Financial Liberalization and Economic Growth: The Role of Exchange Rate Volatility, Composition of Capital, and Governance

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Financial Liberalization
Economic development
Capital movements
Foreign exchange rates
Corporate governance
Economic policy


بسم الله الرحمن الرحيم

Dedication

To the one who is no more yet never gone,

for he lives in my heart,

my father:

who happily sacrificed what he had to realize what we dreamt for.

My mother:

by whose prayers, I am alive today and achieved what I wanted to.

My Beloved Wife and Son:

Their patience and courage always encouraged me and never let me down.

APPROVAL SHEET

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Abstract

This study attempts to explore various channels through which financial liberalization may affect economic growth, specifically the exchange rate volatility and the composition of capital. Additionally, this study explores the moderating role of governance for the impact of financial liberalization on economic growth. We employ the Biorn's (2004) methodology for unbalanced panel data, the SUR model with one-way random effects for our former analysis and standard panel data method, the fixed effect estimation for later analysis for 105 countries from 1976 to 2017.

We examine the impact of financial liberalization on the composition of capital through exchange rate volatility. The results show that de jure and de facto measures of financial liberalization intensify the exchange rate volatility and hamper the quality of capital. Moreover, these measures confirm the mediation of exchange rate volatility, and financial liberalization works as a catalyst and absorbs the adverse effects of exchange rate volatility and improves the quality of capital. Moving on, we investigate the impact of financial liberalization on economic growth through the improvement in the composition of capital and conclude that the de jure (de facto) measures improve the country's quality of capital, yet it impairs (stimulates) per capita output growth. The mediation analysis confirms the negative (partial positive) impact of financial liberalization on economic growth using de jure (de facto) measures.

The topic of investigation for our third analysis is the relationship between financial liberalization and economic growth through exchange rate volatility. The mediation of exchange rate volatility is confirmed, and in most cases, it is negative. Finally, the net impact confirms that de facto financial liberalization works as a catalyst and, in most cases, absorb the adverse effects of exchange rate volatility and enhance economic growth.

Further, we investigate the impact of financial liberalization on economic growth through both channels of influence simultaneously and conclude that de jure and de facto measures, intensify exchange rate volatility except for debt flows—higher exchange rate volatility reduces national investment, capital stock quality, and per capita output growth. Additionally, the actual financial flows directly enhance economic growth. At the same time, the quantity of capital (capital accumulation) is crucial for economic growth. Further, short-and long-term mediation is confirmed; that is, financial flows work through exchange rate volatility and hinder economic growth. The long-term indirect effect confirms the mediation of capital quality and, in most cases, when financial flows work through exchange rate volatility dampens economic growth. Similar to the conclusion of third analysis, financial liberalization absorbs the adverse effects of exchange rate volatility and enhances economic growth. Overall, we can say that the financial liberalization policy is not easy to handle and requires some prerequisites, such as well-developed financial markets and a sound institutional framework.

Finally, we investigate the moderating role of governance for the impact of financial liberalization on economic growth. We conclude that the de jure measure hampers (improves) economic growth in the economy with the low (high) level of governance. On the other hand, the de facto measure of financial liberalization improves economic growth. The conditional effects confirm that financial liberalization matters for economic growth in the presence of good institutions. Overall, we conclude that the presence of quality institutions is necessary to enhance economic growth.

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List of Abbreviations/ Acronyms

Debt: Debt liabilities

EG: Economic growth

ERR: Exchange Rate Regime

FDI: Foreign Direct Investment Liabilities

FE: Fixed Effects

FPL: Foreign Portfolio Liabilities

FXSI: Exchange Rate Stability Index

GEP: Gross External Position

GOV: Government final consumption expenditures.

HC: Human Capital

IGOV: Governance Index

INF: Inflation

INV: Investment/ Capital Accumulation

ISIC (Rev2): International Standard of Industrial Classification

KAOPEN: Chin and Ito (2008) Capital Account Openness Index

PRI: Private/ Domestic Credit to GDP (Financial Development)

QUINN: Quinn and Toyoda (2008) Capital Account Openness Index

QC: Composition of Capital

REER: Real Effective Exchange Rate

RGDPPC: Real GDP Per Capita

RPI: Relative Price of Investment

SDER: Standard Deviation of REER

SUR: Seemingly Unrelated Regression

TL: Total Liabilities

TO: Trade Openness

Chapter 1

Introduction

This chapter presents a summary of this research. This study aims to investigate the relationship between financial liberalization and economic growth via a variety of channels.

1.1 Background

The industrial revolution accelerated the progression of human thought. Since then, economies and economic systems have evolved in societies. The viewpoints and opinions of the scholars result in a constant evolution of policies. However, policymakers may or may not agree with the theories and perspectives of scholars, as their primary priority is economic stability. Consequently, improvements in policies and economic ideas regularly occur in response to a nation's economic and socioeconomic situations; the fall of communism is an example of such a transition (planned economy). In contrast, Karl Mark's theories were changed and implemented in this society. Democratic socialism is the best illustration of this development.

The global economy's stability is a major worry for economists all across the world. Numerous indicators are used to measure the health of an economy, but economic growth is the most significant. Economic growth is influenced by a variety of elements, the most debatable of which is economic integration, which helps world in the era of globalization. Integration of the economy encompasses trade and financial reforms. Recent research on economic growth summarizes the beneficial relationship between trade openness and economic growth. However, a group of experts led by Philip Arestis contends that countries only benefit from trade liberalization if certain economic arrangements are in place beforehand. Governance, diversification, financial development, and sound macroeconomic policies constitute these arrangements (Rodriguez and Rodrik, 2000; Rodrik et al., 2004; Chang et al., 2009; Kim et al., 2016).

The economy's lifeblood is its finances. Without appropriate financial resources, no economy can prosper. In the past three decades, globalization has encouraged nations to liberalize their capital accounts, eliminate obstacles to financial flows, and welcome

financial flows from the rest of the world. Kaminsky and Schmukler (2003) identified three facets of financial liberalization. Capital account openness, financial market liberalization, and domestic financial sector liberalization (real domestic liberalization) are the dimensions.

Capital account liberalization is the process through which a country opens its capital account and agrees on free capital mobility; that is, capital moves freely across borders. The process of globalization rises in the late 1980s' and early 1990s' when capital flows from industrialized countries to developing countries after the latter open its capital account and allow foreign capital to move freely in their countries. The ease of capital controls spurs financial liberalization in developing countries. These financial flows bring some benefits, which are the better allocation of foreign capital and improvement in terms of risk-sharing. There is a strong presumption that developing countries took more advantage of these capital flows because they were poor in capital and had a more volatile income growth. The increased financial flows spur growth in capital-scarce countries (Kose et al., 2009a).

The neoclassical growth literature pioneered by Domar (1946) and Solow (1956) motivated the least developed countries (LDC) to liberalize their capital accounts. They predict through their models that capital flows from rich countries to developing countries to get a higher return as LDCs' have a higher interest rate. These predictions have become pivotal work of McKinnon (1973) and Shaw (1973). They grasp the attention of policymakers and academia and highlight the demerits of 'Financial repression'. Financial repression is the condition in an economy that reflects strict control of authorities over financial markets, which would negatively affect overall macroeconomic fundamentals, and believed that a process of financial liberalization could mitigate the nasty effects of 'financial repression'. Since then, there is a debate in the literature regarding the impact of financial liberalization on an economy. However, this debate is far from any consensus.

The literature on financial liberalization and economic growth spread in various dimensions. However, it sums up two influential views on the impact of financial liberalization. First, the 'allocative efficiency view', relies mainly on the predictions of the neoclassical growth model. That capital flows from abundant capital country to scarce capital country as they have higher interest rates. The financial flows into

developing countries reduce the cost of capital, boost investment, and enhance growth temporarily; however, it permanently increases the standard of living of the people in that country permanently (Fischer, 2003; Obstfeld, 1998; Summers, 2000). Second, the 'instability view', pioneered by Rodrik (1998). According to this view, the predictions that allocative efficiency holds only when there is no distortion in the economy. The increased financial liberalization intensifies the crisis and becomes a severe impediment to global financial stability (Rodrik, 1998; Bhagwati, 1998; Stiglitz, 2002). These predictions lead to capital controls and the imposition of other restrictions, such as the Tobin tax on international asset trade.

The literature on the relationship between financial liberalization and economic growth produces uncertain outcomes. These outcomes either support the extreme views discussed above or lies in between the two extremes. Some researchers cast doubts on the relationship between financial liberalization and economic growth and argue that there is no relationship (Grilli and Milesi-Ferretti, 1995, Edison et al., 2002). On one end, researchers found that capital account liberalization is harmful to the economy (Ahmed 2016; Gourinchas and Jeanne, 2006; Gamra, 2009; Mirdala et al., 2015). On the other side, researchers support financial liberalization and conclude that it is favourable for economic growth (Quinn, 1997; Arteta et al., 2001; Honig, 2008; Gehringer, 2013; De Nicolo and Juvenal, 2014; Bhatia and Sharma, 2019). Besides the extreme cases, some studies are in the middle of the road. These studies produce the most sensible and sizeable argument: the relationship between financial liberalization and growth (output or productivity) is conditional. It depends on economic development, institutional quality and governance, financial development and private sector involvement (Klein and Olivei, 2008; Bailliu, 2000; Bonfiglioli and Mendicino, 2004; Bumann et al., 2013; Trabelsi and Cherif, 2017).

As we discussed earlier, the literature analyzes the role of financial liberalization on economic growth using various components, variables, and methodology. For instance, following the neoclassical growth model, economic growth is obtained through two essential components: capital accumulation and total factor productivity growth (TFP hereafter), which would be affected by financial liberalization and enhance growth. A large body of literature is present on the said mechanisms but with varying evidence. Some researchers favour capital accumulation for economic growth (Mankiw et al., 1992; Barro and Sala-i-Martin, 1995). On the other end, some studies focus on

productivity growth and argue that TFP growth is more important to benefit from financial liberalization (Hall and Jones, 1999; Easterly and Levine, 2001; Kose et al., 2009a; Bonfiglioli, 2008). Some researchers think both components are necessary to attain growth (Bekaert et al., 2011; Edwards, 2001). Besides this literature, few researchers argue that both components must need to get maximum benefits of financial liberalization; however, a country's income level determines which channel is vital for economic growth in which group of the country. (Li, 2012; Bhatia and Sharma, 2019).

In addition to the two conventional determinants (capital accumulation and TFP), some academics give evidence of a third element, the 'composition of capital' or quality of capital, that would boost growth. To increase the explanatory power of the production function, the fundamental concept is to disaggregate capital into quality and quantity. The literature on the relationship between financial liberalization and growth using this component is extremely limited. The relevant literature indicates that the quality of capital can explain a substantial proportion of the variation in national TFP. Furthermore, these studies imply that the composition of capital is a significant determinant through which financial liberalization influences productivity and growth. According to this strand, capital inflows improve the quality of capital, which boosts productivity. (Eaton and Kortum, 2001; Caselli and Wilson, 2004; Leblebicioglu and Madariaga, 2015).

There is extensive literature that focuses on the role of different macroeconomic policies, especially exchange rate regimes, and volatility while analyzing the impact of financial liberalization on economic growth. A vast literature is available on this, however, without any concrete evidence. Some researchers favour fixed exchange rates (no volatility) following liberalization with a low level of financial development to enhance economic growth (Husain et al., 2005; Aghion et al., 2009; Bailliu et al., 2003). At the same time, some studies argue that stable exchange rates are harmful to the economic performance of countries (Levy-Yeyati and Sturzenegger, 2003 and 2005; Coudert and Dubert, 2005).

Based on current literature, this study aims to highlight the importance of the exchange rate volatility and the composition of capital channels for the impact of financial liberalization on economic growth. In other words, we are interested in mediation analysis—we want to analyze the process through which our independent variable (financial liberalization) has an impact on our dependent variable (economic growth) through mediating variables (the exchange rate volatility and the composition of capital).

This analysis helps not just examine the effects of the independent variable on the dependent variable instead explains the actual nature of the relationship between the dependent and independent variables (Hayes and Preacher, 2014). Based on the predictions of the neoclassical growth model and aftermath of the financial liberalization process, we explore that financial liberalization improves capital composition directly or there is some mediation of exchange rate volatility. Moreover, financial liberalization directly affects economic growth, or it works through the exchange rate volatility or increased quality of capital or through both channels. In addition, this study explores the role of governance for the impact of financial liberalization on economic growth. More specifically, we explore the moderating role of governance.

We construct the 'composition of capital index' based on the theoretical model of Caselli and Wilson (2004). They show that the quality of capital is an essential factor that disturbs the economic growth in any economy. They construct a model with capital disaggregation in quality and quantity. This disaggregation of capital enhances the explanatory power of the production function. We obtain the share of the capital of a particular type in total capital stock, determined by its embodied efficiency. The more a country invests in highly R&D intensive equipment type, the higher the capital quality. Eaton and Kortum (2001) and Caselli and Wilson (2004) illustrate that in the world, only a few countries produce equipment that is highly R&D intensive, and the rest of the world import it. That is why we use the import of certain types of capital equipment as a proxy for overall investment in specific capital types. However, following Caselli and Wilson (2004) and Leblebicioglu and Madariaga (2015), we did not focus on only capital importing countries. Instead, we identify investment in a particular type of equipment as a specific capital type gross domestic product minus its export plus import. By doing so, we expand our sample to capital producing and capital importing countries.

As disused earlier, the literature on the impact of financial liberalization on economic growth is unclear. This study fills the gap in the literature by shedding light on the quality of capital proposed by Caselli and Wilson (2004) —financial liberalization enhances economic growth by improving the country's quality of capital stock, that is financial liberalization helps countries to invest in highly efficient and R&D intensive capital which then alters the course of economic growth. On the other hand, the exchange rate volatility leads to volatility in returns and results in a decreased level of investment and economic growth. Further, exchange rate volatility may be affected by any change in

financial flows emanating from financial liberalization policies which in turn may affect the composition of capital as well as economic growth. Moreover, effective and efficient role of governance to amplify the growth enhancing effects of financial liberalization is confirmed in the theoretical and empirical literature.

We include both de jure and de facto measures. The de jure measures are Chinn and Ito's (2008) index of capital account openness (KAOPEN) and Quinn and Toyoda's (2008) capital account openness index (QUINN). The de facto measures we include in our analysis obtained from *External Wealth of Nations* constructed by Lane and Milesi-Ferretti (2007) contain the information of financial flows and capture the actual event of the liberalization process. Using the information on financial flows, we identify how these flows converted into investment and improve the quality of capital. The measures we include are the gross external position (GEP), total liability (TL), and composition of total liability, namely, foreign direct investment liabilities (FDI), portfolio liabilities (FPL), and debt liabilities (debt). The reason to include both measures is that these measures are calculated using different sample size, information source, tell a different story regarding liberalization process and produces systematic different growth results (Quinn et al., 2011).

We include three different de facto measures of exchange rate volatility—first, Reinhart and Rogoff (2004) coarse classification of exchange rate regime (ERR hereafter). Second, the standard deviation of REER (SDER hereafter), and third, Aizenman et al. (2008) exchange rate stability index (FXSI hereafter), we reciprocate this stability index to convert this into volatility index. To analyze the impact of financial liberalization on economic growth directly or through exchange rate volatility and the composition of capital, we use unbalanced panel data for 105 countries from 1976 to 2017, for which the data on import, exports, and production of the specific type of capital goods is available. This is because the main aim of our study is to explore the composition of capital (quality channel). Moreover, the data on exchange rate volatility is needed uninterruptedly. We use a five-year non-overlapping average because average data covers business cycle fluctuations. We follow Biorn's (2004) methodology, a relatively new method to estimate unbalanced panel data; this method is the Seemingly Unrelated Regression (SUR hereafter) model that estimates a system of equations with one-way random effects. We choose this method because it has some crucial advantages and which we never overlooked. For instance, we easily control country-level heterogeneity, and this process

avoids biased estimates. Further, it is more efficient because it contains more information and less collinearity due to the large size of data with more scope (Biorn, 2004; Baltagi, 2005; Demirdogen et al., 2016). Additionally, we use fixed effect method (FE hereafter) to estimate the moderating role of governance for the effect of financial liberalization on economic growth.

We examine the relationship between financial liberalization on composition of capital through exchange rate volatility and conclude that the de jure and de facto measures intensify the exchange rate volatility and hamper the quality of capital. Moreover, these measures confirm the mediation of exchange rate volatility, and financial liberalization works as a catalyst and absorbs the adverse effects of exchange rate volatility and improves the quality of capital.

Further, we scrutinize the impact of financial liberalization on economic growth through composition of capital and conclude that the de jure measures improve the country's quality of capital, yet they harm per capita output growth. On the contrary, the actual capital inflows improve the country's capital quality and boost economic growth. As we were curious about the exact nature of the relationship between the said variable, the mediation analysis confirms the negative impact of financial liberalization on economic growth using de jure measures. At the same time, the de facto measures confirmed the positive partial mediation of the quality channel. Further, these measures intensify the benefits of the quality of capital on the overall economic prosperity.

Moreover, the mediation of exchange rate volatility is confirmed for the impact of financial liberalization on economic growth, and in most cases, it is negative. Finally, the net impact confirms that de facto financial liberalization works as a catalyst and, in most cases, absorb the adverse effects of exchange rate volatility and enhance economic growth.

Further, we explore the impact of financial liberalization on economic growth through both channels of influence (double mediation). The results are mixed. We conclude that with de jure measures, exchange rate volatility intensifies, which abates the quality of capital and economic growth. Further, short-and long-term mediation is confirmed, and official financial flows dampen the adverse effects of exchange rate volatility. Variously, with the de facto measures, financial flows intensify the volatility in the exchange rates except for debt inflows. Besides, this increased volatility in exchange rates reduces

country-wide investment and lessens the country's capital stock quality and per capita output growth. The actual financial flows directly enhance economic growth. At the same time, the quantity of capital (capital accumulation) is crucial for economic growth. In all cases, we found the short-term mediation; that is, actual financial flows work through exchange rate volatility and hampers economic growth. The long-term indirect effect confirms the mediation of capital quality and, in most cases, when financial flows work through exchange rate volatility dampens economic growth. We also conclude that financial liberalization works as a catalyst in the economy, absorbs the adverse effect of exchange rate volatility, and improves per capita output growth.

Finally, we explore the moderating role of governance and we come up with the opinion that de jure measure of financial liberalization hampers economic growth in the economy which have low level of governance. However, with the improved level of governance the financial liberalization contributes positively to the economic prosperity of the country. While the de facto measure of financial liberalization improves economic growth. The conditional effect confirms that financial liberalization matters for economic growth in the presence of better institutions.

1.2 Research Objectives

Based on our discussion in section 1.1, we outline our research objectives as follows:

1) To explore the impact of financial liberalization on capital composition.
2) To investigate the impact of financial liberalization on the composition of capital through exchange rate volatility.
3) To examine the impact of financial liberalization on economic growth through the composition of capital channel.
4) To study the impact of financial liberalization on economic growth through exchange rate volatility.
5) To inspect the impact of financial liberalization on economic growth through both the channels (double mediation) of exchange rate volatility and the composition of capital.
6) To assess the role of governance while analyzing the relationship between financial liberalization and economic growth.

1.3 Research Questions

The research questions of this study are as follow,

1) Does financial liberalization directly affect the composition of capital? Whether the financial flows due to financial liberalization improve the quality of capital?
2) Does there exist any indirect channel (exchange rate volatility) through which financial liberalization affects the composition of capital?
3) Does there exist any indirect channel (exchange rate volatility) through which financial liberalization affects economic growth?
4) What is the relationship between financial liberalization and economic growth? Whether financial liberalization affects economic growth directly or through the exchange rate volatility and the composition of capital channel?
5) What is the role of governance in achieving the growth enhancing effects of financial liberalization?

1.4 Significance of the Study

A vast theoretical and empirical literature explores the relationship between financial liberalization and economic growth. However, no consensus is established so far on the said relationship. There is a debate among researchers on the positive or negative impact of financial liberalization on economic growth. The existing literature uses the neoclassical growth model and studies the effect of financial liberalization on growth (output or productivity growth). The neoclassical growth literature sheds light on the two components of capital accumulation and total factor productivity (TFP) through which financial liberalization has growth-enhancing effects. However, there is still a need to explore the relative importance of these components.

In addition to these factors, Caselli and Wilson (2004) explore a new component which they call the 'composition of capital' (quality of capital). According to them, the composition of capital is an important component, and it helps to explain the important variations in TFP across countries. The empirical literature, which explores the importance of the composition of capital in financial liberalization and growth nexus, is minimal. According to the best of our knowledge, only Leblebicioglu and Madariaga (2015) scrutinize financial liberalization and economic growth through the quality channel; however, they emphasize more on productivity growth. Variously, they use the composition channel for the impact of financial liberalization and economic growth;

however, they only use total liabilities, employ GMM to explore this channel, and do not discuss the significance of the presence of any indirect effect in their study.

Therefore, in this study, we explore this channel in more detail; that is, we want to check whether financial liberalization directly affects composition of capital or works indirectly through exchange rate volatility. Further, financial liberalization directly affects economic growth, or it is affected through exchange rate volatility or the composition of capital or through both channels. In short, the exchange rate volatility leads to volatility in returns and decreases the level of investment and economic growth. Further, financial flows originating following financial liberalization policies affect exchange rate volatility, which may affect the composition of capital and economic growth. Pondering upon the composition of capital, financial liberalization enhances economic growth by improving the quality of a country's capital stock; that is, financial liberalization helps countries invest in highly efficient and R&D intensive capital, which alters the course of economic growth.

Moreover, in recent literature, researchers emphasize some prior arrangements to get maximum benefits from financial liberalization and the effective role of governance is one of them. The literature focuses on the role of governance both public and private. The literature on the relationship between governance, liberalization and growth produces limited results (Kose et al., 2009a). The presence of efficient and effective institutions works as an effective channel between economic actors which restrict the use of political powers to abuse economic activities and helps countries to move on the path of economic growth (North, 1990). This view is supported by several empirical studies (Hall and Jones, 1999; Rodrik et al., 2004; Acemoglu et al., 2001; Wilson, 2015; Fraj et. Al., 2018). Keeping in view this strand of literature, we want to investigate the role of governance while analyzing the impact of financial liberalization on economic growth.

Summing up the above discussion, we want to explore the relationship between financial liberalization and economic growth through various channels, such as exchange rate volatility and the composition of capital. In addition to this, we want to analyze the role of governance for the effect of financial liberalization on economic growth This study aims to enhance the existing literature and fill the potential gap in the existing literature by exploring the above-mentioned channels for the impact of financial liberalization on economic growth. To the best of our knowledge, no study in the existing literature

discusses the said channels through which financial liberalization promotes economic growth.

1.5 Scheme of Study

This study is organized as follows: chapter 2 includes an overview of the existing literature on the nexus of financial liberalization and economic growth. Chapter 3 discusses the theoretical model, econometric model and methodology, data used in the analysis. Chapter 4 discusses the estimation results. Finally, chapter 5 concludes this study.

Chapter 2

Literature Review

In this chapter, we discuss the six different dimensions of literature for the impact of financial liberalization on economic growth

2.1. Introduction

Financial liberalization is the process through which a country opens its capital account and agrees on free capital mobility; that is, capital moves freely across borders. The process of globalization started in the late 80's, and early 90's when developing countries removed the barriers and allowed capital flows to rush into the country. The debate regarding the relationship between financial liberalization and growth is inconclusive after more than three decades. However, some weak consent developed after this debate; financial liberalization policy requires some prior policy shifts to attain maximum benefits.

Financial Liberalization is spurred by the ease of capital controls in developing countries, and these financial flows bring some benefits which are, better allocation of foreign capital and improvement in terms of risk-sharing. There is a strong presumption that developing countries take more advantage of capital flows because they are poor in capital and have a more volatile income growth. The increased financial flows spur growth in countries that are capital scarce (Kose et al., 2009a).

The literature on financial liberalization develops two different views on the perception of liberalization, adopted by developing countries as a policy option. One is the 'allocative efficiency view'. This view relies mainly on the prediction of the neoclassical growth model. According to this view, capital account liberalization produces health effects in the economy as it allows countries to allocate capital efficiently. Capital flows from capital abundant country to capital scarce country as they have higher interest rates. The financial flows into developing countries reduce the cost of capital. It boosts the investment and enhances growth temporarily; however, it increases the standard of living of the people in that country permanently (Fischer 2003; Obstfeld, 1998; Summers, 2000).

The neoclassical growth literature pioneered by Domar (1946) and Solow (1956) motivated the least developed countries (LDC) to liberalize their capital accounts. They predict through their models that capital flows from rich countries to poor countries to get a higher return as LDCs' have a higher interest rate. These predictions have become the pivotal work of McKinnon (1973) and Shaw (1973). They grasp the attention of policymakers and academia and highlights the demerits of 'Financial repression'.

Financial repression is the process in which authorities have control over financial markets; they fix interest rate which is obviously below the equilibrium rate, credit expansion and allocation is also in strict control of authorities. The results of 'financial repression' did not favour the economy as it is negatively related to macroeconomic fundamentals. For instance, low saving rates as returns on savings are uncertain, high inflation, untenable fiscal deficits, exchange rate overvaluation, derisory financial deepening, and most prominent, the risk of a financial crisis.

The solution for this condition of the economy is provided by McKinnon (1973) and Shaw (1973) in their thesis. They believed that financial liberalization could mitigate the hostile effects of 'financial repression'. Financial liberalization is observed as a set of operational reforms and policy measures adopted by policymakers in which they decide to transform and deregulate a financial system that works under market conditions without any financial control. However, this liberalized financial system is supervised under an appropriate regulatory framework. Thus, it includes several measures that should be considered, such as ease of capital controls, allowing foreigners to invest in domestic capital markets and deregulating the domestic banking sector.

Hence, financial liberalization has three dimensions, as noted by Johnston and Sundararajan (1999) and Kaminsky and Schmukler (2003). These dimensions are capital account liberalization, financial market openness, and domestic financial market liberalization (real domestic liberalization/banking sector liberalization). To measure financial openness, there are different indicators used in the literature, such as 'SHARE', 'IMF_BINARY', 'VOLUME', 'QUINN' ', SMLD', and 'KAOPEN'. However, these measures are divided into two broad categories that are de jure and de facto measures of liberalization. (Henry, 2007). The literature on financial liberalization and growth uses both de facto and de jure measures. The reason behind the use of both the measures of financial openness is that they are different from each other in terms of sample coverage,

information source, and actual liberalization process. They also produce systematically different growth results (Quinn et al., 2011).

On the other hand, the alternate view is there with the predictions that allocative efficiency holds only when there is no distortion in the economy, this view is presented by Rodrik (1998). According to this view, increased financial liberalization and increased financial flows are a serious problem to the economic health, as it is a serious impediment to global financial stability (Rodrik, 1998; Bhagwati, 1998; Stiglitz, 2002). These predictions lead to capital controls and the imposition of other restrictions such as Tobin tax on international asset trade.

After reviewing current literature on the liberalization growth nexus, we come to know that literature is spread in various dimensions. As far as our study is concerned, we focus on four different aspects of the literature on the topic of interest that is liberalization-growth nexus. However, studies in these varying strands of literature favor as well as to oppose the two views on the perception of liberalization namely, allocative efficiency and instability view. The strand of literature we discussed in this study are financial liberalization and economic growth, impact of financial liberalization on economic growth through the composition of capital, financial liberalization, exchange rate volatility and economic growth., the role of governance for the impact of financial liberalization on economic growth and collateral benefits of financial liberalization.

Literature focuses on the relationship between capital account liberalization and growth produces equivocal outcomes. On one end, researchers cast doubts on the relationship between financial liberalization and growth and found no relationship among said variables (Rodrik, 1998). However, some researchers provide evidence of a positive correlation between financial liberalization and growth, but it is subtle to measure liberalization used and income level of the economy and estimation technique (Quinn, 1997; Quinn et al., 2001; Gehringer, 2013; Bhatia and Sharma, 2019). On the other hand, some studies found capital account liberalization harmful for the economy (Gourinchas and Jeanne, 2006; Gamra, 2009; Mirdala et al., 2015). The most sensible and sizable argument is generated in the current literature capture the association among capital account liberalization and economic growth is that the relationship between the said variables is conditional and depend upon the level of economic development,

institutional quality, and financial development (Klein and Olivei, 2008; Bailliu, 2000; Bonfiglioli and Mendicino, 2004).

Besides this, some studies focus only on stock market liberalization dates as a measure of financial liberalization. This side of literature comes up with a strong positive association between stock market liberalization and economic growth in general and investment growth in particular (Henry, 2000a, b; Bekaert et al., 2001 and 2005; Li, 2012). However, some studies conclude a shred of mixed evidence on the relationship between financial liberalization and growth. These studies argued that stock market liberalization has positive effects on sectoral growth, which relies heavily on external finance (Gupta and Yuan, 2009; Hammel, 2006).

A large body of literature analyzes the relationship between financial liberalization and economic growth using capital flows to output ratio as a measure of financial liberalization that is FDI/Y and Equity/Y and Debt/Y (Henry, 2007; Kose et al., 2009b and 2010). Studies using FDI/Y as a measure of openness sum up with mixed evidence. According to this strand of literature, financial liberalization has a positive effect on growth; however, this positive relationship holds unless some factors are controlled. For instance, FDI contributes only when human capital is well developed, financial markets are well developed, and education level is high and possible substitutability between FDI and domestic investment (Balasubramanyam et al., 1996; Borensztein et al., 1998; DeMello, 1999; Alfaro et al., 2004, 2010; Aizenman at al., 2012).

The studies using the Debt/GDP ratio as a measure of openness show that debt flows are more volatile than other types of financial/capital flows. These inflows comprise portfolio bond flows, commercial bank loans, etc. These flows are considered to be more volatile than FDI and equity flows, as they are easily reversible during bad times. These studies show that moral hazard in the domestic financial market and unrestricted capital flows can together create a potential for disaster. Further, these studies argue that open capital account can intensify the adverse effects of poor financial sector supervision by allowing banks to expose their balance sheet to currency risk and by permitting them to take a speculative open position in foreign exchange. (Wei, 2006; McKinnon and Pill, 1996 and 1998; Rodrik and Velasco, 1999; Berg et al., 2005; Reinhart and Reinhart, 2008). It is also a matter of fact that this is the only form of international capital inflow

available to certain countries, so they may have little say in this outcome (Eichengreen et al., 2003).

The literature identifies two important modules of economic growth namely, capital accumulation and TFP growth which affects economic growth aftermath of financial liberalization. A large body of literature is present on the said components but with varying evidence. Some researchers think capital accumulation is important for economic growth (Mankiw et al., 1992; Barro and Sala-i-Martin, 1995) while some studies focus on productivity growth and argue that TFP growth is more important to get benefit from financial liberalization (Hall and Jones, 1999; Easterly and Levine, 2001; Kose et al., 2009a; Bonfiglioli, 2008). Some researchers think both factors have necessary to attain growth (Bekaert et al., 2011; Edwards, 2001). Besides this literature, few researchers argue that both components must need to get maximum benefits of financial liberalization however, a country's level of income determines which component is important for economic growth in which group of the country. (Li, 2012; Bhatia and Sharma, 2019).

Besides the two conventional components (capital accumulation and TFP), there is another factor through which financial liberalization promotes growth is 'the composition of capital' (quality channel). There is very scarce literature available on the relationship between financial liberalization and economic growth through this channel. The literature on composition or quality of capital can explain an important share of variation in TFP across countries. These studies further argue that the composition of capital provides a useful channel through which financial liberalization affects productivity. These studies find that capital inflows help to increase the quality of capital, which enhances productivity. (For example, Eaton and Kortum, 2001; Caselli and Wilson, 2004; Leblebicioglu and Madariaga, 2015).

Capital account liberalization improves macroeconomic policies through discipline; that is, it increases the potential cost of weak policies and enhances the benefit of good policies (Kose et al., 2009b, 2010). Many studies show that liberalization causes a sudden shift in investment sentiment globally and makes a country more vulnerable, and it also uses as an indicator for better macroeconomic policies (Bartolini and Drazen, 1997; Tytell and Wei, 2004; Gourinchas and Jeanne, 2006). A large body of literature explores the relationship between financial liberalization and monetary policy and concludes a

negative relationship with inflation and better overall monetary outcomes (Rogoff, 2003; Gupta, 2008; Spiegel, 2009; Tytell and Wei, 2004). However, on the implications of fiscal policy, the literature is scarce and produces mixed results. Some researchers find a negative association of fiscal outcomes with liberalization (Garrett and Mitchell, 2001; Kim, 2003). Moreover, many researchers show that when countries remove the restrictions on outflows, the inflow of capital increases significantly (Mathieson and Rojas-Suarez, 1993; Laban and Larrain, 1997).

The debate in the prevailing literature regarding the choice of exchange rate regime is not new. This topic is important for academic research and policymaking for decades. Theoretical and empirical literature that tries to shed light on this issue whether the fixed exchange rate regime is important for lower macroeconomic volatilities, promote economic performance, or flexible exchange rate regime is important to do so. The evidence generated by these studies is mixed. Some studies thought that countries that open their capital account following a fixed exchange rate with less developed financial markets practice higher economic growth (Husain et al., 2005; Aghion et al., 2009 and Bailliu et al., 2003). Whereas some studies produce an opposite argument that is the fixed exchange rate regime is harmful to countries' economic performance (Levy-Yeyati and Sturzenegger, 2003, 2005; Coudert and Dubert, 2005).

Moreover, recent literature emphasizes on some preliminaries to get maximum growth benefits from financial liberalization and the effective role of governance is one of them. The literature focuses on the role of governance both public and private. The literature on the relationship between governance, liberalization and growth produces limited results (Kose et al., 2009a). The presence of efficient and effective institutions works as an effective channel between economic actors which restricts the use of political powers to abuse economic activities and helps countries to move on the path of economic growth (North, 1990). This view is supported by several empirical studies such as Hall and Jones (1999), Rodrik et al. (2004), Acemoglu et al. (2001), and Wilson (2015).

2.2. Financial liberalization and Economic Growth

Financial liberalization has three dimensions, as noted by Johnston and Sundararajan (1999) and Kaminsky and Schmukler (2003). These dimensions are capital account liberalization, financial market openness, and domestic financial market liberalization (real domestic liberalization/banking sector liberalization). The literature on financial

liberalization and economic growth further divided into three different directions based on the measure of liberalization. In the following subsections we discuss the literature on these dimensions.

2.2.1. Capital Account Liberalization and Growth

The debate in the literature regarding the relationship between capital account openness and economic growth is not new. After more than four decades of debate on the said relationship, researchers did not reach any concrete evidence. Instead, literature produces mixed results. The results produced must be sensitive to the methodology adopted and the measure of liberalization used in the analysis. On one end, some studies cast doubts on the relationship between financial liberalization and economic growth and found no relationship among said variables (Rodrik, 1998).

However, some researchers provide evidence of a positive correlation between financial liberalization and growth, but it is subtle to measure liberalization used and income level of the economy and estimation technique (Quinn, 1997; De Nicolo and Juvenal, 2014). On the other hand, some studies found capital account liberalization harmful for the economy (Ahmed 2016; Gourinchas and Jeanne, 2006). The most sensible and sizable argument is generated in the current literature capture the association among capital account liberalization and economic growth is that the relationship between the said variables is conditional and depend upon the level of economic development, institutional quality, and financial development (Edwards, 2001; Klein and Olivei, 2008).

Most of the studies in this regard find no evidence on the said relationship that is financial liberalization boosts investment or growth. For instance, Grilli and Milesi-Ferretti (1995) cast doubts on the relationship between capital account liberalization and economic growth. Similarly, Rodrik (1998) chooses 100 developed and underdeveloped countries as a sample for his analysis. He wants to analyze the relationship between financial liberalization and growth, and he finds no correlation between liberalization and growth using SHARE. As the growth literature predicts that financial liberalization has growth-enhancing effects through the channel of capital accumulation, he also regresses investment with SHARE, and again he finds no relationship. Rodrik (1998) concludes that countries that impose fewer restrictions on capital movement tend to grow faster or invest more as compared to the countries with greater restrictions on capital account.

Further, Edison et al. (2002), after controlling for certain financial, economic, and policy variables, find no relationship between financial liberalization and growth.

The findings we mentioned above were consistent with the study of Kraay (1998), who broaden the scope of the literature by studying the association between capital account liberalization, inflation, investment, and economic growth comprehensively for 117 countries. He reached a similar conclusion that is there is no relationship between capital account liberalization and economic growth and if there is some relationship, then it would be very week. However, he shows that the results would yield a positive and significant relationship among said variables by employing de facto measures of financial liberalization.

Moreover, Levine and Zervos (1998) test the permanent growth hypothesis that is they test whether capital flows resulting from capital account liberalization have permanent growth effects. Their results do not provide any strong evidence for any such effects. In other words, they did not find any support that capital account liberalization improves economic growth. In addition to this, Klein (2003) do not provide enough evidence on the said relationship. However, he creates an argument using LS estimator that financial liberalization leads to growth only in middle-income countries. Likewise, Hye and Wizarat (2013) for Pakistan did not find any significant long-term relationship. However, they employ the ARDL approach and report the only short-run impact of financial liberalization on economic growth.

On the contrary, the literature on the relationship between capital account liberalization and economic growth concludes growth-enhancing effects. For instance, the study of Quinn (1997) was the pioneer and found a positive impact of capital account liberalization and growth. He constructs a measure of capital account liberalization using AREAR information. Similar conclusions were drawn by Arteta et al. (2001) by using the QUINN measure and found a positive linkage between capital account liberalization and per capita GDP growth. However, they show that this positive association is fragile and purely depends on the measurement of capital account liberalization and what technique is used for estimation.

Similarly, for a sample of 89 countries, Edison et al. (2004) support this strand of literature and establish an argument that capital account liberalization promotes economic growth in developing countries. Likewise, Gehringer (2013) for Europe

produces similar results. However, his study only focuses on the process of monetary (Euro) and economic (EU) integration. Moreover, Honig (2008) reports a positive relationship between capital account liberalization and economic growth by employing different methodologies and a vast sample of 122 countries.

Broaden the scope of literature, De Nicolo and Juvenal (2014) found a positive impact of financial liberalization, globalization on growth that is both globalization and liberalization stimulate economic growth. Their study is the first, which analyzes the impact of financial liberalization, globalization on real activities for 48 emerging and developed countries. They also show that globalization and financial liberalization reduces growth volatility and the probability of a decline in real activities. Correspondingly, studying 18 major developed and emerging economies, Bhatia and Sharma (2019) illustrate that capital account liberalization enhanced growth in both sets of countries when de facto measures were employed. However, by using de jure measures of financial liberalization, the positive relationship becomes insignificant.

