariff barriers, high import and export duties (Yanikkaya, 2003).

Lastly, all three proxy of financial integration measures confirm the positive effect of one unit stock in trade integration. The increase in financial integration ranges from 0.001 to 0.005 for the full sample and emerging countries, whereas its ranges from 0.03 to 0.1 for industrial economies. This result is consistent with the previous finding in this study. Inflation as a control variable shows a mixed effect in all the three models explained above. A unit shock in inflation produces a positive but insignificant effect on economic growth and negative and insignificant financial integration for full sample and emerging countries. At the same time, the shock in inflation responds positively to the growth and financial integration.

To summarize the analysis of the results so far, individual financial integration indicators provide strong evidence on future growth through facilitating international capital flows across the countries. Similarly, it's also promoted trade integration among the countries by providing easy transitions and secure payments.

Table 4.8: Forecast error variance decomposition in GDP, financial integration, trade integration and inflation (full sample, 90)

Value based financial integration (GDP, VBIFI, TRADE, INF)						Equity based financial integration (GDP, EQBIFI, TRADE, INF)					
Response variables	Forecast horizon	Impulse variables				Response variables	Forecast horizon	Impulse variables			
		LnGDPPC	LnVBIFI	LnTOPEN	LnINF			LnGDPPC	LnEQBIFI	LnTOPEN	LnINF
LnGDPPC	2	98.4	1.42	0.07	0.008	LnGDPPC	2	95.7	4.0	0.02	0.05
	10	98.3	1.54	0.08	0.008		10	95.4	4.2	0.02	0.06
LnVBIFI	2	4.06	95.9	0.48	0.49	LnEQBIFI	2	0.20	99.7	0.42	0.31
	10	4.80	94.0	0.50	0.65		10	0.69	98.4	0.44	0.41
LnTOPEN	2	0.01	2.32	97.6	0.37	LnTOPEN	2	0.004	0.01	99.9	0.33
	10	0.07	2.23	96.5	0.45		10	1.0	0.01	98.5	0.42
LnINF	2	0.19	0.008	2.24	97.5	LnINF	2	0.52	0.26	2.7	96.5
	10	0.17	3.32	1.88	94.7		10	0.48	10.7	2.0	86.7
KAOPEN based financial integration (GDP, KAOPEN, TRADE, INF)						Restricted based Trade integration index (GDP, VBIFI, RSTRATE, INF)					
		LnGDPPC	KAOPEN	LnTOPEN	LnINF			LnGDPPC	LnVBIFI	LnRSTOPEN	LnINF
LnGDPPC	2	99.3	0.39	0.26	0.02	LnGDPPC	2	96.6	2.77	0.56	0.01
	10	99.2	0.45	0.28	0.04		10	96.1	3.10	0.06	0.08
KAOPEN	2	0.06	99.9	1.9	0.06	LnVBIFI	2	3.43	96.5	0.46	0.51
	10	2.1	95.8	1.9	0.12		10	3.54	95.3	0.47	0.66
LnTOPEN	2	0.02	0.23	99.7	0.05	LnRSTOPEN	2	0.04	0.01	99.9	0.41
	10	0.12	0.78	99.0	0.06		10	0.04	0.01	98.9	0.57
LnINF	2	0.50	0.19	2.31	96.9	LnINF	2	0.48	0.06	0.36	99.0
	10	0.41	7.35	3.67	84.9		10	1.0	2.64	1.81	94.5
Restricted based Trade integration index (GDP, EQBIFI, RSTRATE, INF)						Restricted based Trade integration index (GDP, KAOPEN, RSTRATE, INF)					
		LnGDPPC	LnEQBIFI	LnRSTOPEN	LnINF			LnGDPPC	KAOPEN	LnRSTOPEN	LnINF
LnGDPPC	2	95.3	4.58	0.10	0.003	LnGDPPC	2	99.6	0.22	0.10	0.02
	10	95.1	4.78	0.10	0.003		10	99.5	0.26	0.11	0.02
LnEQBIFI	2	0.12	99.8	0.16	0.14	KAOPEN	2	0.11	99.8	0.10	0.16
	10	0.14	99.4	0.16	0.19		10	0.70	98.9	0.10	0.24
LnRSTOPEN	2	0.25	0.07	99.6	0.93	LnRSTOPEN	2	0.19	2.15	99.4	0.21
	10	0.33	0.14	98.2	1.23		10	0.23	2.19	99.7	0.30
LnINF	2	0.74	0.05	1.31	97.8	LnINF	2	0.45	0.03	1.59	97.9
	10	0.83	5.62	1.64	91.8		10	1.40	4.60	3.32	90.5

Table 4.9: Forecast error variance decomposition in GDP, financial integration, trade integration and inflation (emerging countries 44)

Value based financial integration (GDP, VBIFI, TRADE, INF)						Equity based financial integration (GDP, EQBIFI, TRADE, INF)					
Response variables	Forecast horizon	Impulse variables				Response variables	Forecast horizon	Impulse variables			
		LnGDPPC	LnVBIFI	LnTOPEN	LnINF			LnGDPPC	LnEQBIFI	LnTOPEN	LnINF
LnGDPPC	2	98.26	1.39	0.23	0.11	LnGDPPC	2	95.31	4.01	0.49	0.19
	10	97.95	1.53	0.29	0.23		10	95.00	3.96	0.69	0.35
LnVBIFI	2	8.24	90.28	0.89	0.58	LnEQBIFI	2	1.32	97.17	1.01	0.51
	10	8.24	90.03	0.99	0.74		10	1.31	96.77	1.38	0.54
LnTOPEN	2	1.27	3.48	94.41	0.85	LnTOPEN	2	1.09	0.18	98.21	0.52
	10	1.27	3.46	94.22	1.05		10	1.10	0.21	98.00	0.69
LnINF	2	1.07	1.21	2.35	95.37	LnINF	2	0.94	6.16	4.22	88.69
	10	1.93	1.82	2.20	94.05		10	1.61	6.69	4.04	87.66
KAOPEN based financial integration (GDP, KAOPEN, TRADE, INF)						Restricted based Trade integration index (GDP, VBIFI, RSTRADE, INF)					
LnGDPPC		LnGDPPC	KAOPEN	LnTOPEN	LnINF	LnGDPPC		LnGDPPC	LnVBIFI	LnRSTOPEN	LnINF
	2	99.62	0.05	0.29	0.04		2	97.9	1.68	0.38	6.54
	10	99.47	0.11	0.31	0.11		10	97.6	1.82	0.47	0.006
KAOPEN	2	0.45	98.62	0.47	0.47	LnVBIFI	2	8.13	91.25	0.22	0.38
	10	0.51	98.21	0.48	0.80		10	8.14	91.12	0.24	0.48
LnTOPEN	2	0.90	0.33	98.54	0.23	LnRSTOPEN	2	1.20	0.46	98.14	0.19
	10	0.91	0.36	98.42	0.32		10	1.26	0.46	97.99	0.28
LnINF	2	1.78	4.47	3.27	90.47	LnINF	2	0.33	2.91	1.30	95.44
	10	3.05	6.36	3.45	87.15		10	0.34	3.72	1.36	94.56
Restricted based Trade integration index (GDP EQBIFI RSTRADE INF)						Restricted based Trade integration index (GDP KAOPEN RSTRADE INF)					
LnGDPPC		LnGDPPC	LnEQBIFI	LnRSTOPEN	LnINF	LnGDPPC		LnGDPPC	KAOPEN	LnRSTOPEN	LnINF
	2	93.47	5.68	0.80	0.05		2	99.80	0.0004	0.20	0.0001
	10	93.02	5.66	1.23	0.08		10	99.78	0.0018	0.22	0.0003
LnEQBIFI	2	1.20	97.13	1.10	0.57	KAOPEN	2	0.30	98.63	0.28	0.79
	10	1.19	96.87	1.31	0.63		10	0.31	97.97	0.35	1.37
LnRSTOPEN	2	0.96	0.16	98.26	0.62	LnRSTOPEN	2	0.68	1.61	97.52	0.18
	10	1.02	0.18	97.85	0.95		10	0.69	1.74	97.24	0.33
LnINF	2	0.21	1.84	5.58	92.37	LnINF	2	0.75	7.37	2.35	89.53
	10	0.24	1.92	6.61	91.23		10	0.97	11.10	2.86	85.07

Table 4.10.Forecast error variance decomposition in GDP, financial integration, trade integration and inflation (industrial economies34)

Value based financial integration (GDP, VBIFI, TRADE, INF)						Equity based financial integration (GDP, EQBIFI, TRADE, INF)					
Response variables	Forecast horizon	Impulse variables				Response variables	Forecast horizon	Impulse variables			
		LnGDPPC	LnVBIFI	LnTOPEN	LnINF			LnGDPPC	LnEQBIFI	LnTOPEN	LnINF
LnGDPPC	2	91.07	8.07	0.47	0.39	LnGDPPC	2	94.36	1.91	3.71	0.02
	10	88.45	9.63	0.50	1.42		10	92.69	1.79	5.41	0.12
LnVBIFI	2	1.86	97.98	0.16	0.0003	LnEQBIFI	2	0.01	99.71	0.01	0.26
	10	1.95	97.88	0.17	0.01		10	0.02	99.45	0.01	0.53
LnTOPEN	2	6.19	3.26	90.47	0.08	LnTOPEN	2	5.51	2.98	91.46	0.04
	10	6.26	3.35	90.18	0.21		10	5.58	2.98	91.22	0.22
LnINF	2	0.34	0.21	16.06	83.38	LnINF	2	0.04	2.54	4.92	92.50
	10	1.11	0.36	13.83	84.70		10	0.61	3.68	3.35	92.36
KAOPEN based financial integration (GDP, KAOPEN, TRADE, INF)						Restricted based Trade integration index (GDP, VBIFI, RSTRADE, INF)					
		LnGDPPC	KAOPEN	LnTOPEN	LnINF			LnGDPPC	LnVBIFI	LnRSTOPEN	LnINF
LnGDPPC	2	93.01	4.65	2.34	0.00	LnGDPPC	2	87.59	2.87	9.29	0.25
	10	91.81	5.04	3.08	0.06		10	83.91	2.89	11.45	1.76
KAOPEN	2	0.72	99.26	0.01	0.01	LnVBIFI	2	1.02	64.26	34.72	0.00
	10	0.85	99.08	0.05	0.03		10	1.24	59.44	39.29	0.03
LnTOPEN	2	7.12	19.04	73.46	0.38	LnRSTOPEN	2	2.20	6.54	91.20	0.06
	10	7.06	19.95	72.18	0.81		10	2.20	6.34	91.38	0.09
LnINF	2	0.37	1.80	11.45	86.37	LnINF	2	0.46	4.04	5.83	89.67
	10	0.62	3.14	10.40	85.83		10	0.33	4.14	4.79	90.74
Restricted based Trade integration index (GDP, EQBIFI, RSTRADE, INF)						Restricted based Trade integration index (GDP, KAOPEN, RSTRADE, INF)					
		LnGDPPC	LnEQBIFI	LnRSTOPEN	LnINF			LnGDPPC	KAOPEN	LnRSTOPEN	LnINF
LnGDPPC	2	79.18	13.40	7.30	0.12	LnGDPPC	2	95.37	4.26	0.35	0.02
	10	77.61	14.77	7.10	0.52		10	93.56	5.78	0.62	0.04
LnEQBIFI	2	0.02	99.67	0.0001	0.31	KAOPEN	2	0.69	91.66	7.60	0.05
	10	0.02	99.38	0.01	0.58		10	0.66	87.58	11.52	0.24
LnRSTOPEN	2	0.75	0.65	98.15	0.45	LnRSTOPEN	2	0.20	2.67	96.93	0.20
	10	0.75	0.78	97.82	0.65		10	0.21	2.99	96.58	0.22
LnINF	2	1.73	4.53	3.23	90.50	LnINF	2	0.72	2.28	20.38	76.63
	10	1.77	6.55	2.55	89.14		10	1.29	1.88	19.00	77.83

4.10 Conclusion

The role of integration in an economy cannot be neglected with rising interest to understand the process of global integration and its benefit to economic growth and welfare. The past literature on trade, financial integration and economic growth relationship remains inconclusive. The consensus is that a country with higher trade and financial integration will promote economic growth and welfare. The earlier studies analysed the effect of international trade and financial integration on economic growth separately with a different set of countries, the majority of them dealt with OECDs and industrial countries. This chapter aims to examine the combined role of trade and international financial integration and its response to economic growth. For this, the study used an annual dataset for a sample of 90 countries; in which there are 34 industrial countries, 56 emerging and developing economies, over the period of 1988 to 2017. Two different proxies are employed to measure both trade and financial integration, one is the *de-facto* measure and the other is *de-jure* measure for integration. Towards empirical modelling the study applied a panel-vector autoregressive (PVAR) model with GMM framework and estimated 4-models to capture the growth effect of trade and financial integration. The findings of the P-VAR estimations confirmed the effect of international trade and financial integration on economic growth. However, all the four measures of trade and financial integration show different effect on economic performance.

The results shows that the three indicators of financial integration i.e. value based financial integration (VBIFIF), equity based financial integration (EQBIFI), indicator based on capital account openness (KAOPEN) along with the trade integration indicators (ratio of exports plus imports to GDP (TOPEN) and index of freedom to trade internationally (RSTOPEN)) capture the growth effect for all the three group of countries over the period. Higher degree of financial integration possibly makes available new type of capital from the international capital market. This could help the country to better participate in global capital market and access capital at lower cost. In the standard neoclassical framework, the key benefit of international financial integration arises from long-term net capital flows from capital-rich (industrial) countries to relatively capital-poor (developing) countries. This process of integration generates “welfare effect⁵¹” for both the group of countries.