Gamra (2009) further dig into this issue and concludes that to get growth-enhancing effects of capital account liberalization policymakers should proceed with partial openness of capital account. Similarly, Mirdala et al. (2015) support the findings of Gamra (2009). For a sample of 23 developed and 77 developing countries, they show that gradual liberalization of the capital account is beneficial for economies.

Besides positive and no impact of financial liberalization on economic growth some studies found that financial liberalization is harmful to economic growth. For instance, Stiglitz (2000) was a great disbeliever of the benefits of financial liberalization. He argues that if financial liberalization policies are adopted too fast, the proclivity of crisis is higher. Similarly, Bhagwati (1998) and Stiglitz (2002) found capital account liberalization followed by increased financial flows is a serious impediment to global financial stability.

Gamra (2009), while working on emerging East Asian economies, argued that the intensity of financial sector liberalization is a key factor to understand the nature of capital account liberalization and economic growth. Countries that open their capital account fully, faced slower growth that is full liberalization of capital account negatively affects growth. Likewise, Mirdala et al. (2015) working on financial liberalization and macroeconomic volatility, show that capital account liberalization is associated with

growth and other macroeconomic variable volatility which implies that full liberalization of the capital account is negatively associated with economic growth.

Moreover, Ahmed (2013) suggests a negative impact of financial liberalization on economic growth for developing countries, especially for the SSA region. He argues that for developing countries financial liberalization is harmful to economic growth because it causes destabilization of the financial system and domestic capital outflows. By employing various measures of liberalization, Ahmed (2016) finds a negative association between financial liberalization and economic growth. In addition to this, by constructing a theoretical model of welfare gain of financial liberalization, Gourinchas and Jeanne (2006) argue that removing the distorting effects of capital controls could exacerbate the negative impact of existing distortions, leading to financial liberalization that undermines growth and leads to a loss of welfare.

There is a debate in the literature that the absence of significant evidence that there is no correlation between liberalization and growth is due to the reason that studies focus on the unconditional correlation between liberalization and growth. The said relationship is not very easy to handle rather, it is complex. The relationship between financial liberalization and growth may be conditional, and it depends on the strength of a country's institution quality and development (Henry, 2007; Kose et al., 2009a).

Klein and Olivei (2008) find a significant correlation between SHARE and growth in developed countries. However, they find no correlation between non-OECD countries. They conclude that to promote growth by liberalization of the capital account in any country, there should be a well-developed environment of institutions. However, Klein (2005) argues that the growth-enhancing effects of capital account openness achieve in countries with better institution quality, not the best institution. Similarly, Edwards (2001) finds a positive relationship between financial openness and growth. He uses Quinn's capital account measure. He further argues that it is necessary to achieve a certain degree of economic development before the liberalization process, to get the benefits of financial openness. Similarly, Bailliu (2000) noted that without a certain level of development in the banking sector growth effects of financial liberalization would not achieve. However, they employ the dynamic GMM method and use a de facto measure of openness that is VOLUME.

In addition to this, Bonfiglioli and Mendicino (2004) results are in favor of capital account liberalization. They illustrate that capital account liberalization leads to economic growth not directly, however, through financial development. Similarly, Ahmed (2016) found a positive impact of financial liberalization and financial development. His findings imply an indirect relationship between financial liberalization and economic growth through financial development. However, by employing granger causality and VECM for Botswana, Ahmed and Mmolainyane (2014) argue that financial liberalization only enhances economic growth when there is a certain level of financial development, sound institutions, and strong macroeconomic fundamentals.

Moreover, Bumann et al. (2013) study emphasize the indirect linkage between financial liberalization and economic growth. They contend that financial liberalization policy may be more beneficial if combine with some reforms that are good governance and sound macroeconomic policies. Trabelsi and Cherif (2017) enhance the current literature by generating an argument that some pre-requisites should be there to get growth-enhancing effects of capital account liberalization and such pre-requisites are private sector involvement in the economy and good quality institutional framework.

2.2.2. Stock Market Liberalization and Growth

The removal of restrictions on capital flows requires a time frame when these restrictions were removed. The researchers focused on the dates of liberalization. By doing so, they narrow down the scope of the problem in that they try to determine the date on which specific aspect of capital account policy is liberalized instead of the date when the entire capital account is opened (Henry 2007). According to Claessens and Rhee (1994), specific liberalization of the capital account is a decision by the policymakers to permit foreigners to purchase shares of companies listed on the domestic stock exchange for the first time and this policy change occurs in the late 1980s and early 1990s'.

Stulz (1999) and Bulow and Summers (1984) extend the neoclassical model of capital account liberalization to the risky asset. They argue that in the absence of uncertainty, it is optimal to invest until the marginal product of capital equates to interest rate. However, risky atmosphere optimality requires that investment takes place until the marginal product of capital is equal to the interest rate and a risk premium to compensate for uncertain returns to capital.

The main issue is whether liberalization reduces the cost of capital, Stulz (1999) discusses two components of cost of capital. First, the domestic interest rate falls as compared to the world interest rate when liberalization is done. Second, aggregate equity premium, before liberalization it equal to the price of risk times the local market return variance. However, it equals the covariance of the local market returns with world market returns times the price of risk. Liberalization reduces the cost of capital if the return volatility of the domestic market is greater than the covariance of the world market and a review of historic returns shows that this condition holds for the emerging market.

Henry (2007) states that for empirical research, we do not observe the cost of capital directly. Instead, we use observed sock prices and there is an inverse relationship between stock prices and the cost of capital. He further argues that the literature observed a one-time revaluation of the stock market if liberalization reduces the cost of capital.

Henry (2000a) while working on a sample of 12 emerging economies, which liberalize between 1986 and 1991, experience revaluation of 26% in real dollar terms on average. Similarly, Kim and Singal (2000) and Martell and Stulz (2003) find a sharp increase in the stock prices as liberalization takes place. However, Karolyi (1998) and Foerster and Karolyi (1999) noted that firms from emerging market economies, when listed on stock markets in developed countries, experienced an increase in their stock prices. They work on the stock market and asset prices, although their results are related to the literature of liberalization and growth. Further, Bekaert and Harvey (2000) find that liberalization reduces the cost of capital, and there is a reduction of stock prices. However, they find that liberalization also results in a fall in dividend yield to 5 to 75 basis points.

There is a strand of literature that captured the behaviour of investment and GDP after liberalization and supports the prediction of the neoclassical model. For instance, Henry (2003) shows that the raw growth rate of the capital stock rises after liberalization. Similarly, Henry (2000b) noted that stock market liberalization leads to an increase in the growth rate of real private investment. He works on the sample of 11 countries and finds that only two countries do not experience high investment growth in the first year following liberalization, and one experience higher investment in the second year after liberalization. Moreover, Bekaert et al. (2005) also support the findings of this literature and finds a positive relationship between equity market liberalization and growth. He concludes that the growth rate of GDP increases per annum after financial openness.

By using OLS and IV techniques on a sample of 95 countries from eight different regions, Li (2012) concludes that liberalization of the equity market improves growth in all countries whether they belong to any income group. Further, the stock market liberalization policy has a significant and positive impact on international capital flows. Moreover, Rejeb and Boughrara (2013) generate an argument based on the efficient market hypothesis that financial liberalization not only improves market efficiency but also helps countries to stabilize. They determine that when the stock market becomes efficient followed by stock market liberalization, capital allocation becomes efficient also which helps stock market development which then promotes economic growth.

Another believer of the benefits of stock market liberalization, Alfaro and Hamel (2007) find a shred of strong evidence that liberalization of the capital market coincides with a significant increase in the import of capital goods, which improves capital stock efficiency and promotes economic growth. Similarly, Biedny (2012) reached on the conclusion that the degree of stock market liberalization has a positive and significant impact on economic growth. however, this study uses the magnitude of stock market liberalization for the first time as prior studies only rely on openness dates.

Moreover, Bekaert and Harvey (2000), Bekaert et al. (2005), and Henry (2000a, b) incorporate the effects of economic reforms while analyzing the relationship between stock market liberalization and economic growth. They find that stock prices, dividend yield, investment, and growth remain statistically and economically significant after controlling for economic reforms. However, Gupta and Yuan (2009), while working on micro-level data, show that stock market liberalization positively affects economic growth across new and existing firms, but some complementary reforms must need to promote competition and improve the efficiency of the capital allocation process.

Obstfeld and Rogoff (1996) discuss that there are some limitations to the use of aggregate data in analyzing the role of international risk sharing. Which is now become important for researchers, and it also has important implications for efficiency and a sound financial and economic environment. Moreover, Chari and Henry (2004) confer that liberalization of the stock market promotes international risk sharing because liberalization changed the set of non-diversifiable risks. For representative investors, share prices should be consistent with the changes in systematic risk. Further, Henry (2007) argues that the cost of capital matters for investment and risk-sharing. It is natural to think about the

importance of risk sharing relative to the fall in the interest rate for an overall change in liberalizing a country's cost of capital. That is why researchers focus on the firm-level data to capture a broader picture of the degree of liberalization, the impact of risk-sharing, and interest rate analyze separately.

The main theme to utilize firm-level data to capture the relationship between stock market liberalization and growth is to get a better understanding of risk-sharing and allocation of capital within countries. To check that any increase in a firm's stock prices resulting from liberalization embodies signals about the impact of liberalization on the firm's fundamentals. If the capital allocation is efficient, then a firm's investment decision should respond to these signals.

The theory of risk-sharing and asset price discussed by Henry (2007) shows two channels through which financial liberalization alters the firm cost of capital. One is the traditional interest rate that falls into a risk-free rate as the economy moving from no liberalization to liberalization. The shocks from this channel are common to all firms. Whereas the second channel has a unique effect on each firm that is the covariance of returns between local and world markets. The greater the difference in covariance, the greater change in the firm-specific cost of capital.

The empirical work supports these two-channel predictions. For instance, working on a sample of 430 firms from 8 countries, Chari and Henry (2004) find that after liberalization firms enjoy a reduction in stock which is about 15% in real dollar terms on average. While one-third of revaluation is explained by the change in firm-specific covariance. Based on these results, they conclude that during the liberalization process firms experience revaluation, and stock price change associated with capital account openness is positively related to the difference of covariance between the local market and world market. Similarly, Patro and Wald (2005) reach a similar conclusion that liberalization causes stock prices to reevaluate.

Proposing a new method to determine the need for external finance in different industries, Rajan and Zingales (1998) show by using firm-level data that external financing helps the industry to grow faster in countries that have more developed financial markets. Similarly, Gupta and Yuan (2009) illustrate that industries that rely more on external finance grow faster following stock market liberalization.

Further, Hammel (2006) supports the findings of former studies. However, his results show that this only happens in countries which have higher stock market capitalization ratio. Li (2010) also reports a decline in the cost of capital after stock market liberalization. He concludes that industry growth increase after the liberalization process in emerging markets. Further, his results show that high dependence on external finance leads the industry to grow faster in terms of real value-added.

The other side of literature on the said relationship using firm-level data rejects the theoretical predictions and show that stock market liberalization has nothing to do with economic growth. For instance, using microdata from 24 emerging economies McLean et al. (2017) reject all theoretical pieces of evidence which argue that stock market liberalization is beneficial for the economic growth of firms as well as of the economy through foreign ownership, better management, more external finance, and higher investment. They show that stock market liberalization does not cause growth or if it does so then there must be some indirect channel that must be overlooked in the current literature. Likewise, O'Connor (2013) by using data of 626 investable firms out of 2014 total firms from 26 emerging countries, concludes that investable firms (mature firms) did not rely on external finance followed by stock market liberalization.

2.2.3. Effect of other Financial Flows on Growth

In this sub-section, we deliberate the literature on the growth effects of other financial flows a country enjoys in the aftermath of financial liberalization. These capital flows were comprising of two broad categories, equity, and debt flows, and these two categories were subdivided into inflows and outflows of foreign direct investment (FDI), foreign portfolio investment, and debt flows. We discussed them separately as well as their joint effects on economic growth.

FDI, Liberalization, and Growth

The interest in discovering the nexus between economic growth and FDI has increased in current literature. The reason behind this intuition is the policy of deindustrialization adopted by developed countries and the conversion of the production processes as a global phenomenon. FDI boosts this internalization of the production process as it integrates countries into the global market (Popescu 2014).

Recent theoretical literature assumes FDI more important for economic growth as compared to other financial flows and it is presumed to be a benefactor of financial liberalization. The theoretical literature argued that FDI improves technology and management know-how which augments domestic physical and human capital stock, which enhance productivity and growth. (Kose et al., 2009b)

The theoretical literature provides a weak explanation regarding the association between FDI and economic growth. The literature explains that the relationship between FDI and growth asserts when there is high technological capital is available besides good infrastructure and employment. Further, investment rates are associated with capital accumulation and the development of human capital.

For example, in endogenous growth literature, Romer (1986) and Lucas (1988, 1993) emphasize the role of human capital to attract foreign investment in developing countries. In addition to this, Findlay (1978) concludes that FDI leads to economic growth in the host country as it increases technological progress, and this could be done through a contagion effect. This effect arises from the interaction of more advanced technology, management practices, and so forth. In the option of Aghion and Howitt (1998), innovation is the key driver of economic growth. Barro (2001) and Lucas (1988) findings are justified by the fact that FDI accelerates the development process through technology transfer and knowledge in the production function.

Anwar and Nguyen (2010) test the two-way linkages between FDI and economic growth by employing different determinants of growth and FDI provided by different theories, for instance, learning by doing, human capital and macroeconomic stability and found that the impact of FDI on economic growth is greater when more resources are invested in education and training, developing financial markets and reducing technological gaps between local and foreign enterprises.

A recent survey of literature by Lipsey (2004) and Moran et al. (2005) show that a large body of empirical literature prospered looking for evidence in support of theoretical benefits of FDI. However, the evidence is mixed. Some studies showed that the growth-enhancing effects of FDI are only achieved in economies that fulfil some initial conditions, or they have achieved some sort of economic reforms in advance. These conditions are human capital accumulation, development of the financial sector, and finally, free trade nurturing policies (Borensztein et al., 1998; Hermes and Lensink, 2003;

Alfaro et al., 2004; Balasubramanyam et al., 1996). DeMello (1999) further added the debate through his argument that, there is substitutability and complementarity between FDI and investment in domestic country and growth effects of FDI will depend on this.

Likewise, some studies favor FDI to enhance growth and support the findings of theoretical literature. For example, Barrell and Pain (1997) works on the relationship between FDI and economic growth in European countries and suggest that FDI is one of the main sources of proclaiming innovative ideas and technology among countries. This process of investment promotes growth and welfare benefits in the host countries. A similar conclusion is drawn by Borensztein et al. (1998) while working on a large cross-country sample. They believe in FDI's beneficial effects on economic growth, especially in developing countries. However, their findings indicate that FDI benefits host countries through technology transfer and enhancing productivity only when countries working on the development of human capital.

Moreover, working on Latin American countries, Bengoa and Sanchez-Robles (2003) supports this strand of literature and argue that FDI leads to economic growth if the receiving country has the capacity to absorb new technology. However, the conclusion drawn by them is sensitive to some prior arrangement or some degree of threshold in the economy. Whereas Choong et al. (2010) find a significant positive association between FDI and economic growth using a vast sample of 51 developing and developed countries.

A good edition in FDI-Growth nexus is by Alguacil et al. (2011), they explore the divergent results produced in the current literature by examining the role of institutional development and macroeconomic stability on the said relationship. Their results provide evidence that the impact of FDI inflows on the host country's economic performance and growth depends on institutional as well as macroeconomic environment and stability in both low income and high-income countries. Besides, Alfaro et al. (2004, 2010) suggested that the development of the local financial sector is important to get maximum benefits of FDI on an economy.

Aizenman et al. (2012) re-think the relationship between capital flows and economic growth pre- and post-global crunch on a large sample and found that FDI inflow improves the host country's economic structure and promotes economic growth. However, they indicate that not only foreign savings benefited the recipient country, the

foreign factor of production that is technological advancement and know-how also important.

On the other hand, some studies point out the role of FDI and economic growth and suggest that there is no relationship between FDI and growth. For instance, Hermes and Lensink (2003) investigate the role of FDI, financial development, and economic growth and argued that FDI does not influence economic growth. They use the data from the least developed countries. However, they provide some evidence that this relationship becomes positive if economies have some degree of financial development.

Similarly, Carkovic and Levine (2005) explore the relationship between FDI and growth. They employ dynamic panel GMM and cross-section OLS on five-year averaged data from 1960 to 1990. They find that after controlling for the joint determination of FDI and growth; there is no robust causal effect of FDI on economic growth. Moreover, Melitz (2005) points out that the main conclusion of Carkovic and Levine (2005) suggests a positive relationship between FDI and growth though, this positive association disappears when they introduce trade and domestic financial credit as the control variable. Moreover, Melitz (2005) shows that FDI and trade flows have a strong relationship, and the interaction of FDI and trade flows are correlated with economic growth. According to him, Carkovic and Levine (2005) results imply that an increase in FDI flows accompanied by a rise in trade could enhance growth. Further, Alvarado et al. (2017) point out that FDI is not promoting growth in Latin American countries, yet this phenomenon only works with high-income countries.

Some studies test cointegration and investigate the causality and its direction for FDI and growth nexus and show mixed results (Sunde, 2017). For example, using the ARDL model, Sunde (2017) tests the direction of causality between FDI and growth in South Africa and found that there exists only one-way causality between FDI and economic growth, that is FDI causes economic growth. However, working on long and short-run macroeconomic fundamentals in Vietnam, Nguyen et al. (2017) established that there exists a two-way causal relationship between the said variables and the impact of GDP growth on FDI is greater than the impact of FDI on economic growth.

Working on FDI and productivity spillovers, several studies provide evidence that horizontal spillovers that are productivity spillovers from foreign firms in the same sector to the domestic firm, in transmitting of productivity benefits of FDI have been

inconclusive. For instance, Haddad and Harrison (1993) work on the sample of Morocco finds that the total effect of FDI on sectoral productivity appears to be small. Similarly, working on Venezuela, Aitken and Harrison (1999), and Djankov and Hoekman (2000) reached the same conclusion. Djankov and Hoekman (2000) analyze Czech Republic data. However, working on a sample of the United Kingdom, Haskel et al. (2007) find that FDI has significant horizontal spillovers to sectoral productivity. Moreover, Keller and Yeaple (2009), using data from the USA; Blalock and Gertler (2005), working on the sample of Indonesia, reached a similar conclusion drawn by Haskel et al. (2007).

On the other side of the picture, Lipsey and Sjolhom (2005), regarding this literature, argue that differences in the results of studies are due to differences in the country's characteristics. These characteristics are differences in human capital quality and quantity, trade and investment policies, competition in different sectors, and the capability to espouse new technology. Moreover, Lipsey (2004) emphasizes the role of the trade regime while studying the relationship between FDI and productivity. He argues that Morocco and Venezuela were closed economies during the period covered in the panel dataset used by Haddad and Harrison (1993) and Aitken and Harrison (1999), respectively.

Rodrik and Velasco (1999) generated an argument based on the former two studies. According to them, FDI has no extra benefit to that country's development. However, Moran (2005) rejects this argument and finds that both countries practiced import substitution based on trade policies during the sample period. He discusses several case studies that showed that to get complete benefits of FDI, there should be no or minimum distortion from trade barriers and other protectionist policies.

Gorg and Greenway (2004) observe that studies employing cross-section data cannot truly establish causality since they are unable to account for differences in productivity across different sectors. They further noted that, if there is an investment by the foreign firm only in high-productive sectors, besides the fact, there are no productivity spillovers, these studies may find a positive relation between FDI and productivity. More importantly, studies working on the relationship between horizontal spillovers do not explain the possibility that foreign firms try to lessen technological spillovers in the same sectors to domestic firms. The reason behind this is, they want to keep their firm level-specific advantages.

Literature also evidences a vertical spillover channel of productivity spillovers, which is the transfer of knowledge from foreign firms to the local supplier and customers. Recent research has been done to explain this stream of literature. For example, Javorcik (2004) employs a semi-parametric estimation to account for simultaneity and selection bias. Using firm-level data and conclude that while there is a positive spillover from FDI occurring through backward linkages and there seem very few spillovers through the horizontal channel. She shows that the spillover effect is economically meaningful; that is, there is a 10% increase in foreign presence in downstream sectors results in a 0.38% increase in output of firms in the supplying industry. However, using different data set and employing different methodologies, several studies find a positive effect of FDI spillovers through backward linkages (Lopez-Cordova et al., 2003; Alfaro and Rodriguez-Clare, 2004; Blalock and Gertler, 2005).

Debt Flows and Growth

Debt flows consider being more volatile than other types of financial/capital flows. These inflows comprise portfolio bond flows and commercial bank loans. These flows consider being more volatile than FDI and equity flows, as they are easily reversible during bad times that are crises. Wei (2006) shows that a sudden reversal of international flows is more likely to occur among countries that rely relatively more on portfolio debt flows including bank loans and less FDI. Likewise, World Bank (2000) observes that short-term bank loans to developing countries are procyclical that is they move with the business cycle, increase during the boom, and vice versa during the recession. Therefore, these procyclical and highly volatile financial flows hurt economic growth.

Moreover, McKinnon and Pill (1996) highlight the problem of over-borrowing by banks in the event of financial liberalization without adequate supervision. They construct a theoretical model and show that moral hazard in the domestic financial market and unrestricted capital flows can together create a potential for disaster. Additionally, McKinnon and Pill (1998) extend their model and show that open capital account can intensify the adverse effects of poor financial sector supervision by allowing banks to expose their balance sheet to currency risk and by permitting them to take a speculative open position in foreign exchange.

There is an interesting fact that countries with unfavourable conditions rely more on short-term external debt in foreign currency as the main source of foreign capital. This

creates weaknesses, especially when financial intermediaries are underdeveloped, poorly supervised, and subject to governance problems (Kose et al., 2010).

Eichengreen et al. (2003) argue that this is the only form of international capital inflow available to certain countries, so they may have little say in this outcome. Berg et al. (2005) review the literature on the risk of short-term debt in foreign currency and show that short-term debt is associated with the likelihood of financial crises. Similarly, Rodrik and Velasco (1999) find that among emerging economies ratio of short-term debt to reserve is a robust prediction of financial crises. They find that countries holding a larger amount of short-term debt to reserve are more likely to experience a sudden and massive reversal in financial flows as larger as three times. Further, they added that the severity of the crisis becomes more acute as exposure to short term debt increases.

However, Diamond and Rajan (2001) hypothesize that banks in developing countries have no choice to overcome liquidity problems through short-term debt to finance the investment projects which are illiquid, and the overall investment environment is not good. This argument implies that developing countries face financial crises which is due to illiquidity and low creditworthiness of investment opportunities, not by the accumulation of short-term debt. Similarly, Jeanne (2003) argues that the short-term debt could serve as a useful determination device to adopt good macroeconomic policies, although debt would of course increase vulnerability to external shocks.

In the option of Bordo et al. (2010), existing literature provides evidence, especially after the ASIAN crisis that foreign currency debt is one of the important causes of the crisis. They checked the effect of debt and economic growth and also test the effect of the crisis, short as well as long term for 45 countries. They concluded that a large amount of foreign debt is associated with a greater risk of crisis and a decline in growth. Similarly, Reinhart and Reinhart (2008) conclude that during the era of 'capital inflow Bonanzas' the expansion of foreign debt raise the probability of a crisis. Besides, Choong et al. (2010) find a negative impact of debt on growth while analyzing the effect of different types of capital inflows on economic growth.

Joint Analysis of the Effect of Different Types of Inflows on Growth

As we discuss in the preceding sub-sections that the relationship between FDI and growth is indecisive, studies find mixed evidence. However, there is strong empirical literature available on the relationship between equity market liberalization and growth. To get a

clearer picture of the relationship between financial liberalization and economic growth, there are two strands of literature that help researchers to look at the other side of the picture namely, the joint effect of financial flows on growth and cost of capital controls.

Working on the relationship between the effects of different flows in a unified empirical framework, Reisen and Soto (2001) find that FDI and portfolio equity flows increase growth. Whereas bond flows and official flows have not increased growth. Their findings constitute a negative relationship between foreign bank lending and both long and short-term growth except in the countries, where financial intermediaries are well developed and capitalized. Moreover, Choong et al. (2010) find a positive role of FDI on economic growth. however, their results do not show support with Reisen and Soto (2001). According to them, foreign debt and portfolio flows have negatively affected economic growth.

However, working on the relationship between capital inflows in a different form and productivity growth rather than output growth, Kose et al. (2009 a) found a strong robust positive association of FDI and portfolio equity flows on economic growth. In line with various studies, they provide evidence of the negative impact of debt on economic growth. Likewise, Durham (2004) found a piece of mixed evidence that FDI and portfolio flow both the asset and liabilities improve a country's growth if the economy has a certain level of financial and institutional development. Equally, Alfaro et al. (2010) accomplished that countries with well-developed financial markets derive maximum benefits from capital flows especially FDI.

2.3. Financial Liberalization, Exchange Rate Volatility and Growth

The most argumentative aspect of macroeconomic policy in developing countries, the choice of exchange rate regime. The two extremes present in the world are criticized in the literature. On one end, the inflexible exchange rate regime was practiced by China. On the other end, South Africa's highly flexible exchange rate regime. Fixed exchange rate regime followed by a tradeoff between monetary independence and stability.

The theoretical and empirical literature has not provided a shred of concrete evidence on the impact of the exchange rate regime and long-run growth. For instance, Obstfeld and Rogoff (1995) argue that economies having a weak financial system and following a fixed exchange rate regime when liberalizing their capital account may be prone to crisis. They further added that capital account openness, fixed exchange regime, and weak

financial markets are not considered favorable combination. Moreover, in the absence of de jure and de facto fixed rates, the contagious effect of the crises arises in the 1990s should be minimized or evaded. Similarly, Fischer (2001) supports the findings of Obstfeld and Rogoff (1995). However, Husain et al. (2005) argued that the fixed exchange rate regime is more important for countries which have less developed financial institution and lack of political stability. Still, their argument lacks any direct evidence for this view.

Broaden the debate on this issue, Eichengreen (2005) says that as China changes its policy of fixed exchange rate regime and moves toward a flexible exchange rate regime, this would help China to get some degree of monetary independence from the USA. However, he noted that in the presence of a weak domestic banking system, liberalization should be a secondary goal for policymakers. Similarly, Prasad et al. (2005) support the argument generated by Eichengreen (2005). They extend the debate by showing the experience of industrial and developing countries. They show that capital account liberalization and fixed exchange rate combination frequently ended either forcefully or by shifting of policy from fixed to the flexible regime.

However, Husain et al. (2005) state that the countries which started the process of financial development, or their financial sector is not much stable before liberalization will not face any problem with fixed exchange rates. They conclude that less developing countries likely to enjoy higher growth and lower inflation following a fixed exchange rate regime.

Similarly, Aghion et al. (2009) support the view of Husain et al. (2005). They present a theoretical model and show that the domestic financial development level helps a country to choose the correct exchange rate regime. They further test the theoretical model empirically by using a vast dataset and comprehensive methodology and elaborate that fixed exchange rate regime enhances growth in less financially developed countries. In contrast, for developed countries, the relationship between financial development, exchange rate regime, and growth is insignificant. Nevertheless, they used productivity growth rather than GDP growth and use different specifications of exchange rate volatility. A rational justification to the findings of Aghion et al. (2009) is provided by Slavtcheva (2015) who develop a micro-founded general equilibrium model. He illustrates that under fixed regime, inflation is lower and hence, the required reserve ratio

by financial intermediaries is low, leading to economic growth. On the other hand, less financially developed countries following the flexible regime practice higher inflation rates, the required reserve rate is also higher, which decreases productivity growth and vice versa for financially developed countries.

There are two extreme overlapping arguments regarding the impact of the exchange rate regime on inflation present in the financial liberalization literature. On one side, researchers argue that the fixed regime reduces prices of tradeable in the economy and saturate monetary discipline and enhance the credibility of the central bank to control inflation. On the other side, at the cost of high inflation, the central bank adopts policies for the short-term which enhance economic growth (Tornell and Velasco, 2000). Husain et al. (2005), Ghosh et al. (2002); Ghosh (2014), and Levy-Yeyati and Sturzenegger (2003, 2005) support the former argument. These studies express that the countries which adopt a fixed exchange rate regime rather than flexible regime practice lower inflation.

There exists another strand of literature that focuses on inflation and economic growth relationship and generates an argument that inflation is harmful to long term economic performance. Grier and Tullock (1989), Fischer (1991, 1993), Barro (1995) affirm that inflation has a substantial effect on the long-term growth of countries that is countries that experience higher inflation rates must grow slower in the long period. Further, Roubini and Sala-i-Martin (1995) construct a theoretical model in which they want to explain the reason for a negative relationship between economic growth and inflation though there exists no direct relationship among the said variables. They argue that the financial sector is taxed (inflation tax) to fill budgetary gaps, and due to financial development, demand for money is reduced, and the government loses seigniorage and inflation tax base collection is reduced. They also show that in countries with tax evasion practices, more tax is imposed, which affects the efficiency of the financial sector due to repression policy by the government. Which therefore increase inflation and lower growth outcomes. A very first study in the literature, which explores the relationship between financial liberalization, exchange rate regime, and inflation, Ghosh (2014) using a sample of 137 countries, found that a high degree of capital account liberalization followed by a fixed exchange rate regime reduces inflation.

Correspondingly, Rodriguez (2017) extends Aghion et al. (2009) model and investigates the role of financial liberalization instead of financial development for the relationship

between exchange rate volatility and economic growth. He finds a negative association between productivity growth and flexibility of exchange rate and this negative effect cancelled out with the degree of financial liberalization. He concludes that poor nations with a low level of liberalization only get benefits in terms of productivity growth when following a fixed exchange rate regime. Moreover, following Aghion et al. (2009) model, Kassa and Lartey (2018) work on a sample of African economies. Their results are in line with Aghion et al. (2009) that is there exists a threshold level of financial development to get maximum benefits of exchange rate volatility on economic growth.

However, working on CEE, especially after the adaptation of Euro as a currency, Ihnatov and Capraru (2012) conclude that a flexible and intermediate exchange rate regime is more beneficial for economic growth than the fixed regime. In contrast, Bleaney and Francisco (2007), while critically analyzed the previous literature on the said relationship, contend that the results generated by previous studies were not robust. Using a sample of 91 developing countries, they sum up the debate that the flexible exchange rate regime and growth are negatively correlated. Besides, Bailliu et at. (2003) supports this strand of literature which produces favorable results on the association between fixed exchange rate regime and economic growth. Their study further emphasizes the strong role of monetary anchor. They show that the absence of an anchor, the intermediate or flexible regime exerts harmful effects on economic growth.

On the contrary, few studies provide evidence on the negative effect of the fixed exchange rate regime on economic growth. For example, Levy-Yeyati and Sturzenegger (2003) use their exchange rate classification and study the impact of exchange rate volatility on economic growth on a sample of 183 countries and illustrate that fixed exchange rate regime lowers growth in developing countries. However, they report no relationship between exchange rate volatility and growth for industrialized countries. Levy-Yeyati and Sturzenegger (2005) also reached a similar conclusion.

On the other hand, Coudert and Dubert (2005) claim that the fixed regime produces volatile growth results as compared to the flexible regime in emerging and major Asian economies. However, Ghosh (2002) discovered that there is no relationship between the exchange rate regime adopted by countries and economic growth, but a fixed exchange rate is some step forward when it comes to stimulating economic growth.

There is a large literature that exerts the impact of nominal and real exchange rate volatility on growth. This strand of literature focuses on the relationship between financial flows and the long-term equilibrium of exchange rate (Coudert and Couharde, 2009). For instance, Elbadawi et al. (2012) show that various studies covering the said topic argue that small and open developing countries which bear the high cost of diversification due to lack of information and low-quality institutions only survive when they maintain real exchange rate to its equilibrium. Similarly, Rodrik (2008) generates an argument that a depreciated real exchange rate would be the second-best solution if a country has a weak institutional framework that penalizes growth through the tradeable sector.

Likewise, Rodriguez (2017) concludes that small open economies opt to adopt a fixed exchange rate regime because financial flows and trade are controlled. He added that a fixed exchange rate combined with good governance and sincere monetary anchor, enhances economic activities. However, the scope of this study is limited as this study only captures Latin American countries. Working on a large sample of developing countries, Combes et al. (2019) found that real exchange rate appreciation negatively affects growth and this negative relationship is an indirect effect of exchange rate on economic growth.

2.4. Financial Liberalization, Composition of Capital and Economic Growth

The neoclassical growth literature focuses on two components through which financial liberalization promotes growth, namely, capital accumulation and total factor productivity (TFP). The predictions of the neoclassical model by Solow (1956) are, when capital account liberalize, it facilitates a more efficient international allocation of resources and produces all kinds of health effects. The resources flow from capital abundant countries to capital scarce countries where the interest rate is high. This reduced cost of capital and results in a temporary effect on growth and investment; however, permanently raise their standard of living (Romer, 2012).

Mankiw et al. (1992) emphasize the role of factor accumulation (capital accumulation and human capital accumulation); they argue that factor accumulation is the key determinant of economic growth. However, the influential paper of Hall and Jones (1999) change the direction of the debate in the literature. They argue that TFP growth is more important than factor accumulation. Similarly, Easterly and Levine (2001), Klenow and

Rodriguez-Clare (2005), and Parente and Prescott (2005) support this argument and consider TFP growth as the main determinant of growth. However, Bosworth and Collins (2003) argue that previous literature analyzing the importance of TFP growth overestimate the importance of TFP. They find that for the short term as well as for long term growth, factor accumulation and TFP both are equally important. Similarly, Bekaert et al. (2011) find both channels as equally important. However, they find that effect of TFP is higher than factor accumulation on economic growth.

The theoretical literature emphasizes that capital mobility allows poor countries to grow faster as they get higher investment. This notion has been challenged by several studies. For instance, Gourinchas and Jeanne (2006) construct a theoretical model regarding welfare gains of financial liberalization and argue that in the presence of capital controls, the gains from capital mobility are minimal and results in a transitory distortion in the economy. As the country with close financial accounts starts accumulating domestic capital, so this distortion vanishes over time. Thus, to capture the benefits of financial liberalization, which results in a permanent decrease in these distortions (capture through interest rate differential) is an overstatement on the benefits of financial openness. They conclude that developing countries have low per capita income due to the reason of less productivity, not because of capital scarcity and they face many other distortions as well. Their findings are like Hall and Jones (1999).

Further, Jones and Olken (2005) find that fluctuations in TFP growth are considered to be the primary determinant for short-term as well as for long term growth. Additionally, Caselli (2005) constructs the theoretical model, which shows that TFP growth is crucial for long-term growth, not capital accumulation. However, he opposes the view that to understand the differences in growth among different nations, capital accumulation is not a factor that explains these differences. Still, this may simply reflect problems in the measurement of factors of production and how they introduce in the production function.

On the contrary, empirical literature explores the relationship between financial liberalization and two sources of economic growth that is capital accumulation (investment) and productivity enhancement and comes up with diverse results which are in line with theoretical literature, that is some supports capital accumulation while other favours TFP to enhance growth following financial liberalization. (Kose et al., 2009b)

Moreover, Edwards (2001) briefly studies the relationship between financial openness and productivity noted that there is some evidence that financial liberalization increases TFP growth; however, the relationship is not robust. On the same pattern, Kose et al. (2009a) analyze the empirical relationship between financial openness and productivity growth rather than output growth. Their sample consists of 67 countries for the period of 1966 to 2005. Using system GMM and both openness measures that is de jure and de facto. They find that economies with a higher degree of capital account openness enjoy higher TFP growth benefits. Their findings suggest that liberalization and TFP growth has a causal effect after controlling for standard determinants of growth.

However, using a cross-country dataset of 70 industrial and developing countries and employing different methodologies, Bonfiglioli (2008) evaluates the association between financial liberalization and two important components of growth, namely, TFP and capital accumulation. She finds a direct and positive effect of financial liberalization on TFP growth. But the results do not support a similar conclusion for capital accumulation. A similar conclusion is drawn by Gehringer (2013) for EU countries. He further noted that these results were sensitive to measure of financial liberalization. A strong significant relationship exerts when de jure measured is used—otherwise, a weak relationship with de facto measures.

Shading more light on this topic, Alfaro et al. (2010) studies the impact of financial flows on economic growth through financial market development and check that whether this relationship works through capital accumulation (human and physical) or TFP improvements. They found that financial flows work through TFP channels to promote economic growth in countries that have a framework of well-established financial markets. However, they only rely on FDI in their study.

Gehringer (2015) further dig into the issue and scrutinizes the relationship between financial liberalization and productivity growth. His work emphasizes productivity differences in different sectors especially manufacturing and services. He is using data from eight EU countries and employing both measures of financial liberalization. He concludes that the growth-enhancing effects (TFP) of financial liberalization were imbalanced. He further argues that these uneven effects were produced due to different effects of financial liberalization on the manufacturing and service sector. He asserts that

financial liberalization has a more positive influence on manufacturing sector TFP growth rather than service sector TFP.

Some researchers favour both channels to get benefited from financial liberalization (Bekaert et al., 2011). Whereas some authors show that the size of an economy is also a determinant while analyzing the role of said relationship (Li, 2012). By employing both financial liberalization measures and using pooled OLS with cross-sectional error correction, Bekaert et al. (2011) analyze the linkage between financial openness and productivity growth. They use both channels of the literature in their analysis namely, capital stock growth and TFP growth, and found that financial openness has a positive effect on both channels, but the effect of TFP growth is higher.

On the contrary, few studies illustrate that the effect of financial liberalization on two channels of economic growth, namely, capital accumulation and productivity depend on the country's income level. For instance, Li (2012) while working on the relationship between stock market liberalization and growth, argues that stock market liberalization enhances growth in developed and emerging countries through productivity improvements. At the same time, poor nations' growth improves when they start accumulating capital. However, by using a different measure of liberalization that is capital account openness and other de jure measures, Bhatia and Sharma (2019) affirm that financial liberalization affects economic growth through capital accumulation in emerging and developing countries while developed countries practice growth effects of financial liberalization through improvements in productivity levels.

Composition of Capital

Besides the two conventional channels through which financial liberalization promotes growth is the 'composition of capital' channel. There is very scarce literature available on the relationship between financial liberalization and growth through this channel.

Eaton and Kortum (2001) state that the world production of capital goods almost produces by a certain small group of countries that are highly experienced in R&D activities, whereas the rest of the world import these capital goods. Caselli and Wilson (2004) construct a theoretical model based on the idea presented by Eaton and Kortum (2001) and investigate the overall differences in the composition of capital stock among countries. They show that the composition and quality of capital can explain an important

share of variation in TFP across countries. They further argue that the composition of capital is to provide a useful channel through which liberalization affects productivity.