The estimated coefficients show a positive and robust relationship between financial integration and output growth for industrial economies for all three indicators of financial integration while emerging countries experienced a small growth effect from financial integration. It implies that the industrial

⁵¹ In theory, access of global capital market allows the countries to smoothing consumption, by protecting against country specific income risk (kose et. al, 2006).

countries are better off with financial globalization, whereas emerging and developing countries are still lagging to take advantage of financial globalization. The theory of financial integration suggests that integrated countries are more efficient in allocating their resources through diversifying the risk associated with it. This could also help create new innovative technology in the financial system and induce investment opportunity and increase the specialization in production and economic growth. According to King and Levine (1993); Obstfeld (1994); Prasad et al. (2003); the positive impact of financial integration on growth in industrial countries is mainly due to an increase in the level of investment and greater financial infrastructure. Most of the emerging market economies suffer from deficiency of capital flows. Capital inflows can increase the availability of capital to firms and help poor countries from a binding constraint on economic growth. Capital inflows can also improve the function of the financial system and help transfer advanced technologies and skills to emerging market economies. The benefits of capital market openness is via the international risk-sharing channel, not the investment channel. Capital inflows to developed countries result in relatively more efficient allocation of resources and diversify investments. The effect of trade integration (in terms of volume) on economic growth is more pronounced in emerging countries than industrial economies.

On the other hand, when trade integration is measured on the basis of policy restriction (RSTOPEN), the estimated results suggest that the industrial countries benefit from trade by imposing restriction on other countries. Finally, both trade and financial integration has a positive impact on growth for industrial countries. The main conclusion of this chapter is that industrial countries have benefited more from the global integration, while the growth response from financial integration is larger than the trade integration. On the other hand, emerging economies are still lagging to take advantage of trade, financial integration. However, in emerging economies, trade integration performance is better than financial integration in explaining the long-run economic growth.

Appendix 4.I

S.L No	Industrial Countries	S.L No	Emerging Economies		
1	Argentina	35	Algeria	69	Philippines
2	Australia	36	Bangladesh	70	Romania
3	Austria	37	Belize	71	Senegal
4	Barbados	38	Bolivia	72	South Africa
5	Belgium	39	Botswana	73	Sri Lanka
6	Canada	40	Brazil	74	Thailand
7	Chile	41	Bulgaria	75	Tunisia
8	Cyprus	42	Cameroon	76	Turkey
9	Denmark	43	China	77	Venezuela, RB
10	Finland	44	Colombia	78	Zimbabwe
11	France	45	Congo, Rep.	79	Benin
12	Germany	46	Costa Rica	80	Botswana
13	Greece	47	Dominican Republic	81	Central African Republic
14	Hong Kong SAR, China	48	Ecuador	82	Cote d'Ivoire
15	Hungary	49	Egypt, Arab Rep.	83	Fiji
16	Iceland	50	El Salvador	84	Malawi
17	Israel	51	Gabon	85	Mauritius
18	Italy	52	Ghana	86	Nepal
19	Japan	53	Guatemala	87	Niger
20	Korea, Rep.	54	Guyana	88	Rwanda
21	Malta	55	India	89	Sierra Leone
22	Netherlands	56	Indonesia	90	Togo
23	New Zealand	57	Iran, Islamic Rep.		
24	Norway	58	Jamaica		
25	Panama	59	Jordan		
26	Poland	60	Kenya		
27	Portugal	61	Malaysia		
28	Singapore	62	Mexico		
29	Spain	63	Morocco		
30	Sweden	64	Namibia		
31	Switzerland	65	Nicaragua		
32	United Kingdom	66	Pakistan		
33	United States	67	Paraguay		
34	Uruguay	68	Peru		

Appendix 4.II

Figure: 1

International Financial Integration (1988-2017)

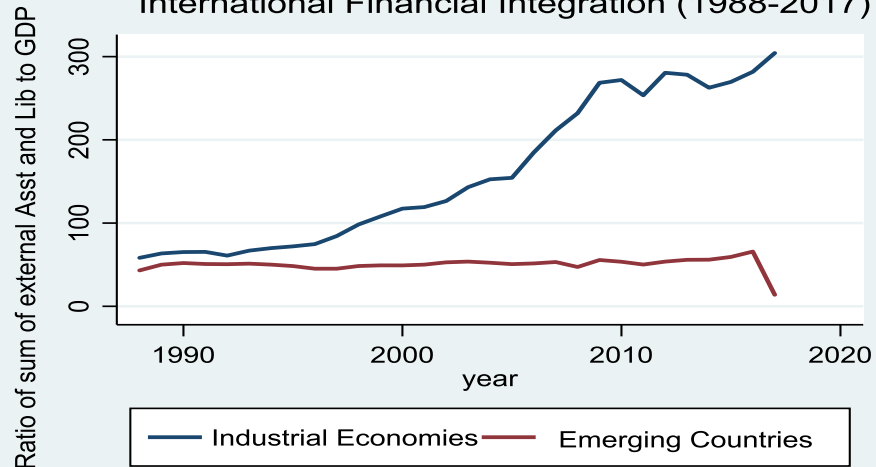


Figure: 2

International Equity Integration (1988-2017)

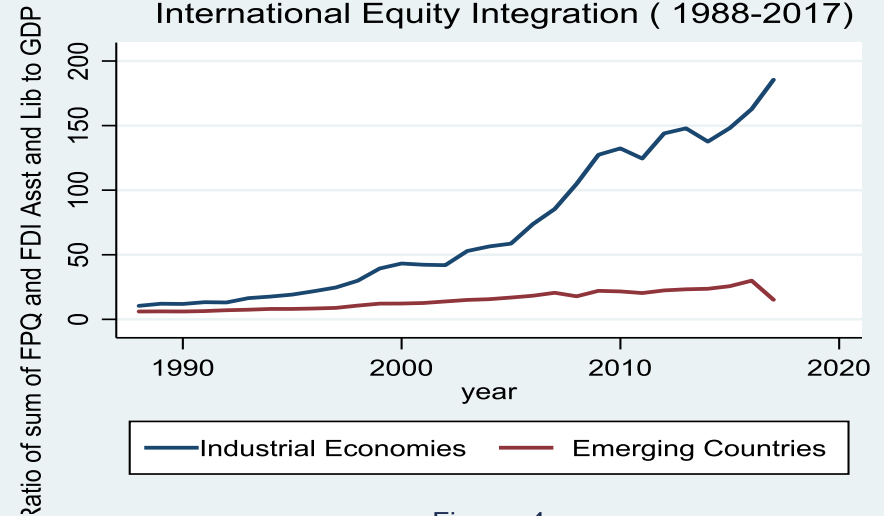


Figure: 3

Equity Share in External liabilities

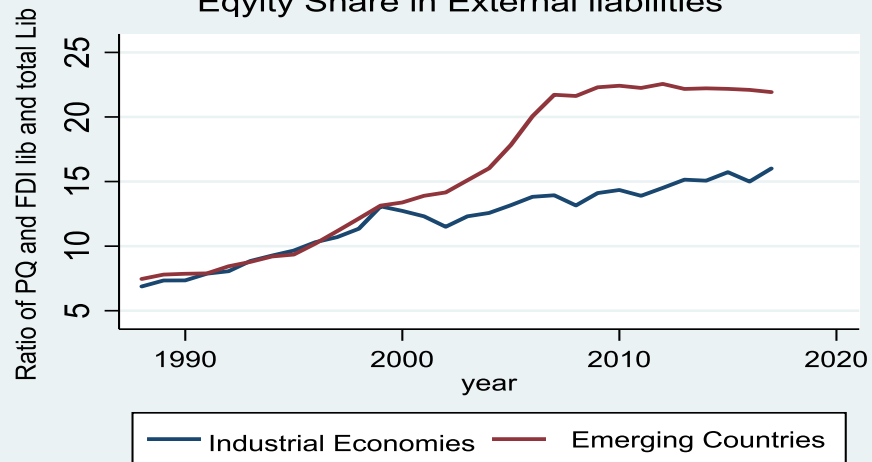
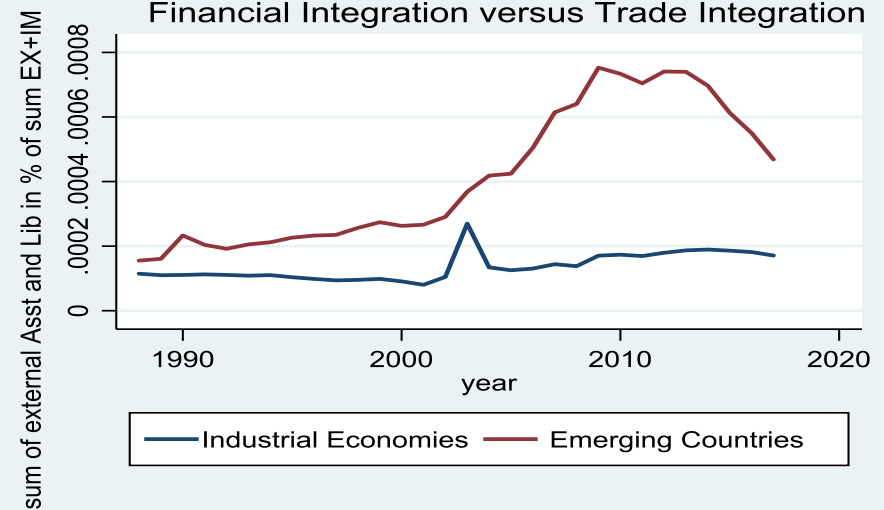


Figure: 4

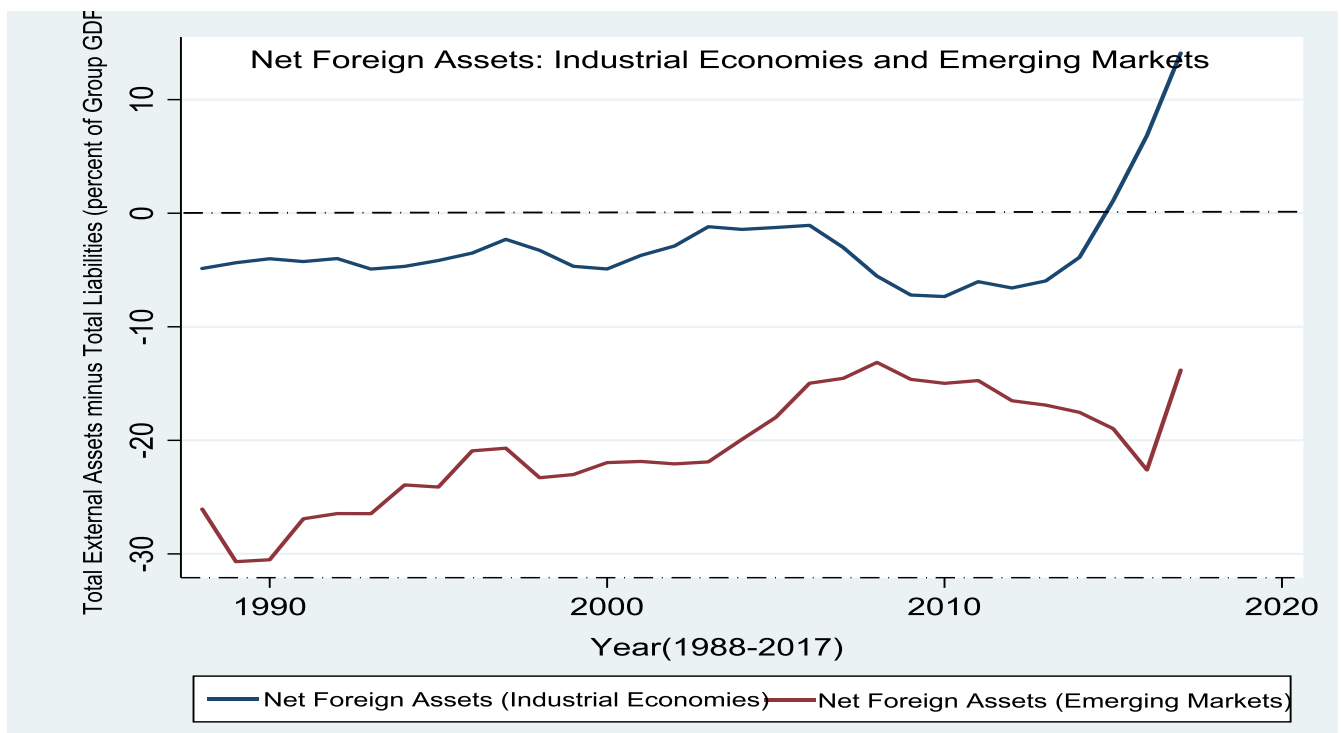
Financial Integration versus Trade Integration