However, Alfaro and Hammel (2007) empirically work on the relationship between equity market liberalization and import of capital goods, using data from 79 countries from 1980 to 1997. They find that stock market liberalization is associated with some significant increases in the import of machinery and equipment. They pay little attention to the importance of financial flows to improve the composition and quality of a country's capital stock and thereby foster growth.

Conversely, Leblebicioglu and Madariaga (2015) test the implications of Caselli and Wilson (2004) and assess the importance of quality channel or capital composition channel. They are using data from 60 developing and developed countries from 1976 to 2001. They employ GMM to test the impact of financial liberalization on the composition of capital and growth. Using de jure and de facto measures of openness, they conclude that the quality of capital is positively related to financial openness. In other words, capital inflows help to increase the quality of capital, which enhances productivity.

2.5. Role of Governance for the Impact of Financial Liberalization on Economic Growth

In recent literature, researchers emphasize some prior arrangements to get maximum benefits from financial liberalization and the effective role of governance is one of them. The presence of efficient and effective institutions works as an effective channel between economic actors which restrict the use of political powers to abuse economic activities and helps countries to move on the path of economic growth (North, 1990). This view is supported by several empirical studies (Hall and Jones, 1999; Rodrik et al., 2004; Acemoglu et al., 2001; Wilson, 2015).

North (1990) who praise as an institutionalist in the existing literature identifies institutional quality as the 'rule of game'. He constructs a theoretical model in which he highlights the importance of transaction cost and property rights. His work primarily focuses on the quality of the institution as they help to minimize the transaction cost and transform markets into efficient ones. He illustrates, with efficient institutions economic growth enhanced through the reduction of the transaction cost. Further, he claims that well functioned legal and regulatory environment catalyzes economic growth. Moreover, Fraj et al. (2018) reached a similar conclusion that improved governance directly or

indirectly affects economic growth through property rights and reduction of transaction/operating cost of the project.

In connection with the above debate, Hall and Jones (1999) who primarily work on income differences and output per workers and argue that TFP plays a vital role in economic growth. They also argue that sound infrastructure that is quality of institution and government policies is a factor that causes variations in output per worker and hence growth. In addition to this, Rodrik et al. (2004) sort out the quality of institutions as an important factor if it is absent, it destroys all the theoretical predictions. In other words, when they control the quality of institutions for financial liberalization. it lost the significant effects of financial liberalization on income growth. Furthermore, trade openness has the opposite signs with income growth. Their results show a positive effect of institution quality on financial liberalization also financial liberalization possesses a positive impact on institutional quality.

In the same pattern, while working on the causality effects of provincial governance improvements and economic growth in China, Wilson (2015) finds that there is a significant positive impact of economic growth on quality of governance. Whereas no significant effect of quality of governance on economic progress. Moreover, Besley (1995) claims that better governance has enhanced economic growth by an increase in investment. His argument works in two steps. In the first place, improvement in property rights enhances investors' trust that is, their property is safe from individual or state and at the second stage, institutional efficiency allows better organization which then helps credit markets to remove hurdles and finally market efficiency increases which then facilitates economic changes between individual and business.

Moreover, Alfaro et al. (2008) show that recent literature focusing on institutional quality and governance for growth finance nexus, consider governance as an important factor through which countries attaining income growth. However, they did not work on some specific mechanism through which this relationship holds. They filled this literature gap by providing a channel through which governance affects long-run growth and development and this channel is foreign investment. Likewise, Aron (2000) findings support North (1990). Yet, he thinks reduction in administrative bureaucracy and fights again corruption guarantee property rights which enhance investment and growth.

However, working only on developing countries, Svensson (1998) uncovers that governance and growth have a positive link through investment. Added to the debate,

Fosu (1992) finds a positive linkage between governance and growth. According to him bad governance measures as instability and uncertainty leads to a decline in investment, hurdles economic growth.

On the contrary, using industry-level data and following Rajan and Zingales (1998) methodology, Friedrich et al. (2013) introduce a new concept of governance termed as 'political integration', a four-dimensional view including institutional dimension, policy co-ordination, the attitude of the government and political stability. They contend that political integration explains the differences in the growth after the financial liberalization process. They claim that political integration enhances the benefits of financial liberalization and speeds up the transition process in developing countries. Although, they found no evidence of political integration on growth differentials of industries in advanced economies. The reason for this intuition is simple, advanced countries have better institutions so political integration loses its relevance.

By using country-level data and panel data methodology, Abiad et al. (2009) concluded that institutional quality has partially explained the difference in growth between Europe and the rest of the world. However, Njikam (2017) comes up with a similar conclusion while working on SSA economies that financial liberalization's positive effects on growth are conditional upon the level of governance.

Kunieda et al. (2011) extend the theoretical as well as empirical literature by expanding the work of Tornell and Velasco (1992). They find strong support both theoretically and empirically on the relationship between liberalization, governance, and growth. They found that if in a country, government corruption and weak institutions are less frequent, financial liberalization enhances growth and vice versa. Correspondingly, Nawaz et al. (2014) enhance the existing literature and developed a theoretical model and portray that cost of capital decreases as a result of better governance which enhances growth and vice versa. The empirical evidence is also in line with theoretical findings. However, the magnitude of the empirical relationship between governance and growth is subject to economic development in the country. In contrast, Rachdi et al. (2018) test different indicators for measuring governance in the MENA region and conclude that financial liberalization directly enhances growth, and this relationship is no influenced by institutional quality except for democratic reforms and rule and order conditions in MENA.

2.6. Collateral Benefits of Financial Liberalization

Mishkin (2006) and Kose et al. (2009b, 2010) identifies different indirect channels through which the benefits of financial openness should be achieved. Kose et al. (2009b and 2010) while reviewing the literature on the said relationship; that is financial liberalization and growth, discuss that financial openness in the literature is supposed to enhance growth through increased financial flows, which is accepted as the direct channel (as discussed in the preceding sections).

However, the literature on growth also identifies some indirect channels which are more important than the direct channel to get the benefits of financial liberalization. They show that literature highlight three main channels through which benefits of financial liberalization in promoting growth could be achieved. These channels are some prior arrangements any country could be made before liberalization to get desired outcomes from financial openness as suggested by theories. These channels are financial sector development, institutional quality/governance, and macroeconomic policies. We discuss the literature on these policies in detail in the following subsections.

Financial Sector Development

Financial liberalization catalyzes domestic financial market development, and it is measured through the size of the banking sector and stock markets as well as supervision and regulation in the financial sector. Foreign bank ownership is considering to be beneficial by a large theoretical literature. The reason is that there are several benefits any economy could get through them (Levine, 1997, 2005; Mishkin, 2006).

Mishkin (2006) observes some important benefits such as, improvement in regulatory and supervisory framework of the domestic banking industry, ease of access to international financial markets, decreases the government influence on the financial sector which helps to improve loans quality, and introduction of new financial instruments and new technologies which enhance healthy competition hence the quality of services.

Several empirical studies concluded by employing several methodologies using different data sets and case studies that foreign banks presence in any economy raise competition and decline overhead costs and profit in domestic as well as in foreign banks (Claessens et al, 2001; Errunza, 2001; Levine, 2001; Claessens and Leaven, 2004; Clarke et al, 2003;

Schmukler, 2004). However, Detragiache et al. (2008) argue that when we are accessing the benefits of foreign bank entry in any economy, we should not control this principle, that evidence of foreign bank in a very poor country could wipe out domestic bank thus, creates harmful effects on small and medium-sized firms as they have limited access to financing.

In recent literature, there is a presumption that foreign entry into the domestic stock market increases efficiency. Empirical literature supports this channel. For instance, Levine and Zervos (1998) using data from 16 emerging economies and employ an event study approach. They find that after liberalization, stock markets become large and more liquid. Similarly, Karolyi (2004) noted that the growth of American depository receipts (ADRs) in emerging economies have a positive impact on the development of the stock market in the domestic country.

A vast literature showed the importance of financial liberalization in attaining overall financial sector development. For instance, Mishkin (2006) analyzes various direct and indirect channels through which liberalization could have a positive impact on financial sector development. He further noted that foreign financial institutions could lead to an improvement in the quality of domestic supervision and could be instrumental in the reform of regulatory institutions. Bailliu (2000) and Klein and Olivei (2008) show that financially integrated economies enjoy a higher degree of financial sector development as compared to low or ill liberalized countries.

However, Chinn and Ito (2006) by employing a cross country regression framework, provides one possible explanation to present misconception while finding the benefits of financial liberalization. They find that unless and until there is some moderate level of legal and institutional development, financial openness did not contribute to equity market development, and less developed countries do not necessarily gain these benefits. Similarly, Bekaert et al. (2005) find a positive impact of financial liberalization (stock market and capital account liberalization) on economic growth, argue that this relationship exerts when there is a good quality of institutions along with better macroeconomic policies, human capital, and most important financial market development.

Trabelsi and Cherif (2017) further explore this issue and explore the impact of capital account liberalization on financial sector development. They illustrate to get the benefits

of financial liberalization on financial sector development some prerequisites would require namely, private sector involvement and institutional environment. Likewise, Chinn and Ito (2002) illustrate that one should notice the effects of financial liberalization and financial development if there is an environment of a better quality of the institution and legal framework. However, he uses stock market development only.

Correspondingly, Prasad et al. (2007) advocate some threshold level of financial market development to get maximum growth benefits from financial liberalization especially in developing countries. However, using Rajan and Zingales (1998) methodology on industry-level data of 61 countries, Guiso et al. (2004) conclude that financial sector development work as a catalyst for economic growth in Europe. Their findings also show that financial sector development enhances growth and enhance the effects of financial liberalization in any economy.

Macroeconomic Policy

Capital account liberalization improves macroeconomic policies through discipline that is it increases the potential cost of weak policies, and it enhances the benefit of good policies (Kose et al., 2010). Many studies show that liberalization causes a sudden shift in investment sentiment globally and makes a country more vulnerable and it also uses as an indicator for better macroeconomic policies (Bartolini and Drazen, 1997; Tytell and Wei, 2004; Gourinchas and Jeanne, 2006).

Rodrik (2001) and Tytell and Wei (2004) find that if the investment is driven by herding, momentum trading, or other patterns that are not related to economic fundamentals, the policy discipline effect would be weaker. However, Stiglitz (2000 and 2002), who is a great disbeliever of the benefits of financial liberalization, accepts macroeconomic policies as one of the most important indirect channels through which benefits of liberalization are achieved efficiently.

Many studies explore the fiscal and monetary policy effects for financial liberalization and growth nexus and produce mixed results. For instance, Rogoff (2003) comes with a strong argument that there is increased competition in the goods and labour market (price level falls and wages increased) due to the wave of financial openness. Thus, it reduces or minimizes the short-lived real effects of unanticipated monetary policy. Further, Hawkins (2005) noted that after liberalization is done, uncertainty about the output gap, inflation gap, and monetary transmission mechanism increases. It is not clear that these

factors improve monetary policy outcomes. However, it is worthwhile that emerging markets have succeeded in developing more independent and inflation focused central banks.

Moreover, Gupta (2005, 2008) affirms that the disciplinary effects of financial liberalization on monetary policy. He constructs a theoretical model that provokes a negative linkage between financial liberalization and inflation. Further, they test the implications of the theoretical model empirically and confirms theoretical prediction. However, both studies use different samples and various econometric methodologies. Using a sample of 127 countries, Spiegel (2009) comes up with a similar conclusion that is financial liberalization leads to disinflation. However, he uses different financial liberalization measures especially a new one called financial remoteness.

On the fiscal policy implications, the literature is very scarce. Garrett and Mitchell (2001) working on OECD countries and find that financial liberalization may bear a negative relationship with government spending. However, their evidence is weak. Similarly, Kim (2003) finds that capital account openness reduces government deficit. These two studies only use the de jure measure of openness and ignore endogeneity problems, spurious correlation, and reverse causality.

In connection with the previous debate, Toderascu and Gavriluta (2018) suggest that financial liberalization, fiscal policy, and growth were interlinked and increased financial liberalization increased the importance of good policies. Financial liberalization improves the composition of government debt and augments risk-sharing by increasing the share of foreign debt in total debt. Similarly, Furceri and Zdzienicka (2012) argue that financial liberalization affects government debt composition. However, Gemmell et al. (2011) show that fiscal policy effects on economic growth were ambiguous and depends on their nature.

On the contrary few studies explore the relationship of financial liberalization on both policies. For example, Tytell and Wei (2004) examine the relationship between financial liberalization and both monetary and fiscal policy using de jure measures of financial liberalization for a sample of 62 countries including developed countries. Their findings support better monetary disciplines that are countries with a higher level of financial liberalization enjoy lower inflation and better monetary outcomes. However, their results do not show any support for fiscal policy outcomes. Similar results were produced by

Nair (2012), who works on the association between financial liberalization and both policies in India.

2.7. Gap Analysis

Overall, the literature for the impact of financial liberalization on economic growth is diversified and with no consensus. The neoclassical growth model highlights the importance of different components (factor accumulation and TFP) and variables to enhance growth, yet the results are mixed. The composition of capital (quality of capital), a relatively new component that affects productivity and growth, highlights in the theoretical literature; however, the empirical literature is scarce. According to best of our knowledge only one empirical study of Leblebicioglu and Madariaga (2015) explore this channel using GMM with only one de facto measure and do not highlight the significance of indirect channel The theoretical literature shows that financial liberalization enhances economic growth by improving the country's quality of capital stock. On the other hand, any variation in financial flows originating from financial liberalization policies may affect exchange rate volatility. Further, exchange rate volatility leads to uncertainty, which converts the profits of businessmen volatile. They, in return, slowdown economic activities, causing a decrease in investment and economic growth. Moreover, the literature on financial liberalization on economic growth did not explore the channels of exchange rate volatility and the composition of capital. Therefore, this study attempts to explore the exchange rate volatility and the composition of capital channels through which financial liberalization affects economic growth. In addition to this, theoretical literature highlights the importance of good governance to achieve the growth enhancing effects of financial liberalization, however, the empirical literature produces limited results.

This study aims to fill the above-mentioned gaps in the literature and investigates the impact of financial liberalization on economic growth through the mediating variables (exchange rate volatility and composition of capital). Additionally, this research examines the moderating role of governance for the said relationship.

Chapter 3

Methodology and Data

In this section, we discuss the research methodology and data to be used in this study. That is, we analyze the impact of financial liberalization on economic growth, directly or through the channels of exchange rate volatility and the composition of capital.

3.1 Theoretical Background

This study aims to explore the association between financial liberalization on economic growth through various channels, namely the exchange rate flexibility and the composition of capital channel. In this section, we discuss the theoretical background of our study. We start with the prediction of the neoclassical growth model on the effects of financial liberalization. The neoclassical model is pioneered by Solow (1956). Following Romer (2012), Barro and Sala-i-Martin (1995), and Henry (2007), we assume Cobb-Douglas production function with labour augmenting technological progress.

$$Y = F\,(K, AL) \tag{3.1}$$

where Y is total output, K is capital stock, and AL is effective labour. Explicitly, equation (3.1) can be written as,

$$Y = K^{\alpha}(AL)^{1-\alpha} \tag{3.2}$$

where α is the share of capital and $(1-\alpha)$ is the share of labour.

Expressing the above model per unit of effective labour,

$$\frac{1}{AL}Y = \frac{1}{AL}(K^{\alpha}AL^{1-\alpha})$$

$$y = f(k) = k^{\alpha} \tag{3.3}$$

Where, $y = {}^{Y}/_{AL}$ is the output per unit of effective labour. k= ${}^{K}/_{AL}$ is the amount of capital per unit of effective labour.

We assume that labour (L), capital stock (K), and knowledge (A) change over time. The initial level of K, A, and L are known and positive. Further, L and A grow at a constant rate, n, and g, respectively.

$$\hat{L}_t = n \tag{3.4}$$

$$\hat{A}_t = g \tag{3.5}$$

where $\hat{L}_t$ is the labour growth rate and $\hat{A}_t$is the growth rate of knowledge that is total factor productivity.

The output is divided into two parts, which is consumption and investment. Savings (s) is the fraction of output converted into investment and it is assumed to be given. We interpret it as one unit of output saved becomes part of the investment and as a result, increases the capital stock of a country by one unit. The existing capital stock should be depreciated at the rate of δ.

$$\widehat{K}_t = sY_t - \delta K_t \tag{3.6}$$

We add all other factors in the equation (3.6), namely L which grows at the rate 'n', and total factor productivity (A) which grows at the rate 'g'. Savings increase capital stock means that the more the savings, the more amount available for investment which implies more capital stock in a country. On the other hand, depreciation 'δ', a growing labour force or population growth 'n', and rising knowledge 'g' negatively impact capital stock[1] that is they all decrease the capital stock of a country. Then, capital per unit of effective labour $\hat{k}_t$ is expressed as

$$\hat{k}_t = sf(k_t) - (n + g + \delta)k_t \tag{3.7}$$

This is the main equation of the neoclassical model[2]. This equation states that the capital stock per unit of effective labour changes due to two factors, namely actual investment $\boldsymbol{sf(k_t)}$ and breakeven investment $\boldsymbol{(n + g + \delta)k_t}$ which is the amount of investment just made to keep capital (k) at the current level. This happens because of two reasons, first is depreciation, the decreasing stock of capital by the amount δk. To keep k constant, new capital is required to replace the existing stock of capital. Second, the number of

[1] See Appendix A3

[2] See appendix for detail derivation of neoclassical model A3

effective labour (AL) increases at the rate of n + g[3], to keep capital at some steady level, capital stock' must grow at the rate same rate at which per unit of effective labour grows. That is, k should grow at the rate $(n + g)\, k_t$

At $\hat{k}_t = 0$, $sf(k_t) = (n + g + \delta)k_t$, the economy is said to be at a steady-state, that is all factors grow at some constant rate and when actual investment expressed in per unit of effective labour exceeds breakeven investment, that is $sf(k_t) > (n + g + \delta)k_t$, k is rising and vice versa. This is shown in figure A1.[4]

Finally, when we apply the first-order condition to the equation (3.7) at the steady-state level concerning k_t to obtain the marginal product of capital at the steady-state level, we get

$$f'(k_{ss}) = r + \delta \tag{3.8}$$

where, $f'(k_{ss})$[5]is the steady-state marginal product of capital. $\boldsymbol{r}$ is the cost of capital and $\boldsymbol{\delta}$ is the rate of depreciation.

The above equation is a general condition for investment and to understand the predictions of the neoclassical model after financial openness. This equation explains the post-liberalization subtleties of growth and the country's investment. This is because the model predicts that the rate of interest 'r' is an important actor and liberalization works through the cost of capital (r). Capital account liberalization is beneficial to the economy as it allows countries to allocate capital efficiently. Capital flows from capital abundant country to capital scarce country as the latter have higher interest rates. The financial flows into developing countries reduce the cost of capital, which results in an increased standard of living of the people and boost the investment in the country while growth enhances temporarily (Fischer, 2003; Obstfeld, 1998; Summers, 2000).

The main assumption to capture the impact of capital account liberalization in the neoclassical framework is the international interest rate (r^*) which is exogenous, and it is less than the domestic interest rate (r). This is because the world has abundant capital as compared to a domestic developing country. It is also assumed that a domestic country is small enough and has no influence on r^*. In the presence of these assumptions, when a

[3] Appendix A3
[4] Appendix A3
[5] Appendix A3

country opens its capital account it receives the bulk of the financial flows from the rest of the world. The owners of the capital take the advantage of the interest rate differential; that is, the rate of return in the domestic country and it is higher than the world rate of return ($r > r^*$). As we look at the model, there are no barriers it implies that the inflow of capital helps the country to move from a steady-state before liberalization to a new steady-state level after liberalization and this new steady-state level is higher than the previous one. It happens because 'r' falls as more and more capital enters the country and becomes equal to r^* and at this new steady-state marginal product of capital is

$$f'(k_{ss\,new}) = r + \delta \tag{3.9}$$

A very unappealing feature of this model is the immediate shift in the steady-state level because capital stock installation is very speedy in the country which is not sensible (Henry, 2007). As we look carefully at the model before and after liberalization, we see that capital stock increases temporarily. However, the change in the steady-state level has some important implications and these important inferences about the transition dynamics tell us that during the process of capital accumulation a time comes when the growth rate of capital is higher as compared to the before or after financial liberalization. This happens because when we compare pre-and post-financial liberalization steady-state equilibrium capital grows at a constant rate n + g, whereas the quantity of capital stock at post-liberalization steady-state (k_{new}) is higher than the pre-liberalization level of capital stock at steady state point (k_{old}). This seems that growth in the capital stock should be greater than (n + g) during this process.

As we see that the capital per unit of effective labour will increase temporarily, it provides an important implication for a country. The reason behind this temporary growth in $\hat{k}_t$, is the growth rate of output per worker.

$$y_{Y/L} = \alpha\left(\frac{\hat{k}}{k}\right) + g \tag{3.10}$$

we see that the growth rate of output y, which is $\left(\frac{\hat{k}}{k}\right)$ exceeds (n + g) during the transition period and it is greater than 0. Thus, the growth rate of output per worker also increases temporarily.

The neoclassical literature focuses on two factors through which globalization promotes growth, namely capital accumulation, and total factor productivity (TFP). For example,

Mankiw et al. (1992) emphasize the role of factor accumulation (capital and human capital accumulation); they argue that factor accumulation is the key determinant of economic growth. However, the influential study of Hall and Jones (1999) changes the direction of the debate in the literature. They argue that TFP growth is more important than factor accumulation. Similarly, Easterly and Levine (2001), Klenow and Rodriguez-Clare (2005), and Parente and Prescott (2005) support this argument and consider TFP growth as a main determinant of growth.

Gourinchas and Jeanne (2006) and Caselli (2005) develop a theoretical model that shows that TFP growth is crucial for long term economic growth rather than capital accumulation. However, Caselli (2005) opposes the view, that to understand the differences in growth among different nations, capital accumulation is not a factor that explains these differences. They further argue that it is the problem of measurement of factors of production and how they incorporate in the production function.

The theoretical literature emphasizes that capital mobility allows poor countries to grow faster as they get higher investment. This notion has been challenged by several studies. For instance, Gourinchas and Jeanne (2006) argue that in the presence of capital controls the gains from capital mobility are minimal and they result in a transitory distortion in the economy. Moreover, they state that a country, with close financial accounts, starts accumulating domestic capital, so this distortion vanishes over time. Thus, to capture the benefits of financial liberalization, which results in a permanent decrease in these distortions (capture through interest rate differential), is an overstatement of the benefits of financial openness. They conclude that developing countries have low per capita income due to the reason of less productivity or besides capital scarcity they face many other distortions as well, such as capital controls, low quality of human capital, etc. Their findings are consistent with Hall and Jones (1999).

Exchange rate Volatility

We follow Aghion et al. (2009) simple framework extended by Rodriguez (2017) in which they show how exchange rate volatility along with financial openness influence productivity growth. Aghion et al. (2009) model highlights that excess volatility in

exchange rates in an economy affects businessmen's profits, leading to a decrease in country-wide investment levels, hence lowering productivity growth[6].

Composition of Capital

Caselli and Wilson (2004) introduce the concept of composition of capital or quality of capital. According to them "labour is disaggregated in development accounting exercise in raw labour and human capital or skilled or unskilled labour. This is done to enhance the explanatory power of the production function and succeed in understanding the income differences across countries". Caselli and Wilson (2004) extend the literature by proposing a disaggregation of capital in nine equipment categories.

We will not directly measure the quantities of equipment (by different types) installed in any country because it is not available. Eaton and Kortum (2001) show that most of the world's capital is produced by a small number of countries that are highly R&D intensive, while the rest of the world import the equipment from the R&D intensive countries. This suggests that the import of a certain type of capital is used as a proxy for overall investment in a particular type of capital.

Caselli and Wilson (2004) raise two questions that arise due to the variations in the composition of capital. First, what explains cross country investment share differences in different types of equipment? Second, can these differences in the composition of capital help countries to fill the cross-country unexplained gaps in labour productivity? to address these questions Caselli and Wilson (2004) write down a simple model of investment in heterogeneous types of capital. This model suggests that the share of different types of capital in total investment depends on embodied efficiency and on the degree of complementary with other inputs whose abundance varies across countries. We reproduce this model following Caselli and Wilson (2004).

Let us begin with a country i producing Y amount of output using x_p intermediate goods with the following technology

$$Y_i = B_i\left[\sum_{p=1}^{P} x_{ip}^{\gamma}\right]^{1/\gamma} \qquad (3.11)$$

where Y_i is the total output of country i. B_i is the total factor productivity of country i. x_{ip} is the intermediate goods. γ is the degree of substitutability. γ is assumed to be less

[6] The derivation of Aghion et al. (2009) model is in Appendix A3

than 1 ($\gamma < 1$). p is the number of different intermediate goods. Production of P intermediate goods is done by the following production function,

$$x_{ip} = A_{ip}K_{ip}^{\alpha}L_{ip}^{1-\alpha} \quad 0 < \alpha < 1, \tag{3.12}$$

A_{ip} is the productivity of sector p, L_p is the quantity of labour and K_p is the quantity of capital used in the production process of intermediate input p. α is the share of capital and $(1-\alpha)$ is the share of labour used in the production of x_{ip} intermediate goods. Caselli and Wilson (2004) assume that capital is heterogeneous, that is there are several types of capital denoted by P and all are product specific[7]. It means, that each type of product will utilize different types of capital. In other words, intermediate good p is produced by using type p capital. For instance, equipment type 'truck' the intermediate good 'x' corresponds to the truck (say, road transportation) obtained by combining workers with trucks. For equipment type computer, 'computing service' is the corresponding intermediate good 'x'. this is the case that the intermediate goods we take do not easily map into sectors or industries. However, these intermediate goods use in various activities such as transportation and computing, and others which generate output in different sectors. Simply, every intermediate good is classified by equipment type which is used for its production. γ is assumed to be less than one ($\gamma < 1$) which means that all activities involved in the production of the overall country's output are imperfect substitutes.

Another important assumption is about productivity. A_p, which is product specific productivity, assumed to be embodied in p-type capital. It varies with the variation in research and development (R&D) intensity among capital p. It means that A_p increases for higher R&D intensive type capital. Caselli and Wilson (2004) further assume perfect labour mobility across the production of intermediate inputs, P. The optimal choice of factors by the producers requires that the marginal product of capital and labour (MP_k and MP_L) must be equal in all intermediate sectors. Thus, the equilibrium condition is given as follows:

$$\xi_{ip} = \frac{K_{ip}}{K_i} = \frac{A_{ip}^{\gamma/(1-\gamma)}}{\Sigma_j A_{ij}^{\gamma/(1-\gamma)}} \tag{3.13}$$

[7] We use five categories of equipment. Details are given in Appendix A2

$(\frac{K_{ip}}{K_i})$ is the share of type p capital in the capital stock. K_i is the total capital stock of country i. This expression illustrates that countries tend to invest in that capital type which embodies higher efficiency.

Now, Y_i, the aggregate output should be written in the light of the above assumptions as,

$$Y_i = B_i K_{ip}^{\alpha} L_{ip}^{1-\alpha} \left[\sum_p A_{ip}^{\gamma/(1-\gamma)}\right]^{\gamma/(1-\gamma)} \quad (3.14)$$

$$Y_i = B_i QC_i K_{ip}^{\alpha} L_{ip}^{1-\alpha} \quad (3.15)$$

$$\text{Where, } QC_i = \left[\sum_p A_{ip}^{\gamma/(1-\gamma)}\right]^{\gamma/(1-\gamma)} \quad (3.16)$$

Equations (3.14) and (3.15) are the same. QC_i in equation (3.15) is interpreted as, the quality of capital stock. Caselli and Wilson (2004) called this quality of capital stock (QC_i) as 'composition of capital index'. Aggregate output (Y_i) depends on both quantity of capital (K_i) and quality of capital (QC_i), which also determines the relative efficiency of different types of capital. A higher value of QC means a higher quality of capital which results in higher output.

Overall, the above discussion highlights the importance of financial liberalization to boosts investment and economic growth. However, exchange rate volatility leads to volatility in the returns and hampers investment and growth. Moreover, increased financial flows resulting from the financial liberalization policy affect exchange rate volatility, which in return disturbs the investment levels, more specifically, the composition of capital as well as economic growth. Mediated on the composition of capital, financial liberalization affects economic growth by improving the quality of a country's capital stock; that is, financial liberalization helps countries to invest in highly efficient and R&D intensive capital goods, which amends the course of economic growth.

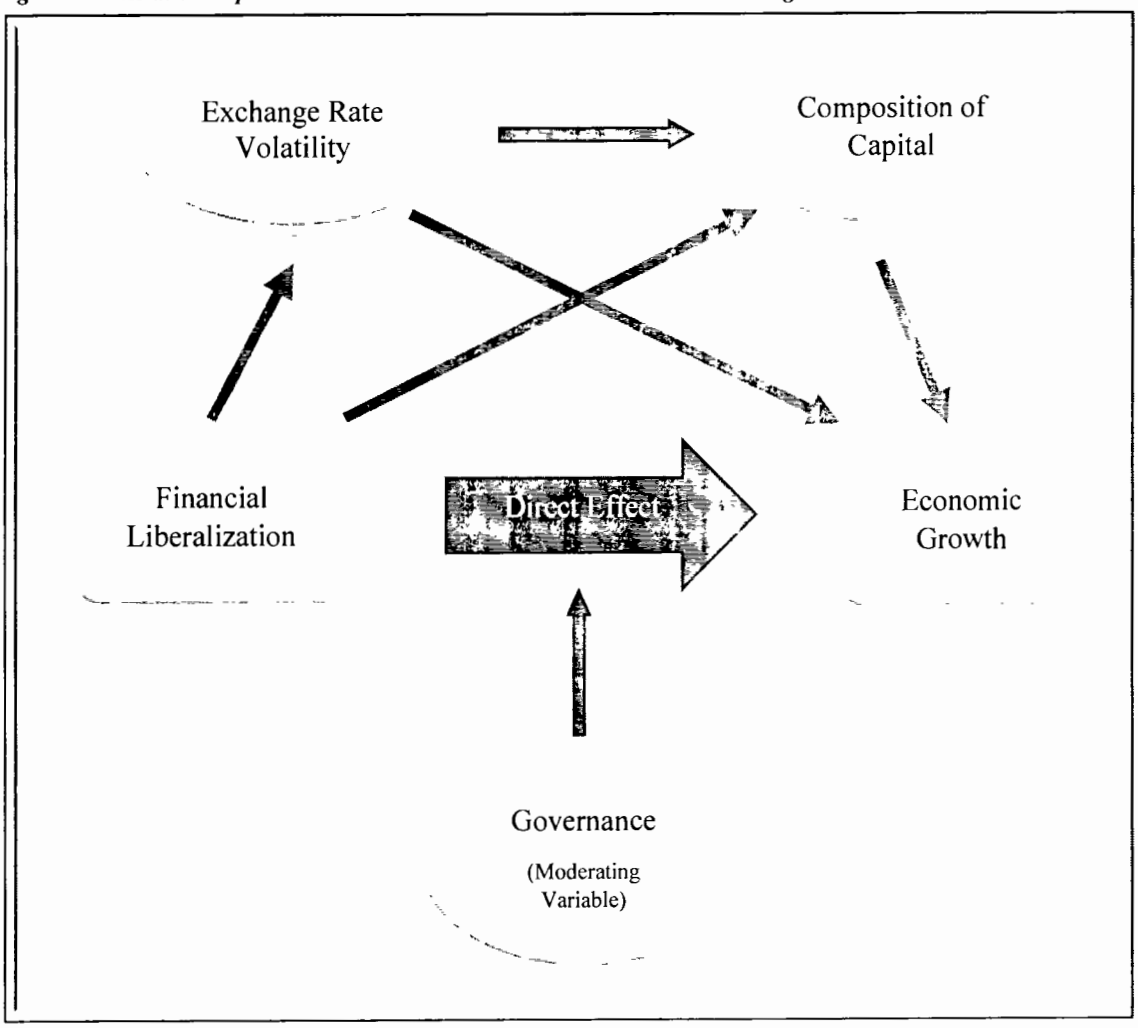
3.2 Model

We discussed in detail that there are various channels through which financial liberalization affects growth in the neoclassical growth literature. These channels are factor accumulation and TFP. However, some important channels are ignored in the existing literature, namely, exchange rate volatility and the composition of capital. In this study, we want to analyze the role of these channels while studying the relationship

between financial liberalization and economic growth. Further we want to analyze the role of governance for the effect of financial liberalization on economic growth. In this section, we discuss the model used to analyze the said relationship through exchange rate volatility, the composition of capital and governance. In addition. This relationship is shown in figure 3.1.

We are interested in mediation and moderation analysis; that is, we want to analyze the process through which our independent variable (financial liberalization) has an impact on our dependent variables (composition of capital and economic growth) through mediating variables (the exchange rate volatility and the composition of capital). This analysis helps not only to examine the effects of the independent variable on the dependent variable but explains the actual nature of the relationship that exists among the dependent and independent variables (Hayes and Preacher, 2014).

Figure 3.1: Relationship between Financial liberalization and Growth through Various Channels

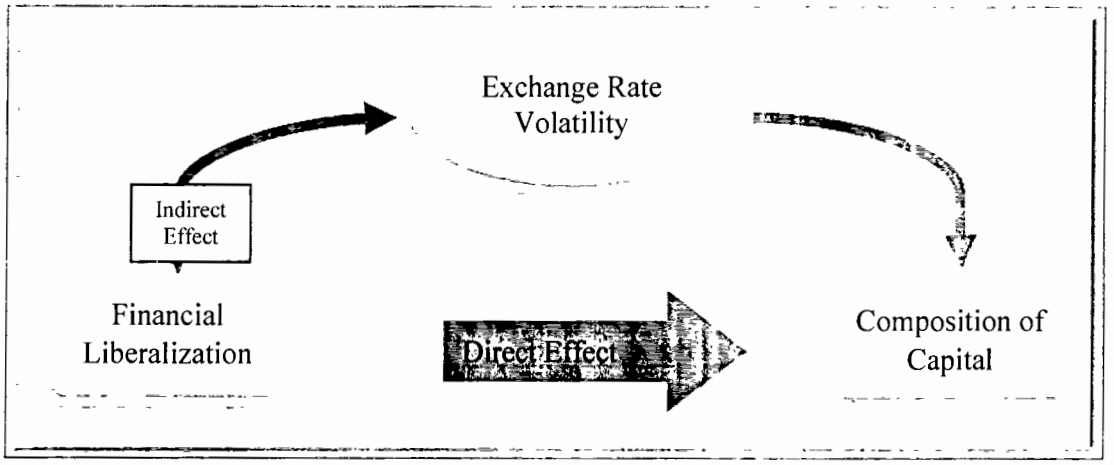


Now, in the preceding subsections, we explore these channels in detail one by one.

3.2.1 Impact of Financial Liberalization on the Composition of Capital

In this sub-section, we explore the relationship between financial liberalization and the composition of capital (quality of capital), whether this relationship is direct; that is, financial liberalization helps a country to invest in highly efficient R&D intensive capital or not. Further, we want to analyze the channel (exchange rate volatility) through which financial liberalization helps countries improve capital quality. The relationship between financial liberalization and the composition of capital is shown in figure 3.2, and we use the following econometric model (Eqs. 3.17 and 3.18) to explore the above-mentioned relationship.

Figure 3.2: ***Relationship between Financial Liberalization and Composition of Capital; Direct or Indirect***



$$ER_{it} = \alpha_i + \alpha_1 FL_{it} + \alpha'_2 Cont_{it} + \varepsilon_{it} \quad (3.17)$$

$$QC_{it} = \beta_i + \beta_1 FL_{it} + \beta_2 ER_{it} + \beta_3 QC_{i0} + \beta'_4 MF_{it} + \varepsilon_{it} \quad (3.18)$$

Equations (3.17) and (3.18) is a system of equations and solved simultaneously. Equation (3.17) is the mediating equation. In equation (3.17), ER_{it} is exchange rate volatility. We employ three different de facto measures of exchange rate volatility. These measures are Reinhart and Rogoff (2004) coarse exchange rate regime classification (ERR), real exchange rate volatility, the standard deviation of REER (SDER), and exchange rate stability index by Aizenman et al. (2008).

FL_{it} is the financial liberalization index divided into a broad category of de jure and de facto measures. The de jure measures indicate the degree of legal restrictions imposed

by a country on cross border financial movements. On the other hand, the de facto measures reveal the actual process of financial liberalization. The reason behind the use of both measures of financial openness is that they are different from each other in numerous ways. For instance, they are different in terms of sample coverage, information source, and they tell a different story about the actual liberalization process. Moreover, they produce systematically different growth results (Quinn et al., 2011).

The de jure measures of financial liberalization includes Chin and Ito's (2008) index of capital account openness (KAOPEN) and the capital account openness index of Quinn and Toyoda (2008) [QUINN]. Further, de facto measures include the gross external position (GEP), total liabilities (TL) and the composition of capital inflows which are the main component of total liabilities, foreign direct investment inflows (FDI), foreign portfolio liabilities (FPL), and debt (debt) as a percentage of total income.

$Cont_{it}$ is the vector of control variables. These are the factors that are correlated with exchange rate volatility even in the absence of financial liberalization. The variables are trade openness (TO) and domestic credit as a ratio of total output (PRI). We include (TO) in equation (3.17) because theoretical models predict that openness to trade affects exchange rate stability (Obstfeld and Rogoff, 1995 and Hau, 2000). Our analysis includes financial development proxied by PRI because past literature sums up that domestic financial development impacts macroeconomic variables (Kose et al., 2009b).

Equation (3.18) is the main equation. In equation (3.18), QC_{it} is the composition of capital index. FL_{it} is the financial liberalization index, ER_{it} is exchange rate volatility. MF_{it} is the vector of macroeconomic fundamentals or control variables. These are the factors that could be correlated with the composition index, even in the absence of financial liberalization. These variables are TO, price of investment relative to output (RPI). RPI includes in the analysis to account for its impact on the composition index because Hsieh and Klenow (2007) show that RPI is a component to understand the differences in investment rates and income across countries. We also include the initial value of GDP per capita to account for overall development levels in the country, which creates a favourable environment for investment for the private sector. We also include $QC_{i0,}$ which is the initial value of the composition of capital index to check for convergence level. α_i and β_i are the country specific effects in equations (3.17 and 3.18) respectively.

We hypothesize that,

- $\alpha_1 > 0$, that is FL and ER hold positive relationship. It means that FL intensifies the volatility in the exchange rate.
- $\beta_1 > 0$ and $\beta_2 < 0$, that is financial flows improves the quality of capital, whereas exchange rate volatility hampers quality of capital because it disturbs the overall investment levels.

Moreover, we want to analyze the significance of the direct and indirect impacts, that is, financial liberalization affects the quality of capital directly or through exchange rate volatility. For this, we calculate direct and indirect effects for equations (3.17) and (3.18).

The direct effect is computed by taking the partial derivative of equation (3.18) as,

$$\frac{\partial QC_{it}}{\partial FL_{it}} = \beta_1 \tag{3.19}$$

If the direct effect is significant, that is, β_1 is significant. It means that financial liberalization helps countries to invest in a higher quality of capital.

The indirect effect is calculated using equations (3.17) and (3.18) as,

$$\frac{\partial QC_{it}}{\partial FL_{it}} = \frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial QC_{it}}{\partial ER_{it}} = \alpha_1 * \beta_2 \tag{3.20}$$

If the indirect effect is significant, it means both impacts are valid; that is, financial liberalization improves the composition of capital (quality of capital) directly and through the exchange rate flexibility channel, the indirect impact. If both the direct and indirect effects are significant, we calculate the total effect of financial liberalization on the composition of capital.

The total effect is calculated as,

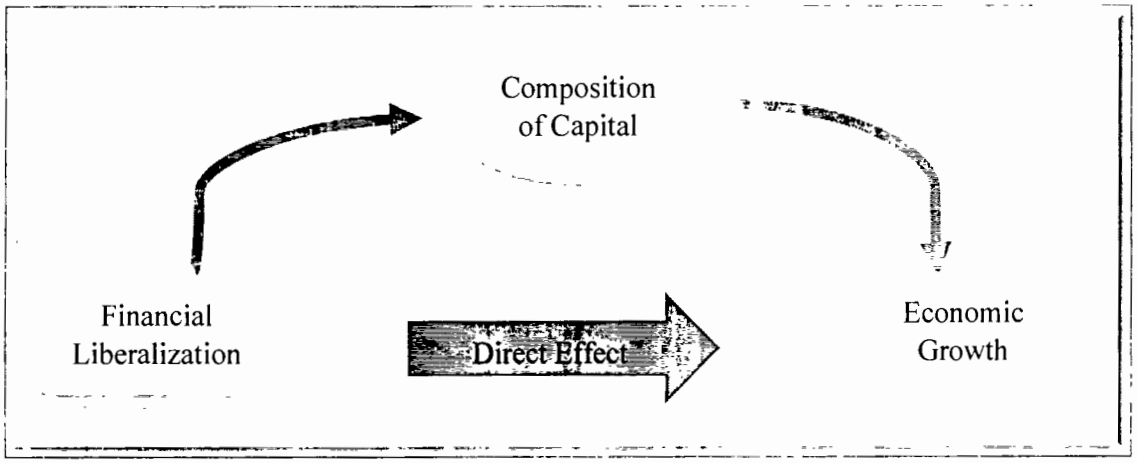
$$Total\ Effect = \frac{\partial QC_{it}}{\partial FL_{it}} = \frac{\partial QC_{it}}{\partial FL_{it}} + \frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial QC_{it}}{\partial ER_{it}} = \beta_1 + (\alpha_1 * \beta_2) \tag{3.21}$$

The total effect provides a clear picture of the impact of financial liberalization on the composition of capital.

3.2.2 Impact of Financial Liberalization on Economic Growth Through the Channel of Composition of Capital

In the former discussion, we discussed the channel through which financial liberalization improves the composition of capital. Now, we discuss the effects of financial liberalization on economic growth, keeping in view that direct impact is significant. In other words, financial liberalization works through the capital composition to affect per capita output growth. This relationship is presented in figure (3.3). We use the following econometric model (Eqs. 3.22 and 3.23) to analyze this relationship.

Figure 3.3: Relationship between Financial Liberalization and Economic Growth through Composition of Capital Channel



$$QC_{it} = \alpha_i + \alpha_1 FL_{it} + \alpha'_2 X_{1,it} + \varepsilon_{it} \quad (3.22)$$

$$EG_{it} = \beta_i + \beta_1 FL_{it} + \beta_2 QC_{it} + \beta_3 INV_{it} + \beta_4 HC_{it} + \beta_5 RGDPP_{i0} + \beta'_6 X_{2,it} + \varepsilon_{it} \quad (3.23)$$

Equations (3.22) and (3.23) is a system of equations and solved simultaneously. Equation (3.22) is the mediating equation, whereas equation (3.23) is the main equation. In equation (3.22), QC_{it} is the composition of capital index. FL_{it} is the financial liberalization index. We use both de jure and de facto measures of financial openness, as discussed above. $X_{1,it}$ is the vector of control variables. These are the factors that could be correlated with the quality of capital, even in the absence of financial liberalization. These variables are TO, PRI and RPI. RPI includes in the analysis to account for its impact on the quality of capital channel.

In equation (3.23), EG_{it} is the per capita output growth of country *i* at time *t*. QC_{it} is the composition of capital or quality of capital index. INV_{it} is investment or quantity of capital, a proxy for capital accumulation. We include both quantity and quality of capital in our analysis to capture that which one affects growth. HC_{it} is the human capital index. We include this in equation (3.23) following Romer (1986) and Barro (2001). Barro (2001) shows that with more skilled labour efficiency increased and boosts economic growth.

X_{2it} is the vector of control variables. We used TO. Further, inflation (INF) is included in our analysis to account for the adverse effects of price instability in the economy and capture the influence of monetary authorities. Furthermore, we control the economy's fiscal side by incorporating the government final consumption expenditures (GOV). Besides, we include PRI to capture the financial development or financial depth in the country. We also include $RGDPPC_{i0,}$ which is the initial real per capita output to capture the overall convergence level. α_i and β_i are the country specific effects in equations (3.22 and 3.23) respectively.

We hypothesize that,

- $\alpha_1 > 0$, that is FL and QC hold positive relationship. It means that FL improves the composition of capital.
- $\beta_1 > 0$ and $\beta_2 > 0$, that is financial liberalization improves economic growth, similarly the composition of capital enhances economic growth.

To check whether financial liberalization affects economic growth directly or indirectly, through the composition of capital channel, we calculate direct and indirect effects using equations (3.22) and (3.23). we observe the direct effect by taking the partial derivative of equation (3.22) with respect to financial liberalization.

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \beta_1 \tag{3.24}$$

β_1 is interpreted as financial liberalization directly affects economic growth without any channel, which is the composition of capital in this case.

We also compute the indirect effects to check for the validity of our channel as,

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \frac{\partial QC_{it}}{\partial FL_{it}} * \frac{\partial EG_{it}}{\partial QC_{it}} = \alpha_1 * \beta_2 \tag{3.25}$$

$\alpha_1 * \beta_2$, if significant, talks about the relationship between financial liberalization and economic growth works through the composition of capital. On the other side of the picture, if both effects are significant, it entails that financial liberalization works either directly or through the quality of capital channel and affects economic growth. If this is the case, we then check for the total effect of financial liberalization on economic growth.

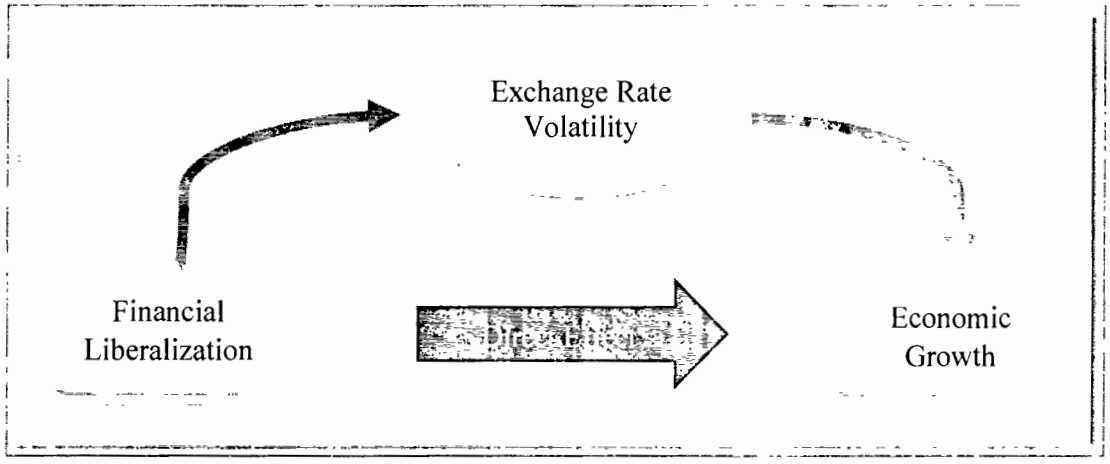
The total effect is the sum of both direct and indirect effects and tells which impact is more influential on economic growth. It is calculated as,

$$Total\ Effect = \frac{\partial EG_{it}}{\partial FL_{it}} = \frac{\partial EG_{it}}{\partial FL_{it}} + \frac{\partial QC_{it}}{\partial FL_{it}} * \frac{\partial EG_{it}}{\partial QC_{it}} = \beta_1 + (\alpha_1 * \beta_2) \quad (3.26)$$

3.2.3 Impact of Financial Liberalization on Economic Growth Through the channel of Exchange Rate Volatility

In this subsection, we investigate the impact of financial liberalization on economic growth through exchange rate volatility. We want to check whether financial liberalization affects economic growth through this channel or not. Figure 3.4 displays the said relationship. We construct the following econometric model (Eqs. 3.26 and 3.27) to capture the impact of financial liberalization on economic growth through the exchange rate volatility.

Figure 3.4: Relationship Between Financial Liberalization and Economic Growth through Exchange rate Volatility



$$ER_{it} = \alpha_i + \alpha_1 FL_{it} + \alpha'_2 Z_{it} + \varepsilon_{it} \quad (3.26)$$

$$EG_{it} = \beta_i + \beta_1 FL_{it} + \beta_2 ER_{it} + \beta_3 INV_{it} + \beta_4 HC_{it} + \beta_5 RGDPP_{i0} + \beta'_6 X_{it} + \varepsilon_{it} \quad (3.27)$$

Equations (3.26) and (3.27) is the system of equations and solved simultaneously. Equation (3.26) is the mediating equation and equation (3.27) is the main equation. In equation (3.26), ER_{it} is the exchange rate volatility. We use three different measures for the exchange rate volatility, discussed in the preceding section. FL_{it} is the financial liberalization index. We use both de facto and de jure measures of financial liberalization. Z_{it} is the vector of control variables. We use those variables which are correlated with exchange rate volatility even in the absence of financial liberalization. We used TO in this analysis because theoretical literature shows that trade openness stabilizes the volatility in exchange rates (Obstfeld and Rogoff, 1996 and Hau 2000). Further, we include PRI, a proxy for financial development. We include this as it mitigates the adverse effects of exchange rate volatility and improves economic growth (Aghion et al., 2009).

In equation (3.27), EG_{it} is the per capita output growth of country *i* at time *t*. FL_{it} is the financial liberalization measure categorized into de jure and de facto measures. ER_{it} is exchange rate volatility. HC_{it} is the human capital index. We include this in equation (3.27) because Barro (2001) shows that with more skilled labour, efficiency increases and boosts economic growth.

X_{it} is the vector of control variables. We use trade openness (TO) to account for its impact on economic growth even when financial openness is absent. Correspondingly, we include INF in this analysis to account for the adverse effects of price instability on the economy and capture the influence of monetary authorities. Furthermore, we control for the fiscal side of the economy by incorporating GOV. Moreover, we include PRI to capture the financial development or financial depth in the country. Besides this, we include RPI following Hsieh and Klenow (2007). They show that the relative price of investment is a component to understand the differences in investment rates and income across countries. We also include $RGDPPC_{i0}$, the initial real per capita output, to account for the overall convergence level. α_i and β_i are the country specific effects in equations (3.26 and 3.27) respectively.

We hypothesize that,

- $\alpha_1 > 0$, that is FL and ER hold positive relationship. It means that FL intensifies the volatility in the exchange rate.

- $\beta_1 > 0$ and $\beta_2 < 0$, that is financial liberalization boosts economic growth, whereas exchange rate volatility dampens economic growth through decline in investment levels.

To check whether financial liberalization affects economic growth directly or indirectly through exchange rate volatility, we calculate direct and indirect effects using equations (3.26) and (3.27). The direct effect is calculated by taking the partial derivative of equation (3.27) with respect to financial liberalization.

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \beta_1 \tag{3.28}$$

β_1 is interpreted as financial liberalization directly affects economic growth without any role of exchange rate volatility.

We also compute the indirect effect using equation (3.26) and (3.27) coefficients as,

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial EG_{it}}{\partial ER_{it}} = \alpha_1 * \beta_2 \tag{3.29}$$

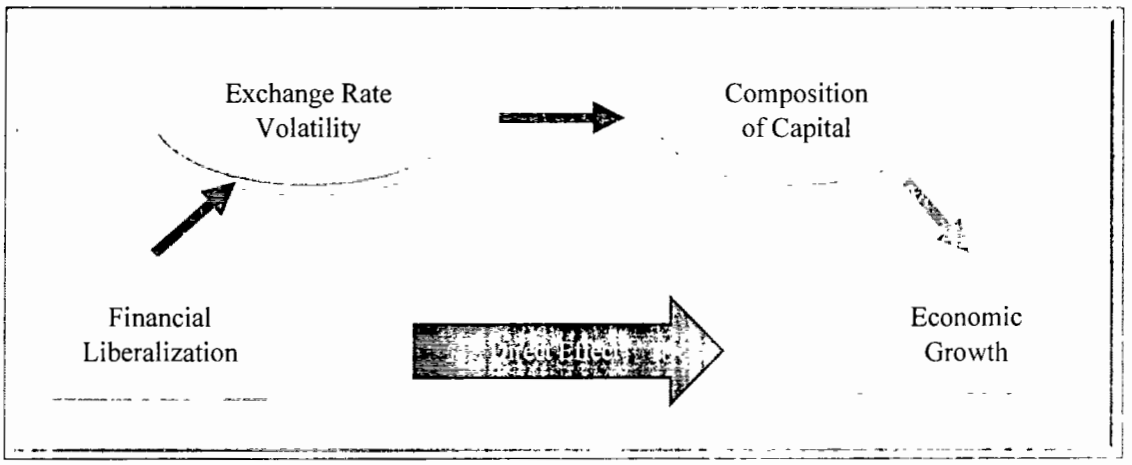
$\alpha_1 * \beta_2$, if significant, it entails that the relationship between financial liberalization and economic growth works through the exchange rate volatility. However, it is also possible that both effects become significant. It means that financial liberalization either directly affects economic growth or through exchange rate volatility. To check which effect has a more significant influence, we calculate the total effect as,

$$Total\ Effect = \frac{\partial EG_{it}}{\partial FL_{it}} = \frac{\partial EG_{it}}{\partial FL_{it}} + \frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial EG_{it}}{\partial ER_{it}} = \beta_1 + (\alpha_1 * \beta_2) \tag{3.30}$$

3.2.4 Impact of Financial Liberalization on Economic Growth Through Both the Channels of Composition of Capital and Exchange Rate Volatility

Another possibility is that financial liberalization works indirectly through both channels (double mediation) and affects per capita output growth. In other words, financial liberalization affects capital composition through the exchange rate channel simultaneously, which then affects economic growth. Figure 3.5 reveals this relationship. We construct the following econometric model (Eqs. 3.31, 3.32 and 3.23).

Figure 3.5: Relationship between Financial Liberalization and Economic Growth through Both the Channels (Double Mediation) of Composition of Capital and Exchange Rate Volatility



$$ER_{it} = \alpha_i + \alpha_1 FL_{it} + \alpha'_2 X_{1it} + \varepsilon_{it} \quad (3.31)$$

$$QC_{it} = \beta_i + \beta_1 ER_{it} + \beta'_2 X_{2it} + \varepsilon_{it} \quad (3.32)$$

$$EG_{it} = \gamma_i + \gamma_1 FL_{it} + \gamma_2 ER_{it} + \gamma_3 QC_{it} + \gamma_4 INV_{it} + \gamma_5 HC_{it} + \gamma_6 RGDPP_{i0} + \gamma'_7 X_{3it} + \varepsilon_{it} \quad (3.33)$$

Equations (3.31), (3.32) and (3.33) is a system of equations and solved simultaneously. The mediating equations are equations (3.31) and (3.32); besides, equation 3.33 is the main equation. From equation (3.31), ER_{it} is the exchange rate volatility. FL_{it} is the measure of financial liberalization. We employ both de facto and de jure measures of financial liberalization. The detail about these measures is discussed above. X_{1it} is the vector of control variables. We include PRI, which is a measure of financial sector development and TO.

In equation (3.32), QC_{it} is the composition of capital index. ER_{it} is exchange rate volatility. X_{2it} the vector of control variables. We include the variables which affect the composition of capital in the absence of financial liberalization. The variables are PRI, a measure of financial depth or development, TO, and RPI, which is the price of investment relative to the output price.

In equation (3.33), EG_{it} is the per capita GDP growth of country *i* at time *t*. FL_{it} is the financial liberalization indicator. Both de facto and de jure indicators are used in this study. QC_{it} is the composition of capital or quality of capital index. INV_{it} is investment measured as gross fixed capital formation percent of total output. It is a proxy for capital accumulation in the country, the quantity of capital stock. We include both the quantity

and quality of capital in our analysis to capture that which component, either capital accumulation or the quality of capital is valid for economic growth, or both are valid. HC_{it} is the human capital index. We include this in equation (3.33) to check the importance of skilled labour and their efficiency on overall economic performance. Lucas (1988) highlights that investments in physical capital stock are low in developing countries as these countries lack education and training, which is a prerequisite to adopting capital goods with augmented R&D.

X_{3it} is the vector of control variables. We used TO, to account for its impact on economic growth even when financial openness is absent. Moreover, we control for INF in this analysis to account for the effects of price stability on the economy and capture the monetary policy outcomes. Besides, we include GOV to control the fiscal policy's impact on the economy. Further, we include PRI to capture the financial development or depth in the country. Besides this, we include RPI following Hsieh and Klenow (2007). They show that the relative price of investment is a component to understand the differences in investment rates and income across countries. We also include $RGDPPC_{i0}$, the initial real per capita output, to account for the overall convergence level. α_i, β_i and γ_i are the country specific effects in equations (3.31, 3.32 and 3.33) respectively.

We hypothesize that,

- $\alpha_1 > 0$, that is FL and ER hold positive relationship. It means that FL intensifies the volatility in the exchange rate.
- $\beta_1 < 0$, that is exchange rate volatility negatively impacts the composition of capital. It means that volatile exchange rate disturbs the composition of capital index as it disturbs the overall investment levels in the economy.
- $\gamma_1 > 0$, that is financial liberalization and EG has positive impact. It means that FL contributes to the dynamics of EG.
- $\gamma_2 < 0$, that is exchange rate volatility hampers economic growth because it declines the overall investment levels in the economy.
- $\gamma_3 > 0$, that is QC positively impacts EG. It implies that improve quality of capital enhances economic growth.

As discussed above, we want to check for the existence of mediation that financial liberalization affects the composition of capital through exchange rate volatility, which then affects per capita output growth. That is why we compute direct and indirect effects.

We estimate the direct effect of financial liberalization on economic growth by taking the partial derivative of equation (3.33) as,

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \gamma_1 \tag{3.34}$$

If γ_1 is significant it means that financial liberalization directly affects economic growth. The indirect effect of financial liberalization on per capita output growth, that is, financial liberalization affects exchange rate volatility, which affects the composition of capital index, and as a result, per capita output growth is affected. The indirect effect of financial liberalization on economic growth is captured in two steps. First, we capture the short-run indirect effect, and in the second step, we find the long-run indirect effect. Finally, we calculate the total effect of financial liberalization on economic growth through both channels.

Short Run Indirect Effect

The short-run indirect effect of financial liberalization on economic growth through exchange rate volatility is calculated using estimated coefficients of equations (3.31) and (3.33) as,

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial EG_{it}}{\partial ER_{it}} = \alpha_1 * \gamma_2 \tag{3.35}$$

Long Run Indirect Effect

The long-run indirect effect is calculated by incorporating the effect of financial liberalization through exchange rate volatility and the composition of capital, on economic growth. It is computed as follows using coefficients of equations (3.31), (3.32), and (3.33), respectively.

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial QC_{it}}{\partial ER_{it}} * \frac{\partial EG_{it}}{\partial QC_{it}} = \alpha_1 * \beta_1 * \gamma_3 \tag{3.36}$$

Total effect

The total effect of financial liberalization on economic growth through exchange rate volatility and the quality of capital is calculated by combining all three effects, namely direct effect, short-run indirect effect, and long-run indirect effect. It is given as,

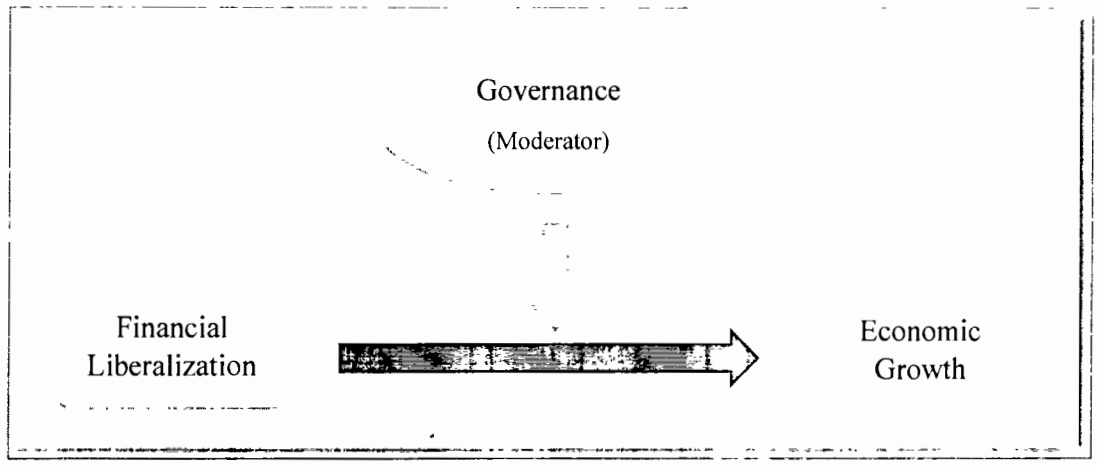
$$Total\ Effect = \frac{\partial EG_{it}}{\partial FL_{it}} + \left(\frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial EG_{it}}{\partial ER_{it}}\right) + \left(\frac{\partial ER_{it}}{\partial FL_{it}} * \frac{\partial QC_{it}}{\partial ER_{it}} * \frac{\partial EG_{it}}{\partial QC_{it}}\right)$$

$$Total\ Effect = (\gamma_1) + (\alpha_1 * \gamma_2) + (\alpha_1 * \beta_1 * \gamma_3) \quad (3.37)$$

3.2.5 The Role of Governance for the Effect of Financial Liberalization on Economic Growth

In this subsection, we want to investigate the role of governance as a moderator while analyzing the association between financial liberalization and economic growth. We scrutinize the moderating role of governance because the theoretical as well as empirical literature predict that effective and efficient role of governance both public and private is necessary to amplify the growth enhancing effects of financial liberalization (Mishkin 2006; Kose et al., 2009b; North, 1990; Kunieda et al., 2011). We use the following model.

Figure 3.6: Financial Liberalization and Growth, the Role of Governance



$$EG_{it} = \beta_1 + \beta_2 FL_{it} + \beta_3 IGOV_{it} + \beta_4 IGOV_{it} * FL_{it} + \beta_5 RGDPP_{i0} + \beta'_6 X_{it} + \eta_i + \varepsilon_{it} \quad (3.38)$$

Where, EG_{it} is per capita GDP growth of country *i* at time *t*. FL_{it} is financial liberalization index. We employ both the de facto and de jure measures in this analysis. $IGOV_{it}$ is institutional quality and governance index. $IGOV_{it}$ is the average of twelve components of political risk representing the political stability and these components are obtained from International Country Risk Guide (ICRG). These components are military in politics, democratic accountability, corruption, law and order, bureaucratic quality, government stability, socioeconomic conditions, investment profile, internal conflicts, external conflicts, religious tensions and ethnic tensions. FL*IGOV is the interaction term— it is included to examine whether the nature of relationship between FL and EG changes as the level of governance improves in the sampled economies.

X_{it} is the vector of control variables such as, investment (INV), human capital (HC), trade openness (TO), inflation (INF), government size (GOV). We use INV measured as gross fixed capital formation percent of total output. It is a proxy for capital accumulation in the country, the quantity of capital stock. Further we include HC, we include this as growth theories suggest that labour disaggregation increases the explanatory power of production function and enhances economic growth, and one of the primary determinants of output growth. (Romer, 1986; Lucas, 1988; Mankiw et al., 1992 and Barro, 1991). Lucas (1988) highlights that investments in physical capital stock are low in developing countries as these countries lack education and training, which is a prerequisite to adopting capital goods with augmented R&D. Similarly, we use TO, to account for its impact on economic growth even when financial openness is absent. Moreover, we control for INF in this analysis to account for the effects of price stability on the economy and capture the monetary policy outcomes. Besides, we include GOV to control the fiscal policy's impact on the economy. Further, we include PRI to capture the financial development or depth in the country. We also include $RGDPPC_{i0}$, the initial real per capita output, to account for the overall convergence level. η_i are the country specific characteristics.

We compute the conditional effects using the first order derivative of equation (3.38) as follows,

$$\frac{\partial EG_{it}}{\partial FL_{it}} = \beta_2 + \beta_3 * IGOV \qquad (3.39)$$

Equation 3.39 shows that the impact of financial liberalization is conditional on the level of governance (IGOV). We examine the above derivative by using low (25^{th} percentile), medium (50^{th} percentile), and high (75^{th} percentile) levels of IGOV.

3.3 Data: Description and Construction of Variables

In this study, we use unbalanced panel data for 115 countries from 1976 to 2017, for which the data on import, exports, and production of the specific type of capital goods is available. This is because the main aim of our study is to explore the composition of capital (quality channel). Moreover, the data on exchange rate volatility is needed uninterruptedly. We use a five-year non-overlapping average because average data covers business cycle fluctuations.

We select countries for this study for which three consecutive observation is available in the series that is approximately 40 percent data available for major dependent and independent variables. However, we exclude ten countries with outliers' observations, and our final sample consists of 105 countries[8]. For this study, we collect data from various sources[9]. Most data are collected from the World Development Indicator (WDI), the United Nations Conference on Trade And Development (UNCTAD), the United Nation's Commodity Trade Statistics Database (UN COMTRADE), Pen World Table (PWT 9.1) and International Counter Risk Guide (ICRG). The definition and sources are available in the Appendix.

3.3.1 Dependent Variables

We use three different variables in various models as dependent variables: the composition of capital (QC), exchange rate volatility, and per capita output growth. Their calculation is discussed as follows:

Composition of Capital

Our computation of the quality of capital index (QC) follows Caselli and Wilson (2004) and Leblebicioglu and Madariaga (2015). From equations (3.15) and (3.16).

$$Y_i = B_i QC_i K_{ip}^{\alpha} L_{ip}^{1-\alpha} \tag{3.15}$$

$$\text{where, } QC_i = \left[\sum_{p=1} A_{ip}^{\gamma/(1-\gamma)}\right]^{(\gamma/1-\gamma)} \tag{3.16}$$

A_p is the product-wise embodied efficiency, and it is not possible to observe embodied efficiency in p-type of capital. To get some observable figures for the empirical work, we substitute the equation (3.13) in (3.16). We get,

$$QC_i = A_1 \left[\sum_{p=1}^{P} \frac{K_{ip}}{K_{i1}}\right]^{(\gamma/1-\gamma)} \tag{3.38}$$

This measure of the composition of capital is expressed in terms of relative capital ratio, and this term is observable. For normalization, we choose type 1 capital, the least R&D intensive good, namely fabricated metal products, following Caselli and Wilson (2004). The reason to choose type 1 capital in this equation is that the efficiency of each type of

[8] List of countries is available in appendix

[9] Summary statistics and correlation matrix available in appendix

capital is not observable. Caselli and Wilson (2004) and Leblebicioglu and Madariaga (2015) use fabricated metal for three facts; first, the data on fabricated metal products is available in bulk without interruption, making it easy to use this for normalization. Second, it is least R&D intensive which is why minimal differences measure across countries. Third, as it is the least R&D intensive good, R&D expenditure remains constant across the sample period. Due to these important facts, A_1 is assumed to remain constant across the dataset, and it is not the reason for any variation in the composition of capital index.

To obtain observable capital ratios K_{ip}/K_{i1}, we construct each type of capital stock using the perpetual inventory method. Where we proxy investment in p-type capital,

$$INV_{ipt} = Y_{ipt} + M_{ipt} - X_{ipt} \tag{3.39}$$

INV_{ipt} is the investment in p-type capital goods at time t for country i. Y_{ipt} refers to the production of p-type capital goods in a country i at time t. M_{ipt} is p-type capital imports, and X_{ipt} is type p capital exports. We obtain data of production, imports, and exports from UN COMTRADE and UNCTAD following Nicita and Olarreaga (2007) Trade Production and Protection database methodology, which classifies goods by their three-digit international standard of industrial classification (ISIC) codes[10]. For computation, we set the elasticity of substitution to 2 as we assumed $\gamma = 0.5$, and we choose five types of capital categories that are $p = 5$, following Leblebicioglu and Madariaga (2015). For each type of equipment, we use the perpetual inventory method.

$$K_{ipt} = (1 - \delta_p)K_{ip,t-1} + INV_{ipt} \tag{3.40}$$

Where INV_{ipt} is the investment in country i, for capital type p and during time t. δ_p is depreciation on type p capital. Depreciation rates are taken from Wilson (2009), and it is assumed that δ_p is the same across countries. K_{ipt} is the capital stock type p for country i and at time t. We use incremental capital-output ratios (ICOR) to compute K_{ipt}, the capital stock of type p following Manzoor (1981) and Enders (2015) $ICOR_{ipt}$ is calculated as,

[10] We follow Leblebicioglu and Madariaga (2015) and select 5 equipment types instead of 9 equipment categories of Caselli and Wilson (2004). Caselli and Wilson (2004) obtain data from world trade flow dataset of Feenstra (2015) which have different codes and bilateral trade data for equipment is available. To achieve uniform data, we select ISIC (Rev2) codes which were easily available in bulk quantity for each country. List of capital categories according to ISIC (Rev2) classification is presented in appendix

$$ICOR_{ipt} = \frac{INV_{ipt}}{\Delta Y_{ipt}} \quad (3.41)$$

Here, $ICOR_{ipt}$ is the incremental capital-output ratio of p-type capital good at time t for country i. ΔY_{ipt} is $Y_{ipt} - Y_{ipt-1}$ that is, type p capital goods production at time t minus production of capital goods of type p at time t-1. After computation of $ICOR_{ipt}$, we compute K_{ipt-1} that is the capital stock of type p, at time t-i, we use the following equation,

$$K_{ipt-1} = ICOR_{ipt} * Y_{ipt-1} \quad (3.41)$$

Where, K_{ipt-1} is the stock of capital type p for country i at time t-1. Y_{ipt-1} is the total output of type p capital goods produced at time t-1 for country i. Finally, we can calculate K_{ipt}, the stock of capital goods of type p, using equation (3.40).

Exchange Rate Volatility

As we want to check how exchange rate volatility affects the composition of capital and growth, we include three different measures of exchange rate volatility. These measures are de facto measures, which capture the actual arrangements by policymakers, not just the announced policies. First, Reinhart and Rogoff (2004) coarse exchange rate regime classification (ERR), following Aghion et al. (2009) and Rodriguez (2017). This ERR measure range from 1 – 4, from rigid to more volatile regime. We exclude category 5, "free falling" and 6, "dual market in which parallel market data is missing". 1 represents fixed regime, four means floating exchange rate regime. 2 and 3 represent peg and managed float regimes of exchange rates. It is computed as,

$$ERV_{t,t+5} = \frac{1}{5}\sum_{i=1}^{i=5} ERR_{t+i} \quad (3.42)$$

where $ERV_{t,\ t+5}$ is the exchange rate volatility at a five-year interval. ERR_{t+5} is the exchange rate regime of country i and, on average, five years. This five-year measure of flexible exchange rates indicates Reinhart and Rogoff (2004) coarse classification with non-free falling and non-dual market regime.

Second, we use the standard deviation of real effective exchange rates (SDER) to measure exchange rate volatility. This measure is obtained by taking the standard deviation of the real effective exchange rate (REER) growth rate over five years. REER data is obtained from Darvas (2012) and is calculated by the data of the nominal exchange rate and consumer price index.

Third, we use the Aizenman et al. (2008) index of Exchange rate stability (ERS). This index ranges from 0 to 1 and is obtained by adjusting monthly variations in the exchange rate between home and base country to annual standard deviation. The reason behind this continuous stability index is that it can define the countries' policies, how they can stabilize the flexible exchange rate and uncertainty conditions, which are the outcome of a flexible exchange rate regime. This index is an exchange rate stability index; we reciprocate this index and convert this stability index into an exchange rate volatility index (FXSI).

3.3.2 Independent Variables

In this section, we define the independent variables in detail and discuss how we get these variables.

Financial Liberalization Measures

As we want to check the impact of financial liberalization on economic growth, we use different measures of financial openness. Different indicators are used in the literature to measure financial openness, such as 'SHARE', 'BINARY', 'VOLUME', 'QUINN', 'SMLD', and 'CHIN'. However, these measures are divided into two broad categories: de jure and de facto financial liberalization measures. (Henry, 2007; Kose et al., 2009b). We include both de jure and de facto measures in our specification. The literature on financial liberalization and growth uses both de facto and de jure measures. The de jure measures indicate a country's policies to relax the legal restrictions imposed on cross border asset trade. Besides, the de facto measures capture the actual phase of financial liberalization. The reason behind the use of both the measure of financial openness is that they are different from each other in terms of sample coverage, information source, and they tell a different story about the actual liberalization process. They also produce systematically different growth results (Quinn et al., 2011).

For de jure measures of financial openness, several measures are available. For instance, IMF_BINARY, a moving average of IMF_BINARY named SHARE, Johnston and Tamirisa's (1998) financial openness index (FOI), Chinn and Ito's (2008) capital account openness index (KAOPEN), Quinn and Toyoda's (2008) capital account liberalization index (QUINN), Schindler's (2009) capital account openness index (KA), Bekaert et al. (2005) equity market liberalization index (EQUITY) and Heritage Foundation's investment freedom index (IF). For de facto measures of financial liberalization current

literature focuses on various measures; namely, Lane and Milesi-Ferretti's (2007) index (GEP), FDI liabilities, Edison and Warnock (2003) index (FORU) and Dreher's (2006) globalization index, a hybrid index (KOF)[11].

For this study we use the following de jure measures, such as Chinn and Ito (2008) capital account openness index (KAOPEN). For constructing this measure, they use information from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). They include four principal components in this index. Three of them are from financial current account restrictions, namely multiple exchange rate presences, surrender on export proceedings, and current account restrictions.

Besides these restrictions, they also include SHARE in this analysis; it is the fraction of years in which a country is free from "restrictions on capital account transactions", judged by the IMF. SHARE is obtained by counting the number of years a country opens its capital account divided by the total number of years in the period. Chinn and Ito's (2008) measure is first of its nature, which standardized four principal components from AREAER and is referred to as 'first composite de jure measure of capital account openness'.

The higher value of KAOPEN shows that country opened its capital account and financial liberalization increased. KAOPEN is used because of its various advantages; an important one is that it covers an extensive sample of countries and is readily available for a long period. However, the biggest drawback of this index is that it uses the information only on capital controls—this liberalization measure scale between -1.8 to 2.54.

Further, we include Quinn and Toyoda's (2008) capital account liberalization index (QUINN). They also use the information from AREAER but not from the AREAER categorical table of restrictions yet AREAER text. This index ranges from 0 to 100; 0 refers to a closed economy while 100 means a fully open economy.

Quinn and Toyoda (2008) construct this index by coding AREAER text and covering six categories: import payments, export receipts, receipts and payments from Invisibles, and capital flows by residents and non-residents. If we summarize QUINN, it contains the

[11] A detailed comparison of these measures is present in Appendix Table A5

information on strict controls on financial transactions by residents and non-residents of a country.

Further, we use the de facto measures in our analysis. The reason to employ de facto measures in this study is that de jure measures do not provide the actual figure about the response of financial flows to legal restrictions. This happens because legal restrictions face a lack of enforcement or control imposed on one sector induces the capital flows in some other sectors (Quinn et al., 2011). The de facto measures tell how a country does for liberalization or perform in international financial or capital markets.

Our first measure is the GEP, a widely-used de facto measure in the literature. This measure was constructed by Lane and Milesi-Ferretti (2007), and it used country total asset and liability data. It is calculated as the sum of total foreign assets and liabilities as a ratio of total output. It includes the following essential categories: foreign direct investment, foreign portfolio investment, financial derivatives, sovereign debt, debt from official agencies such as the IMF and foreign exchange official reserves. GEP covers all inflows and outflows, and it shows the actual figure of financial liberalization.

However, Bonfiglioli (2008) identifies that GEP estimates did not tell us the true picture as it mixed the financially liberalized and non-liberalized countries. This is because GEP includes foreign debt, which treats an economy as financially liberalized under the conventional definition. That is, a country that holds foreign debt in any form must repay it, which means cross border movement of finance even no announced liberalization policy by a country. Further, international inflows matter more when we talk about financing higher-quality capital (Leblebicioglu and Madariaga, 2015).

Another de facto measure is TL. It includes foreign direct investment liabilities, foreign portfolio liabilities, debt inflows, other investments and financial derivatives inflows. Moreover, we include three different components of total liabilities separately in our analysis as a ratio of total output: FDI, FPL, and debt liabilities.

Governance and Institutional Quality

The term 'good governance' first used by World Bank in the year 1989 since then this concept is adopted by several international organizations, such as World Bank, the United Nations, the Organization for Economic Cooperation and Development (OECD), the International Monetary Fund (IMF) and the Asia-Pacific Economic Cooperation

Conference. Good Governance is defined as the important factor which promotes competitiveness of a country and ensures quality of life of individuals in the country. Because it encourages investment by effective regulations, ensure property rights, democratic accountability and corruption controls (Fraj et al., 2018; Abbas et al., 2021). According to Kaufmann and Kraay (2002), "governance is the responsibility of state to relies on institutions to organize and manage public affairs". We use Principal Component Analysis (PCA) to construct the governance index (IGOV) from ICRG data. The ICRG's data contains twelve components of political risk and accesses political stability in the country. The components include military in politics, democratic accountability, corruption, law and order, bureaucratic quality, government stability, socioeconomic conditions, investment profile, internal conflicts, external conflicts, religious tensions and ethnic tensions.