Author calculation

Appendix 4.II

Figure: 5



Author calculation

Appendix 4.III

Evolution of Trade and Financial Integration: 1988-2017

Figure: 1 IFI for Industrial economies: 1988-2017

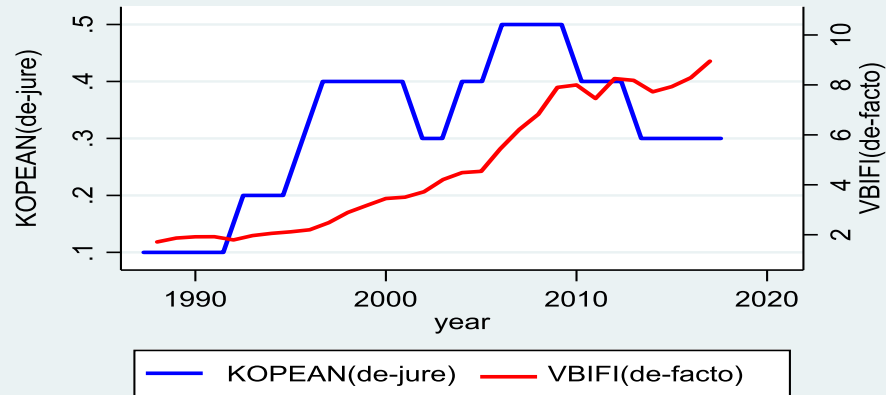


Figure: 2 Trade Integration for Industrial Countries : 1988-2017

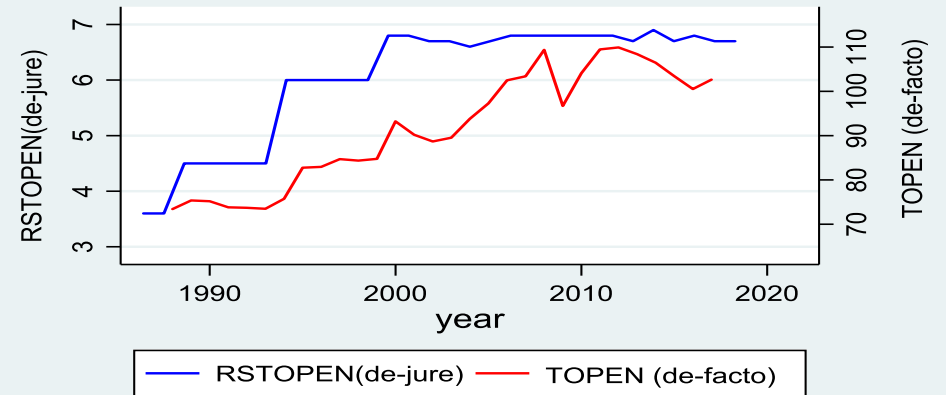


figure:3 Trade Integration for Emerging Countries : 1988-2017

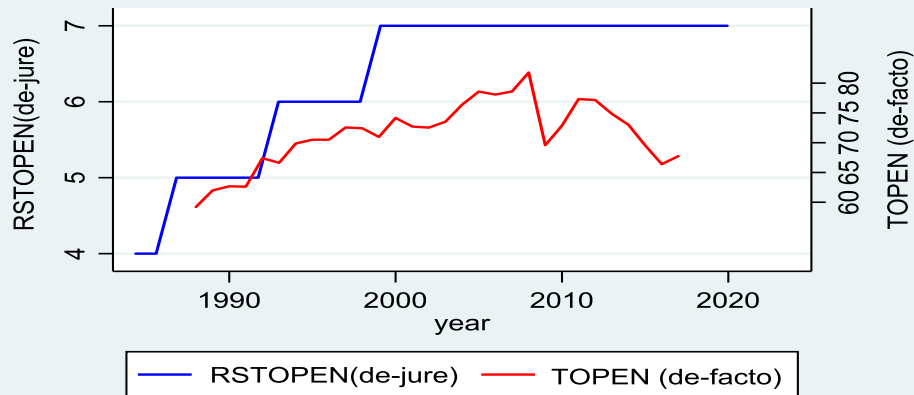
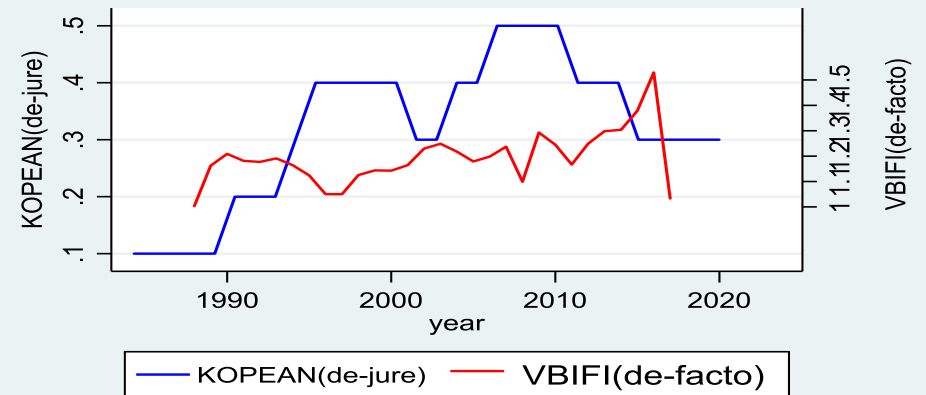
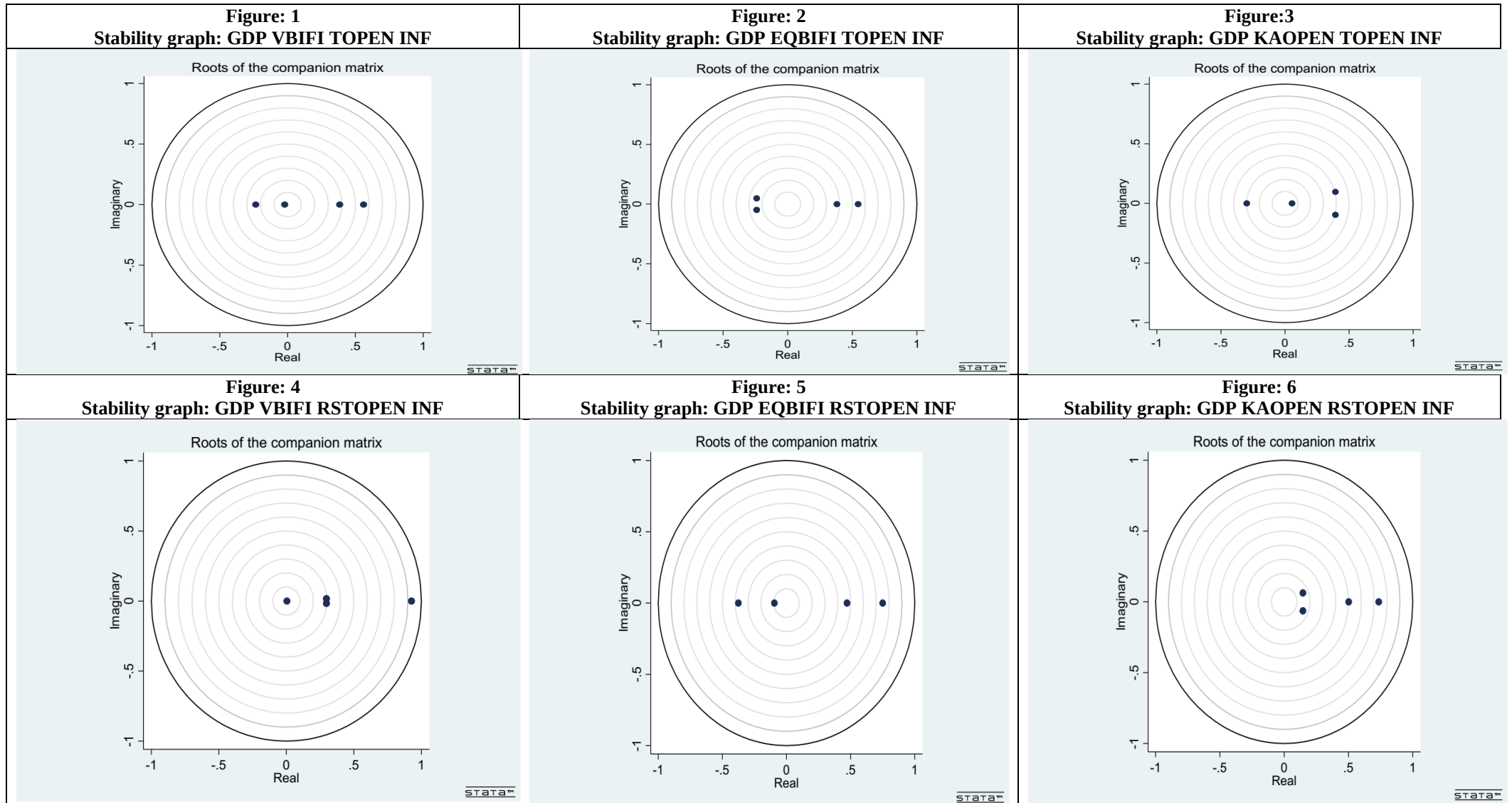


Figure: 4 IFI for Emerging Countries : 1988-2017



Author calculation

Appendix 4.IV **Stability Graphs (Eigenvalues lies in the Unit Root Circle)**



Appendix-4.V

Figure 4.1(A)
Impulse response function: GDP VBIFI TOPEN INF (full sample 90)

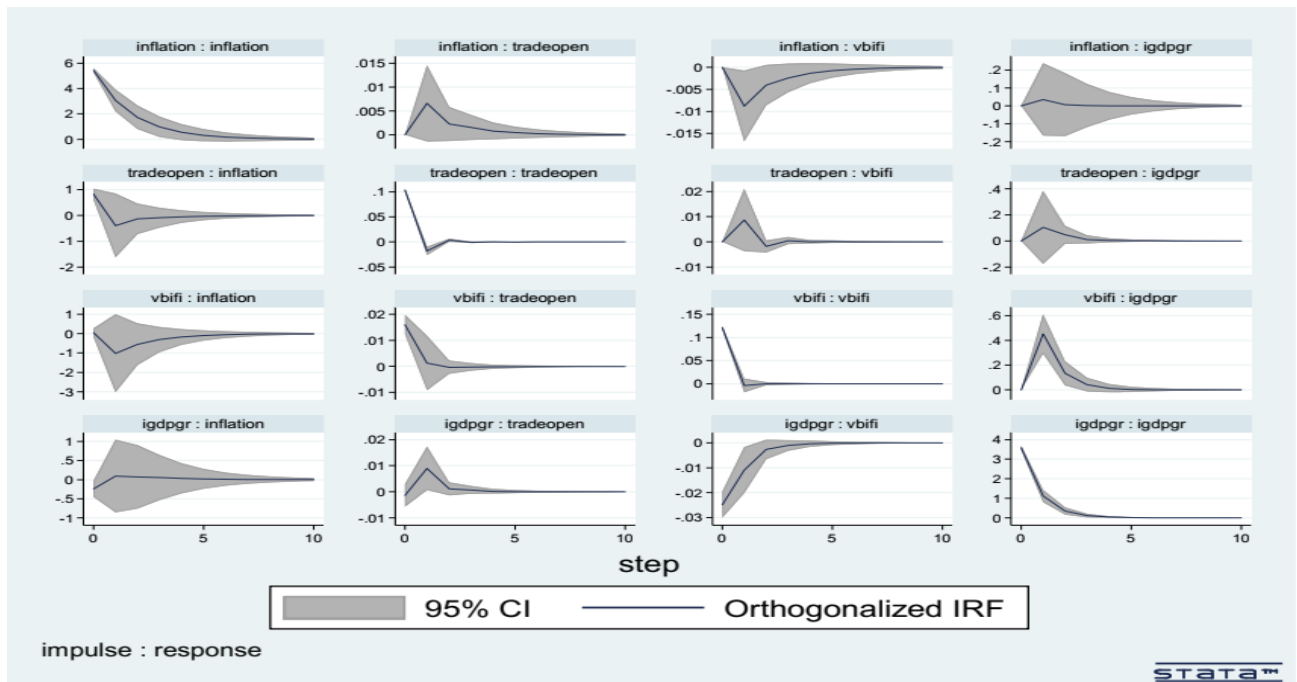


Figure 4.1 (B)
Impulse response function: GDP VBIFI FREETRADE INF (full sample)

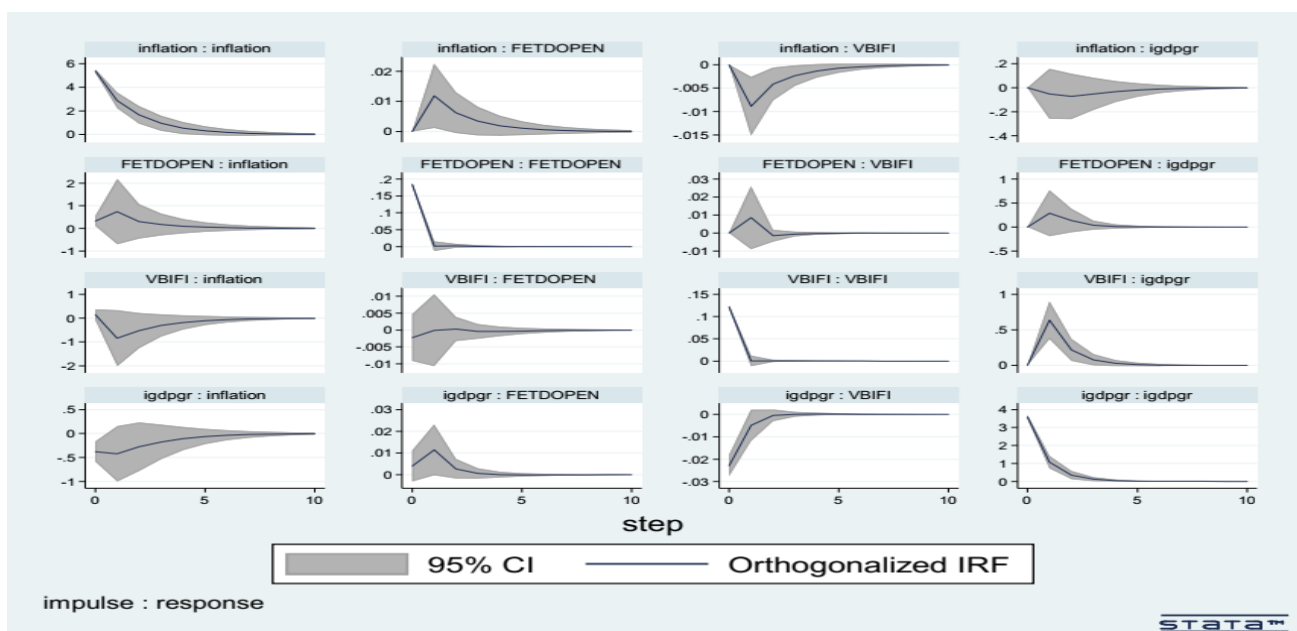


Figure 4.1 (C)
Impulse response function: GDP EQBIFI TRADE INF (full sample)

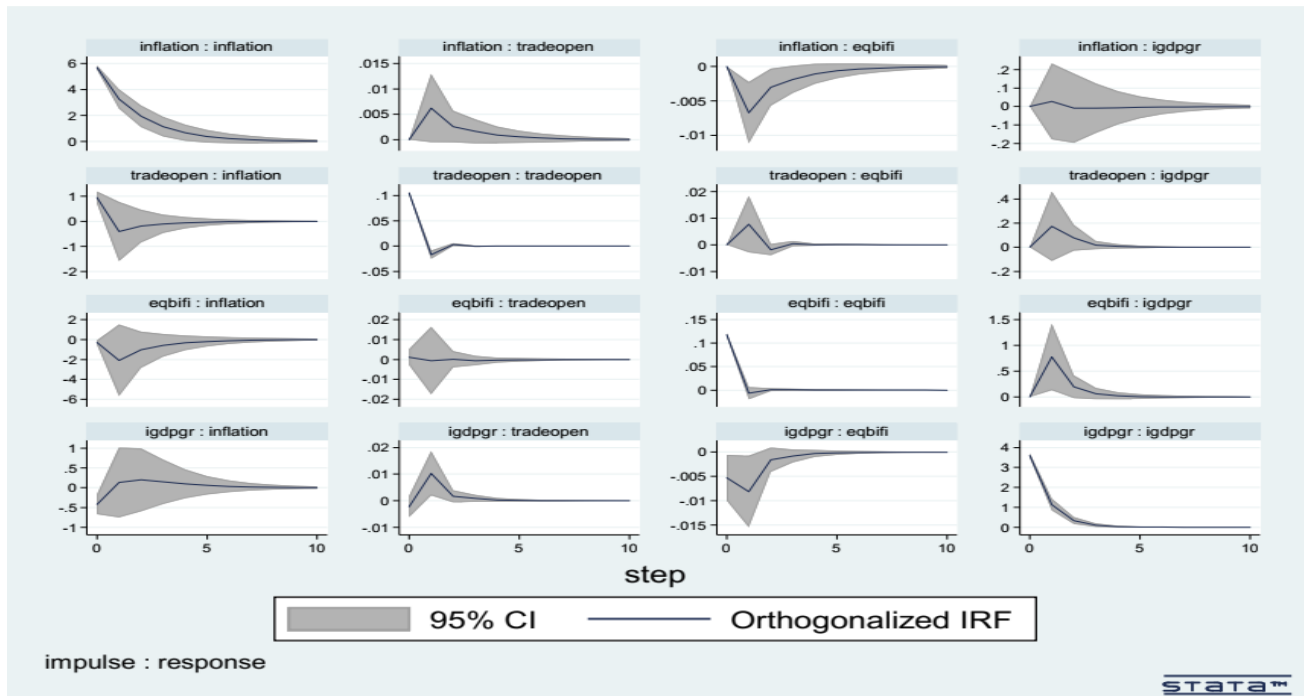


Figure 4.1 (D)
Impulse response function: GDP EQBIFI FREETRADE INF (full sample)

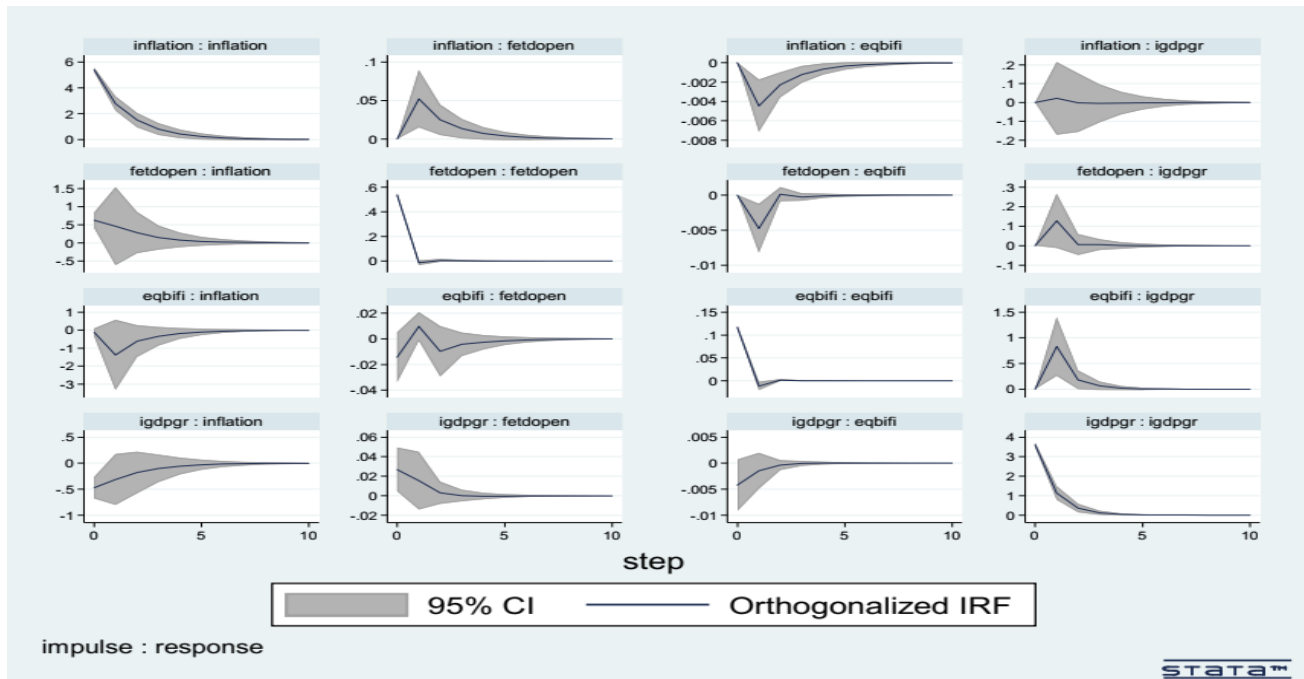


Figure 4.1 (E)
Impulse response function: GDP KAOPEN TRADE INF (full sample)

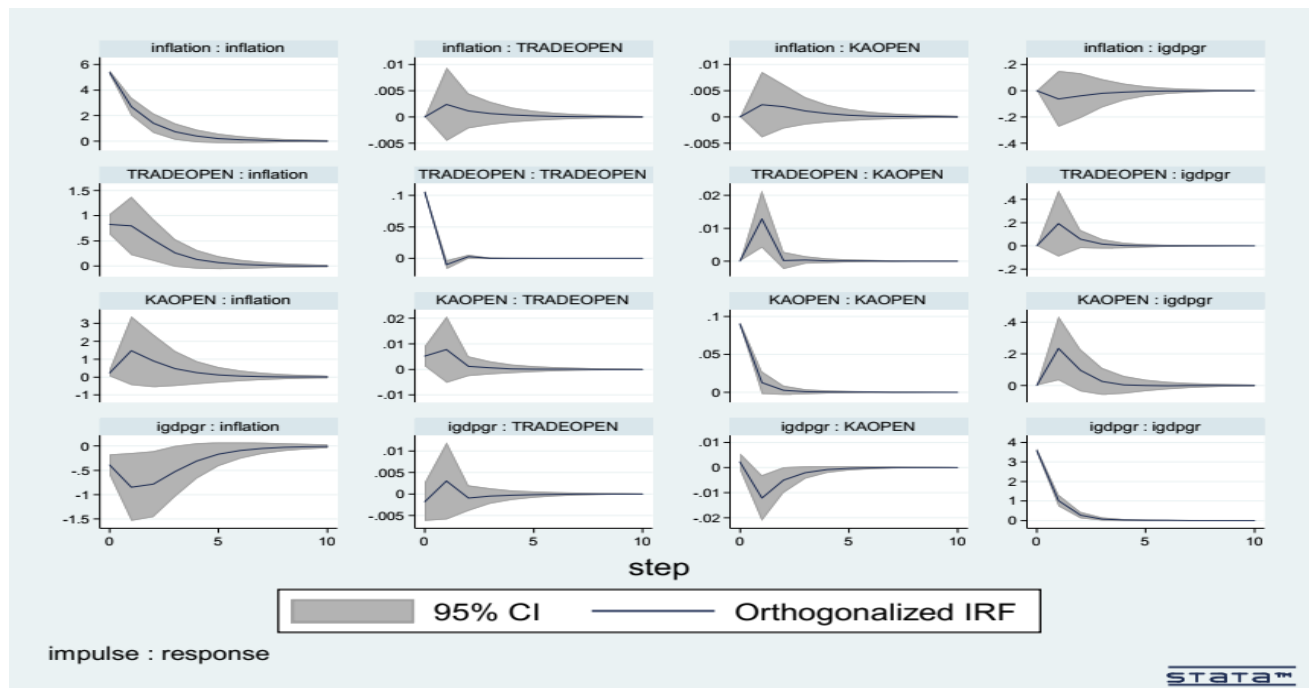


Figure 4.1 (F)
Impulse response function: GDP KAOPEN FREETRADE INF (full sample)

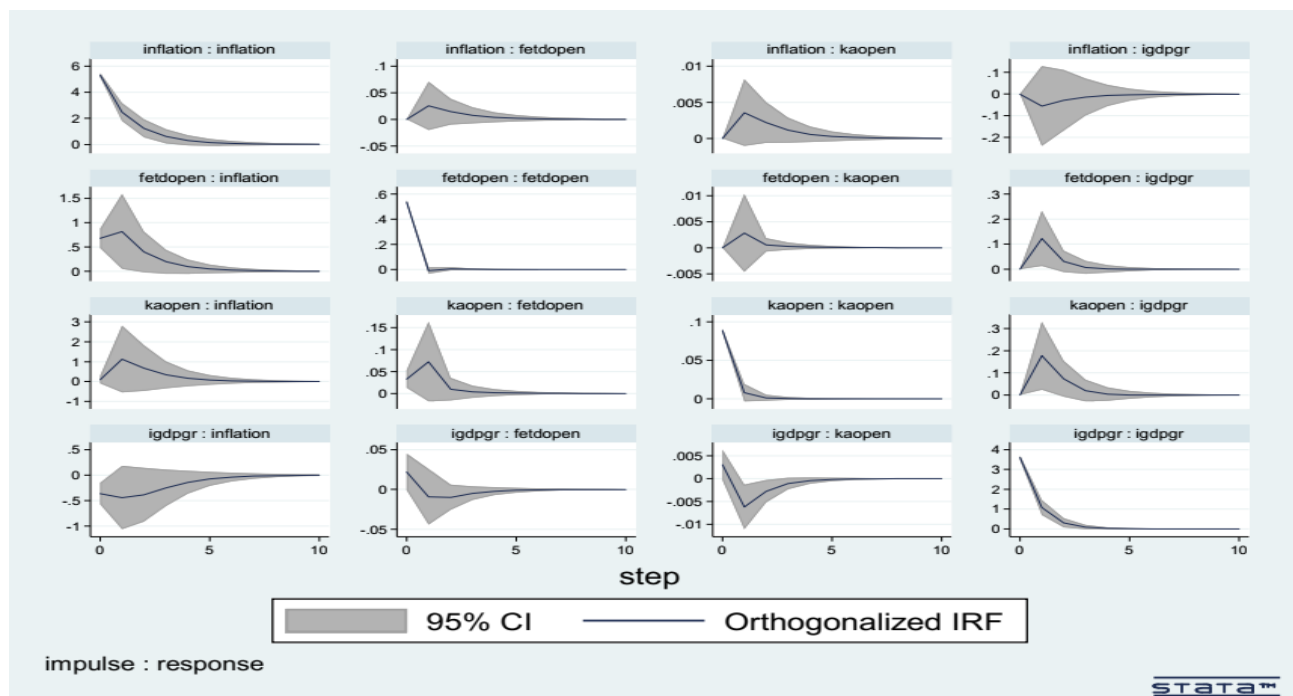


Figure 4.2 (A)
Impulse response function: GDP VBIFI TOPEN INF (emerging countries 44)