3.3.3 Control Variables

This study uses various control variables. The selection criteria for control variables are their impact on dependent variables. The variables are HC, TO, PRI, RPI, INF and GOV. We include TO in every equation because trade openness plays a role in mitigating excess volatility in exchange rates (Obstfeld and Rogoff, 1995; Hau, 2000). Additionally, TO helps to improve the composition of capital hence improve growth even in the absence of financial liberalization through comparative advantage (Sachs and Warner, 1995; Leblebicioglu and Madariaga, 2015). Trade openness is calculated as exports plus imports as a percent of total output.

We also control for financial development or financial depth in a country. For this, we use domestic credit as a percentage of total output following Levine (2001) in all specifications. We include PRI because it mitigates the adverse effects of exchange rate volatility and improves the composition index and per capita output growth (Aghion et al., 2009).

Furthermore, Hsieh and Klenow (2007) state that the differences in the price of investment relative to the price of output is an important source of variation among investment and income. That is why it is an important determinant. We control RPI in the composition of capital specification that is equation (3.18), (3.22), (3.32) to account for the potential impact of the relative price of investment on the composition of capital. Correspondingly, we include RPI in equation (3.27), which is the equation of economic

growth to account for the impact of investment differential across countries because Aghion et al. (2009) show that exchange rate volatility curbs investment levels in the economy and hampers growth. It is calculated as the price of investment (rate of return) divided by output price. The data for the computation of this variable is obtained from the pen world table (PWT 9.1).

Further, we include the human capital index computed as the average year of schooling and returns to education. We include HC in economic growth specifications that is equations (3.23), (3.26), and (3.33). The human capital index is included as an important determinant of economic growth because theoretical predictions show that disaggregation of labour into skilled and unskilled workers enhance the explanatory power of the neoclassical growth models and enhance economic growth (Romer, 1986; Mankiw et al., 1992 and Barro, 1991) and serves as a prerequisite to receiving investment in highly efficient and R&D intensive capital goods (Lucas 1988).

Furthermore, we include inflation in economic growth equations that is equations (3.23), (3.27), and (3.33). INF is measured using consumer price index data. We control for the impact of price instability because unstable prices hinder economic growth. The monetary authorities' main objective in this regard is price stability. Thus, we include inflation in our analysis to incorporate the effect of monetary authorities' objective and cost of instable prices.

Besides, we control for fiscal side variables by incorporating government expenditures which are measured as government final consumption expenditures as a percentage of total income. We include GOV in economic growth equations. This variable is used because it is the most controversial variable. On one end, Keynes believes more government spending favours economic growth; on the other end, empirical studies show that more and more government spending hinders economic growth.

3.4 Estimation Method

As discussed earlier, this study explores the relationship between financial liberalization and economic growth through different channels, namely exchange rate volatility and the composition of capital. We estimate the system of equations to explore the impact of financial liberalization on economic growth and discover the channels which affect this relationship. For each mediation analysis we use Biorn's (2004) method of unbalanced

panel data to estimate the system of equations. Whereas for moderation analysis we use fixed effect estimator.

To estimate unbalanced panel data, the researchers develop innovative econometric methods that are relatively new and uncommon to estimate models containing a system of equations. Biorn (2004) develops an estimation method to tackle unbalanced panel data. He develops an estimation procedure to estimate a system of equations with random effects and this estimation method is Seemingly Unrelated Regression (SUR hereafter) for unbalanced panel data. This method is based on Maximum Likelihood (ML) and Generalized Least Square (GLS) estimation. Biorn (2004) uses Monte Carlo simulations and confirms that the SUR model provides more reliable estimates as compared to single equation estimates by FE and RE models. For this reason, we estimate the mediation models explained in section 3.2. using Biorn (2004) method for unbalanced panel data[12].

We choose SUR model which is similar to three stage least square (3-SLS hereafter) where we assume that the error terms in mediation and main equations are correlated, contrary to the case of two stage least square (2-SLS hereafter) where we assume that the shocks of two equations are independent of each other. Further, it has some advantages which were not overlooked. For instance, we easily control country-level heterogeneity, and this process avoids biased estimates. Further, it is more efficient because it contains more information and less collinearity. This is due to the large size of data with more scope (Biorn, 2004; Baltagi, 2005; Demirdogen et al., 2016).

Further, we estimate equation (3.38) to investigate the moderating role of governance for the impact of financial liberalization on economic growth using FE estimator as suggested by the Hausman (1978) test. Kohler and Kreuter (2009) describe fixed effect models as "FE models are designed to study cause of changes within a person or entity". FE estimator is used when we are only interested in analyzing the impact of variables that vary over time. In FE the country specific variables (η_i) are fixed with the assumption that the country specific characteristics (η_i) have no correlation with the error term (ε_{it}) or the independent variable (FL_{it} and $IGOV_{it}$). We construct a parsimonious model following specific to general approach and eliminating those variables which have no significant impact on EG.

[12] We use XTSUR codes written by Nguyen (2010).

Chapter 4

Results and Discussion

This chapter documents the estimation results and analyze the relationship between financial liberalization on economic growth through the mediating variables exchange rate volatility and composition of capital. Additionally, the moderating role of governance is discussed for the impact of financial liberalization on economic growth. in the following sections we discuss separately the estimations results.

(A) Financial Liberalization and Composition of Capital

In this section, we discuss the estimation results and analyze the relationship between financial liberalization and the composition of capital. The reason for this is to test the theoretical predictions of the neoclassical growth model. When countries liberalize the capital accounts, capital moves freely across the border, which helps them improve the quality of capital (Caselli and Wilson, 2004). Further, capital flows exacerbate the volatility in exchange rates (Dornbusch, 1976), which in return dampen countrywide investment levels (Aghion et al., 2009). Therefore, we investigate the mediating role of exchange rate volatility for the impact of financial liberalization on the composition of capital.

For this analysis we estimate a system of equations (3.17) and (3.18) following Biorn's (2004) methodology and employs a Seemingly Unrelated Regression (SUR hereafter) model for unbalanced panel data[13]. The dependent variable is the exchange rate volatility in equation (3.17), the mediating equation, and we use three de facto measures of exchange rate flexibility—first, Reinhart and Rogoff's (2004) coarse classification of exchange rate regime (ERR hereafter). Second, real exchange rate volatility, measured using the standard deviation of the growth rate of the real effective exchange rate (SDER hereafter) and finally, exchange rate stability index, constructed by Aizenman et al. (2012) [FXSI hereafter] following Aghion et al. (2009) and Rodriguez (2017). Equation

[13] We use XTSUR codes by Nguyen (2010).

(3.18), the main equation, uses the composition of capital (quality of capital) [QC hereafter] as our dependent variable.

We use both de jure and de facto financial liberalization measures in this analysis as our primary independent variables. The measures of financial liberalization are Chinn and Ito's (2008) de jure measure of capital account openness (KAOPEN hereafter) and Quinn and Toyoda (2008) de jure capital account openness measure (QUINN hereafter). The de facto measures are as follows: first, the gross external position (GEP hereafter). It is calculated as the sum of total foreign assets and total foreign liabilities as a ratio of total output. Second, total liabilities as a ratio of total output (TL hereafter). Third, the three different components of total liabilities, that are, foreign direct investment liabilities (FDI hereafter), debt liabilities (debt hereafter), and foreign portfolio liabilities (FPL hereafter) as a ratio of total output following Leblebicioglu and Madariaga (2015) and Bonfiglioli (2008).

We use a different set of control variables for mediating and the main equation; (3.17) and (3.18), respectively. These variables are domestic credit to GDP ratio (PRI hereafter) to proxy financial development and use in both equations. This is because financial development in the country plays a significant role in mitigating the adverse effects of exchange rate volatility and enhancing economic growth (Aghion et al., 2009). Trade openness (TO hereafter) is used in both models to account for its impact on exchange rate volatility and composition index even in the absence of financial liberalization. In main equation, equation (3.18), we include the relative price of investment (RPI hereafter): the price of investment relative to the output price following Hsieh and Klenow (2007)—in standard growth literature, income and growth differences across countries are a major question. An argument is generated in growth literature that the cost of capital in developing countries is high due to adopted measures, for instance, a high tax rate on capital goods. Which in return increases the relative price of investment as compared to rich countries.

However, Hsieh and Klenow (2007) argue that RPI is the factor that possibly explains the income differences across countries. The RPI is high in poor countries due to high consumption, low consumption price, and a lack of efficiency in producing investment and consumption goods cause low investment rates compared to rich countries. Correspondingly, we include the initial value of per capita output ($RGDPPC_0$ hereafter)

because we explore the role of overall economic development in contributing to the quality of capital. Finally, we include the initial value of the composition of capital index (QC_0) in this analysis to check for the overall level of convergence.

This study aims to check whether financial liberalization directly affects the composition of capital or indirectly through exchange rate volatility. In the following subsections, we discuss direct and indirect effects of financial liberalization on the composition of capital.

4.1. Impact of Financial Liberalization (De Jure Measures) on the Composition of Capital Through Exchange Rate Volatility (Exchange Rate Regime)

In this subsection, we analyze the relationship between financial liberalization and the composition of capital and discuss the estimation results using de jure measures of financial liberalization. We examine whether this relationship is direct or there exists some mediating role of exchange rate instability. Our main objective is to check whether financial liberalization helps countries to invest in highly R&D intensive capital or not, and the exchange rate volatility plays some role in exacerbating countries' quality of capital.

Table 4.1 explains our regression results for the impact of financial liberalization on the composition of capital, directly and through the flexibility of exchange rates. It contains estimation results of two models—model 1 uses the KAOPEN measure of financial liberalization, whereas model (2) uses the QUINN measure. In each model, column 'a' shows the estimation of the mediation equation, while column 'b' provides the results of the main equation. The dependent variable in models 1a and 2a is ERR, a proxy for exchange rate flexibility and QC, the proxy of the quality of capital in models 1b and 2b. The explanatory variable is financial liberalization in models 1 and 2 of Table 4.1. We use two measures for our explanatory variable, financial liberalization, such as KAOPEN, QUINN as de jure measures.

In model 1a, the KAOPEN elasticity of ERR is negative but insignificant. This result opposed the theoretical findings of Dornbusch (1976) and the empirical work of Calderon and Kubota (2018). On the other hand, in column 'b' of model 1, the KAOPEN elasticity of QC is negative and significant. It brightens that financial liberalization moderates the investment in a higher quality of capital. This is because KAOPEN is a de jure measure

and calculated using the AREAER[14] information, and it would not include many aspects of the financial liberalization process. Moreover, the de jure measures do not provide the actual figure about the response of financial flows to legal restrictions. This happens because legal restrictions face a lack of enforcement, or control imposed on one sector induces the capital flows in some other sectors (Quinn et al., 2011).

One more possible explanation for the negative elasticity is that most of the world belongs to developing countries, and most of them open their borders for financial trade without adopting prior arrangements as identified in the current literature, for instance, Mishkin (2006) and Kose et al. (2009b, 2010) identify some preliminary steps before financial liberalization such as sound macroeconomic policies, level of governance and human capital development. These prior arrangements help countries to absorb innovations quickly and make their products competitive in the international market. However, in most cases, these developing countries do not adopt these innovations as these innovations are risky and costly. The developing world must invest more in consumption goods; that is why they prefer discarded technologies by high R&D intensive countries. An example of this is the 'BOSE suspension system'[15], which is the best suspension system. However, it fails because it is too expensive for the automobile industry to adopt, although it is highly efficient and R&D intensive.

In addition, in the main model, model 1b, the ERR elasticity of QC is negative and highly significant. It clarifies that exchange rate volatility hampers the quality of capital. This happens because exchange rate volatility creates uncertainty in the economy and slow down economic progress. It causes a contraction in business activities by the private sector as businessmen find themselves in a riskier position because their profits become volatile. This leads to a decline in countrywide investment. There are lesser funds available to import capital goods with high R&D intensity (Aghion et al., 2009). Hence, the composition of capital declines. These results are in line with the theoretical and empirical findings of Aghion et al. (2009).

[14] IMF's Annual Report on Exchange Rate Arrangements and Exchange Restrictions

[15] A proactive suspension system, which make automobiles smarter and make drive easy on uneven roads. It first tested in mid-2000's and till now it is not adopted by automobile industry. Though there are rumors that in 2020 mass production of BOSE suspension started.

Table 4.1: Impact of Financial Liberalization (De Jure Measures) on the Composition of Capital Through Exchange Rate Regime

	Model (1)		Model (2)	
	1a	1b	2a	2b
	ERR	**QC**	**ERR**	**QC**
Capital Account Openness Index (Chin and Ito) [KAOPEN]	-0.1037 (0.191)	-0.0461*** (0.001)		
Capital Account Openness (Quinn and Toyoda) [QUINN]			0.0340* (0.100)	0.2684*** (0.000)
Exchange Rate Regime (ERR)		-0.4567*** (0.000)		-0.1908*** (0.000)
Control Variables				
TO	-0.1239*** (0.000)	0.1217*** (0.000)	-0.2059*** (0.000)	-0.0351 (0.133)
PRI	-0.0535*** (0.001)	0.0313* (0.083)	-0.0833*** (0.000)	0.0846*** (0.000)
RPI		0.2881*** (0.000)		0.2655*** (0.000)
$RGDPPC_0$		0.2178*** (0.000)		0.1910*** (0.000)
QC_0		0.0722*** (0.000)		0.0176 (0.158)

Indirect and Total effects				
	Indirect Effect	Total effect	Indirect Effect	Total effect
KAOPEN	0.047 (0.110)	0.001** (0.030)		
QUINN			-0.006 (0.111)	0.262*** (0.000)
Number of Observations	505	505	505	505
Number of Countries	105	105	105	105

Notes:
Table 4.1 contains the estimation results for the relationship between financial liberalization and the composition of capital (QC), either directly or through exchange rate volatility. For this, we use a coarse exchange rate regime (ERR) by Reinhart and Rogoff (2004). Our dependent variables are the exchange rate regime (ERR) and the composition of capital (QC). Our main independent variables are financial liberalization and exchange rate regime (ERR). We use five different measures for financial liberalization in total and two in this table, namely, KAOPEN and QUINN, the de jure measures. We employ different control variables such as trade openness, the relative price of investment, and domestic credit to GDP as a proxy of financial development. All variables are in log form. We estimate our model using Biorn's (2004) method for unbalanced panel data, the SUR model. Moreover, we calculate the indirect and total effects of financial liberalization and QC. We check that financial liberalization directly affects the composition of capital or through exchange rate flexibility. Here, the dependent variable is the composition of capital, and the independent variable is KAOPEN and QUINN. We calculate the indirect and the total effects as discussed in chapter 3. *, **, *** indicate the significance level at 10%, 5% and 1%, respectively, p-value appears in parenthesis.

The aim of this study, as we discussed earlier, is that we check the mediating role of exchange rate volatility; that is why we calculate the indirect effect for the impact of financial liberalization and the composition of capital. The results are presented in the lower panel of Table 4.1. The indirect effect of KAOPEN on the composition of capital is positive but insignificant. It implies that there is no mediation of ERR in contributing country's quality of capital. However, the direct effect is negative and significant, as the coefficient of KAOPEN shows in column 'b' of the model (1). It elucidates that KAOPEN directly influences the composition index. Further, we calculate the total effect, the sum of both direct and indirect effects for the said relationship. We calculate the total effect because we want a clear picture of the impact of financial liberalization on the composition index. The total effects of KAOPEN on the quality of capital through ERR is positive and significant. It implies that financial liberalization amplifies the quality of capital when it works through ERR. It infers that financial liberalization absorbs the adverse effects of ERR and improve the country's quality of capital stock. This result is in line with Rodriguez (2017).

We employ a different set of control variables in both columns of model 1 of Table 4.1. We briefly explain the relationship between ERR, the composition of capital and various control variables. The TO elasticity of ERR is negative and highly significant in model 1a. It elucidates that trade openness mitigates volatility in exchange rates and stabilize them. This result is consistent with the theoretical findings of Obstfeld and Rogoff (1995) and Hau (2000) and the empirical findings of Hau (2002) and Calderon and Kubota (2018). Besides, the PRI elasticity of ERR is negative and highly significant, as shown in column 'a' of model 1. It irradiates that financial development helps to lower exchange rate volatility. Our results are the same as those of Aghion et al. (2009).

Variously, in model 1b, the TO elasticity of QC is positive and highly significant. It expounds that trade openness helps countries invest in R&D intensive capital goods and enriches the quality of capital. Besides, the PRI elasticity of the investment in efficient capital goods is positive and significant. The reason to use domestic credit as a control variable is the theoretical and empirical predictions that domestic financial development improves growth even in the presence of exchange rate volatility (Aghion et al., 2009). It elucidates that domestic credit works as a catalyst and mitigates the adverse effects of exchange rate volatility, if any, and enhances the quality of capital. Our results are consistent with Aghion et al. (2009).

In addition, the RPI elasticity of QC is positive and significant. The positive sign indicates that the relative price of investment enhances the quality of capital. It implies that when countries invest in highly efficient and R&D intensive capital goods and these goods are expensive compared to low R&D intensive goods, the RPI is high. An example of this is Pakistan, in the last few years working on CPEC, and the capital goods involved in this project are being imported from the world. So, RPI is high and improves the composition of capital. Our findings are consistent with Leblebicioglu and Madariaga (2015). The $RGDPPC_0$ elasticity of QC in column 'b' is positive and significant. It means that overall development in the country helps to improve the quality of capital. Further, to test the overall convergence, we include the initial value of the composition index. The positive and significant elasticity of QC_0 rejects the convergence in the model.

On the contrary, model 2b of Table 4.1 comprehends the impact of QUINN on the quality of capital. The QUINN elasticity of higher quality capital is positive and significant. It elucidates that allowing cross-border financial flows help countries to invest in highly efficient and R&D intensive capital, enhancing the quality of countries' capital stock. Our results are consistent with Caselli and Wilson (2004) and Leblebicioglu and Madariaga (2015). This happens because there is a massive inflow of foreign funds to seek higher interest rates aftermath of the announced policy to allow financial flows. This foreign capital boosts investment as more loanable funds are available for the private sector, investing in new capital goods. Hence the composition of capital improves. However, the increased volatility slowdowns this investment if financial markets are underdeveloped, as indicated by the ERR elasticity of QC in model 2b, which is negative and significant. This result is like Aghion et al. (2009).

As discussed earlier, we were interested in the true impact of financial liberalization on the composition of capital. That is why we compute the indirect effect to explore the mediating role of ERR for the impact of QUINN on the quality of capital, as shown in the lower panel of Table 4.1. The indirect effect of ERR using QUINN as a proxy of financial liberalization is negative but insignificant. It crystallizes that there is no mediation, and financial liberalization directly influences the quality of capital. The direct effect is significant, whereas the indirect effect is insignificant; that is why we compute the total effects of financial liberalization on the composition of capital through ERR. The total effect using QUINN is positive and significant. It elucidates that financial liberalization, when works through ERR, improves a country's quality of capital. This

happens because financial flows absorb the adverse effects of ERR and increase the quality of a country's capital stock. This result is in line with Rodriguez (2017). In model 2a and 2b of Table 4.1, we discuss the impact of various controls variables. The results remain the same as of model 1 except TO in model 2b, which becomes insignificant.

4.2. Impact of Financial Liberalization (De facto Measures) on the Composition of Capital Through Exchange Rate Volatility (Exchange Rate Regime)

In this subsection, we analyze the relationship between financial liberalization and the composition of capital and discuss the estimation results using de facto measures of financial liberalization.

Table 4.2 describes our estimation results for the impact of financial liberalization on the composition of capital, directly and through exchange rate flexibility. There are three models, and each model contains two equations. Model 1a represents the estimation results of the mediating equation, whereas model 1b represents the estimation results of our main equation. The dependent variable in models 1a through 3a is ERR, a proxy for exchange rate flexibility and QC, the proxy of the quality of capital in models 1b through 3b. The explanatory variable is financial liberalization in models 1 through 3 of Table 4.2. We use three measures for our explanatory variable, financial liberalization, namely, GEP, TL, FDI, debt and FPL as a ratio of total output as de facto measures.

The results of the mediation and the main equation obtained through the SUR model using GEP as a proxy of financial liberalization are presented in model (1) of Table 4.2. In mediating equation, model 1a, the GEP elasticity of ERR is positive and significant. It means that exchange rate volatility enhances the aftermath of financial liberalization; de facto measures exacerbate volatility in the exchange rate. This happens because when cross-border financial flows are permitted, the inflows from the rest of the world for seeking higher interest rates and outflows of funds from one country to another disturb the exchange rate markets and results in volatile exchange rates. This result is consistent with the theoretical findings of Dornbusch (1976) and the empirical work of Calderon and Kubota (2018). They show that when the share of foreign equity is lower than that of foreign liabilities, financial liberalization intensifies volatility in exchange rates. In the main model, model 1b covers the impact of financial liberalization proxied by GEP on the QC. The GEP elasticity of QC is positive and significant. It elucidates that when countries remove restrictions on cross-border financial flows, it allows countries to invest

in highly efficient and R&D intensive capital, enhancing the quality of countries' capital stock. Our results align with Caselli and Wilson (2004) and Leblebicioglu and Madariaga (2015). However, the increased volatility slowdowns the countrywide investment and hampers the composition of capital. The negative ERR elasticity of QC confirms that. This happens due to undeveloped financial markets, as pointed out by Aghion et al. (2009).

We discussed in detail the direct impact of GEP, a proxy of financial liberalization on QC, and it is significant. However, this study aims to analyze the mediating role of ERR. For this reason, we calculate the indirect effects. The lower panel of Table 4.2 contains the indirect effect of GEP on the composition index. The indirect effect coefficient is negative and highly significant, confirming mediation. It clarifies that the cross-border financial flows increased after countries decided to open asset trade. It helps them invest in better quality capital goods to compete with the rest of the world.

This process may be reversed due to exchange rate volatility; that is, the quality of capital hampers as investors slow down investments because of uncertainty in the exchange rate market. The direct and indirect effects are significant. The total effect of GEP on QC exchange rate volatility is positive and significant. It elucidates that financial liberalization when working through exchange rate volatility, contributes to the quality of capital as the direct effect dominates and cancels out the adverse effects of exchange rate volatility. This result is in line with Rodriguez (2017).

However, the results generated using GEP do not provide a clear picture, as they overestimate the impact of financial liberalization on QC. This is due to the presence of foreign debt from official sources. The inclusion of foreign debt mixed the results and treats financially autarky countries as financially liberalized as they receive and pay the debt in foreign currency even when no policy is adopted to open cross border financial flows. Following her approach, we include the interaction of de jure and de facto measure (KAGEP). The results are presented in models 1a and 1b of Table A4.1 in Appendix. Surprisingly, the signs of the direct and indirect impacts are intact; however, with a change in the magnitude. The KAGEP elasticity of QC is negative and significant. It shows that financial flows, following the policy to adopt liberalization, hamper the quality of capital.

Table 4.2: Impact of Financial Liberalization on the Composition of Capital Through Exchange Rate Regime.

	Model (1)		Model (2)		Model (3)	
	1a	2b	2a	2b	3a	3b
	ERR	**QC**	**ERR**	**QC**	**ERR**	**QC**
GEP (Total Assets + Total Liabilities /Y)	0.1676*** (0.0001)	0.2454*** (0.0001)				
TL			-0.0773*** (0.000)	0.0124 (0.387)		
FDI/GDP					-0.0174 (0.161)	0.0503*** (0.001)
DEBT/GDP					-0.1016*** (0.000)	-0.0288* (0.063)
FPL/GDP					0.0224*** (0.000)	-0.0888*** (0.000)
ERR		-0.0765*** (0.009)		-0.2273*** (0.000)		-0.4501*** (0.000)
Control Variables						
TO	-0.2516*** (0.0001)	-0.1428*** (0.0001)	-0.1403*** (0.000)	0.0741*** (0.009)	-0.0378 (0.175)	0.0262 (0.448)
PRI	-0.0690*** (0.0001)	-0.0275 (0.122)	-0.0555*** (0.000)	-0.0065 (0.687)	-0.1044*** (0.000)	0.0467*** (0.000)
RPI		0.2909*** (0.0001)		0.2596*** (0.000)		0.2618*** (0.000)
$RGDPPC_0$		0.2920*** (0.0001)		0.1897*** (0.000)		0.2354*** (0.000)
QC_0		0.0316 (0.642)		0.0758*** (0.000)		0.0718*** (0.000)

Indirect and Total effects						
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**	**Indirect Effect**	**Total effect**
GEP	-0.013*** (0.000)	0.233*** (0.000)				
TL			0.018*** (0.000)	0.030** (0.028)		
OL					0.043*** (0.000)	0.010 (0.162)
FDI					0.007 (0.162)	0.057*** (0.000)
DEBT					0.041*** (0.000)	0.012 (0.380)
FPL					-0.009** (0.040)	-0.098*** (0.000)
Observations	507	507	508	508	508	508
Countries	105	105	105	105	105	105

Notes: As of Table 4.1. GEP is Gross external Position. TL is Total Liabilities. FDI is Foreign Direct Investment inflows, Debt is debt inflows. FPL is foreign portfolio liabilities. OL is the combined indirect effect or total effect.

In model 1a, of Table 4.2, the TO elasticity of ERR is negative and significant. It implies that exchange rates become stable when countries switch from autarky to open trade. Moreover, the result produced using PRI is like the theoretical predictions of Aghion et al. (2009), highlighting the role of financial development in mitigating the excessive volatility in exchange rates. The negative elasticity of PRI confirms this with ERR. Under other conditions, in model 2b, the TO elasticity of investing in higher quality capital is negative and significant. However, when we include both policy announcements along with actual financial flows, the negative elasticity converts into a positive one[16]. Further, the PRI elasticity of QC is negative but insignificant.

In addition to this, the RPI elasticity of QC is positive and significant. It simply means that when investing in higher R&D intensive capital goods increased due to financial liberalization, the relative price of investment increased because R&D intensive capital goods are more expensive than low R&D intensive goods resulting in improvement in the quality of capital. This result is consistent with Leblebicioglu and Madariaga (2015). Moreover, the positive elasticity of $RGDPPC_0$ of QC confirms that overall economic development improves the quality of capital. However, convergence in the model is rejected by the positive elasticity of QC_0.

Furthermore, we employ total liabilities (TL) as a proxy of financial liberalization in model (2) of Table 4.2. The relationship between TL and ERR presented in model 2a, the mediation equation. The TL elasticity of ERR is negative and significant. It explains that foreign financial inflows mitigate volatility in exchange rates and stabilize them. Our results are consistent with Sutherland (1996)—when there is more government spending in an economy, debt accumulates domestically. This accumulation of debt under imperfect capital mobility by domestic consumers raises the domestic interest rate, which results in the change in consumer preferences, and future consumption will increase in the short run. In the case of perfect mobility, this effect is more prominent. Therefore, the exchange rate appreciates if the decision to increase output continues. In this condition, if financial liberalization is in place, then debt levels increase, and volatility in exchange rates would reduce. Further, Jeanne (2003) shows that countries ask for debt in foreign currency when the receiving countries lack monetary reliability. To enhance their monetary credibility, they prefer foreign debt. After better macroeconomic

[16] Table A4.1.1 model 2 column b

management (enhancing monetary integrity), they rely on domestic currency debt accumulate domestically.

Variously, in model 2b, the TL elasticity of investment in highly efficient capital goods is positive but insignificant. It implies that the financial liberalization process does not directly enhance the quality of capital but indirectly through some channels. However, the ERR elasticity of QC is negative and significant. It irradiates that exchange rate volatility slowdowns the process of converting investment in the capital because of uncertainty.

As we discussed, this study explores the mediating role of exchange rate volatility for the impact of financial liberalization on the composition of capital, so we calculate the indirect effects. The results are shown in the lower panel of Table 4.2. The indirect effect of TL on the composition of capital is positive and significant. It confirms the presence of pure mediation; however, it is positive. It entails that financial liberalization when working through ERR enhances the country's capital stock quality. It sums up that exchange rate volatility is a channel through which financial liberalization's benefits be extracted. Moreover, we compute the total effect for the impact of TL on the composition of capital. The total effect of TL is significant. It means that the overall impact of financial liberalization is quality enhancing as both direct and indirect effects move in the same direction and enhance countries' capital quality.

However, as discussed above, Bonfiglioli (2008) shows that the GEP overstates the impact of financial liberalization in the absence of announced policy to open cross-border financial flows. Similarly, the TL contains sovereign foreign debt from official sources. A financial autarky country treats as financially liberalized because they accumulate debt in foreign currency. Following Bonfiglioli's (2008) approach, we include the interaction of de jure and de facto liberalization (KATL). The results presented in models 2a and 2b of Table A4.1. Surprisingly, the signs of the coefficient change, and we only discussed those elasticities that change after the interaction term's inclusion. In model 2a, the TL elasticity of ERR becomes positive and significant. Additionally, in model 2b, the TL elasticity of QC becomes positive and significant. It explains that financial inflows improve the quality of capital. The KATL elasticity is negative and significant. It implies that financial inflows after announced policy dampens the quality of capital. The indirect effect of TL on QC is negative and significant. It confirms the presence of partial

mediation as the direct effect is significant. It entails that financial liberalization when working through ERR abates the country's capital stock quality. Moreover, we compute the total effect for the impact of TL on the composition of capital. The total effect of TL is positive and significant. It means that financial inflows absorb the adverse effects of ERR and contributes to the country's quality of capital stock.

In the same pattern as of model 1, we include various control variables in model 2. The results are similar with only one exception, that is, the TO elasticity of QC becomes positive and significant. It suggests that openness to trade enhances a country's capital quality

Elseways, model (3) contains the results of a system of equations produced using Biorn's (2004) methodology for the impact of financial liberalization proxied by three different components of total liabilities on quality of capital through ERR. In mediating equation, model 3a, the FDI and debt elasticities of ERR are negative and significant. It elucidates that financial inflows and specifically debt liabilities mitigate volatility in exchange rates and stabilize them. Our results are consistent with Sutherland (1996); however, the FDI elasticity is insignificant. However, the FPL elasticity of ERR is positive and significant. It means that foreign portfolio inflows exacerbate the volatility in exchange rates. This result is consistent with the theoretical findings of Dornbusch (1976) and the empirical work of Calderon and Kubota (2018). They show that when the share of foreign equity is lower than that of foreign liabilities, financial liberalization intensifies volatility in exchange rates.

Variously, in the main model, model 3b, the FDI elasticity of investment in higher quality capital is positive and significant. Contrary to the debt and FPL elasticities of QC are negative and significant. It denotes that debt and portfolio inflows curtail the investment in a higher quality of capital. According to the best of our knowledge, the literature on financial liberalization and the composition of capital is very limited. That is why the impact of financial flows on capital composition is inconclusive.

However, theoretical literature concludes that the quality of capital measured through the composition of capital index has growth-enhancing effects. So, the composition of capital and economic growth has the same characteristics. The literature on economic growth shows that debt is negatively correlated with economic growth (Reinhart and Reinhart, 2008; Bordo et al., 2010). Our results are consistent with McKinnon and Pill

(1996 and 1998) because foreign debt is usually available to governments to overcome the balance of payment crisis, or the foreign debt is available specifically to finance any development project and distributed through financial intermediaries. In the absence of sufficient supervision in the financial markets, the overborrowing aftermath of financial liberalization leads to moral hazard problems that enhance the economy's probability of a crisis.

The results obtained through FPL contradict previous studies such as Leblebicioglu and Madariaga (2015) and Alfaro and Hammel (2007). Alfaro and Hammel (2007) show that stock market liberalization enhances the import of machinery. Nevertheless, our results are in line with Aizenman et al. (2008). They conclude that countries with the aim to maintain the stability of exchange rate and financial liberalization face sudden financial flows while relying on external finance. Foreign portfolio liabilities and bank lending increase growth volatility and hamper growth in countries. In addition, the ERR elasticity of higher quality capital investment is negative and significant. It means that market uncertainty leads to lower investment which leads to lower quality of capital.

The direct effect is significant, which means that financial liberalization directly affects the composition of capital. We also calculate the indirect effect to check the presence of mediation, and indirect effect results are comprehended in the lower panel of Table 4.2. The coefficient of combined indirect effect (OL) is positive and significant; the sum of all three components of total liability confirms the partial mediation. However, when we separately measure the indirect effect of these three components, FDI shows a positive but insignificant impact on the exchange rate. It means that there exists no mediation, and FDI directly improves countries quality of capital. Besides, debt shows a positive and significant impact. The direct impact of debt liabilities is significant; it means that both direct and indirect effects are valid to improve a country's quality of capital.

However, when FPL is used, the indirect effect coefficient shows a negative and significant impact. It also confirms the mediation but with a negative sign. It implies that financial liberalization when working through ERR hampers capital quality because investment falls due to uncertainty. The direct effects of foreign portfolio liabilities are significant. It concludes that both channels are valid.

Overall, we observe that both direct and indirect effects are significant in some cases, while in other cases, they are insignificant. Hence, we further check the total effect of the

said relationship. The combined total effect of three different components of total liabilities (OL) is positive but insignificant. It implies that financial liberalization works through the exchange rate volatility channel and affect the composition of capital. Besides, discrete analysis of these components of total liability showed some different results. The total effect using FDI inflows is positive and significant, which is conflicting with the indirect effect. Indirect effect rejects the presence of mediation. It simply indicates that financial liberalization directly affects the composition of capital and absorbs the adverse effects of ERR and enhances capital quality. In addition to the previous debate, the total effect of financial liberalization proxied by debt liabilities on the composition of capital is insignificant. However, positive mediation exists, and we can say that exchange rate volatility is a valuable channel to get maximum benefits of financial liberalization. On the other hand, the total effect of using FPL is positive and significant. It entails that negative direct and indirect effects cancel out, and the overall impact of foreign portfolio inflows is the betterment of the country's quality of capital.

Similarly, the impact of various control variables on ERR and QC are similar to model 3; however, with some exceptions. In model 3a, the impact of TO on ERR is negative but insignificant. Variously, in model 3b, the relationship between TO and QC is positive but insignificant. The PRI elasticity of QC is positive and insignificant. The reason to use domestic credit as a control variable is the theoretical and empirical predictions that domestic financial development improves growth even in the presence of exchange rate volatility (Aghion et al., 2009). It elucidates that domestic credit works as a catalyst, mitigates the adverse effects of exchange rate volatility, and enhances capital quality.

Effect of Other Proxies of Exchange Rate Volatility (SDER and FXSI)

We also use two other measures of exchange rate volatility, the standard deviation of the real effective exchange rate (SDER) and exchange rate stability index (FXSI) constructed by Aizenman et al. (2008). The results using these two proxies of exchange rate volatility are presented in Appendix[17]. Most of the results are similar except a few exceptions discussed as follows.

When we use SDER, the KAOPEN elasticity of SDER and QC becomes positive and significant. At the same time, mediation is confirmed as shown by the significant negative coefficient of the indirect effect using KAOPEN. On the contrary when we

[17] Table A4.2, Table A4.3, Table A4.4 and Table A4.5

employ the GEP, and TL measures, the impact of TL on QC becomes significant. Further, SDER elasticity of QC becomes positive and significant. This is surprising; we follow Bonfiglioli (2008) and include the interaction term of de jure and de facto measures (KAGEP)[18]. Finally, the FDI elasticity of SDER becomes positive and significant whereas, negative significant with QC. Similarly, the FPL elasticity of SDER becomes significant negative. The mediation is confirmed in all cases however, with opposite sign.

The results obtained using FXSI, a proxy of exchange rate volatility show that the FXSI elasticity of QC becomes positive but insignificant. The indirect effect coefficient confirms the mediation. The total effect of KAOPEN is negative which is not surprising. As we discussed earlier that the direct impact of KAOPEN is negative and significant. On the contrary, the mediating role of exchange rate volatility is confirmed as the indirect effects of KAOPEN is negative and significant. That is why we say that the overall impact of financial liberalization measured by KAOPEN is the quality of capital detraction. Correspondingly, the GEP elasticity of QC turns into negative one. At the same time the TL elasticity of QC becomes positive and significant. However, the FXSI elasticity of QC is positive and significant with GEP and TL. The sign of coefficient of indirect effect converts into positive with GEP, whereas no mediation is confirmed with TL.

The positive FXSI elasticity of QC is hard to interpret. The practical solution to this problem is identified by Bonfiglioli (2008) that is why we include the interaction of de jure measure and GEP/TL (KAGEP/KATL) in the same place and the results are surprising[19]. Finally, the FDI elasticity of FXSI becomes significant positive. However, the FPL elasticity of QC grows into insignificant one.

4.3.Summary

Summing up the debate, we can say that the announced policy of financial liberalization disturbs the exchange rate market and intensifies the volatility in the exchange rate. This increased volatility dampens the quality of capital through a decline in investment levels. This result holds with all three proxies of exchange rate volatility. Besides, the direct impact of de jure financial liberalization on the composition of capital is positive and

[18] Table A4.3.1
[19] Table A4.5.1

significant except when we employ KAOPEN along with ERR and FXSI. The indirect effect coefficient confirms that mediation of exchange rate volatility; that is, financial flows, when works through exchange rate volatility, disturb the quality of capital except when we use ERR as a proxy of exchange rate volatility in Table 4.1.

As far as de facto measures are concerned, we discussed that GEP and TL produce incorrect results due to foreign debt from official sources. Therefore, we follow Bonfiglioli's (2008) approach and include an interaction term of de jure and de facto measure. The estimates obtained after the inclusion of the interaction term are more reliable. However, the actual financial liberalization process in total intensifies the volatility in the exchange rate, with some exceptions. That is, debt inflows with all three measures of exchange rate volatility is negative. It means that debt inflows mitigate excess volatility in the exchange rate. This increased volatility abates the investment in a higher quality of capital, reducing the overall quality of capital stock.

Similarly, the actual financial flows in total enhance the country's quality of capital, and we can also conclude that the nature of financial inflow matters for the composition of capital. When countries try to stabilize the exchange rate market along with financial flows, the debt and FPL inflows hampers the quality of capital. Finally, de facto financial liberalization measures confirm the mediation of exchange rate volatility with a negative sign. That is, financial liberalization, when works through exchange rate volatility, hampers the quality of capital stock because of a decline in investment levels. Finally, in most cases, the total effect confirms that financial flows absorb the adverse effects of exchange rate volatility and contribute to the country's quality of capital and enable them to grow faster.

(B) Financial Liberalization, Composition of Capital and Economic Growth

In this section, we discuss the estimation results of the relationship between financial liberalization and economic growth. We analyze whether this relationship is direct, or it works through the composition of capital. The reason for this is to test the neoclassical growth literature predictions that financial liberalization enhances investment levels and improves the quality of capital, which in turn boosts economic growth (Caselli and Wilson, 2004). Therefore, we examine the mediating role of the composition of capital (quality of capital) for the impact of financial liberalization on economic growth.