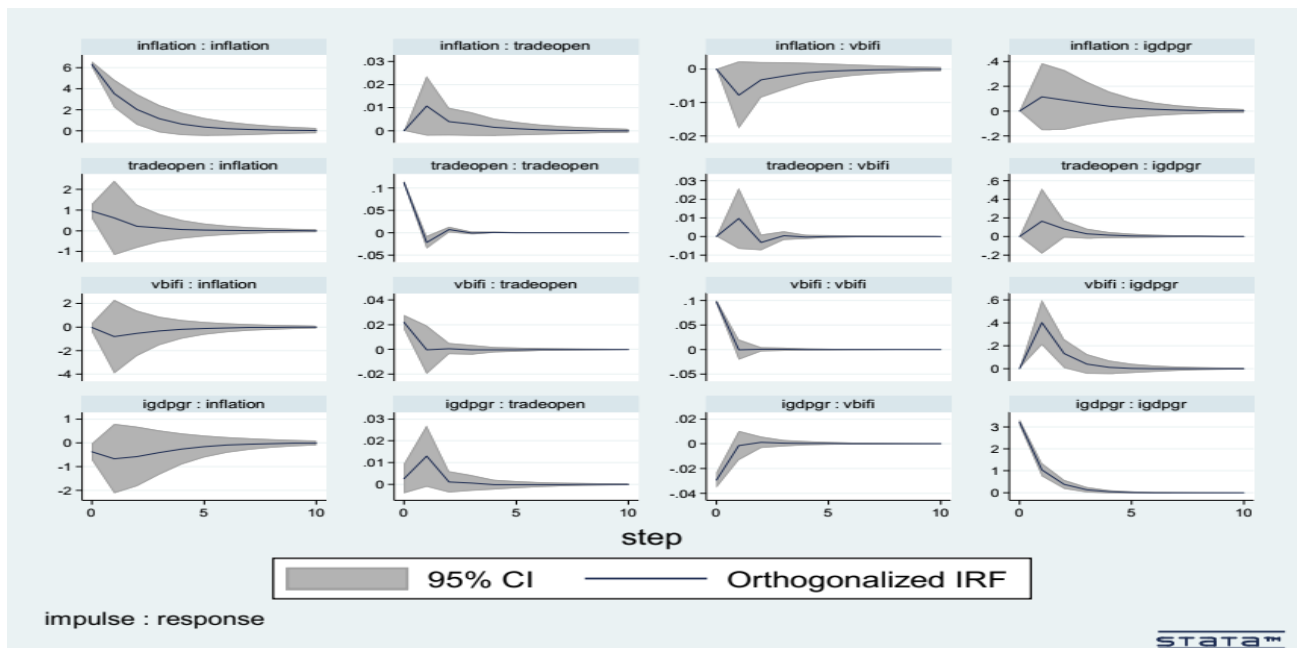


Figure 4.2 (B)
Impulse response function: GDP VBIFI FREETRADE INF (emerging countries)

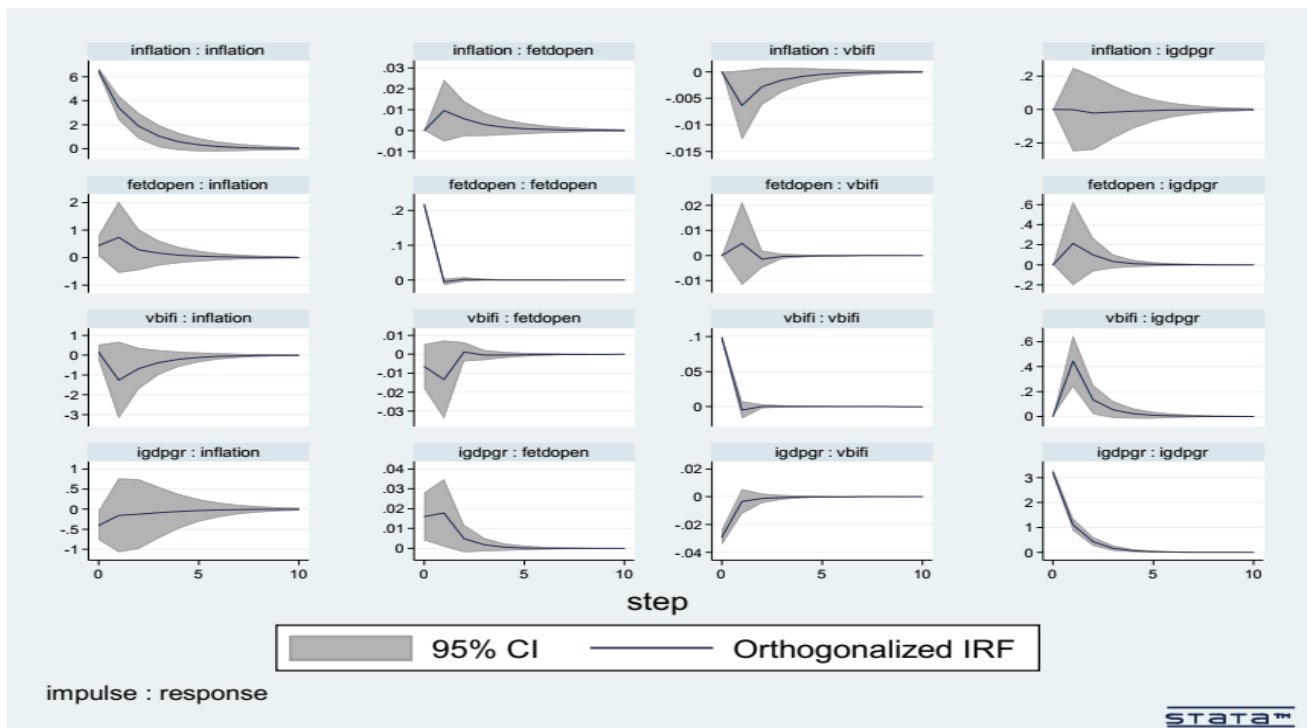


Figure 4.2 (C)
Impulse response function: GDP EQBIFI TRADE INF (emerging countries)

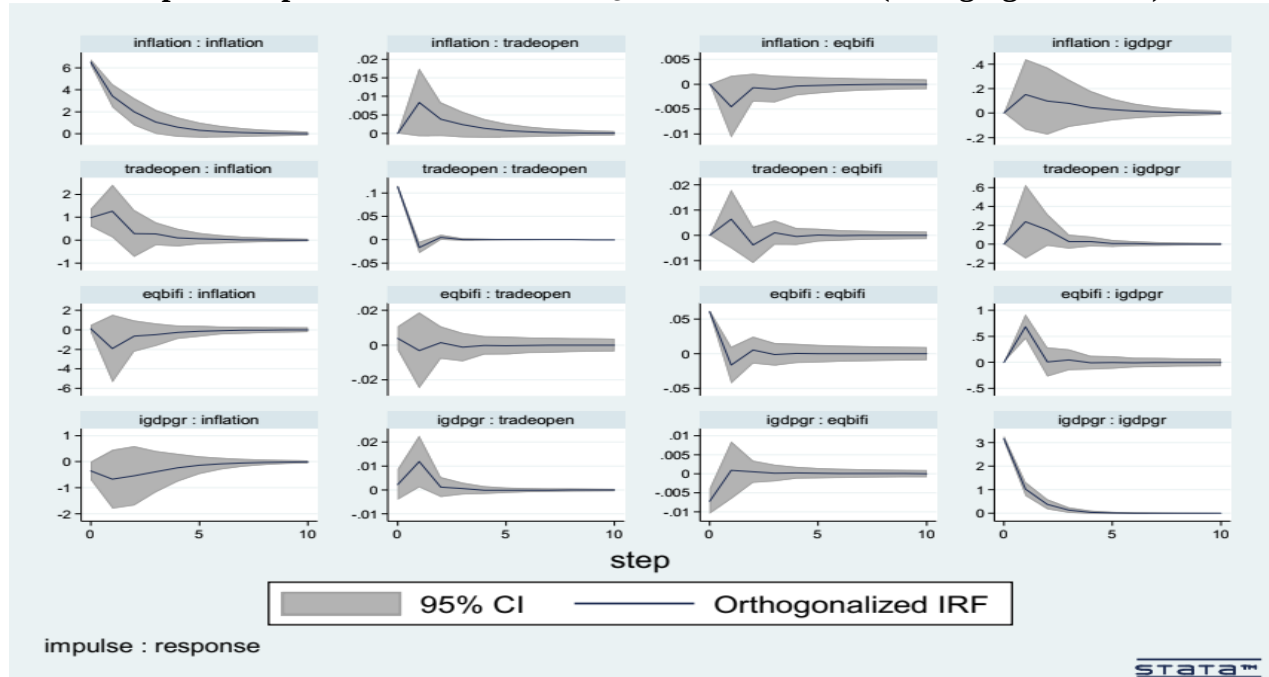


Figure 4.2 (D)
Impulse response function: GDP EQBIFI FREETRADE INF (emerging countries)

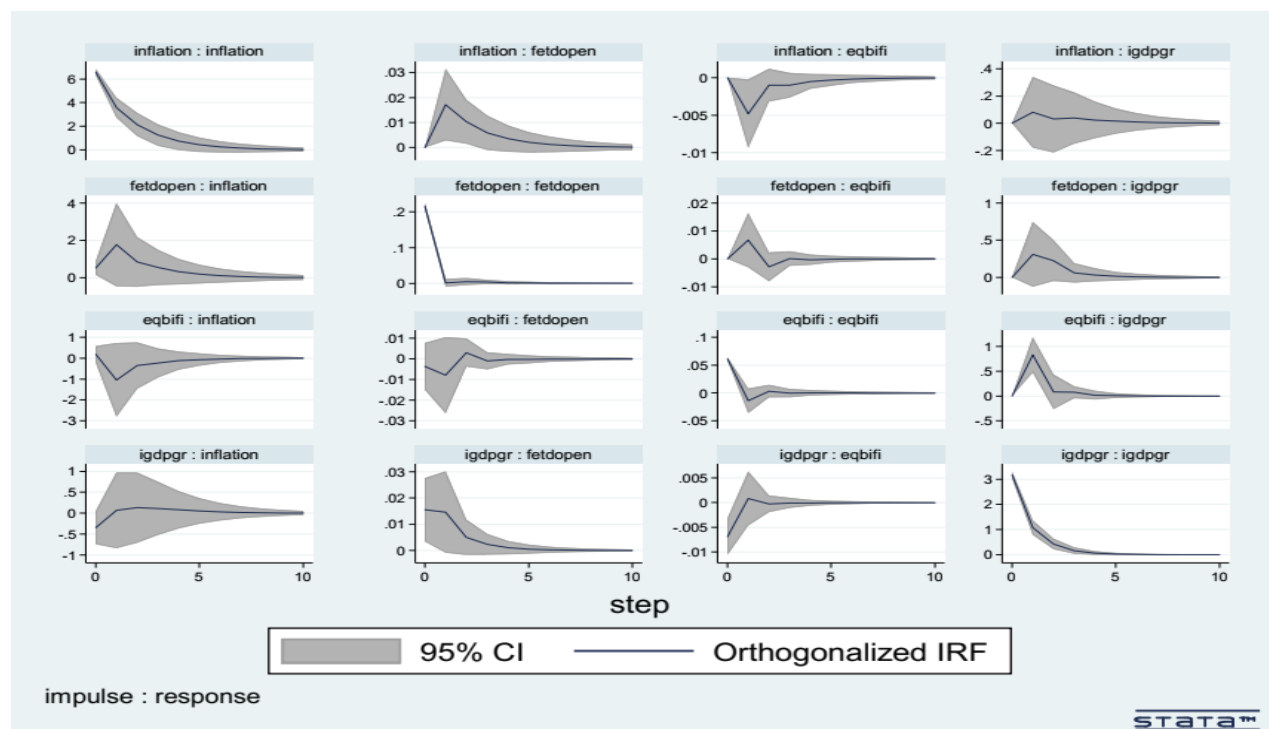


Figure 4.2 (E)
Impulse response function: GDP KAOPEN TRADE INF (emerging countries)

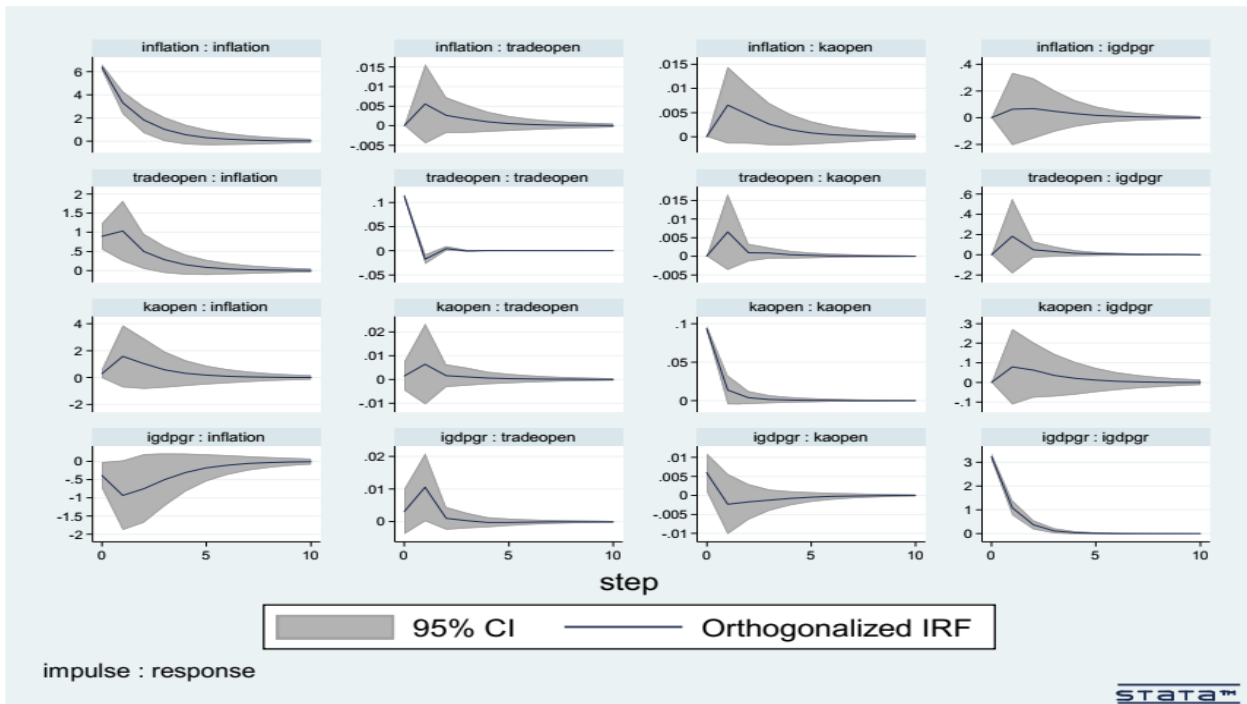


Figure 4.2 (F)
Impulse response function: GDP KAOPEN FREETRADE INF (emerging countries)

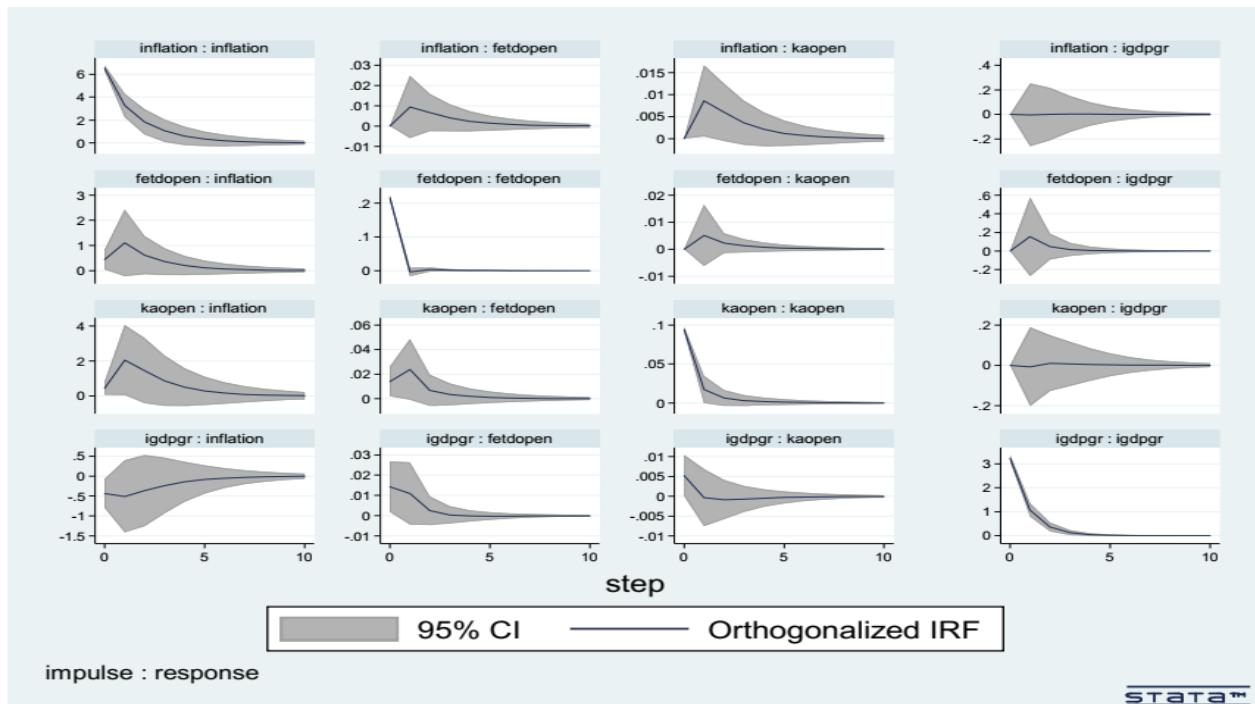


Figure 4.3 (A)
Impulse response function: GDP VBIFI TRADE INF (industrial economies 34)

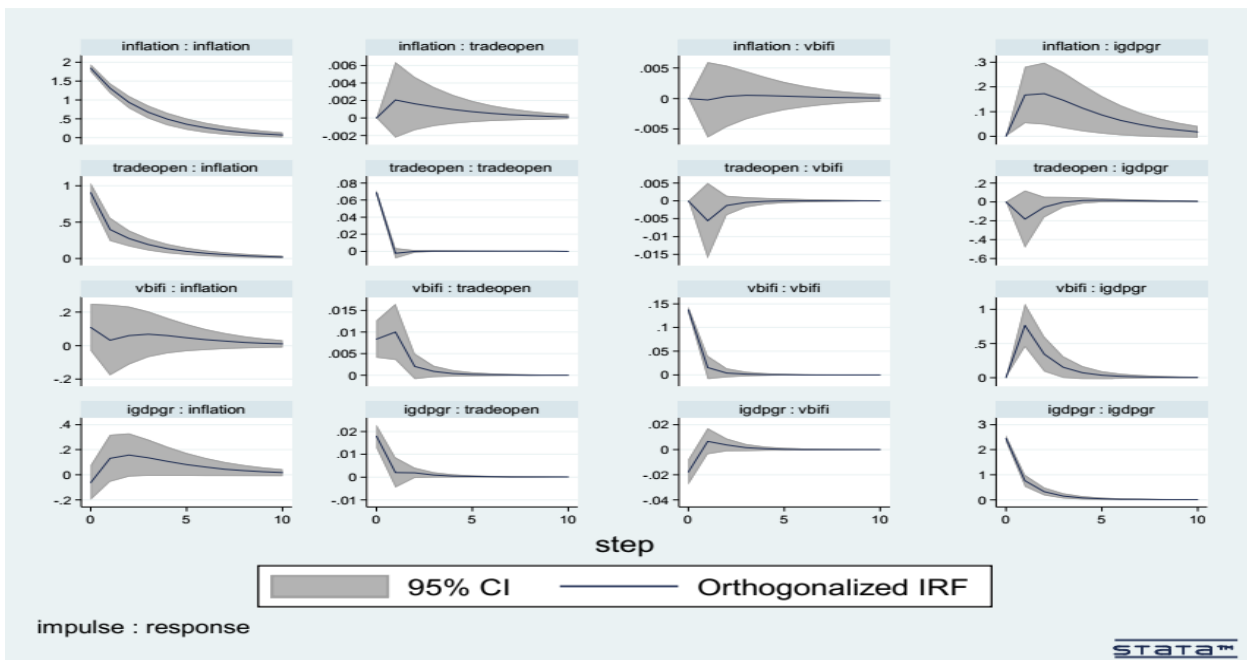


Figure 4.3 (B)
Impulse response function: GDP VBIFI RSTOPEN INF (industrial economies)

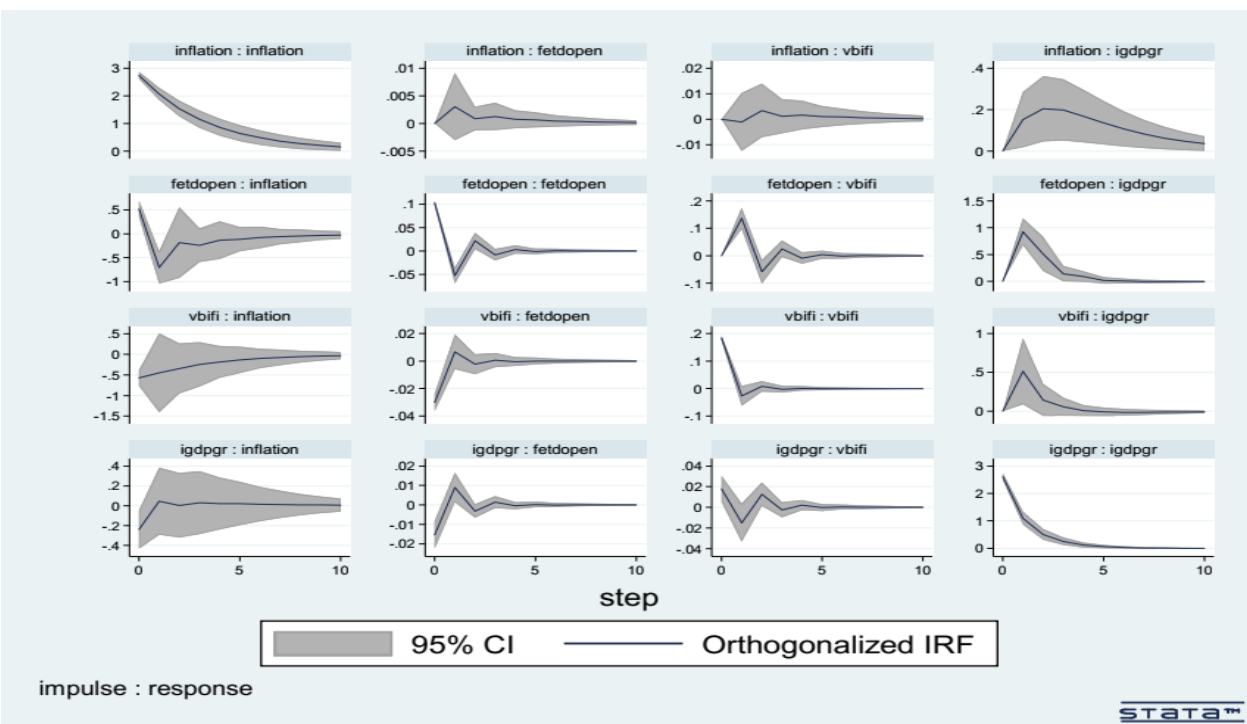


Figure 4.3 (C)
Impulse response function: GDP EQBIFI TRADE INF (industrial economies)

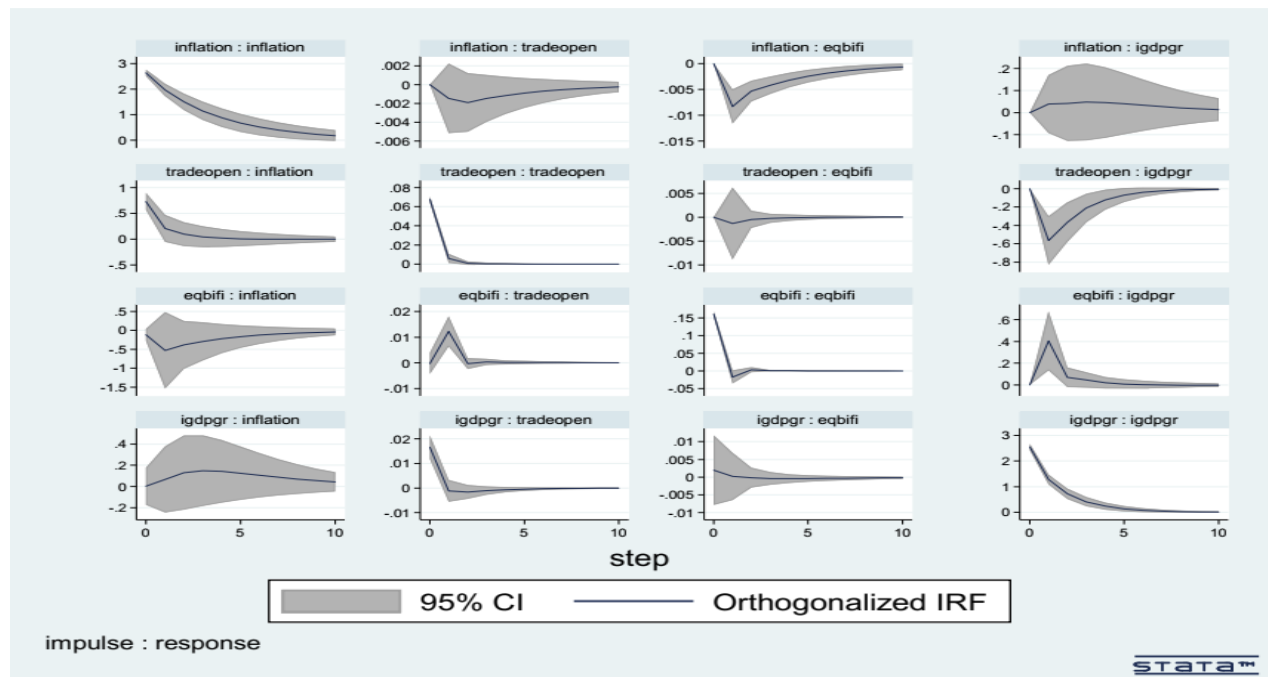


Figure 4.3 (D)
Impulse response function: GDP EQBIFI RSTOPEN INF (industrial economies)

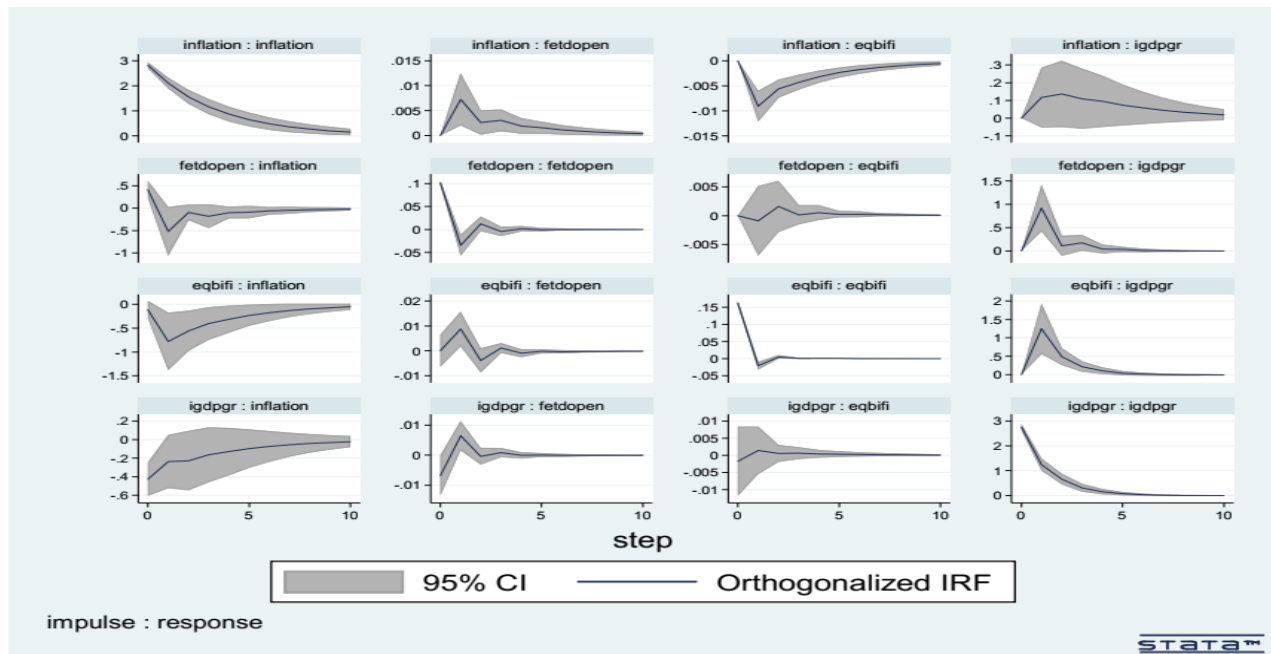


Figure 4.3 (E)
Impulse response function: GDP KAOPEN TRADE INF (industrial economies)