This analysis employs the same methodology of SUR for unbalanced panel data as used in Section (A) to estimate equations (3.22) and (3.23), a system of equations. Equation (3.22) is the mediation equation, whereas equation (3.23) is the main equation. In the mediation equation, the dependent variable is the composition of capital (QC). The dependent variable in the main equation, equation (3.23), is the economic growth computed as per capita output growth rate. In our analysis, we use both de jure and de facto measures of financial liberalization as explanatory variables. These measures are These measures are Chinn and Ito (2008) capital account openness index (KAOPEN), capital account openness index constructed by Quinn and Toyoda (2008) [QUINN] as de jure measures. The de facto measures are as follows: first, the gross external position (GEP). It is the sum of total foreign assets plus total foreign liabilities as a ratio of total output. Second, total liabilities as a ratio of GDP (TL). Third, we use three different components of TL, namely, foreign direct investment liabilities (FDI), debt liabilities, and foreign portfolio liabilities (FPL) as a ratio of total output following Leblebicioglu and Madariaga (2015) and Bonfiglioli (2008). We obtain all de facto measures from Lane and Milesi- Ferretti (2007).

In our analysis, other explanatory variables included in the main equation, equation (3.23), are QC, a measure for the quality of capital to account for the impact of the quality channel on economic growth. Further, investment (INV hereafter), the gross fixed capital accumulation as a percentage of total output, referred to as capital accumulation or quantity of capital and human capital (HC hereafter) to account for the effect of capital accumulation and human capital, following neoclassical growth literature.

We use a different set of control variables for equations (3.22) and (3.23). These variables are, Trade openness (TO), which is included in both equations. It is an essential determinant of the composition of capital and economic growth even in the absence of financial liberalization. Inflation (INF hereafter), a measure of price stability, is included in the main equation to account for monetary shocks. Moreover, in equation 3.23, we have government final consumption expenditures (GOV hereafter) as a ratio of total output to account for the fiscal side impact on economic growth. Additionally, PRI includes in both the mediation and the main equations, equations (3.22) and (3.23). We use PRI because developed financial markets help increase capital quality as it provides a suitable environment for investors and boosts economic growth. We the relative price of investment (RPI), which is the price of investment relative to the output price in equation (3.22) following Hsieh and Klenow (2007)—a variable that plays a vital role in cross-country income differences. We also include the initial value of the per capita output ($RGDPPC_0$) in this analysis to check for the overall level of convergence.

As discussed earlier, this study aims to check the impact of financial liberalization on economic growth. We examine whether financial liberalization directly affects economic growth or works through the composition of capital. The following subsection discusses the direct, indirect, and total effects of financial liberalization on economic growth.

4.4. Impact of Financial Liberalization (De Jure Measure) on the Composition of Capital and Economic Growth

This subsection analyzes the impact of financial liberalization (de jure measures) on economic growth and discusses the estimation results. The main objective is to verify whether this relationship is direct or mediation of the composition of capital exists.

Table 4.3 explains the regression results for the impact of financial liberalization on economic growth directly and through the composition of capital. Table 4.3 contains 2 models; each model has the mediation equation and the main equation, presented in columns 'a' and 'b', respectively. In the mediation equation, models 1a and 2a, the dependent variable is the composition of capital. The dependent variable is economic growth in the main equation, models 1b and 2b. The independent variable in both columns is financial liberalization, as shown in models 1 and 2. We employ various measures for our explanatory variable, financial liberalization, divided into a broad category of de jure measures, such as KAOPEN and QUINN.

Table 4.3 illustrates the estimation results for the impact of financial liberalization on economic growth using de jure measures only. This table contains two models—the KAOPEN, a measure of financial liberalization, is used in model (1), whereas model (2) uses the QUINN measure. In each model, the first column encompasses the estimation of the mediation equation, while the second column provides the results of the main equation. In model 1a, the KAOPEN elasticity of investment in better quality capital is positive but insignificant. Elseways, in model 1b. the KAOPEN elasticity of economic growth is negative but insignificant. It implies that the announced policy to open cross-border financial flows improves the country's quality of capital, and it hampers economic growth; however, this impact is insignificant. The impact of QC on economic growth is positive and significant in model 1b. This study includes QC as an explanatory variable to incorporate the importance of quality channels for economic growth. It clarifies that the decision to invest in higher quality capital improves economic growth. These results are like the theoretical findings of Caselli and Wilson (2004) and the empirical work of Leblebicioglu and Madariaga (2015). It means that financial liberalization affects the composition of capital index (increase or decrease), which in return enhances per capita output growth.

In the same pattern, in model 1b, the INV elasticity of per capita output growth is positive and significant. That is, capital accumulation impact is growth-enhancing. It entails that capital accumulation is necessary to enhance output in the economy. Our results are consistent with the neoclassical growth model pioneer by Solow (1956) and the findings of Barro (1990), Mankiw et al. (1992), and Bekaert et al. (2011)—investment positively affects economic growth, and capital accumulation is crucial for economic growth.

Furthermore, the lower panel of Table 4.3 provides the indirect effect of financial liberalization on economic growth through the quality of capital. The indirect effect coefficient using KAOPEN is positive and insignificant. Our result rejects the presence of mediation. However, the total effect result using KAOPEN is negative and insignificant. The direct, indirect, and total effect coefficients are insignificant; that is why we can say that the impact of financial liberalization on economic growth through the composition of capital is inconclusive. It happens because KAOPEN is a de jure measure and did not cover many aspects of the financial liberalization process.

Table 4.3: Impact of Financial Liberalization on Economic Growth Through the Composition of Capital (De Jure Measures)

Variables	Model (1)		Model (2)	
	1a	**1b**	**2a**	**2b**
	QC	**Economic GROWTH**	**QC**	**Economic GROWTH**
KAOPEN	0.0144 (0.125)	-0.0259 (0.138)		
QUINN			1.4616*** (0.000)	-0.0745*** (0.000)
QC		0.2899*** (0.000)		0.0337*** (0.000)
INV		0.4023*** (0.000)		0.0341*** (0.000)
	Control Variables			
HC		-1.3091*** (0.000)		0.0526*** (0.000)
TO	0.2987*** (0.000)	-0.1453*** (0.000)	0.2850*** (0.000)	0.0008* (0.061)
INF		-0.0355 (0.165)		-0.0103*** (0.000)
GOV		-0.1079*** (0.000)		-0.0160*** (0.000)
PRI	0.0152 (0.135)	-0.0465** (0.030)	-0.2085*** (0.000)	0.0158*** (0.000)
RPI	0.1975*** (0.000)		0.1699*** (0.000)	
$RGDPPC_0$		0.3628*** (0.000)		-0.0009 (0.231)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
KAOPEN	0.004 (0.128)	-0.001 (0.966)		
QUINN			0.049*** (0.000)	-0.025*** (0.000)
Number of Observations	417	417	416	416
Number of Countries	105	105	105	105

Notes: Table 4.3 contains the estimation results for the relationship between financial liberalization and economic growth, either directly or through the composition of capital channel. Our dependent variables are QC and per capita output growth. Our main independent variables are financial liberalization and QC. We use five different measures for financial liberalization; however, in this Table, we include only de jure measures, namely, KAOPEN and QUINN. Further, we use INV and QC to check which channel is valid. We employ different control variables such as HC, TO, INF, GOV, RPI, and PRI. All variables are in log form. We estimate our model using Biorn's (2004) method for unbalanced panel data that is the SUR model. We compute the indirect and total effects of financial liberalization on economic growth. We test that financial liberalization directly affects economic growth or through the composition of capital channel. Here, the dependent variables QC and per capita output growth, and the independent variable are KAOPEN and QUINN. We calculate the indirect effects and the total effects as discussed in chapter 3. *, **, *** indicate the significance level at 10%, 5% and 1% respectively, p-value appears in parenthesis.

Moreover, it does not provide the actual figure about the response of financial flows to legal restrictions. Because legal restrictions face a lack of enforcement or control imposed on one sector, the capital flows in some other sectors (Quinn et al., 2011).

In model 1a, the TO elasticity of investment in higher quality capital is positive and significant. It illuminates that trade openness contributes to a country's capital quality. Our result is consistent with Leblebicioglu and Madariaga (2015). However, the literature on TO and composition of capital is very scarce, so we elaborate on this finding using economic growth literature. Our result is consistent with the theoretical findings of Sachs and Warner (1995) and the empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008).

Continuing our debate, the PRI elasticity of QC is positive but insignificant in model 1a. It entails that financial development proxied by domestic credit improves the quality of capital; however, the impact is uncertain. Correspondingly, we include the price of investment relative to the output price following Hsieh and Klenow (2007) as it is a vital variable to check for income differences across countries. The RPI elasticity of QC is positive and significant. It means that the increased investment in higher R&D intensive goods, which are expensive than low R&D intensive capital goods, increases the RPI. This result is the same as Leblebicioglu and Madariaga (2015).

On the other end, in model 1b, the HC elasticity of per capita output growth is negative and significant. It elucidates that human capital accumulation negatively affects economic growth. This result is not surprising as many studies earlier found the same negative effect. This result is in line with the findings of Benhabib and Spiegel (1994), Pritchett (2001), and Kumar (2006). These studies confirm the negative association between human capital and growth. Additionally, the TO elasticity of economic growth is negative and significant. It irradiates that trade openness impedes per capita output growth. Our finding is in line with Rigobon and Rodrik (2005)—trade openness reduces per capita output growth after controlling for institutions and natural features.

In model 1b, the inflation elasticity of per capita output growth is negative and significant. It clarifies that price instability hampers economic growth. It happens because when inflation is high in any economy, the purchasing power of people disturbs, and consumption patterns change, resulting in a decline in overall production in the economy unless strict measures are taken to curb price instability. Our results are aligned

with the theoretical findings of Roubini and Sala-i-Martin (1995) and the empirical work of Barro (1995) and Aghion et al. (2009).

Further, in model 1b, the GOV elasticity of economic growth is negative and significant. It elucidates that government spending impedes output growth. The impact of government expenditure is one of the most controversial topics in economic literature. On one end, Keynes believes in the government's role in contributing to total output. However, empirical literature shows that government expenditure is necessary for economic growth, but more and more government spending increase the fiscal gap, which impedes economic growth these results are in line with Landau (1983), Barro (1991), and Devarajan et al. (1996). The PRI elasticity of economic growth is negative and significant. It elucidates that financial development hampers economic growth. This result opposes the previous work of Levine (2001 and 2005) and Levine and Zervos (1998)—financial sector development enhances economic growth. However, our finding aligns with Bhatti (2014) and Rousseau and Wachtel (2011). They show that financial development measure using domestic credit affects economic growth negatively as the financial liberalization process increases the intensity of the crisis, which becomes the cause of excess finance during these crisis periods and hampers economic growth. Finally, we include initial per capita GDP to check for convergence; however, the positive $RGDPPC_0$ elasticity rejects the presence of convergence in the model.

As discussed earlier, Model 2 includes QUINN measure of financial liberalization. In the mediation model, model 2a, the QUINN elasticity of QC is positive and significant. It reveals that the announced policy to open cross border financial flows improves the country's quality of capital; because when countries allow cross-border financial transactions, capital flows increase, which helps countries invest in capital goods with higher R&D intensity. This result aligns with Caselli and Wilson's (2004) and Leblebicioglu and Madariaga (2015) findings. Variously, the main model, model 2b, the QUINN elasticity of per capita output growth is negative and significant. It illustrates that the announced policy to open capital account hampers economic growth. This result is harmonized with the findings of Stiglitz (2000, 2002), Mirdala et al. (2015), and Ahmed (2016). It happens because open cross-border financial flows increase crises in the recipient country and disturb global financial stability. The theoretical predictions of the neoclassical model and Caselli and Wilson (2004) seem to be confirmed as indicated by the positive relationship between QC and economic growth in model 2b. It expounds

that highly efficient, and R&D intensive capital goods improve a country's per capita growth. Besides, the quantity of capital (capital accumulation) proxied by gross fixed capital formation boosts per capita output, indicated by the positive INV elasticity of economic growth. This result is like Mankiw et al. (1992), Bekaert et al. (2011) and Bhatia and Sharma (2018).

As we discussed earlier, we were interested in mediation analysis and explored the importance of the composition of capital channel. The results are presented in the lower panel of Table 4.3. The indirect effect of financial liberalization on economic growth using QUINN is positive and significant. It implies that financial liberalization improves the composition of capital and becomes a significant channel and improves output growth. The direct and indirect effects are significant in model 2, that is why we compute the total effect of financial liberalization on economic growth through the composition of capital. The total effect is negative and significant. It elucidates that financial liberalization improves the quality of capital stock, which improves economic growth. However, the negative direct effect of financial liberalization dominates and absorbs the positive effect of the quality channel and eradiates the per capita output.

Various control variables are included in equations 3.22 and 3.23, as discussed earlier. In model 2a, the TO elasticity of QC is positive and significant. It explicates that trade openness improves the quality of a country's capital stock. The PRI elasticity of QC, on the other hand, is negative and significant. We obtained different results from using different de jure measures because these de jure measures did not provide an actual event of financial liberalization. These measures calculated by using different information from AREAER, different methodology and different sample, and most importantly, they produce different growth results (Quinn et al. 2011). The RPI elasticity of investment in better quality capital goods is positive and significant. When countries invest in high R&D intensive capital goods, which are more expensive than least R&D intensive goods, the quality of capital increases so does the price of investment increase relative to output price. For instance, installing a new automated process plant instead of a fabricated metal manual plant increases the quality of capital; however, it is too costly, which increases the RPI. This result is consistent with Leblebicioglu and Madariaga (2015).

Variously, in model 2b, the HC elasticity of output growth is positive and significant. It brightens that skilled labour accumulation improves per capita output growth. This result

is in line with Mankiw et al. (1992) and Romer (1986). The TO elasticity of output growth is positive and significant. It infers that trade openness is good for economic growth. It allows countries to put their efforts into those goods in which they have a comparative advantage and trade them, which increases total output, hence improving economic growth. Our result is consistent with the theoretical model of Sachs and Warner (1995) and the empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008).

The price instability is harmful to economic growth, as indicated by the negative INF elasticity of output growth. It clarifies that price instability eradiates the growth rate of output. It happens because high inflation disturbs the consumption pattern resulting from the change in purchasing power; therefore, overall production in the economy declines unless strict measures are taken to curb price instability. Our results are aligned with the theoretical findings of Roubini and Sala-i-Martin (1995) and the empirical findings of Barro (1995) and Aghion et al. (2009). Moreover, the GOV elasticity of economic growth is negative and significant. This result is the same as Landau (1983), Barro (1990), and Devarajan et al. (1996). The PRI elasticity of output growth is positive and significant. It elucidates that financial development facilitates economic growth. This finding is similar to the previous work of Levine (2001 and 2005), Levine and Zervos (1998) and Aghion et al. (2009). The $RGDPPC_0$ elasticity of output growth is negative and insignificant. It means that there is no convergence.

4.5. Impact of Financial Liberalization on the Composition of Capital and Economic Growth (De facto Measures)

In this subsection, we analyze the effect of financial liberalization on economic growth and discusses the estimation results using de facto measures of financial liberalization.

Table 4.4 includes the estimation results of three models for the impact of financial liberalization on the composition of capital and economic growth, and we employ various de facto measures for our explanatory variable, financial liberalization. For instance, model (1) uses the GEP measure of financial liberalization, elseways, model (2) uses TL to proxy financial liberalization, whereas model (3) employs components of TL to measure financial liberalization. Each model contains two equations, the mediation equation, presented in the first column and the main equation, encompasses in the second column.

In model 1a, the decision to invest in higher quality capital followed by actual financial flows improves the quality of capital stock, as shown by the positive GEP elasticity of QC. This result is consistent with Caselli ad Wilson (2004) and Leblebicioglu and Madariaga (2015). Conversely, in the main equation, model 1b, the GEP elasticity of per capita output growth is negative and significant. It explicates that financial flows are harmful to economic growth. It happens because of more capital outflows compared to inflows aftermath of financial liberalization. When domestic savings invest abroad seeking higher interest, fewer funds are available to finance domestic projects, disturbing overall output in the economy.

Likewise, results produced using the GEP are like Bonfiglioli (2008). She shows that the GEP overstates the impact of financial liberalization in the absence of announced policy to open cross border financial flows by the country. The GEP contains sovereign foreign debt from official sources. Even in the absence of an announced policy to liberalize capital account, the country is financially liberalized as it accumulates debt in foreign currency. Following Bonfiglioli (2008), we introduce the interaction of de jure and de facto measures[20] (KAGEP). The GEP elasticity of output growth becomes positive and significant in model 1b of Table A4.7. However, the KAGEP elasticity of output growth is negative. It means that countries with announced financial liberalization policies and then attain good gross external position is harmful to economic growth. In model 1b of Table 4.4, the QC and INV elasticities of output growth are positive and significant. It illustrates that both the quantity and quality of capital is crucial to enhance per capita output growth. These results are consistent with Leblebicioglu and Madariaga (2015), Mankiw et al. (1992) and Bekaert et al. (2011).

Besides the impact of the composition of capital on economic growth, we were interested in finding the exact nature of the relationship among the said variables. For this reason, we find the indirect effects to explore the mediation of the quality channel. The results are shown in the lower panel of Table 4.4. The indirect effect of GEP on economic growth is positive and significant. It means that there exists partial mediation as the direct effect is significant. It implies that when financial liberalization measures using the GEP, it works through the composition of capital and boosts economic growth. In model 1, both direct and indirect effects are significant; that is why we compute the total effects

[20] Table A4.7

of financial liberalization on economic growth. The total effect is the sum of both direct and indirect effects. The total effect of GEP on economic growth is negative and significant. It elucidates that the negative direct effect of GEP dominates and cancels out the positive effects of the quality channel and hampers per capita output growth.

Besides, in model 1a, the TO elasticity is negative and significant; however, when we include both measures in Table A4.7, the elasticity converts into a positive one. It entails that openness to trade helps countries to improve the quality of their capital stock. The PRI elasticity of investment in higher quality capital is positive and significant in model 1a of Table 4.4. It implies that domestic financial development expands output growth. This result aligns with Levine (2001 and 2005).

The RPI elasticity of investment in higher quality capital is positive and significant. It entails that the relative price of investment improves the quality of capital as countries invest in highly R&D intensive goods which are more expensive. Hence increase the RPI. This result is consistent with Leblebicioglu and Madariaga (2015).

On the other side, in model 1b, the HC elasticity of economic growth is positive and insignificant. However, when we incorporate KAGEP, it converts into a positive one[21]. It infers that human capital accumulation is suitable for output growth as more skilled labour is present in the economy, new technology is adopted quickly and improves the country's total output, hence improving output growth. This result is in line with Mankiw et al. (1992) and Romer (1986). The TO elasticity of economic growth is positive and significant. It implies that openness to trade contributes to output growth. It allows countries to put their efforts into those goods in which they have a comparative advantage and trade them, increasing total output and consequently improving economic growth. Our results are consistent with the theoretical findings of Sachs and Warner (1995) and the empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008).

The INF elasticity of output growth is negative and significant. It means that price instability abates per capita output growth as it shrinks people's purchasing power, reducing current consumption and resulting in low output. This result is aligned with the theoretical findings of Roubini and Sala-i-Martin (1995) and the empirical work of Barro (1995) and Aghion et al. (2009). The GOV elasticity of output growth is negative and

[21] Table A4.7

Table 4.4: Impact of Financial Liberalization on Economic Growth, Through the Composition of Capital (De facto measures)

Variables	Model (1)		Model (2)		Model (3)	
	1a	**1b**	**2a**	**2b**	**3a**	**3b**
	QC	**EG**	**QC**	**EG**	**QC**	**EG**
GEP	0.6019*** (0.000)	-0.3072*** (0.000)				
TL/GDP			-0.0207** (0.013)	0.0742*** (0.000)		
FDI/GDP					0.177 (0.404)	0.0024** (0.011)
DEBT/GDP					0.0678*** (0.005)	-0.0092*** (0.000)
FPL/GDP					-0.1347*** (0.000)	0.0079*** (0.000)
QC		0.4883*** (0.000)		0.2574*** (0.000)		0.0121*** (0.000)
INV		0.0438*** (0.000)		0.3941*** (0.000)		0.0348*** (0.000)
HC		0.0055 (0.455)		-1.3920*** (0.000)		-0.0131** (0.029)
TO	-0.0535*** (0.001)	0.0293*** (0.000)	0.2908*** (0.000)	0.1166*** (0.000)	0.7668*** (0.000)	0.0281*** (0.000)
INF		-0.0125*** (0.000)		0.0842*** (0.001)		-0.0044*** (0.002)
GOV		-0.0172*** (0.000)		-0.1144*** (0.000)		-0.0156*** (0.000)
PRI	0.0192* (0.098)	-0.0013 (0.822)	0.0460*** (0.000)	-0.0663*** (0.003)	0.1032*** (0.000)	-0.0085*** (0.000)
RPI	0.0293*** (0.000)		0.1941*** (0.000)		0.2618*** (0.000)	
$RGDPPC_0$		-0.0036*** (0.000)		0.3417*** (0.000)		0.0112*** (0.000)

	Indirect and Total effects					
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**	**Indirect Effect**	**Total effect**
GEP	0.294*** (0.000)	-0.013*** (0.000)				
TL			-0.005** (0.016)	0.069*** (0.000)		
OL					0.001* (0.061)	0.0001** (0.027)
FDI					0.0002 (0.404)	0.003*** (0.001)
DEBT					0.001*** (0.007)	-0.008*** (0.000)
FPL					-0.002*** (0.000)	0.006*** (0.000)
Observations	416	416	417	417	418	418
Countries	105	105	105	105	105	105

Notes: As of Table 4.3 except for the independent variables. We use de facto measures of financial liberalization. EG is economic growth.

significant. It entails that more government spending is harmful to economic growth. Because more government spending usually finances using debt which increases the fiscal gap; therefore, impede output growth. This result is the same as Landau (1983), Barro (1990), and Devarajan et al. (1996). The PRI elasticity of output growth is negative but insignificant. However, with the inclusion of both measures in one place[22], the elasticity becomes positive. It implies that domestic financial development contributes to economic growth. This result is in line with Levine (2001 and 2005). Further, the negative $RGDPPC_0$ elasticity confirms the convergence in the model.

Model (2) of Table 4.4 includes the regression results using TL as a proxy of financial liberalization. In the mediation equation, model 2a, the TL elasticity of QC is negative and significant. It implies that financial inflows hamper the quality of capital. TL includes the portion of foreign debt from official sources such as IMF. and this foreign debt mix the results of financially liberalized and non-liberalized countries. However, when we include de jure measure and TL interaction (KATL) following Bonfiglioli's (2008) approach, this negative impact disappears in model 2a of Table A4.7. It explicates that a financial autarky country receives foreign debt, which comes under financial liberalization. However, no announced policy from the government classifies this country as an autarky level. Besides, when both policy announcement and actual liberalization are in place, TL enhances the economy's capital quality.

On the other end, in model 2b, the main equation, the TL elasticity of output growth, is positive and significant. It suggests that financial inflows amplified per capita output growth. This result is consistent with Leblebicioglu and Madariaga (2015). However, when we incorporate KATL, the TL elasticity of economic growth remains the same. However, the KATL elasticity is negative and significant. It illustrates that financial inflows following the announced policy eradiate per capita output growth. Moreover, the QC and INV elasticities of output growth validate the importance of quality and the quantity of capital (capital accumulation) to attain economic growth. Our results are in line with Leblebicioglu and Madariaga (2015) and Bekaert et al. (2011).

Furthermore, we compute the indirect effects to evaluate for the presence of mediation of the composition of capital, the lower panel of Table 4.4 contains the results. The indirect effect of financial liberalization on economic growth using TL is negative and

[22] Table A4.7

significant. However, when we follow Bonfiglioli's (2008) approach, this negative impact becomes positive. It means that partial mediation of the composition of capital channel exists; that is, TL works through the quality channel and improves per capita output. As both direct and indirect effects are significant, that is why we calculate the total effect of financial liberalization on economic growth. The total effect coefficient is positive and significant in model 2 of Table 4.4 and Table A4.7. It implies that financial inflows improve the quality of capital which in return enhance per capita output growth.

Various control variables are included in both the columns of Table 4.4. In model 2a, the TO elasticity of investment in higher quality capital is positive and significant. It implies that trade openness contributes to the quality of capital by allowing cross border friction-free goods trade. When countries trade goods in which they have a comparative advantage, they need more efficient capital goods to fulfil the foreign country's demand. Therefore, the investment increased in R&D intensive capital, and it improves capital's quality. This result is consistent with the findings of Leblebicioglu and Madariaga (2015). The PRI elasticity of QC is positive and significant. It entails that domestic financial development serves as a catalyst and provides an environment that helps businessmen invest more to expand their business, improving the quality of capital. This result is like Aghion et al. (2009). In the same pattern discussed above, the RPI elasticity of QC is positive and significant.

Variously, in model 2b, the HC elasticity of output growth is negative and significant. It implies that human capital accumulation hampers total output hence output growth. This result is in line with the findings of Benhabib and Spiegel (1994), Pritchett (2001), and Kumar (2006). These studies confirm the negative association between human capital and growth. The TO elasticity of economic growth is positive and significant. It elucidates that trade is better than autarky to achieve growth. This result is consistent with the Sachs and Warner (1995) theoretical findings and Wacziarg and Welch (2008) empirical work. The price instability surprises us. The INF elasticity of output growth is positive and significant. Nevertheless, INF's positive and significant impact converts to negative and insignificant when introducing both de jure and de facto interaction term[23] following Bonfiglioli (2008).

[23] Table A4.7

To capture the fiscal impact on overall economic prosperity, we include government expenditures. The GOV elasticity of output growth is negative and significant. It explains that excess government spending eradiates per capita output growth because the fiscal gap increases as more spending are financed using debt. This result is consistent with the findings of Landau (1983), Barro (1990), and Devarajan et al. (1996). The PRI elasticity of output growth is negative and significant. It elucidates that financial development hampers economic growth. This finding is in line with Bhatti (2014) and Rousseau and Wachtel (2011). They show that financial development measure using domestic credit affects economic growth negatively as the financial liberalization process increases the intensity of the crisis, which becomes the cause of excess finance during these crisis periods and hamper economic growth. Further, Demetriades and James (2011) conclude that the thin financial markets and weak credit protection laws cause financial development to impede economic growth. Finally, the $RGDPPC_0$ elasticity of output growth rejects the presence of convergence.

Model (3) of Table 4.4 includes the results using total liabilities as a proxy of financial liberalization. In model 2a, the mediation equation, the FDI elasticity of QC is positive but insignificant. Besides, the debt elasticity is positive and significant. It implies that financial inflows in the form of FDI inflows and debt inflows improve the country's quality of capital. Further, the results produced using debt as a measure of financial liberalization contradicts the theoretical and empirical literature on the relationship between debt and economic growth. However, the results are consistent with Reisen and Soto (2001). They find that with financial development, borrowing adverse effects would be removed. Besides this study, our results are consistent with Warner (1992)—there is a positive impact of debt on economic growth. He advocates that theories ignore other factors while analyzing the role of debt on economic growth. These factors are the world interest rate, the relative price of export, and low growth. These factors cause investment decline in high indebted countries.

Conversely, the FPL elasticity of QC is negative and significant. It illuminates that foreign portfolio inflows hamper the quality of capital. As we discussed in section A, FPL eradicates capital composition, so; this result is consistent with our finding. The result produces using FPL contradict the findings of Leblebicioglu and Madariaga (2015) and Alfaro and Hammel (2007); however, in line with Aizenman et al. (2008).

Variously, in the main equation, model 3b, the FDI and FPL elasticities of economic growth are positive and significant. It elucidates that financial inflows improve a country's total output. The result obtained using FDI liabilities are consistent with Reisen and Soto (2001) and Aizenman et al. (2012). The results produce using FPL are the same as those of Alfaro and Hammel (2007). They show that equity market liberalization increases the import of machinery, enhancing the quality of capital and then improving economic growth. Similarly, our results are harmonized with Bekaert et al. (2005). They show that stock market liberalization boosts economic growth. However, the debt elasticity of output growth is negative and significant. It entails that debt inflows are harmful to the economy. The result obtained using debt liabilities is consistent with Eichengreen et al. (2003), Rodrik and Velasco (1999)—that debt inflows are associated with the crisis. Further, our result is the same as Bordo et al. (2010). Further, in model 3b, the QC and INV elasticities of per capita output growth are positive and significant. It explicates that both the quality along the quantity of capital enhance per capita output growth. These findings are consistent with Leblebicioglu and Madariaga (2015), Mankiw et al. (1992) and Bekaert et al. (2011).

In addition, we assess for the mediating role of the composition of capital for the impact of financial liberalization on economic growth; the lower panel of Table 4.4 comprehends the results. When we include three components of TL jointly (OL), the indirect effect coefficient is positive and significant. It illustrates that partial mediation exists and capital inflows jointly help countries invest in high R&D intensive capital goods, which boosts per capita output. However, when we checked the effects of these components individually, we got different results. FDI liabilities rejects mediation. At the same time, debt liabilities confirm the positive mediating role of the composition of capital. It elucidates that most projects rely on funding from foreign investors in developing countries, and these foreign investors (banks, corporations and lending agencies) finance the project. In return, the quality of capital is enhanced as the lending agencies, for instance, instruct the project personnel to import better machinery. These projects improve quality hence economic growth. On the contrary, when we use FPL as a proxy of financial liberalization, the negative and significant coefficient confirms mediation. It means that portfolio inflows do not improve the quality of capital and distort the output in the economy.

As we discussed, the direct and indirect effects both are significant in most cases. In order to get a clearer picture, we calculate the total effect of financial liberalization on economic growth. The combined total effect of the three components of TL (OL) is positive and significant. It crystallizes that the financial inflows jointly improve the quality of capital, which improves total output. The total effect of FDI inflows is positive and significant. It elucidates that the direct positive impact dominates and FDI liability directly affect economic growth without any mediation of the composition of capital and improves per capita growth. The total effect of debt on economic growth is negative and significant. It implies that the negative direct effect dominates the positive indirect effects and reduce per capita output growth. This result is consistent with the debt and growth literature which sums up the negative association of debt on economic growth. However, the positive direct effect outcast the negative indirect effect in the case of FPL. That is, portfolio liabilities eradiate the country's quality of capital; however, the overall impact is growth enhancement.

4.6. Summary

Summing up the debate, the impact of financial liberalization on economic growth through the composition of capital is complex and to understand this; one should be very careful. The results produced by this analysis show that the de jure measures improve the country's quality of capital, yet it is harmful to per capita output growth. On the contrary, the actual capital inflows measured using different proxies improve the country's capital quality and boost economic growth. As we were curious about the exact nature of the relationship between the said variables, the mediation analysis confirms the positive impact of financial liberalization on economic growth using de jure and de facto measures.

The difference in the results produced using different de jure and de facto measures is that de jure measures did not provide an actual financial liberalization event and using different information from AREAER for measurement purposes. They did not cover many aspects of the financial liberalization process as well. Moreover, they do not provide the actual figure about the response of financial flows to legal restrictions. Because legal restrictions face a lack of enforcement or control imposed on one sector, the capital flows in some other sectors. On the other hand, de facto measures tell us about the actual event of financial liberalization. However, the difference arises because these

measures are calculated using different information, different methodology, different sample, and most importantly, they produce different growth results (Quinn et al., 2011).

The impacts of various control variables on the composition of capital and economic growth are in line with the theoretical predictions. The impact of human capital on economic growth is negative. Trade openness's overall impact on the composition of capital and economic growth is positive. On the other hand, domestic financial development improves the quality of capital, whereas it hampers economic growth because of excess finance. Price stability is good for economic growth, and excess government spending deteriorates per capita output. Finally, no convergence is observed in the estimated model.

(C) Financial Liberalization, Exchange Rate Volatility and Economic Growth

This section investigates the impact of financial liberalization on economic growth and the mediating role of exchange rate volatility and discusses the estimation results. The reason for this is to review the neoclassical growth model predictions; that is, when countries liberalize the capital accounts, capital moves freely across the border, which helps countries enhance growth temporarily and the living standards of people improve permanently. However, the volatility in exchange rates disturbs the growth dynamics of countries (Aghion et al., 2009; Rodriguez, 2017; Kassa and Lartey, 2018).

We use the same methodology as discussed in Chapter 3, to estimate equations (3.26) and (3.27) simultaneously. Equation (3.26) is the mediation equation, and the dependent variable is the exchange rate volatility in this equation. For this, we use three de facto measures of exchange rate volatility, and these proxies are; first, Reinhart and Rogoff's (2004) coarse classification of exchange rate regime (ERR). Second, the standard deviation of the growth rate of the real effective exchange rate (SDER) and third, the exchange rate stability index (FXSI), we reciprocate this stability index to convert this into a volatility index following Aghion et al. (2009) and Rodriguez (2017). In equation (3.27), the main equation, our dependent variable is economic growth, proxied by the per capita output growth rate.

In this analysis, we employ both de jure and de facto financial liberalization measures as our primary independent variable in both equations. The de jure measures of financial liberalization are the capital account openness index, developed by Chin and Ito (2008) [KAOPEN] and the capital account openness index by Quinn and Toyoda (2008) [QUINN]. The de facto measures included in this study are: first, the gross external position {GEP) developed by Lane and Milesi-Ferretti (2007). It is the sum of total foreign assets and liabilities to total output. Second, total liabilities as a ratio of output (TL). Third, the three different components of total liabilities—shows that international inflows matter more for growth. These components are foreign direct investment inflows (FDI), debt inflows, and foreign portfolio inflows (FPL) as a ratio of total output following Rodriguez (2017) and Bonfiglioli (2008).

Further, we include gross capital formation as a ratio of total output (investment) [INV] as a proxy of capital accumulation. INV is used as an explanatory variable. We use a

different set of control variables for the system of equations, (3.26) and (3.27). These variables are HC, which is included in the main equation as it is one of the primary determinants of economic growth (Barro, 1991). TO is used in both equations because of its impact on exchange rate volatility and economic growth, even in the absence of financial liberalization. We include INF in equation (3.27) to account for the impact of price stability and incorporate the effects of monetary policy on economic growth. Further, GOV to incorporate fiscal policy impact on economic growth.

Moreover, we use PRI in both the mediation and the main equations to proxy domestic financial development. This is because financial development in the country plays a significant role in mitigating the adverse effects of exchange rate volatility and enhancing economic growth (Aghion et al., 2009). To check the impact of cross-country income differences, we include RPI that is the price of investment relative to the price of output following Hsieh and Klenow (2007) in equation (3.27). We include RPI in the economic growth equation because Aghion et al. (2009) show that exchange rate volatility seizes the country-wide investment. Finally, we include the initial value of initial output per capita to account for overall convergence.

As discussed earlier, this study explores the impact of financial liberalization on economic growth directly or through exchange rate volatility. In the following subsections, we discuss the direct effects of financial liberalization on economic growth. In addition, we discuss the mediating role of exchange rate volatility for the impact of financial liberalization on economic growth.

4.7. Impact of Financial Liberalization on Economic Growth Through Exchange Rate Volatility (Exchange Rate Regime) using De jure Measures

This subsection evaluates the impact of financial liberalization on economic growth and discusses the estimation results. We investigate whether this association is direct or there exists some mediating role of exchange rate flexibility.

Table 4.5 explains the SUR model results for the impact of financial liberalization on economic growth, whether direct or through exchange rate volatility. Table 4.5 includes the estimation results of two models—model (1) employs the KAOPEN measure, a proxy of financial liberalization, variously, model (2) uses QUINN measure, and each model contains two equations. First is the mediation equation and presented in column 'a'. In contrast, the second is the main equation, as shown in column 'b'. The dependent variable

in the mediation equation models 1a and 2a is ERR, a proxy of volatile exchange rates. The dependent variable in the main equation, models 1b and 2b, is economic growth proxied by the growth rate of per capita output. The independent variable is financial liberalization in each model.

In model 1a, the KAOPEN elasticity of ERR is negative and significant. It implies that when countries adopt policies to liberalize capital account, it tends to stabilize exchange rates. The result obtained through KAOPEN contradicts the theoretical findings of Dornbusch (1976); however, it is consistent with the theoretical model of Sutherland (1996). He develops a general equilibrium model and indicates that allowing cross-border asset trade by lowering restrictions stabilizes REER in the presence of demand or supply shocks. Furthermore, he shows that when there is more government spending in an economy, debt accumulates domestically. This accumulation of debt under imperfect capital mobility by domestic consumers raises the domestic interest rate, which results in the change in consumer preferences, and future consumption will increase in the short run. In the case of perfect mobility, this effect is more prominent. Therefore, the exchange rate appreciates if the decision to increase output continues. In this condition, if financial liberalization is in place, then debt levels increase, and volatility in exchange rates would reduce.

Further, this contradictory result is because KAOPEN is a de jure measure using information from the IMF's Annual Report on Exchange Rate Arrangements and Exchange Restrictions (AREAER) and did not incorporate many aspects of the liberalization process. Moreover, the de jure measures do not provide the actual figure about the response of financial flows to legal restrictions. This happens because legal restrictions face a lack of enforcement or control imposed on one sector induces capital flows in other sectors (Quinn et al., 2011). The biggest drawback of this index is that it uses the information only on capital controls.

In contrast, in model 1b, the KAOPEN elasticity of economic growth is negative and significant. The negative sign indicates that financial liberalization hampers the total output of the economy. This result is consistent with the previous empirical literature findings.; for instance, Stiglitz (2000), Gamra (2009), Mirdala et al. (2015), and Ahmed (2016). They show that financial liberalization intensifies capital outflows, seeking higher returns abroad and increases the chance of a financial crisis. Besides, the ERR

elasticity of per capita output growth is negative and significant. It illuminates that exchange rate volatility eradiates per capita output as it shakes investors' confidence in the country. In return, they slow down the investment in new projects and country-wide investment shrinks, causing the total output of the country to fall; hence, economic growth (Aghion et al., 2009). This result is consistent with Aghion et al.'s (2009) theoretical and empirical findings and Rodriguez (2017). The INV elasticity of economic growth is positive and significant. It elucidates that capital accumulation helps countries to improve per capita output growth.

Our result is consistent with the predictions of the neoclassical growth model pioneer by Solow (1956) and the findings of Barro (1990), Mankiw et al. (1992) and Bekaert et al. (2011)—investment positively affects economic growth, and capital accumulation is crucial for economic growth.