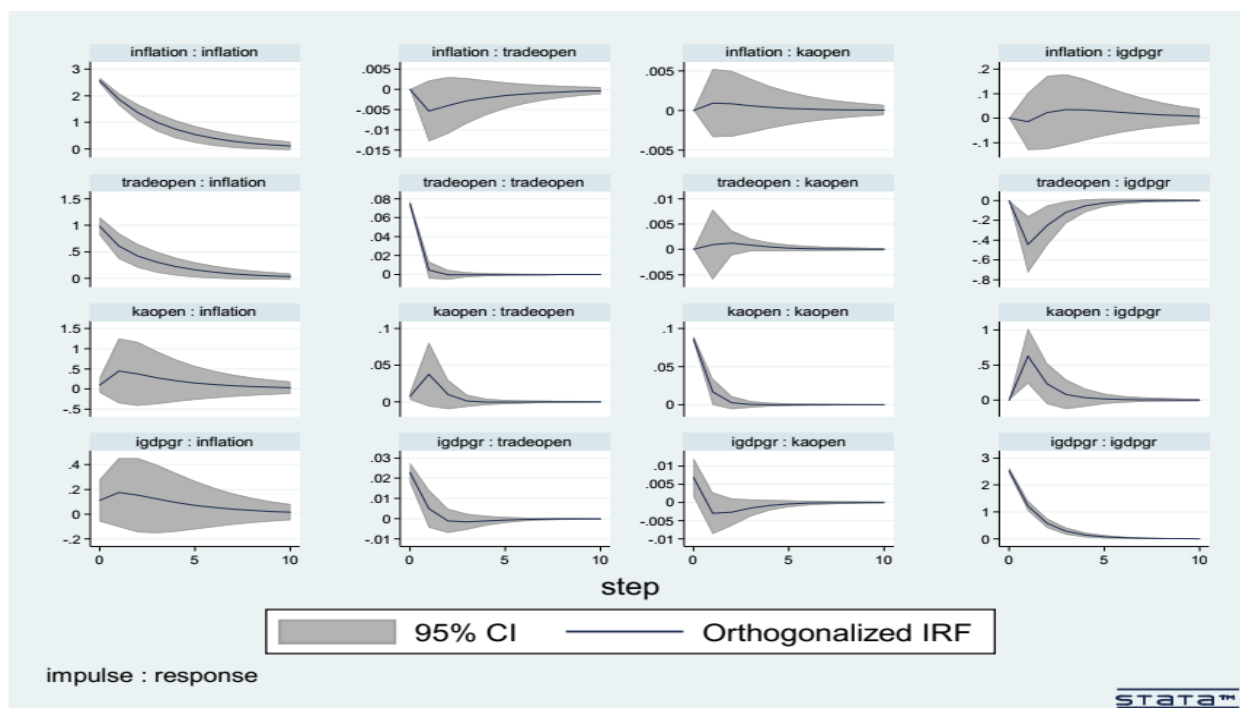
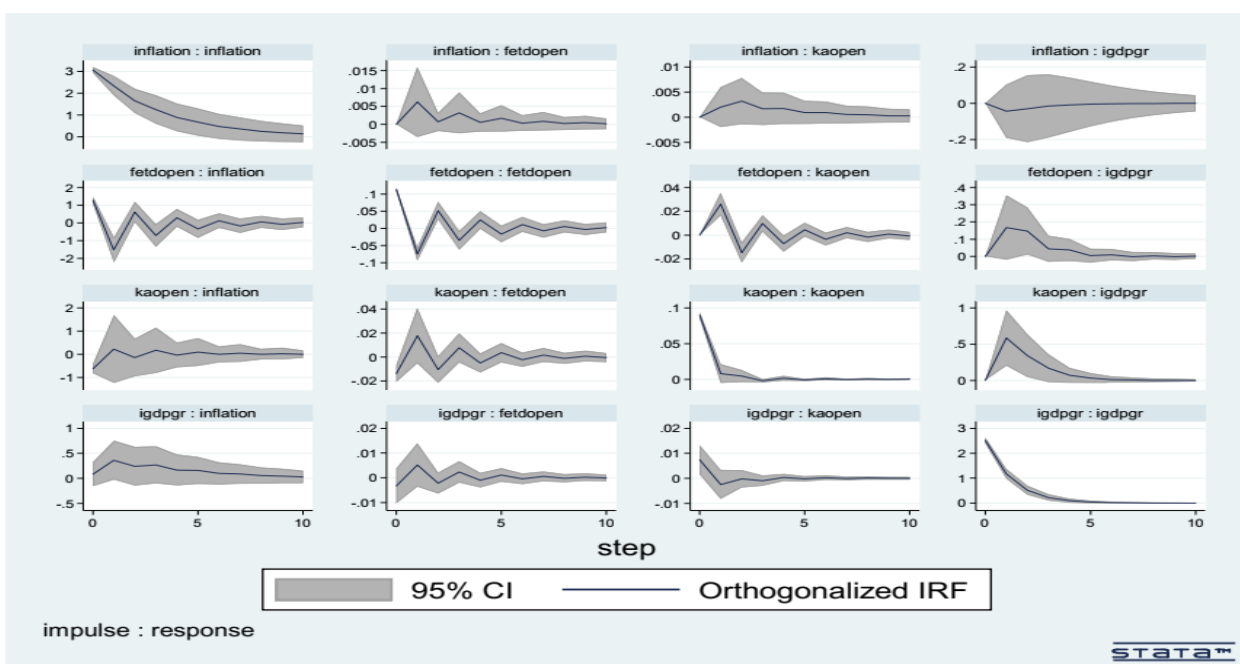


Figure 4.3 (F)
Impulse response function: GDP KAOPEN RSTOPEN INF (industrial economies)



Chapter: 5

Summary and Conclusion

The present study has been a modest attempt to re-examine the effect of international trade integration and financial integration on economic growth in a cross-country setting over an annual period of 1978-2017. The rising commercial and financial integration during the last four decades are evident of many ups and downs in the global economy. The prolonged debates regarding the desirability of this global integration continue today. The past literature argued that trade openness was the pre-condition for financial globalization, while some others argued the level of financial globalization to be acting independently of the degree of trade integration. All these debates inspired this thesis to work on these issues and make an attempt to investigate and see which type of integration (trade or financial) is more effective in explaining the economic growth across the countries. The study started by analysing the effect of macroeconomic volatility on economic growth performance, particularly the association between output growth and output growth volatility. Later, the study analysed the depth of the financial system and its influence on economic growth, taking into account some potential intermediary threshold variables expected to have possible growth effect through financial development. Beyond these, the present study also analyzed the joint role of trade integration and international financial integration in determining economic growth. Specifically, the idea was to see how international trade and financial integration explained economic growth performance. Thus, the thesis focused on three different areas such as growth volatility, financial development, and global economic integration.

Thus the thesis revolved around three thematic areas in trade-finance integration and growth nexus, based on the identified gaps in the literature. They are (1) *growth and volatility relationship*, (2) *finance and growth nexus with threshold effects* and (3) *trade-financial integration and growth nexus*. Therefore, the thesis set the following objectives.

4. To examine the relationship between economic growth and its volatility among the developing and industrial countries.

5. To examine the non-linearities in financial development and economic growth nexus in the presence of threshold effect.
6. To examine the role of trade-financial integration and its impact on economic growth.

This chapter summarises the findings, offers some concluding remarks and a few policy recommendations.

Output growth and output volatility relationship: Some cross country evidence

The sample of 67 countries (40 developing and 27 industrial countries) is used to examine the relationship between output volatility, macroeconomic volatility and economic growth over the period of 1978 to 2017. The overall findings suggest that output volatility negatively affects economic growth, and both cross-section and panel regression results confirm it. Moreover, this negative output volatility and growth association is found to be stronger for developing countries, which implies a higher standard deviation of growth volatility will lead to lower economic growth in developing countries. On the other hand, industrial countries experienced a positive and significant growth effect of output volatility. This can be explained in two ways. First, the positive association between output growth and its volatility comes from the “theory of precautionary savings”. It argues that higher the risk higher the desire to save by an individual, which increases the investment and growth. Second, the relationship will be favourable if volatility is associated with the recession, and this recession leads to higher research and development (R & R&D). The process of knowledge acquiring through the act of “learning-by-doing”, then the effect of relative rise in output volatility will increase the accumulation of knowledge and at the same time growth. The control variables in this study are consistent with growth theory, except human capital and trade openness. To examine how robust the estimates are, the study has modelled the HFI and LFI groups separately. The findings show the negative and significant growth effect of volatility for both the group of countries. The impact of volatility is a bit larger for higher financial integrated (HFI) countries than the low financial integrated (HFI) economies. This might be due to the intermediate stage of financial market development or poor institutional setups resulting in poor management of unpredictable shocks. The results of different HFI and LFI speak of the role of financial integration in defining the growth volatility relationship. Overall, the results confirm that developing countries are more unstable to mitigate their business cycle fluctuations, leading to

lower economic growth. However, in both group of countries, industrial economies are better financially integrated with the global market compared to developing countries.

Non-Linearity in the Finance-Growth Nexus

To assess the presence of contingency effects in the finance-growth nexus, the study used banking sector indicators as the proxy to measure financial development; such as private sector credit, liquid liabilities, and gross domestic savings percentage of GDP. Subsequently, five more threshold variables are applied to know whether these factors potentially intermediate finance-growth nexus. The study begins with structural characteristics such as country's initial level of income and output volatility. Next, the study considers macroeconomic policy factors such as trade openness, government expenditure percentage of GDP and inflation rate (a proxy for monetary policy). This analysis is conducted with a set of 82 countries comprising industrial, developing and underdeveloped countries over 1978 to 2018.

The estimated panel threshold regression (PTR) confirms non-linearity in finance-growth relationship for all three models. It provides new evidence that financial intermediary development could facilitate long-term economic growth when the countries satisfy a certain level of financial threshold. The findings suggest that financial development indicators such as private sector credit and liquid liabilities are positive and statistically significant effect on economic growth, when initial income is the threshold variable. It implies financial development promotes economic growth for the countries with an average initial per capita income below \$848. Similarly, private sector credit and liquid liabilities will positively and significantly affect growth performance once the macroeconomic volatility reaches its threshold point. It suggests that a well-developed financial intermediary system will manage their instability by paying the price in terms of volatility and gain the benefit in terms of a higher rate of growth. Still, the statement does not mean larger financial development are bad. Ranciere et al (2008). There is a negative and significant association between domestic saving and growth, once it exceeds the level of macroeconomic volatility. These results are consistent with the theories and pervious literature including Pagano (1993).

Then taking trade openness as the threshold for finance-growth relationship, the estimation emphasizes that private sector credit and liquid liabilities respond negatively to the economic growth below the threshold of trade openness. The relationship between finance and growth

becomes positive and significant once the trade openness reaches the estimated threshold level. This evidence suggests that trade openness can ease the accessibility of productivity, enhancing technology from the international market and encourage technology diffusion. Thus, higher openness to trade will improve the financial intermediary system, which may later contribute the long-term economic growth (Huang and Lin 2009, Falvey, Foster-McGregor and Khalid, 2013). On the other hand, domestic saving is positive but insignificant when trade openness is above the threshold level. It reveals that above the threshold level, greater domestic saving will not translate into higher investment, and in turn, higher economic growth. By using government expenditure and rate of inflation as thresholds, the estimates show financial development in a lower regime of government expenditure, and the inflation rate is beneficial for the economy to boost long-run economic growth.

On the other side, the effect of these variables is adverse once they exceed the threshold level. It represents that the lower inflation rate allows the economy to take advantage of the financial system (by reducing the information cost) on productivity growth, further increasing economic growth. By taking the financial development indicator itself as a threshold in the model to determine the growth performance, the estimated results confirm the non-linear relationship between financial development and economic growth. A positive and significant growth effect of private sector credit and liquid liabilities below the regime and the coefficients are not significant once it exceeds the threshold. This implies private sector credit and liquid liabilities are reliable banking sector indicators that can better explain economic growth. However, it is observed that in the upper regime domestic saving plays an essential role in promoting economic growth. Finally, the main conclusion is that variables, such as initial income, growth volatility, government expenditure, and inflation rate, enhance the economic growth below the threshold levels. At the same time, it negatively affects economic growth once it exceeds threshold levels. However, trade openness benefits the economy above the threshold level, and it is consistent with the theory. Furthermore, all the banking sector indicators, private sector credit and liquid liabilities are strongly associated with economic growth in lower regimes.