As discussed earlier, instead of just analyzing the relationship between financial liberalization, ERR and economic growth, following Hayes and Preacher (2014), we were interested in the true nature of the relationship among the said variable. That is why we analyze the mediating role of ERR and calculate the indirect effect of KAOPEN on economic growth. The results comprehend in the lower panel of Table 4.5. The indirect effect coefficient is positive and significant using KAOPEN, which is not surprising and confirms partial mediation, as the direct effect coefficient is significant in model 1b. It elucidates that financial liberalization works through ERR and improves per capita output growth. As both direct and indirect effects are significant, we calculate the total effect of financial liberalization on economic growth, the sum of direct and indirect effects. The total effect coefficient is positive and significant. It implies that the positive indirect effect outcast the negative direct effect, and the overall impact is growth-enhancing. It is due to the domestic financial development, which mitigates the adverse effects of ERR and improves total output.

In model 1a, the TO elasticity of ERR is negative and significant. It elucidates that trade is better than autarky and eradiates excess volatility in the exchange rate. This result is in line with the findings of Calderon and Kubota (2018) and Hau (2002) and theoretical findings, for instance, Obstfeld and Rogoff (1995) and Hau (2000). On the other hand, the PRI elasticity of ERR is positive and significant. It elucidates that domestic financial development magnifies the volatility in the exchange rate. This result contradicts the

Table 4.5: Impact of Financial Liberalization (De jure Measures) on Economic Growth Through Exchange Rate Regime

Variables	Model (1)		Model (2)	
	1a	**1b**	**2a**	**2b**
	ERR	**Economic Growth**	**ERR**	**Economic Growth**
Capital Account Openness Index (Chin and Ito) [KAOPEN]	-0.0861*** (0.000)	-0.0521*** (0.000)		
Capital Account Openness Index (Quinn and Toyoda) [QUINN]			0.4963*** (0.000)	0.3838*** (0.000)
ERR		-0.7064*** (0.000)		-0.2898*** (0.000)
INV		0.0599*** (0.000)		0.1025*** (0.000)
HC		0.3756*** (0.000)		-0.2030*** (0.000)
TO	-0.1571*** (0.000)	-0.1395*** (0.000)	-0.6342*** (0.000)	-0.2926*** (0.000)
INF		-0.0290*** (0.000)		-0.0257*** (0.000)
GOV		0.0217*** (0.000)		0.1446*** (0.000)
PRI	0.2272*** (0.000)	0.1132*** (0.000)	-0.2421*** (0.000)	0.1122*** (0.000)
RPI		-0.0094*** (0.000)		-0.1622*** (0.000)
$RGDPPC_0$		-0.0577*** (0.000)		-0.0915*** (0.000)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
KAOPEN	0.061*** (0.000)	0.009*** (0.000)		
QUINN			-0.136*** (0.000)	0.248*** (0.000)
Number of Observations	514	514	448	448
Number of Countries	105	105	105	105

Notes: Table 4.5 contains the estimation results for the relationship between financial liberalization and economic growth, either directly or through exchange rate volatility. For this, we use a coarse exchange rate regime (ERR) by Reinhart and Rogoff (2004). Our dependent variables are ERR and per capita output growth. Our main independent variables are financial liberalization and ERR. We use five different measures for financial liberalization in total and two in this table, namely, KAOPEN and QUINN, the de jure measures. Further, capital accumulation (INV) is used as an explanatory variable. We employ different control variables such as HC, TO, INF, GOV, PRI. All variables are in log form. We estimate our model using Biorn's (2004) method for unbalanced panel data that is the SUR model. Moreover, we calculate the indirect and total effects of financial liberalization and economic growth. We test that financial liberalization directly affects economic growth or through ERR. Here, the dependent variables ERR and per capita output growth, and the independent variable are KAOPEN and QUINN. We calculate the indirect effects and the total effects as discussed in chapter 3. *, **, *** indicate the significance level at 10%, 5% and 1% respectively, p-value appears in parenthesis.

findings of Aghion et al. (2009). This happens due to the thin financial markets and weak credit protection laws; financial development does not absorb the volatility in exchange rates (Demetriades and James, 2011).

On the contrary, in the main equation, model 1b, the HC elasticity of per capita output growth is positive and significant. It explicates that the more the countries work on the skill development of their population through continuous education and training, it enhances worker productivity, increasing per capita output. The results are consistent with the theoretical models of Romer (1986) and Mankiw et al. (1992) as well as with the empirical work of Barro (2001). The TO elasticity of per capita output growth is negative and significant. It expounds that trade openness mitigates per capita output growth. The result contradicts the influential argument presented in the literature that trade openness enriches economic growth and aligns with Rigobon and Rodrik (2005)—trade openness reduces per capita output growth after controlling for institutions and natural features. Further, this result is similar to the findings of Rodriguez and Rodrik (2000) and Lee et al. (2004). Moreover, our finding supports the strand of literature that emphasizes the role of institution quality, government policy, diversification, and financial depth for the impact of trade openness and economic growth (Rodrik et al., 2004; Chang et al., 2009; Kim et al., 2016).

We include inflation to account for the price stability; the INF elasticity of per capita output growth is negative and significant. It crystallizes that price stability matters for economic growth. When there are more volatile exchange rates, the policymakers want to reduce volatility so that the inflation rate increases when there is more volatility in exchange rates (Slavtcheva, 2015; Ghosh, 2014). The increased inflation in return hamper per capita output growth. The results are consistent with Barro (1995) and Aghion et al. (2009). The GOV elasticity of per capita output growth is positive and significant. It infers that more government spending is good for economic growth. This result is consistent with Aschauer (1989) and Ram (1986). The PRI elasticity of output growth is positive and significant. It entails that domestic financial development is favorable for economic growth. This finding is in line with Levine (1997 and 2001) and Aghion et al. (2009).

The RPI elasticity of economic growth is negative and significant. It implies that investors find their profits more volatile when exchange rates are volatile, so they

discourage investing. It decreases total investment in the country, hence total output decreases. Financial institutions have more finance, and excess finance hamper per capita output (Arcand et al., 2011; Ductor and Grechyna, 2013). Finally, convergence is confirmed by the negative $RGDPPC_0$ elasticity.

In model 2 of Table 4.5, we use QUINN as a proxy of financial liberalization. In the mediation equation, model 2a, the QUINN elasticity of ERR is positive and significant. It illustrates that financial liberalization amplifies the volatility in the exchange rate. This result is the same as the theoretical findings of Dornbusch (1976) and the empirical findings of Calderon and Kubota (2018). In model 2b, the main equation, the QUINN elasticity of per capita output growth, is positive and significant. It entails that financial liberalization directly affects per capita output growth and enhance it. The result produced using QUINN is consistent with theoretical and empirical work. For instance, (Quinn 1997; Gehringer, 2013; De Nicolo and Juvenal, 2014). We produce a different result using different de jure measures. This is not surprising, as Quinn et al. (2011) show, de jure financial liberalization measures use different aspects of the liberalization process from AREAER and use different sample sizes and methodology and generate systematic different growth results.

In addition, the ERR elasticity of economic growth is negative and significant. It means that exchange rate volatility abates per capita output growth. It happens because exchange rate volatility reduces country-wide investment levels, slows down the economic process, and reduces total output, therefore, economic growth. This result is consistent with theoretical and empirical findings of Aghion et al. (2009) and Rodriguez (2017) empirical work. Additionally, the INV elasticity of output growth is positive and significant. It elucidates that capital accumulation is a crucial factor to achieve economic growth. The result is in line with Mankiw et al. (1992) and Bekaert et al. (2011).

We further investigate the mediating role of ERR and calculate the indirect effect of financial liberalization on economic growth. The indirect and total effects results are presented in the lower panel of Table 4.5. The indirect effect coefficient using QUINN is negative and significant. The significant indirect effect confirms the partial mediation. It entails that exchange rate volatility is a significant channel and financial liberalization affects per capita output through ERR and hampers per capita output growth. As both direct and indirect effects are significant, we compute the total effects of financial

liberalization on economic growth. The total effect is positive and significant. It implies that financial liberalization when works through ERR, the overall impact is growth-enhancing. QUINN works as a facilitator and absorbs the adverse effects of ERR and improves economic growth. This result is like Rodriguez (2017).

In model 2a, the TO and PRI elasticities of ERR are negative and significant. It crystallizes that trade openness mitigates excess volatility in the exchange rate, and domestic financial development works as a catalyst and abates the volatility in the exchange rate. The results obtained using TO and PRI are like Calderon and Kubota (2018) and Aghion et al. (2009).

Elseways, in model 2b, the HC elasticity of per capita output growth is negative but insignificant. The TO elasticity, on the other hand, is negative and significant. It elucidates that openness to trade abates per capita output in the presence of exchange rate volatility. This result is consistent with Rigobon and Rodrik (2005), Rodriguez and Rodrik (2000), Lee et al. (2004). Similarly, our finding supports the strand of literature that emphasizes the role of institution quality, government policy, diversification, and financial depth for the impact of trade openness and economic growth (Rodrik et al., 2004; Chang et al., 2009; Kim et al., 2016). The INF elasticity of per capita output growth is negative and significant. It implies that monetary authorities should focus on price stability to enhance economic growth. In the presence of volatile exchange rates (flexible exchange rate regime), policymakers aim to alleviate the volatility in the exchange rate, so does the inflation rate (Ghosh, 2014 and Slavtcheva, 2015) and high inflation hampers per capita output growth. This result is consistent with Barro (1995) and Aghion et al. (2009).

In addition to this, the GOV elasticity of economic growth is positive and significant. It denotes that government spending is good for the economic prosperity of the country. This result is like Aschauer (1989) and Ram (1986). The PRI elasticity of per capita output is positive and significant. It means that domestic financial development absorbs the adverse effects of exchange rate volatility and provides a favourable environment for businessmen to expand business activities without any hurdle. This, in return, increases total output, hence economic growth. The RPI elasticity of economic growth is negative and significant. It implies that investors find their profits more volatile when exchange rates are volatile, so they discourage investing. It makes total investment in the country

decreases; hence total output decreases. Financial institutions now have more finance, and excess finance hamper per capita output (Arcand et al., 2011; Ductor and Grechyna, 2013). Finally, convergence is confirmed by the negative $RGDPPC_0$ elasticity.

4.8. Impact of Financial Liberalization on Economic Growth Through Exchange Rate Volatility (Exchange Rate Regime) using De facto Measures

In this subsection, we examine the impact of financial liberalization on economic growth and discusses the estimation results. We explore whether this association is direct or there exists some mediating role of exchange rate volatility.

Table 4.6 encompasses the estimation results of three models for the impact of financial liberalization on ERR and economic growth. In model (1), the GEP is employed to proxy financial liberalization; however, models (2 and 3) use TL and TL components, respectively, as a measure of financial liberalization. We estimate a system of equations; therefore, each model contains the mediation equation and the main equation. The results of these equations are indicated in columns 'a' and 'b' of the respective model, respectively.

In model 1a, the GEP elasticity of ERR is positive and significant. It crystallizes that actual financial flows intensify the volatility in the exchange rate and disturb the market equilibrium. This result is like the theoretical findings of Dornbusch (1976) and the empirical findings of Calderon and Kubota (2018). Conversely, in model 1b, the GEP elasticity of economic growth is positive and significant. It entails that actual liberalization improves per capita output growth. Our result is like Quinn (1997), Bekaert et al. (2005). Similarly, the ERR elasticity of economic growth is negative and significant. It implies that exchange rate volatility mitigates economic growth, and it is because of a decline in investment levels in the economy, as discussed earlier. This result is consistent with the findings of Aghion et al. (2009) and Rodriguez (2017). The INV elasticity of output growth confirms the importance of capital accumulation to achieve output growth. This result is like Barro (1990), Mankiw et al. (1992), Bekaert et al. (2011).

As discussed earlier in section A and B, the GEP did not provide actual financial liberalization events; instead, it misleads because of foreign debt from official sources. It treats a financial autarky country as financially liberalized prior to any announced policy of liberalization from the government. Bonfiglioli (2008) comes with a solution

for this problem and includes both de jure measure and de facto measure in one place (KAGEP). We follow the same approach. Model 1 of Table 4.6 and A4.8 are almost the same, however, with a magnitude change. The KAGEP elasticity of EG is negative and significant. It implies that financial flows after announced policy hamper economic growth.

The main interest of this study is to explore the mediating role of ERR. For this, we compute the indirect effects of GEP on economic growth. The lower panel of Table 4.6 encompasses the results of indirect and total effects. The indirect effect coefficient confirms the partial mediating role of exchange rate volatility, and this mediation alleviates per capita output growth. However, financial flows absorb the adverse effects of ERR and enhance economic growth, as shown by the positive coefficient of the total effect. Furthermore, the sign of indirect effect and the total effect holds when we introduce the interaction of de jure measure and GEP in model 1 of Table A4.8.

In model 1a, the TO and PRI elasticity of ERR is negative and significant. It infers that trade openness stabilizes the exchange rate. Similarly, domestic financial market development mitigates the volatility in the exchange rate. The result produced with TO is consistent with Hau (2000) and Calderon and Kubota (2018) empirical findings and the theoretical findings of Obstfeld and Rogoff (1995). Besides, PRI's result is in line with theoretical and empirical predictions of Aghion et al. (2009) and Rodriguez (2017) empirical work. On the other side, in model 1b, the HC elasticity of economic growth is positive and significant. It explicates that the more the countries invest in their working population's skill development through continuous education and training, it enhances worker productivity, enhancing per capita output. The result is consistent with the theoretical findings of Romer (1986) and Mankiw et al. (1992) as well as with the empirical work of Barro (2001). In addition, the TO elasticity of economic growth is negative and significant. This negative impact contradicts the influential view presented in the current literature that trade liberalization positively affects economic growth. However, this finding is similar to the findings of Rigobon and Rodrik (2005), Rodriguez and Rodrik (2000), Lee et al. (2004). Similarly, this result is in line with the strand of literature that emphasizes some preliminary steps before trade liberalization, such as the role of institution quality, government policy, diversification, and financial depth for the impact of trade openness and economic growth (Rodrik et al., 2004; Chang et al., 2009; Kim et al., 2016).

Table 4.6: Impact of Financial Liberalization (De facto measures) on Economic Growth Through Exchange Rate Regime

Variables	Model (1)		Model (2)		Model (3)	
	1a	**2b**	**2a**	**2b**	**3a**	**3b**
	ERR	**EG**	**ERR**	**EG**	**ERR**	**EG**
GEP	0.1034*** (0.000)	0.0442*** (0.000)				
TL			0.1550*** (0.000)	0.1173*** (0.000)		
FDI/GDP					0.0298*** (0.000)	0.0106* (0.079)
DEBT/GDP					0.1831*** (0.000)	0.1240*** (0.000)
FPL/GDP					-0.0002 (0.946)	-0.0753*** (0.000)
ERR		-0.6972*** (0.000)		-0.7125*** (0.000)		-0.6466*** (0.000)
INV		0.0619*** (0.000)		0.0802*** (0.000)		0.1493*** (0.000)
HC		0.1629*** (0.000)		0.1337*** (0.000)		0.0496 (0.281)
TO	-0.2114*** (0.000)	-0.1918*** (0.000)	-0.2689*** (0.000)	-0.1672*** (0.000)	-0.1811*** (0.000)	-0.0859*** (0.000)
INF		-0.1234*** (0.000)		-0.0604*** (0.000)		-0.0693*** (0.000)
GOV		0.0383*** (0.000)		0.0440*** (0.000)		0.0448*** (0.000)
PRI	-0.0234*** (0.000)	-0.0107 (0.101)	-0.2186*** (0.000)	0.1313*** (0.000)	-0.0746*** (0.000)	0.1034*** (0.000)
RPI		0.0206*** (0.000)		-0.0507*** (0.000)		-0.1267*** (0.000)
$RGDPPC_0$		-0.004 (0.111)		-0.0356*** (0.000)		-0.1098*** (0.000)
Indirect and Total effects						
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**	**Indirect Effect**	**Total effect**
GEP	-0.009*** (0.000)	0.033*** (0.000)				
TL			-0.110*** (0.000)	0.007*** (0.004)		
OL					-0.138*** (0.000)	0.194*** (0.000)
FDI					0.192*** (0.000)	-0.009 (0.137)
DEBT					-0.118*** (0.000)	0.006 (0.401)
FPL					-0.0001 (0.946)	-0.076*** (0.000)
Number of Observations	449	449	450	450	449	449
Number of Countries	105	105	105	105	105	105

Notes: As of Table 4.5 except for the independent variables, we use de facto measures of financial liberalization. EG is Economic Growth.

The role of price stability highlights by controlling for the impact of inflation. The INF elasticity is negative and significant. It entails that price instability hampers per capita output growth. This result is consistent with Barro (1995) and Aghion et al. (2009). The GOV elasticity of economic growth is positive and significant. It implies that policymakers emphasize more on government spending to enhance the total output of the economy. This result is like Aschauer (1989) and Ram (1986). The PRI elasticity of economic growth is negative and insignificant. However, when we follow Bonfiglioli (2008) approach and introduce the interaction of de jure measure and GEP (KAGEP) in model 1b of Table A4.8, the PRI elasticity becomes positive and significant. It illuminates that financial development enhances per capita output growth by mitigating the adverse effects of exchange rate volatility. This result is consistent with Aghion et al. (2009) and Kassa and Lartey (2018). The RPI elasticity of per capita output growth is positive and significant. However, when we follow Bonfiglioli (2008) approach, this positive elasticity becomes negative. It implies that investors find their profits more volatile when exchange rates are volatile, so they discourage investing. It makes total investment in the country decrease, which increase the price of investment relative to output price, hence, total output decreases. Financial institutions now have more finance, and excess finance hamper per capita output (Arcand et al., 2011; Ductor and Grechyna, 2013). Finally, convergence is confirmed by the negative $RGDPPC_0$ elasticity.

In continuation of this debate, model 2 of Table 4.6 incorporate the estimation results using total liabilities as a ratio of total output (TL). In the mediation equation, model 2a, the TL elasticity of ERR is positive and significant. It means that actual financial flows when surges in any country disturb the stability of the exchange rate market and convert stable exchange rate into volatile one. This result is consistent with the theoretical predictions of Dornbusch (1976) and Calderon and Kubota (2018) empirical work. On the contrary, in the main equation, model 2b, the TL elasticity of economic growth is positive and significant. Thus, it crystallizes that financial inflows improve total output in the economy. This result is consistent with Quinn (1997), Bekaert et al. (2011) and Leblebicioglu and Madariaga (2015) that financial inflows matter for growth. However, when we apply Bonfiglioli (2008) approach and check for the validity of the results, the TL elasticity of ERR and economic growth is positive and significant with a slight change in the magnitude, encompassed in model 2b of Table A4.8. Similarly, the impact of

policy announcements followed by actual financial inflows (KATL) is positive and significant.

Further, in model 2b, the ERR elasticity of economic growth is negative and insignificant, as it is in the previous specifications. It elucidates that exchange rate volatility hampers economic growth through a curb in the level of investment, as we discussed above. This result is consistent with Aghion et al. (2009) and Rodriguez (2017) theoretical and empirical findings. Further, our result highlights the importance of capital accumulation and is confirmed by the positive INV elasticity of economic growth. This result is like Barro (1990), Mankiw et al. (1992), Bekaert et al. (2011).

We were interested in the mediation analysis; that is why we compute the indirect effects of TL on economic growth, presented in the lower panel of Table 4.6. The indirect effect coefficient using TL is negative and significant. It confirmed the partial mediation. It implies that exchange rate volatility is a valuable channel through which financial liberalization influence per capita output growth. Both direct and indirect effects are significant, so we compute the total effects of TL on economic growth. The total effect is positive and significant. It elucidates that the direct effect dominates, and financial inflows improve per capita output growth. According to Rodriguez (2017), this happens because financial inflows absorb the adverse effects of exchange rate volatility and improve per capita output. The sign of indirect and total effects is intact; however, only magnitude changes when we use the interaction of both de jure and de facto measure (KATL) following Bonfiglioli (2008) in model 2 of Table A4.8.

In model 2a, the TO elasticity of ERR is negative and significant. It implies that the open trade policy adopted by the country stabilizes the exchange rate market. This result is like Calderon and Kubota (2018). Similarly, The PRI elasticity of ERR is negative and significant. It infers that financial development in the country captivates the unfavourable shocks in the exchange rate and stabilize them. This result is the same as Aghion et al.'s (2009) theoretical and empirical findings—domestic financial development is a catalyst between exchange rate volatility and productivity growth. However, we use the output growth.

On the contrary, in model 2b, the HC elasticity of economic growth is positive and highly significant. It entails that a country's decision to invest in skill development and knowledge enhancement through education, continuous training, and development of its

working population, enhancing labour productivity and amplifying per capita output growth. This result is consistent with Romer (1986), Mankiw et al. (1992) and Barro (2001). The TO elasticity contradicts the literature strand, which concludes the positive impact of trade openness on economic growth. However, the negative TO elasticity of economic growth implies that trade openness is harmful to per capita economic growth. This result is like the findings of Rigobon and Rodrik (2005), Rodriguez and Rodrik (2000), Lee et al. (2004). Similarly, this result is in line with Rodrik et al. (2004), Chang et al. (2009), Kim et al. (2016). They highlight the importance of some preliminary policies that must be there before trade liberalization, such as institution quality, government policy, diversification, and financial depth for the impact of trade openness and economic growth.

In addition, the INF elasticity of economic growth is negative and significant. It elucidates that price instability hampers economic growth. Inflation is high when exchange rates are more volatile (flexible exchange rate regime). Policymakers aim to alleviate the volatility in the exchange rate, so does the inflation rate (Ghosh, 2014; Slavtcheva, 2015) and high inflation hampers per capita output growth. This result is consistent with Barro (1995) and Aghion et al. (2009). The GOV elasticity of per capita output growth is positive and significant. It clarifies that government expenditures help improve total output in the economy and boost per capita output growth. The result is consistent with Aschauer (1989) and Ram (1986). The PRI elasticity of per capita output is positive and significant. It entails that financial development improves growth as it enhances investor trust and provides them with a suitable environment for new investments. It absorbs the adverse effects of exchange rate volatility and, in return, boosts per capita output growth. Our result is like Aghion et al. (2009), Slavtcheva (2015) and Kassa and Lartey (2018). The RPI elasticity of per capita output growth is negative and significant. It implies that when exchange rates are volatile, investors find their profits more volatile, so they discourage investing. It makes total investment in the country decrease, which increase the price of investment relative to output price; hence total output decreases. Financial institutions now have more finance, and excess finance hamper per capita output (Arcand et al., 2011; Ductor and Grechyna, 2013). Finally, the initial GDP per capita confirm the convergence in the model.

Finally, we discuss the estimation results included in model (3) generated using the components of TL as a proxy of financial liberalization. In model 3a, the mediation

equation, the FDI and debt elasticities of ERR are positive and significant. It means that specific financial inflows disturb the equilibrium price in the exchange rate market and aggravate volatility in the exchange rate. However, the FPL elasticity of ERR is negative but insignificant. The results produced using the components of TL are in line with the theoretical findings of Dornbusch (1976) and Calderon and Kubota (2018) empirical work. On the other side, in the main equation, model 3b, the FDI and debt elasticities of economic growth are positive and significant. It illustrates that FDI and debt inflows help countries to enhance per capita output. The result produced using FDI are consistent with the theoretical and empirical literature. For instance, Findlay (1978), Lucas (1988), Alfaro et al. (2004; 2010) and Aizenman et al. (2012).

Conversely, the result produced using debt inflows contradicts the populist view in the literature that debt is negatively related to economic growth and 'original sin' literature (Eichengreen et al., 2003; Berg et al., 2005; Kose et al., 2010). However, the result is in line with Reisen and Soto (2001)—financial development mitigates the adverse effects of debt on economic growth. Further, Fosu (1996) and Blavy (2006) confirm the existence of a threshold level of GDP or Investment levels, and this threshold level identifies the true impact of debt on growth and investment Besides these studies, our result is consistent with Warner (1992). He rejects existing debt theories, which confirm the negative impact of debt on economic growth and concludes that there is a positive impact. He advocates that theories ignore other factors while analyzing the role of debt on economic growth. These factors are the world interest rate, the relative price of export, and low growth. These factors cause investment decline in high indebted countries.

Conversely, the FPL elasticity of economic growth is negative and significant. It crystallizes that portfolio inflows hamper output growth. The result contradicts previous studies such as Leblebicioglu and Madariaga (2015) and Alfaro and Hammel (2007). Alfaro and Hammel (2007) show that stock market liberalization enhances the import of machinery. Nevertheless, our results are in line with Aizenman et al. (2008), who conclude that countries, when aiming to maintain the stability of exchange rate and financial liberalization, face sudden reversal of financial flows when relying on external finance. Foreign portfolio liabilities and bank lending increase growth volatility and hamper growth in countries. Additionally, the ERR elasticity of per capita output growth is negative and significant. It suggests that exchange rate volatility lessen per capita output growth. The results we obtained with the exchange rate regime contradict the

previous literature, which fails to prove any linear effect of the exchange rate regime with economic growth (Baxter and Stockman, 1989; Husain et al., 2005). However, our finding aligns with Aghion et al.'s (2009) theoretical and empirical work and Rodriguez (2017). They construct a simple model that shows how exchange rate volatility slows down the level of investment which causes a decline in the level of economic growth. The positive INV elasticity of economic growth confirms the importance of capital accumulation to enhance total output. This result is consistent with Mankiw et al. (1992), Barro (1990) and Bekaert et al. (2011).

We are not only interested in the impact of financial liberalization on ERR and economic growth; instead, we want to explore the true nature of the relationship between the dependent and independent variables following Hayes and Preacher (2014). That is why we compute the indirect effects of financial liberalization and economic growth. The indirect effect results are presented in the lower panel of Table 4.6. The combined indirect effect of all three components of TL (OL) is negative and significant. It elucidates that partial mediation exists and financial liberalization works through exchange rate volatility, impedes per capita output growth. The direct and indirect effects are significant; that is why we compute the total effects. The combined total effects of financial liberalization on economic growth are positive and significant. It entails that financial inflows and financial development play their role in mitigating the adverse effects of ERR and improving per capita output. Besides, the indirect effect using FDI and debt is negative and significant. It confirms the partial mediation and exchange rate volatility hamper per capita output growth when it works through ERR. However, the total effect of FDI and debt on economic growth is insignificant. It means that FDI and debt inflows work through ERR for their impact on economic growth. Even so, FPL inflows reject the mediation, and the total effect confirms that FPL directly affects per capita output growth.

In continuation of the debate, in model 3a, the TO elasticity of ERR is negative and significant. It means that trade openness stabilizes the exchange rate by reducing excess volatility. This result is consistent with the theoretical findings of Obstfeld and Rogoff (1995) and Hau (2000) and Calderon and Kubota (2018), and Hau (2002) empirical work. The PRI elasticity of ERR, on the other hand, is negative and significant. It explains that domestic financial development is essential to stabilize the exchange rate market. This result is in line with Aghion et al. (2009). Additionally, the least financially developed

market, in which supervision is poorly, exacerbates the moral hazard problem that moral hazard in the domestic financial market and unrestricted capital flows can together create a potential for disaster. (McKinnon and Pill, 1996).

On the far side, in model 3b, the HC elasticity of economic growth is positive but insignificant. It means that human capital accumulation is an important factor to determine economic growth. The TO elasticity of economic growth is negative and significant. It elucidates that trade openness hampers economic growth. This negative elasticity opposes the mainstream argument in the literature that TO promotes growth. Nevertheless, this result is in line with Rigobon and Rodrik (2005), Rodriguez and Rodrik (2000), Lee et al. (2004). The INF elasticity is negative and significant. It highlights the importance of price stability to enhance total output. It implies that high inflation hampers per capita output. In the same pattern, the GOV elasticity of per capita output growth is positive and significant. It implies that government spending enhances total output in the country, and it is a vital source to increase total output in the country even in the time of crisis. Domestic financial development improves per capita output by mitigating the adverse effects of exchange rate volatility. The positive PRI elasticity of economic growth confirms this notation. The RPI elasticity of per capita output growth is positive and significant. Finally, convergence is confirmed by the negative $RGDPPC_0$ elasticity.

Effect of Other Proxies of Exchange Rate Volatility (SDER and FXSI)

In addition to this, we use two other measures of exchange rate volatility, the standard deviation of the real effective exchange rate (SDER) and exchange rate stability index (FXSI) constructed by Aizenman et al. (2008). The results using these two proxies of exchange rate volatility are presented in Appendix[24]. Most of the results are similar except a few exceptions discussed as follows.

The KAOPEN elasticity of SDER converts into insignificant one. Further, the GEP elasticity of economic growth becomes negative and significant. This result is consistent with the previous empirical literature findings; for instance, Stiglitz (2000), Gamra (2009), Mirdala et al. (2015), and Ahmed (2016). They show that financial liberalization intensifies capital outflows, seeking higher returns abroad and increases the chance of a financial crisis Further, the total effect coefficient becomes negative and significant. It

[24] Table A4.9, Table A4.10, Table A4.11 and Table A4.12

means that the overall impact of GEP is quality deteriorating. However, when we follow Bonfiglioli (2008) approach, the signs of coefficient are almost the same, however, with a magnitude change[25].

Similarly, the TL elasticity of SDER transforms insignificant, whereas the TL elasticity of economic growth converts into significant negative. The SDER elasticity of economic growth is positive and significant. The indirect effect coefficient rejects the presence of mediation. However, when we follow Bonfiglioli (2008) approach and include KATL, the results change slightly[26]. Finally, the FDI elasticity of SDER becomes insignificant, while the debt and FPL elasticities of SDER transform into significant negative. Elseways, the economic growth's elasticity of FDI and debt turns into significant negative, whereas FPL elasticity of economic growth becomes positive and significant. The mediation is confirmed, but with opposite signs.

When we use FXSI, the KAOPEN elasticity of FXSI and economic growth transforms into significant positive. Further, The TL and FXSI elasticities of economic growth holds the opposite sign. Finally, the debt and FPL elasticities of FXSI becomes negative and significant. Conversely, the debt elasticity transforms into insignificant negative.

4.9. Summary

Summing up the debate, the results produced using de jure measures of financial liberalization exacerbate the volatility in the exchange rates. However, a few exceptions are there; KAOPEN's relationship with different proxies of exchange rate volatility is different, positive with FXSI and negative with ERR, whereas insignificant with SDER. On the other hand, de jure financial liberalization measures directly enhance per capita output growth in all cases. Moreover, the direct impact of exchange rate volatility (ERR, SDER and FXSI) on economic growth is negative. As discussed earlier, we are interested not only in the impact of the above variables, correspondingly, the true nature of the relationship between these variables. The negative partial mediation of exchange rate volatility is confirmed in all cases except when we employ KAOPEN with SDER. It means that exchange rate volatility is a valuable channel through which official financial liberalization affects economic growth. However, the total effect confirms that financial

[25] Table A4.10.1 model 1
[26] Table A4.10.1 model 2

means that the overall impact of GEP is quality deteriorating. However, when we follow Bonfiglioli (2008) approach, the signs of coefficient are almost the same, however, with a magnitude change[25].

Similarly, the TL elasticity of SDER transforms insignificant, whereas the TL elasticity of economic growth converts into significant negative. The SDER elasticity of economic growth is positive and significant. The indirect effect coefficient rejects the presence of mediation. However, when we follow Bonfiglioli (2008) approach and include KATL, the results change slightly[26]. Finally, the FDI elasticity of SDER becomes insignificant, while the debt and FPL elasticities of SDER transform into significant negative. Elseways, the economic growth's elasticity of FDI and debt turns into significant negative, whereas FPL elasticity of economic growth becomes positive and significant. The mediation is confirmed, but with opposite signs.

When we use FXSI, the KAOPEN elasticity of FXSI and economic growth transforms into significant positive. Further, The TL and FXSI elasticities of economic growth holds the opposite sign. Finally, the debt and FPL elasticities of FXSI becomes negative and significant. Conversely, the debt elasticity transforms into insignificant negative.

4.9. Summary

Summing up the debate, the results produced using de jure measures of financial liberalization exacerbate the volatility in the exchange rates. However, a few exceptions are there; KAOPEN's relationship with different proxies of exchange rate volatility is different, positive with FXSI and negative with ERR, whereas insignificant with SDER. On the other hand, de jure financial liberalization measures directly enhance per capita output growth in all cases. Moreover, the direct impact of exchange rate volatility (ERR, SDER and FXSI) on economic growth is negative. As discussed earlier, we are interested not only in the impact of the above variables, correspondingly, the true nature of the relationship between these variables. The negative partial mediation of exchange rate volatility is confirmed in all cases except when we employ KAOPEN with SDER. It means that exchange rate volatility is a valuable channel through which official financial liberalization affects economic growth. However, the total effect confirms that financial

[25] Table A4.10.1 model 1
[26] Table A4.10.1 model 2

liberalization works as a catalyst and captivates all the adverse effects of exchange rate volatility, contributing to economic growth.

Variously, the results produced using GEP and TL show that both the de facto measures exacerbate the volatility in the exchange rate and enhance per capita output growth directly. However, when we employ SDER as a proxy of exchange rate volatility, GEP and TL dampen economic growth. Conversely, when we employ three components of TL, the evidence is mixed. The financial inflows alleviate the volatility in the exchange rate in total; however, with some exceptions, specific financial inflows are sensitive to the measure of volatility chosen. Similarly, the impact of these selected financial inflows on economic growth is mixed, and it depends on the exchange rate volatility measure.

The mediation of exchange rate volatility is confirmed, and in the majority of cases, it is negative. However, some exceptions are there, and these exceptions are due to the impact of specific financial inflows with different proxies of exchange rate volatility. Finally, the net impact confirms that de facto financial liberalization works as a catalyst and, in most cases, absorbs the adverse effects of exchange rate volatility and enhances economic growth. On the contrary, we concluded that financial inflows exaggerate the adverse effects of exchange rate volatility and hamper economic growth when we employ SDER as a proxy of exchange rate volatility.

(D) Financial Liberalization, Exchange Rate volatility, Composition of Capital and Economic Growth

In this section, we examine the impact of financial liberalization on economic growth and discuss the channels of influence; that is, we investigate the mediating role of exchange rate volatility and the composition of capital (double mediation). We use the similar econometric methodology to estimate equations (3.31), (3.32), and (3.33) simultaneously, provided in chapter 3. Equations (3.31) and (3.32) are mediation equations, whereas equation (3.33) is the main equation; therefore, each equation has a different dependent and independent variable.

The dependent variable is the exchange rate volatility in the first mediation equation, equation (3.31). For this, we use two different de facto measures of exchange rate volatility. These proxies are Reinhart and Rogoff's (2004) coarse classification of exchange rate regime (ERR) and Aizenman et al. (2008) exchange rate stability index (FXSI) following Aghion et al. (2009) and Rodriguez (2017). In the second mediation equation, equation (3.32), our dependent variable is the composition of capital index (QC). In our main equation, equation (3.33), we use per capita output growth (EG) as our dependent variable.

We use both the de jure and de facto financial liberalization measures as an essential explanatory variable in the first mediation equation, equation (3.31) and the main equation, equation (3.33). The measures of financial liberalization are Chinn and Ito's (2008) capital account openness index (KAOPEN), the de jure measure of financial liberalization. The de facto measures we employ in this study are as follows: first, the gross external position (GEP) developed by Lane and Milesi-Ferretti (2007). It is computed as a sum of total foreign assets and liabilities as a ratio of total output. Second, total liabilities as a ratio of output (TL). Besides, we include the composition of total liabilities because we want to investigate the individual impact of capital inflows. Third, foreign direct investment liabilities (FDI), Fourth, debt liabilities, and fifth, foreign portfolio liabilities (FPL) as a ratio of total output, following Leblebicioglu and Madariaga (2015); Rodriguez (2017) and Bonfiglioli (2008).

The primary independent variable in the second mediation equation (3.32) is exchange rate volatility, and we use two proxies for this. Moreover, the exchange rate volatility is used as an explanatory variable in the main equation, equation (3.33). Correspondingly,

other independent variables used in this analysis are the composition of capital (QC) and physical capital accumulation to examine the impact of the quantity of capital on economic growth, proxied by gross fixed capital formation as a ratio of total output (INV). We include QC in equation (3.33) to check the impact of the quality channel on economic growth. The theoretical predictions on the quality channel argue that the capital moved freely when barriers on international asset trade are removed. These capital inflows help countries invest in capital goods that are highly R&D intensive. This increase in the quality of capital escalates economic growth (Caselli and Wilson, 2004). Unfortunately, very scarce literature is available on this topic which explores the quality of the capital channel. To the best of our knowledge, only one empirical study explores this channel.

We use a different set of control variables in the mediation and main equations, equations (3.31), (3.32), and (3.33). These variables are human capital (HC); we include this as growth theories suggest that labour disaggregation increases the explanatory power of production function and enhances economic growth, and one of the primary determinants of output growth (Romer, 1986; Lucas, 1988; Mankiw et al. 1992 and Barro, 1991). Trade openness (TO) is used in all three equations because TO impacts exchange rate volatility; it helps improve the quality of capital and affects economic growth even in the absence of financial liberalization. We include inflation (INF) in the main equation (3.33) to account for the impact of price stability as the main aim of monetary authorities is to stabilize prices in the country. Correspondingly, we include government final consumption expenditures as total output ratio (GOV) to incorporate fiscal policy impacts on economic growth.

Besides this, we use domestic credit as a ratio of total output (PRI) in all equations to proxy domestic financial development. The reason to include financial development in all equations is that financial development had a significant role in mitigating the adverse effects of exchange rate volatility and enhances growth (Aghion et al., 2009). Furthermore, we include the relative price of investment (RPI) in equation (3.32) following Hsieh and Klenow (2007) and Leblebicioglu and Madariaga (2015) to account for cross-country income differences. Finally, we include the initial value of per capita output $RGDPPC_0$ to account for the overall development level and convergence level in the economy.

As we discussed earlier, the aim is to this study is to check the impact of financial liberalization on EG and explore the channels of influence; that is, we explore the mediating role of exchange rate volatility and the composition of capital jointly (double mediation). In the following subsections, we discuss the direct impact of financial liberalization on economic growth as well as the mediating role of exchange rate volatility and QC for the impact of financial liberalization on economic growth.

4.10. Impact of Financial Liberalization (KAOPEN and GEP) on Economic Growth Through Exchange Rate Volatility (ERR) and the Composition of Capital

This subsection evaluates the impact of financial liberalization on economic growth and discusses the estimation results. We testify whether this association is direct or there exists some mediation. That is, we check for the mediating role of exchange rate volatility and QC jointly.

Table 4.7 explains our regression results for the impact of financial liberalization on economic growth, generated using the SUR model following Biorn's (2004) methodology. Table 4.7 includes the estimation of two models, and each model has three equations; columns 'a' and 'b' contain the results of the mediation equations, while column 'c' shows the main equation estimation results.