The Role of Trade and Financial Integration in Explaining Economic Growth

Of late, the interest is to understand global economic integration and its benefits to economic growth. Significantly, the role played by trade-financial integration in economic growth merits attention. Therefore, to analyse the trade-financial integration and growth relationship, this study uses an annual dataset for 90 countries (34 industrial countries, 56 emerging and developing economies) from 1988 to 2017. Two different proxies are utilized to measure trade and financial integration; one is “de-facto” measure based on outcome/volume of openness. The “*de-jure*” measure for integration is based on government restrictions. The empirical analysis is conducted based on the panel-vector autoregressive (PVAR) model with GMM framework where four models are estimated to capture the growth effect of trade, financial integration. The findings that emerge from the above P-VAR estimations confirm the impact of international trade and financial integration on economic growth. However, the effect of trade and financial integration on economic growth varies by different indicators and also across the country groups. The estimates show the causal relationship between GDP per-capita, financial integration and trade openness for industrial and emerging countries. A positive and significant feedback is observed from financial integration to GDP for industrial economies, but there is feedback for emerging countries. In particular, the estimated coefficients show a positive and significant association between financial globalization and per capita GDP growth for industrial economies for all three indicators of financial integration. The emerging countries experience smaller economic growth from financial integration. It suggests that industrial countries largely benefit from financial globalization compared to emerging countries. Moreover, the positive growth effect of financial integration in industrial countries is mainly due to increased investment and greater financial infrastructure. In the standard neoclassical framework, the critical benefit of international financial integration arises from long-term net capital flows from capital-rich (industrial) countries to relatively capital-poor (developing) countries. Thus, the higher the integration greater the efficiency to allocate the resources through diversifying the risk associated with it. The effect of growth on trade integration is more pronounced in emerging countries than industrial economies. However, the feedback effect from GDP per-capita trade openness is observed for both total sample and industrial economies. It implies emerging countries are receiving more benefits from trade openness than industrial economies. Trade integration can help the country through the diffusion of new technology. Especially, trade openness encourages

the emerging countries to participate more in R&D through the innovation of new products. By doing this, they can easily access the global market, which may later increase foreign investment in domestic market and economic growth. On the other hand, a positive and significant growth effect of trade restriction emerged for industrial economies. Overall, the results show that industrial countries highly benefit from economic global integration, while the growth response from financial integration is larger than the trade integration. However, for emerging economies, trade integration performs better than financial integration in achieving long-run economic growth. But the results are not satisfactory to the expectation where the emerging economies are still lagging in taking advantage of trade and financial integration.

The overall conclusion of my research is that Industrial countries are better in managing business cycle fluctuation compared to developing countries. Financial integration gives more room to industrial countries to handle unpredicted volatility without hampering the output growth. Developing countries are mainly affected by domestic shocks due to a lack of a proper financial system and self-inflicted policy mistakes. Countries with well-developed financial intermediaries will reduce the cost of delegating the task of monitoring and later accelerate economic growth. Significantly, development in the banking sector can lower the cost of researching potential investments, exerting corporate control, managing risk, mobilizing savings. The study confirms that banking sector indicators such as; private sector credit and liquid liabilities are strongly associated with lower regimes of economic growth, in about 50 per cent of the sample countries. It emphasizes the efficiency of banking system in establishing a stronger financial superstructure in the country. The thesis finds the evidence that both trade and financial integration are essential to achieve long-term economic growth across the countries. It is notable that financial integration has a significant effect on economic growth in industrial countries. Interestingly, the finding says that capital account openness has a significant positive effect on growth, while most studies have not found such evidence. Furthermore, emerging economies are not benefited so much by adopting financial openness than trade openness. Hence it is clear from the empirical findings that industrial countries are doing better than emerging economies by adopting the liberalization policies.

Policy Recommendations

Based on this research's empirical evidence, the thesis offers some policy implications and recommendations to improve the growth performance across the countries. The notion of global integration and its benefits to the growth is still ambiguous. Some countries experience gain from liberalization and some others are less responsive and more volatile in growth. This ambiguity raises why the literature is so far unable to formulate a strong relationship between international trade integration, financial integration, output volatility, and economic growth. This research confirms the strong association between financial integration and growth in industrial economies. The growth effect of global integration in these countries is driven by a sharp increase in investments levels and accumulation of foreign capital inflows such as surge in portfolio flows and debt inflows. However, the total stock of outstanding liabilities increased by the end of 2004.

Moreover, these countries have a stronger domestic financial system, which operates using better regulation and supervision of domestic banking industry. While, the emerging and developing countries accounted for small or negligible growth effects from global economic integration due to lack of proper financial development and the liberalization process. The difference in the effect of global economic integration across the sample, warrants some policies to improve efficiency.

It is observed that developing countries are the group experiencing a high volatility and low economic growth. Factors that enhance the risk of adverse shocks are mainly internal, and stabilizing exogenous shocks to alleviate long-run macroeconomic volatility in developing countries may be ineffective. Thus, the intensity to manage economic fluctuations is limited in developing countries due to weaker financial sector development and lack of proper implementation of counter-cyclical fiscal policy. The impediments are also observed in the form of credit constraints, quality of institutions and political inconsistency in the countries. It is a known fact that global economic integration allows greater risk diversification and improves the resilience to avoid external shocks, but this is not always true; the benefits are offset because capital movements are highly volatile. However, a developed financial system is the common characteristic for industrial countries. These countries are more efficient in identifying the unobservable shocks generated by the firms that wrongly overstate their liquidity. Hence, it is expected that well developed financial institutions will help smooth the business cycles by

providing potential information regarding borrowing and investment. Due to information asymmetry, lending changes because of lenders' wrong perception about the borrowers repayment ability. Lenders ration loans, which may tighten credit availability, and the financial system fails to manage the shortage. The fundamental way to deal with output volatility or shocks is through an increase in domestic savings, increasing accumulation of physical and human capital, and insurance. So it is recommended that financial institutions can facilitate potential borrowers through the provision of short-term and long-term instruments. In general financial institutions are poorly developed in developing countries which are highly volatile. Regarding government expenditure which is too considered pro-cyclical, government spending in developing countries rises during the period of economic booms. Government spending is considered heterogeneous, such as expenditure on pensions payments, health care, higher education facilities and unemployment allowances. It is a well-known fact that all these programs benefit more from the non-poor community than poor people. Therefore, it is recommended that the policymakers should design programs for the targeted groups and assess the effectiveness of this program and its response to macroeconomic volatility. Shocks generated by oil price volatility and inflation uncertainty appear to harm economic growth. In developing countries, inflation volatility is the reason for both internal and external shocks, whereas the volatility in oil prices arrest the shocks generated in the global market. The former shows the importance of monetary shocks and advice the Central Banks of these countries to adopt "*inflation targeting*" to aim for long-run economic goal of price stability. To deal with oil price volatility, the governments of these countries should implement the "policy of fiscal restraint or fiscal rules" that can help to evade transmitting of oil prices shocks to the global economy. The governments can smoothen their expenditure and help the economy insulate from unanticipated oil price volatility. In addition, it is also recommended that policymakers formulate measures that enable diversification of the real economy, wherein oil proceeds could be employed to enhance productivity and, in turn, growth.

Regarding the change in threshold effect of initial income condition, the countries must enhance the level of income to increase economic growth. It is possible through substantial improvement in the financial system. In this study, the finding indicates that as long as the country's per-capita income is above a certain threshold, an improvement in the financial system promotes economic growth. In the same line, as the level of income increases, the individual demand for financial intermediary

(banking) services increases. Hence, the policy recommendation is to strengthen the banking sector to facilitate individual saving and investment process. Notably, in developing countries, the number of banks is limited, and their services are not so good. Therefore, the suggestion is to establish more new “sub-regional banks” like the Asian development Bank (ADB) to cater to a group of countries. Hence, it will enlarge the size of financial system and attract foreign capital flows to these countries. Despite much progress in the financial system, the issue of predicting a financial crisis remains unresolved. It might be due to inadequate data availability, lack of proper analytical and empirical modelling to predict the earlier crisis. However, it is essential to model and predict a financial crisis to restore the confidence of market participants.

However, the policymakers need to frame the policies such that it can optimise the level of income, enhance trade openness and improve the financial system architecture. Similarly, the policies should counter the business cycle volatilities, monitor inflation targeting and improve potential public spending.

The rising importance of interconnectedness between trade and financial integration stands on different growth benefits to the country, where a rapid increase in global economic integration will enhance the country's efficiency to mitigate the risk of negative shocks arising from international markets. But this scenario is not always true for all the countries; the negative spillovers from global markets directly affect the country's production process. In detail, greater global integration across the countries implies that shocks generated in one country will have an adverse effect on economic activities of other countries. In this regard, countries should work collectively to deal with this issue by implementing good macroeconomic policy adjustments, such as prudential rules to improve the financial depth and some collective exchange rate agreements. It might be very challenging for the policymakers to deal with trade spillovers because of greater supply chain and different markets for goods. Here, the exchange rate agreements decide the trade spillovers. Thus, the country needs to adopt the floating or flexible exchange rate change rate regime to mitigate external shocks to limit the impact on the domestic economy. The industrial economies serve as the best example of such a scenario; they operate a “freely floating exchange rate system” to avoid unanticipated shock emerging from global markets. Collective action is needed when a group of countries are in the net of continuous adverse common shocks that may push the countries into

economic crisis. Hence, the national policymakers should frame an effective “*global rule-based system*” to handle the unobservable external shocks emerges for international markets. This will help the country increase the domestic financial system's efficiency and encourage more trade and financial integration. As the financial integration increases across the country, international transactions and the mobility of business also increase. Here the issue arises regarding the “profit shift and base erosion (BEPS)” among the countries. However, the OECD's framework of BEPS was established as common standards on corporate-tax to protect the domestic tax base. Currently, about 135 countries have adopted this framework to end tax avoidance strategies. Hence, it is suggested that the countries join the membership of BEPS and stand against the “base erosion and profit shifting” technique to control this mismatch in tax rules.

Limitations and Scope for Future Research

Limitation:

The present study encountered several challenges.

- The study applied aggregate level data to establish the relationship between output growth and its volatility, which is limiting in nature. Using simple aggregation omits the hidden information, which may be essential to determine their relationship. Hence, using disaggregated data at the sectoral level, including more information about the true relationship is a better option.
- One of the significant limitations of this study is related to data constraint. The selection of the countries in the study sample is purely based on consistent data availability. Especially, the data available for emerging and developing countries is limited over a long period and across the selected variables. Hence, the sample selection is heterogeneous across the country groups.
- The study limited itself to the banking sector development indicators as a proxy for financial development and neglected the stock market indicators. Both the banking sector and stock markets are essential for predicting overall financial development and real economic growth. Omitting one of them makes a difference to capture the actual effect of financial sector development on growth performance.

- As discussed above the study is purely based on aggregate level data, the study is also limited on the global integration part. Here, integration is analysed across the countries, neglecting the regional level and industrial level of integration. In general, both trade and financial liberalization are deeply associated with global and regional level integration. Hence, it is important to cover regional and industrial levels to capture the full global integration across the countries.

Scope for Further Research:

The present study is a synthesis of the combined benefits of trade-financial integration on long-term economic growth in developing countries. These benefits are associated with strong domestic financial markets, good quality of institutions, stronger macroeconomic policies. Still, there are some fundamental gaps to analyse the costs and benefits of trade-financial integration on economic growth. Hence, some of the areas meriting research in future are as follows.

- It is important to examine the association between output growth and output volatility, component-wise including consumption and investment. One component deals with the effect of macroeconomic fluctuations on the level of investment and the other is about the effect of output volatility on consumption smoothing. In general, the researchers need to concentrate more on the welfare implications of volatility because the economy's welfare is better explained by growth and volatility of consumption than output.
- It would be interesting if the researcher tries to link the regional level trade-financial integration and regional level stock market integration to predict the long-term growth in developing countries. *A priori*, it is expected that regional level trade-financial integration and stock markets integration will predict growth better than simply trade-financial integration at the country level.
- The researchers could analyse the benefits of financial liberalization with regard to the improvement of total factor productivity (TFP) growth. One could also examine the effect of different types of financial flows on total productivity growth over the time.
- The future research could throw some light on what level of global integration will benefit the country. It is better to analyse the threshold effect of trade and financial integration on

economic growth in more detail because threshold models will better capture regime effect in trade-financial integration.

- Finally, last but not least, the researchers could construct additional measures to proxy the strength of trade and financial integration, keeping in view the theoretical notions of integration. Specifically, one could take into consideration different type of flows influencing the long-run economic growth.

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by Raju Ý N

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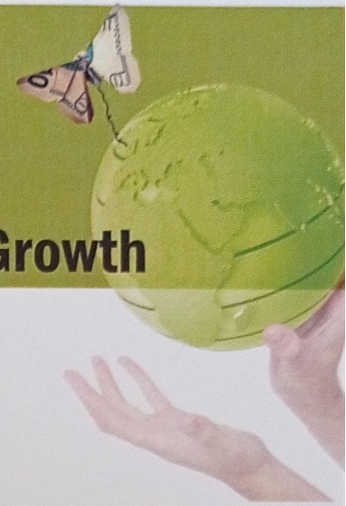


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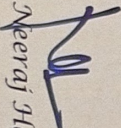
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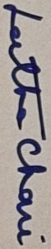
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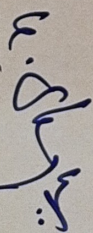
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