In the first mediation equation, models 1a and 2a, the dependent variable is ERR, a de facto measure of exchange rate volatility. The dependent variable in the other mediation equation, presented in models 1b and 2b, is QC. In the last place, the dependent variable is EG in the main equation, models 1c and 2c. We use various measures for our exogenous variable, financial liberalization, such as KAOPEN, a de jure measure, and GEP, the de facto measures in columns 'a' and 'c'. The other explanatory variable is ERR used in columns 'b' and 'c' of models 1 and 2.

Table 4.7 includes the estimation of two models—model (1) uses the KAOPEN measure of financial liberalization, while model (2) employs the GEP measure. Each model has three equations, two mediation and one main equation discussed above. In the first mediation equation, model 1a, the KAOPEN elasticity of ERR is positive and significant. Moreover, it elucidates that a one percent increase in financial flows following the official announcement to open capital account increases volatility in the exchange rate by eight basis points. This result is in line with the theoretical predictions of Dornbusch's

(1976) and Calderon and Kubota's (2018) empirical findings. On the contrary, in the second mediation equation, model 1b, the ERR elasticity of QC is negative and significant. It explains that a one percent increase in the exchange rate volatility abates the investment in a higher quality of capital by 0.22 percent. It implies that when there is excessive volatility in exchange rates, investment levels reduce in the economy so does the quality of capital, measured using the composition index. The reason behind this is the contraction in the private sector, which found themselves at high risk due to excess volatility. So, they slow down the economic activities, resulting in a decline in country-wide investment levels hence the quality of capital falls. This result is in line with Aghion et al. (2009). However, in the main equation, model 1c, the KAOPEN elasticity of EG is positive but insignificant. It means that financial liberalization has no impact on economic growth, and if there exists some, it is very weak. Similarly, the ERR elasticity of KAOPEN is negative but insignificant.

Besides, the QC elasticity of EG is negative and significant. It explicates that a one percent increase to the R&D intensive higher-quality capital leads to a decline in per capita output growth by 17 basis points. The higher quality of capital dampens the output growth is fascinating for us that how more R&D-intensive capital reduces total output. This result contradicts the theoretical predictions of Caselli and Wilson (2004) and the empirical work of Leblebicioglu and Madariaga (2015). We change our specification, estimation methodology and exclude different variables, yet the negative sign is persistent. The possible reason we think of this negative sign is the presence of the exchange rate regime. Because when we regress per capita output growth with quality of capital in previous chapters, the elasticity of capital is positive.

There should be two possible reasons for this: first, capital goods with highly intensive R&D only produced by a few high-income countries, and the rest of the world import them (Eaton and Kortum, 2001). Newly built technology is more efficient but very expensive, and they are only affordable to rich countries, and they adopt new technology by retiring the old one. The speed of this process is so fast as the rich countries did not extract full benefits of the old one and human capital development is somehow slow. This results in unemployment. This unemployment led to a crisis; for instance, a global financial crunch arose when Leman Bank declared bank corrupt as they had no recourses to fulfil creditors' claim. This leads to unemployment, and due to this, people refuse to pay back the mortgage amount, the crisis starts. Further, developed nations reached the

economy's saturation point (steady-state), where more investment did not contribute to total output. For example, in developed countries, automobile plants convert to artificial intelligence, which creates unemployment in the country, resulting in a decline in total production.

Second, less developed countries mostly rely on these retiring capital goods by developed countries, and they mostly rely on external capital to full fill their need for adequate investment. The primary source of external finance available to less developed countries is FDI and foreign debt. As far as FDI is concerned, it helps recipient countries develop human capital and takes maximum benefits by using foreign factors of production. However, these foreign investors work for their profit, and they send back a significant part of these profits to their parent company (capital outflow). Moreover, these foreign entities either purchase local brands and businesses or, by illegal means, failing local businesses, resulting in declining output. In addition, the other financing source for developing countries is foreign debt, however debt repayment remains a big challenge. Countries improve the quality of capital by investing in high R&D-intensive capital goods. They generate resources by utilizing these capital goods. The basic principle is that to repay $10, you must create more than $10. Whereas in developing countries, mismanagement of resources is a huge problem. That is why these countries did not generate sufficient resources, and to the repayment of the debt, they asked for another debt, and they were trapped in this situation.

In addition to the ongoing debate, the INV elasticity of EG is negative and significant. It illuminates that a 100 basis points increase in investment level subsides per capita output growth by almost 0.18 percent. The interpretation of this negative sign is challenging as most theoretical and empirical literature concludes with the positive impact of the investment of economic growth. For instance, Solow (1956), Barro (1990), Barro and Lee (1993) show that investment (capital accumulation) has a positive correlation with economic growth. However, some recent studies try to find the granger causality between investment and economic growth and conclude no granger causality between investment and growth (Blomstrom et al., 1996).

In contrast, Attanasio et al. (2000) find by using various methods, different samples, and different control variables that the granger causality between investment and growth exists, however, is negative.

Table 4.7: Impact of Financial Liberalization (KAOPEN and GEP) on Economic Growth Through Exchange Regime and Composition of Capital

Variables	Model (1)			Model (2)		
	1a	**1b**	**1c**	**2a**	**2b**	**2c**
	ERR	**QC**	**EG**	**ERR**	**QC**	**EG**
KAOPEN	0.0801*** (0.000)		0.0099 (0.597)			
GEP				0.0619*** (0.000)		0.0060 (0.303)
ERR		-0.2173*** (0.000)	-0.0532 (0.116)		-0.3577*** (0.000)	-0.5107*** (0.000)
QC			-0.1718*** (0.000)			-0.1882*** (0.000)
INV			-0.1768*** (0.001)			0.0254*** (0.000)
Control Variables						
HC			0.0809 (0.596)			0.0856*** (0.000)
TO	-0.3439*** (0.000)	0.3648*** (0.000)	0.3010*** (0.000)	-0.1030*** (0.000)	0.8463*** (0.000)	0.1307*** (0.000)
INF			-0.2862*** (0.000)			-0.0018 (0.372)
GOV			0.0739* (0.074)			-0.0071*** (0.000)
PRI	-0.0325** (0.034)	0.1009*** (0.000)	0.0986*** (0.000)	-0.0903*** (0.000)	-0.1259 (0.113)	-0.0605*** (0.000)
RPI		0.2375*** (0.000)	0.0005 (0.958)		0.1327*** (0.000)	0.0239 (0.865)
$RGDPPC_0$			-0.1485*** (0.000)			-0.0116*** (0.000)

Short- and Long-Term Indirect Effect and Total effect						
	Short Term	**Long Term**	**Total effect**	**Short Term**	**Long Term**	**Total effect**
KAOPEN	-0.004 (0.126)	0.001 (0.133)	0.009 (0.660)			
GEP				-0.032*** (0.000)	0.006*** (0.000)	-0.020*** (0.000)
Observations	403	403	403	401	401	401
Countries	105	105	105	105	105	105

Notes: Table 4.7 contains the estimation results for the relationship between financial liberalization and EG (Economic Growth), either directly or through exchange rate volatility and QC. For this, we use ERR. Our dependent variables are ERR, QC, and EG. Our main independent variables are financial liberalization, ERR and QC. We use four different measures for financial liberalization in total and two in this Table, namely, KAOPEN and GEP. The other crucial explanatory variable is the capital accumulation proxy by gross fixed capital formation as a GDP ratio (INV). We employ different set control variables in each column (a, b and c): HC, TO, INF, GOV, RPI, and PRI. All variables are in log form except EG. We estimate our model using Biorn's (2004) method for unbalanced panel data, the SUR model. Moreover, we calculate the short- and long-term indirect and total effects of financial liberalization on EG. We check that financial liberalization directly affects economic growth or through ERR and QC. We calculate the short- and long-term indirect and the total effects as discussed in chapter 3. *, **, *** indicate the significance level at 10%, 5%, and 1% respectively, p-value appears in parenthesis.

One possible explanation of this negative elasticity of investment explains by Vanhoudt (1998). He shows that predictions of the neoclassical model are still valid, and it is consistent with the fact that the causality of factor accumulation (investment rates, human capital, and technological knowledge) to economic growth is negative. The transactional process explains this phenomenon when there is a change in saving rates[27]. As a result, economies experience an instantaneous increase in per capita output growth rate. However, this effect will gradually diminish as countries proceed toward a steady-state point and end up falling economic growth.

Further, we perform an exercise and estimate our main equation with the high-income dummy using standard panel data methods; the elasticity of capital accumulation is positive and significant with both fixed and random effects. It entails that the negative impact of capital accumulation is due to its negative impact in developing countries. The reason behind this is the inefficient use of capital is, in developed countries, the steady-state point is achieved, and interest rates (cost of capital) are too low. That is why capital outflows are there in search of higher interest rates in developing countries. Moreover, in developing countries' financial markets, exchange rate markets are less developed, and this surge in capital leads to volatility in the exchange rate, and this uncertainty discourages domestic investors. However, foreign investors somehow manage their risk as they focus on a higher rate of returns.

Besides, in developing countries, government interference in economic activities is very high, and they try to minimize the budgetary gaps through external finance, which is used inefficiently in most cases. These funds mainly invest in nonproductive sectors, and the total output in the economy declines. This is consistent with Scott (1981, 86 and 89) and Anderson (1990). These studies argue that capital accumulation in developing and industrial countries enhances economic growth only when these investments efficiently use; otherwise, it harms total output. One more thing Anderson (1990) highlights is to understand the actual impact of investment on economic growth. One should find out the effects of investment rates, social rate of return on investment, and investment-induced returns to labour further; sound economic policies greatly influence these three variables.

[27] In textbook models saving and investment used interchangeably due to the assumption of closed economy (Vanhoudt, 1998)

The primary purpose of this study is to explore the meditation of exchange rate volatility and the composition of capital. However, the idea is not just to explore the impact of financial liberalization, ERR, QC, and EG, besides the true nature of the relationship between the said variables following Hayes and Preacher (2014). That is why we compute short- and long-term indirect effects along with the total effects of financial liberalization on economic growth. The lower panel of Table 4.7 encompasses the result. The coefficient of short-term indirect effect using KAOPEN is negative but insignificant. It implies that KAOPEN, when works through ERR, does not affect EG. It means that mediation does not exist with the de jure measure of financial liberalization. On the other hand, we compute the long-term indirect effect for the joint mediating role of ERR and QC for the impact of financial liberalization on EG. The coefficient of the long-run indirect effect of financial liberalization on economic growth is positive but insignificant in model 1. It implies that there is no mediation of ERR and QC for the impact of financial liberalization on EG. It means that financial liberalization works directly and affects economic growth. Moreover, we compute the total effect of financial liberalization on EG. The total effect of financial liberalization using KAOPEN is positive but insignificant. It is not surprising that the direct and both short- and long-term indirect effects are insignificant. It means that financial liberalization has no impact on economic growth either directly or through any of the indirect channels. The results are parallel with Rodrik (1998), Kraay (1998), and Edison et al. (2002).

In the first mediation equation, model 1a, the TO elasticity of ERR is negative and significant. It illustrates that trade openness stabilizes the exchange rate market. It implies that a slight increase in trade openness reduces the volatility in exchange rates by almost 34 basis points. This result is consistent with the theoretical findings of Obstfeld and Rogoff (1995) and Hau (2000) and the empirical findings of Calderon and Kubota (2018) and Hau (2002). Besides, the PRI elasticity of ERR is negative and significant. This negative elasticity highlights the importance of domestic financial development to stabilize the exchange rate market. It entails that the degree of financial development in a country increased by one percent mitigates the volatility in the exchange rate by three basis points. We include PRI because developed financial markets lessen the adverse effect of exchange rate volatility (Aghion et al., 2009). This result is like Aghion et al. (2009) and Kassa and Lartey (2018).

Conversely, in the other mediation equation, model 1b, the TO elasticity of QC is positive and significant. It elucidates that allowing cross-border goods trade improves the investment in higher quality capital; that is, trade flows help countries enhance their quality of capital to compete with the rest of the world. It means that a slight increase in trade openness increases the investment in quality capital by 36 basis points. This result is consistent with Leblebicioglu and Madariaga (2015). Similarly, the PRI elasticity of investment decision in higher quality capital goods is positive and significant. It means that an increase in the degree of domestic financial development by one percent enhances the quality of capital by 0.10 percent. Thus, it illustrates that domestic financial development is the crucial variable that absorbs the adverse effects of exchange rate volatility and enhances the quality of capital. This result aligns with Aghion et al. (2009) and Leblebicioglu and Madariaga (2015). Finally, the RPI elasticity of QC is positive and significant. It entails that a one percent increase in RPI increases the quality of capital by 24 basis points. It implies that when countries invest in higher R&D intensive capital goods, which are quite expensive, the relative price of investment increases. Our results are consistent with Leblebicioglu and Madariaga (2015).

Finally, in the main equation, model 1c, the HC elasticity of EG is positive but insignificant. Moreover, the TO elasticity of EG is positive and significant. It means that a one percent increase in openness leads to a sharp increase in per capita output by 30 basis points. It entails that increased trade flows following trade liberalization policy favour economic growth. It happens because of a country's competitive advantage in some specific good traded for some other good in which the country has no competitive advantage. As a result, the recourses shift in the productive sector, and both countries become better off as their output increases. Our results are like various studies such as Sachs and Warner's (1995) theoretical model and empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008). Additionally, the INF elasticity of EG is negative and significant. It means that a slight increase in price instability abates output growth by 0.29 percent. It irradiates that price stability matters for economic growth. It happens because more volatile exchange rates lead to more inflation. The policymakers want to reduce volatility, and so does the inflation rate (Slavtcheva, 2015; Ghosh, 2014), which hamper per capita output growth. Our findings are the same as those of Barro (1995) and Aghion et al. (2009).

In addition, the GOV elasticity of EG is positive and significant. It explicates that government expenditure increased by one percent per capita output enhanced by 7 basis points. It infers that more government spending is good for economic growth. This result is consistent with the view of Keynes, Aschauer (1989), and Ram (1986). In continuation of the debate, the PRI elasticity shows that a slight increase in the degree of financial development boosts per capita output growth by 0.10 percent. It means that domestic credit helps to boosts economic growth by mitigating the adverse effects of exchange rate volatility. Our results are consistent with Levine (1997 and 2001), Levine and Zervos (1998), and Aghion et al. (2009). The RPI elasticity, on the other hand, is positive but insignificant. Finally, the negative $RGDPPC_0$ elasticity of EG is negative and significant. This negative elasticity confirms the convergence in the model.

On the contrary, model 2 encompasses the regression results using GEP as a proxy of financial liberalization. In the first mediation equation, model 2a, the GEP elasticity of ERR is positive and significant. It entails that actual capital inflows destabilize the exchange rate market and exacerbate the exchange rate volatility. This result is in line with the theoretical predictions of Dornbusch (1976) and the empirical findings of Calderon and Kubota (2018). Besides, in the other mediation equation, model 2b, the ERR elasticity of investment in higher quality capital is negative and significant. It crystallizes that excess volatility in the exchange rate shakes investor confidence as they find themselves in a risky position because their profit becomes volatile. That is why they slow down the business activities, resulting in a decline in country-wide investment; therefore, the quality of capital declines. This result is like Aghion et al. (2009).

Conversely, in the main equation, model 2c, the GEP elasticity of EG is positive but insignificant. It means that GEP has no impact on economic growth. In addition, the ERR elasticity of EG is negative and significant. It explicates that exchange rate volatility is harmful to the economy as it inversely affects its total output. It happens through the curb in country-wide investment levels resulting from the private sector decision to slow down the business activities. Therefore, total output in the country declines so does the economic growth (Aghion et al., 2009). This result is consistent with Aghion et al. (2009). Moreover, the QC elasticity of EG is negative and significant. It elucidates that highly efficient and R&D-intensive capital goods hamper per capita output growth. This is surprising for us that how the higher quality of capital dampens the output growth is fascinating for us: how more R&D-intensive capital reduces total output. This result

contradicts the theoretical predictions of Caselli and Wilson (2004) and the empirical work of Leblebicioglu and Madariaga (2015). The possible explanation for this fact is the same as we discuss in the explanation of model 1. We include the quantity of capital and the quality of capital to explore which one is essential for economic growth. The INV elasticity of EG is positive and significant. That is, capital accumulation impact is growth-enhancing. It entails that capital accumulation is necessary to enhance output in the economy. Our results are consistent with the neoclassical growth model pioneer by Solow (1956) and the findings of Barro (1990), Mankiw et al. (1992), and Bekaert et al. (2011). They conclude that investment positively affects economic growth, and capital accumulation is crucial for economic growth.

Besides the direct impact of GEP, ERR, and QC on EG, we compute the indirect effects to explore the true nature of the relationship between financial liberalization on economic growth through ERR and QC. The lower panel of Table 4.7 contains the results. The short-term indirect effect of GEP on EG through ERR is negative and significant. This significant negative coefficient confirms the pure mediation as the direct impact of GEP on EG is insignificant. It entails that GEP works through ERR and affects EG. Furthermore, we compute the long-term indirect effects of GEP on EG through ERR and QC jointly. The long-term indirect effect coefficient is positive and significant. This significant coefficient confirms the pure mediation of ERR and QC. It means that GEP enhances volatility in the exchange rate, which hampers the quality of capital and finally improves economic growth. As the direct impact is insignificant and both indirect effects are significant, that is why we compute the total effect of financial liberalization on economic growth. The total effect is negative and significant. It clears that the negative short-term indirect effect dominates and cancels out the positive long-term indirect effects, resulting in the decline in per capita output growth. This result contradicts the findings of Rodriguez (2017). However, our results are the same as Ahmed (2016) and Stiglitz (2000).

However, Bonfiglioli (2008) shows that the results produced using GEP overstate the impact of financial liberalization on economic growth. Because GEP contains a portion of foreign debt from official sources and a country practising financial autarky position somehow receive and repay foreign debt and classify as a financially liberalized country. However, no policy announcement was there to open cross-border financial flows. Therefore, she provided the practical solution to adding de jure measure (policy

announcement) and GEP (actual financial flows). The results produced after the interaction term (KAGEP) encompasses in model 1 of Table A4.13. The signs of the coefficients are almost the same as of model 2 of Table 4.7. However, only the magnitude is change. Besides, the direct impact of GEP on EG is a significant positive, as shown by the positive GEP elasticity of EG. In the same pattern, the short-term indirect effect is negative and significant. It confirms the partial mediation. Similarly, the long-term indirect effect is positive and significant. It also confirms the partial mediation of ERR and QC for the impact of financial liberalization on EG. Finally, the total effect is positive and significant. It entails that financial flows absorb the adverse effects of ERR and improves economic growth. This result is like Rodriguez (2017).

In model 2a, the TO elasticity of ERR is negative and significant. It explicates that trade flows abate volatility in exchange rates. This result is in line with Obstfeld and Rogoff's (1995) theoretical model and the empirical work of Calderon and Kubota (2018). Besides, the PRI elasticity of ERR is negative and significant. It entails that domestic financial development mitigates the volatility in the exchange rate. This finding aligns with Aghion et al. (2009). The sign of TO elasticity is the same when we introduce the interaction of both de jure and de facto measure. However, the PRI elasticity becomes insignificant.

On the other hand, in model 2b, the TO elasticity of QC is positive and significant. It explicates that trade openness improves the country's quality of capital. This result is in line with Leblebicioglu and Madariaga (2015). The PRI elasticity of QC is negative but insignificant. However, in model 1b of Table A4.13, the PRI elasticity of ERR is positive and significant. It infers that financial development in the country creates a favourable environment for business and helps business people to invest in a better quality of capital. Similarly, the RPI elasticity of QC is positive and significant. It entails that the price of investment relative to output price increases when countries invest in higher R&D-intensive capital goods, which are expensive compared to common capital goods, resulting in improved quality of the country's capital stock. This finding is the same as Leblebicioglu and Madariaga (2015).

Finally, in model 2c, the main equation, the HC elasticity of EG is positive and significant. It elucidates that the more the countries work on the skill development of their population through continuous education and training, it enhances worker

productivity, increasing per capita output. The results are consistent with the theoretical models of Romer (1986) and Mankiw et al. (1992) as well as with the empirical work of Barro (2001). The TO elasticity of EG is positive and significant. It irradiates that free trade is relatively better than autarky and is good for economic growth. It allows countries to put their efforts into those goods in which they have a comparative advantage and trade them, which increases total output, hence improving economic growth. Our result is consistent with the theoretical model of Sachs and Warner (1995) and the empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008). The INF elasticity of EG is negative but insignificant in Table 4.7 and Table A4.13.

Conversely, the GOV elasticity of EG is negative and significant. It clarifies that excess government spending to enhance total output is not the only solution. One of the primary sources to finance government expenditures is debt, which amplifies the fiscal gap and results in the decline of total output, thus hindering economic growth. This result is consistent with the findings of Landau (1983), Barro (1990), and Devarajan et al. (1996). Likewise, the PRI elasticity of EG is negative and significant. However, when we include the interaction of de jure measure and GEP, the PRI elasticity becomes positive and significant in model 1c of Table A4.13. It entails that domestic financial development helps to improve economic growth as it mitigates volatility in exchange rates. Our result is consistent with Levine (1997 and 2001), Levine and Zervos (1998) and Aghion et al. (2009). The RPI elasticity of EG is positive and significant. However, when we follow Bonfiglioli's (2008) approach, the RPI elasticity becomes insignificant. The $RGDPPC_0$ elasticity of EG confirms the convergence in the model.

4.11. Impact of Financial Liberalization (De facto Measures) on Economic Growth Through Exchange Rate Volatility (ERR) and the Composition of Capital

This subsection assesses the impact of financial liberalization on economic growth and discusses the estimation results. We testify whether this association is direct or there exists some mediation. That is, we check for the mediating role of exchange rate volatility and QC simultaneously.

Table 4.8 encompasses the regression results of two models— model (1) produces results using TL measure, whereas model (2) uses three main components of TL to proxy financial liberalization. Each model has three equations, two mediation equations and

one main equation, presented in columns 'a', 'b' and 'c', respectively, discussed above. In the first mediation equation, model 1a, the TL elasticity of ERR is positive and significant. It infers that financial inflows exacerbate the volatility in the exchange rate by disturbing the market equilibrium. This result is consistent with the current literature, for instance, Dornbusch's (1976) theoretical findings and Calderon and Kubota's (2018) empirical work. On the other side, in other mediation equation, model 1b, the ERR elasticity of QC is negative and significant. It implies that volatility in the exchange rate hinders the investment in highly efficient and R&D-intensive capital goods. It happens due to a decline in country-wide investment levels, as Aghion et al. (2009) identified. Elseways, in the main equation, model 1c, the TL elasticity of EG is negative and significant. It entails that financial inflows hamper per capita output growth. Besides, the ERR elasticity of EG is negative and significant. It entails that exchange rate volatility abates economic growth. This result is like Aghion et al. (2009) and Rodriguez (2017). However, the QC elasticity of EG is negative and significant. This is surprising for us that how better-quality capital eradiates economic growth. The explanation of this negative sign is the same as discussed above in explaining model 1 of Table 4.7. However, the INV elasticity of EG is insignificant positive.

We compute the indirect effects to explore the mediation of ERR and QC for the impact of financial liberalization on EG, as shown in the lower panel of Table 4.8. The short-term indirect effect is negative and significant. It confirms the partial mediation as the direct impact of TL on EG is positive and significant in model 1c. It entails that financial inflows disturb the exchange rate market, and this increased volatility irradiates the per capita output growth in the short run. Besides, the long-term indirect effect is positive and significant. It infers that financial inflows exacerbate the volatility in the exchange rate, which hampers the quality of capital and enhances economic growth in total. As we discuss, the direct and short-and long-term indirect effects are significant. That is why we compute the total effect of financial liberalization on economic growth through ERR and QC. The total effect coefficient is negative and significant. It entails that the direct negative effect dominates, and financial liberalization hampers per capita output growth. This result contradicts the findings of Rodriguez (2017). However, our results are the same as Ahmed (2016) and Stiglitz (2000).

However, we can say that the results we discussed here are overestimated, and this is because of the presence of foreign debt from official sources. The inclusion of this debt

in TL amplifies the effect of financial liberalization. It treats the financial autarky country as financially liberalized before any policy decision by the authorities to open cross-border asset trade. Therefore, following Bonfiglioli's (2008) approach, we include an interaction term (de jure measure and TL) [KATL] to cancel out the impact of foreign debt and the results presented in model 2 of Table A4.13. The signs of the coefficient remain the same except for few ones. The TL and QC elasticities of EG become positive when we include the interaction term. The indirect effects coefficient confirms partial mediation, however, with a different sign. The short-term indirect effect is negative and significant. It entails that financial inflows disturb the exchange rate market, and this increased volatility irradiates the per capita output growth in the short run. Besides, the long-term indirect effect is negative and significant. It infers that financial inflows exacerbate the volatility in the exchange rate, which hampers the quality of capital, which eradiates economic growth. As we discuss, the direct and short-and long-term indirect effects are significant.

That is why we compute the total effect of financial liberalization on economic growth through ERR and QC. The total effect coefficient is positive and significant. It entails that the positive direct effect dominates, and financial inflows absorb the adverse effects of exchange rate volatility and improve per capita output growth. These results are in line with the findings of Rodriguez (2017).

Additionally, in model 1a, the TO elasticity of ERR is negative and significant. It elucidates that trade openness mitigates the volatility in the exchange rate. This result is like Obstfeld and Rogoff (1995) and Calderon and Kubota (2018). Likewise, the PRI elasticity of ERR is positive but insignificant. When we induce the interaction term in model 2 of Table A4.13, the signs are the same. The other way around, in model 1b of Table 4.8, the TO elasticity of QC is positive and significant. It illuminates that trade openness helps countries to decide to invest in better quality capital goods. This result is like Leblebicioglu and Madariaga (2015). In addition, the PRI elasticity of investment in higher quality capital is positive and significant. It entails that domestic financial market development lowers the cost of transactions, mitigates moral hazard problems, and boosts economic activities, improving capital quality. This result is like Aghion et al. (2009). Finally, the RPI elasticity of QC is positive and significant. It infers that RPI enhances the quality of capital. It happens because the increased investment in higher R&D intensive goods, which are expensive than low R&D intensive capital goods,

increases the RPI. This result is the same as Leblebicioglu and Madariaga (2015). The results are the same in model 2b of Table A4.13.

In continuation of the debate, in model 1c, the HC elasticity of EG is positive and significant. It confirms the importance of education and training of the country's working population. This skill development enhances the human capital, which enhances labour productivity, therefore enhancing economic growth. This result is in line with Romer's (1986) theoretical findings and the empirical work of Mankiw et al. (1992) and Barro (2001). The TO elasticity of EG is positive and significant.

It explicates that trade openness improves economic growth as it allows countries to put their efforts into those goods in which they have a comparative advantage and trade them, which increases total output, hence improving economic growth. Our result is consistent with the theoretical model of Sachs and Warner (1995) and the empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008). Additionally, the INF elasticity is negative and significant. It illuminates that price stability matters for economic growth as policymakers' goal is to maintain price stability. However, in the presence of a volatile exchange rate, this task becomes more complicated as they have to alleviate volatility in the exchange rate along with inflation (Slavtcheva, 2015; Ghosh, 2014). Our finding is the same as Barro (1995) and Aghion et al. (2009). However, in model 2 of Table A4.13, the lNF elasticity becomes insignificant.

The GOV elasticity of EG is negative and insignificant. However, when we follow Bonfiglioli's (2008) approach, the GOV elasticity of EG becomes negative and significant, as shown in model 2c of Table A4.13. It implies that excess government spending only amplifies the fiscal gap and irradiates the total output as more and more government expenditure is financed through debt or printing of money, resulting in decay per capita output growth. The findings are consistent with Landau (1983), Barro (1990), and Devarajan et al. (1996). The PRI elasticity of EG is positive and significant. It illuminates that domestic financial development expediates economic growth. However, in model 2 of Table A4.13, when we introduce the interaction term of both measures, the PRI elasticity becomes negative and significant. This result opposes the previous work of Levine (2001 and 2005) and Levine and Zervos (1998)—financial sector development enhances economic growth. However, our finding aligns with Bhatti (2014) and Rousseau and Wachtel (2011). They show that financial development measure using

Table 4.8: Impact of Financial Liberalization (De facto Measures on Economic Growth Through Exchange Regime, and the Composition of Capital

Variables	Model (1)			Model (2)		
	1a	1b	1c	2a	2b	2c
	ERR	**QC**	**EG**	**ERR**	**QC**	**EG**
TL	0.0294*** (0.005)		-0.0820*** (0.000)			
FDI/GDP				0.0881*** (0.000)		0.0424*** (0.000)
DEBT/GDP				-0.0308*** (0.000)		-0.0474** (0.015)
FPL/GDP				0.0137*** (0.000)		-0.0003 (0.981)
ERR		-0.3040*** (0.000)	-0.1500*** (0.000)		-0.3936*** (0.000)	-0.7207*** (0.000)
QC			-0.5471*** (0.000)			0.2134*** (0.000)
INV			0.0016 (0.975)			0.0207* (0.907)
HC			0.6201*** (0.000)			0.1601 (0.290)
TO	-0.3570*** (0.000)	0.3340*** (0.000)	0.3808*** (0.000)	-0.1918*** (0.000)	0.5075*** (0.000)	-0.0466 (0.180)
INF			-0.0534* (0.057)			-0.1314*** (0.000)
GOV			-0.044 (0.245)			0.0255 (0.520)
PRI	0.0212 (0.209)	0.1882*** (0.000)	0.0509** (0.023)	-0.0757*** (0.000)	0.0941*** (0.000)	-0.1718*** (0.000)
RPI		0.2397*** (0.000)			0.2656*** (0.000)	0.1900 (0.122)
$RGDPPC_0$			-0.1783*** (0.000)			-0.1037*** (0.000)
Short- and Long-Term Indirect Effect and Total effect						
	Short Term	**Long Term**	**Total effect**	**Short Term**	**Long Term**	**Total effect**
TL	-0.004** (0.017)	0.005*** (0.008)	-0.082*** (0.000)			
OL				-0.051*** (0.000)	-0.006*** (0.000)	-0.032* (0.065)
FDI				-0.064*** (0.000)	-0.007*** (0.000)	-0.029* (0.095)
DEBT				0.022*** (0.001)	0.003*** (0.004)	-0.023* (0.059)
FPL				-0.010** (0.018)	-0.001** (0.031)	-0.011 (0.418)
Observations	403	403	403	401	401	401
Countries	105	105	105	105	105	105

Notes: As of Table 4.7 except for financial liberalization measures, such as TL and three different components of TL, namely FDI, debt, and FPL

domestic credit affects economic growth negatively as the financial liberalization process increases the intensity of the crisis, which becomes the cause of excess finance during these crisis periods and hamper economic growth. The RPI elasticity of EG is positive but insignificant. Similarly, convergence is confirmed by the negative $RGDPPC_0$ elasticity of EG.

Finally, we discuss model 2, which explores the impact of three components of TL on EG. In the first mediation equation, model 2a, the FDI and FPL clasticities are positive and significant. It clarifies that financial inflows, especially FDI and portfolio inflows, aggravate the volatility in the exchange rate. This result is in line with the findings of Dornbusch's (1976) theoretical model and the empirical work of Calderon and Kubota (2018). However, the debt elasticity of ERR is negative and significant. It infers that debt mitigates the excessive volatility of the exchange rate and stabilizes exchange rates. This result contradicts the theoretical model of Dornbusch (1976); however, it is in line with Sutherland's (1996) model. He shows that allowing cross-border asset transactions stabilizes REER in the presence of demand or supply shocks. The possible reason behind this is debt, the only capital flow available to all nations even in a crisis, and debt from official institutions often allocates to revert the adverse effects of current account deficits. Hence, debt liabilities stabilize the economy so does the exchange rate market.

On the contrary, in another mediation equation, model 2b, the ERR elasticity of investment in higher quality capital is negative and significant. It expounds that exchange rate volatility hinders the quality of capital, which happens through the investment channel, as discussed above. This result is like Aghion et al. (2009). On the other side, in the main equation, model 2c, the FDI elasticity of EG is positive and significant. It elucidates that FDI inflows boost per capita output growth. It happens because FDI helps the recipient country enhance human capital through training, education, and technological transfers. This result is in line with the theoretical and empirical literature, for instance, Findlay (1978), Lucas (1988), Alfaro et al. (2004 and 2010), and Aizenman et al. (2012). However, the debt elasticity of EG is negative and significant. It entails that debt inflows are harmful to the economy. The result obtained using debt liabilities is consistent with Eichengreen et al. (2003), Rodrik and Velasco (1999)—that debt inflows are associated with the crisis. Further, our result is the same as Bordo et al. (2010). Besides, the FPL elasticity of EG is negative but insignificant. It implies that FPL inflows have no impact on economic growth. Moreover, the ERR elasticity of EG is negative and

significant. It explains that exchange rate volatility hampers per capita output growth. The results we obtained with ERR contradict the previous literature, which fails to prove any linear effect of the exchange rate regime with economic growth (Baxter and Stockman, 1989; Husain et al., 2005). However, our finding aligns with Aghion et al.'s (2009) theoretical and empirical work and Rodriguez's (2017) empirical work. They construct a simple model that shows how exchange rate volatility slows down the level of investment which causes a decline in the level of economic growth.

The QC elasticity of EG is positive and significant. This study includes QC as an explanatory variable to incorporate the importance of quality channel for economic growth. It illustrates that the decision to invest in higher quality capital, which is highly efficient and R&D-intensive, enriches per total output in the country and boosts economic growth. These results are like the theoretical findings of Caselli and Wilson (2004) and the empirical work of Leblebicioglu and Madariaga (2015). It means that financial liberalization affects the composition of capital index, enhancing per capita output growth. In addition, the INV elasticity of EG is positive and significant. It eradiates that the quantity of capital (capital accumulation) is also essential for the enrichment of economic growth. This result is like Barro (1990), Mankiw et al. (1992), Bekaert et al. (2011).

We compute indirect effects to test for the presence of mediation of ERR and QC, as presented in the lower panel of Table 4.8. The combined short-term indirect effect coefficient (OL) is negative and significant. This significant negative impact confirms the partial mediation. It elucidates that these capital inflows jointly disturb the exchange rate market and hampers economic growth. Similarly, the coefficients of short-term indirect effect using FDI and FPL is negative and significant. It means that FDI confirms the partial mediation, whereas FPL confirms the pure mediation as the direct effect of FPL on EG is insignificant. It entails that FDI and FPL inflows work through ERR and affect per capita economic growth. Conversely, the short-term indirect effect using debt is positive and significant. It implies that debt flows when works through ERR the result is growth enhancement in the short run. Moreover, we compute the long-term indirect effects. The combined long-term indirect effect (OL) is negative and significant. It confirms the partial long-term mediation of ERR and QC. It implies that financial inflows jointly influence ERR and ERR in return affects the quality of capital. In simple words, when financial inflows work through ERR and QC jointly, the result is a growth

impediment. Now we discuss the long-term indirect effect of these financial inflows separately. The long-term indirect effect coefficient is negative and significant when we use FDI and FPL inflows. This significant impact confirms the partial mediation in the case of FDI inflows. However, FPL confirms pure mediation. It clears that ERR and QC are the effective channels through which specific financial flows influence economic growth. On the contrary, the long-term indirect effect using debt is positive and significant. It explicates that when debt inflows work through ERR and QC, the result is growth enhancement.

The direct, short-and long-term indirect effects are significant. To explore the overall impact of financial inflows on economic growth, we compute the total effect. The combined coefficient of the total effect (OL) is negative and significant. It infers that direct and short- and long-term indirect effects jointly work in the same direction and hamper economic growth. Similarly, the total effect using FDI and debt is negative and significant. Using FDI infers that negative short- and long-term indirect effects dominate the positive direct impact and impede per capita output growth. This result is in line with Aghion et al. (2009) that exchange rate volatility impedes economic growth. Similarly, this result is like Ahmed (2016) and Stiglitz (2000). The result produces using debt implies that the negative direct effect dominates the positive long-term indirect effect and impedes economic growth. This result is in line with Bordo et al. (2010), Ahmed (2016), and Stiglitz (2000). Finally, the total effect using FPL is negative but insignificant. It illuminates that FPL inflows only work through ERR and QC with no direct influence on economic growth.

Continuing the previous debate, in model 2a, the TO elasticity of ERR is negative and significant. It entails that trade openness alleviates excess volatility in the exchange rates. Additionally, the PRI elasticity of ERR is negative and significant. It infers that domestic financial development abates excess volatility in the exchange rate. Conversely, in model 2b, the TO elasticity of QC is positive and significant. It elucidates that trade openness helps countries to invest in a better quality of capital. Besides, the PRI elasticity of QC is positive and significant. It elucidates that financial development increases the investment in higher quality capital. It happens because domestic financial market development lowers the cost of transactions, mitigates moral hazard problems, and boosts economic activities, improving capital quality. Similarly, the RPI elasticity of QC is positive and significant. It infers that when countries invest in high R&D intensive

capital goods, which are more expensive than least R&D intensive goods, the quality of capital increases so does the price of investment increase relative to output price. For instance, installing a new automated process plant instead of a fabricated metal manual plant increases the quality of capital; however, it is too costly, which increases the RPI. This result is consistent with Leblebicioglu and Madariaga (2015).

Finally, in model 2c, the HC elasticity of EG is positive but insignificant. In addition, the TO elasticity of EG is negative but insignificant. The INF elasticity of EG is negative and significant. It illuminates that price stability matters for economic growth, and low-price stability alleviates total output and dampens economic growth. This result is consistent with Barro (1995) and Aghion et al. (2009). The GOV elasticity of EG is positive but insignificant. Additionally, the PRI elasticity of EG is negative and significant. It illuminates that financial development hinders per capita output growth. This result opposes the previous work of Levine (2001 and 2005) and Levine and Zervos (1998)—financial sector development enhances economic growth. However, our finding aligns with Bhatti (2014) and Rousseau and Wachtel (2011). They show that financial development measure using domestic credit affects economic growth negatively as the financial liberalization process increases the intensity of the crisis, which becomes the cause of excess finance during these crisis periods and hamper economic growth. Further, the thin financial markets and weak credit protection laws cause financial development to impede economic growth (Demetriades and James, 2011). However, the RPI elasticity of EG is positive but insignificant. The negative elasticity of $RGDPPC_0$ confirms convergence in the model.

Effect Using Other Proxies of Exchange Rate Volatility (FXSI)

Moreover, we employ another proxy of exchange rate volatility, exchange rate stability index (FXSI) constructed by Aizenman et al. (2008). The results produced using this proxy of exchange rate volatility is shown in Appendix[28]. Majority of the results are similar except a few exceptions discussed as follows.

The KAOPEN elasticity of EG transforms into significant one. Besides, the EG's elasticity of FXSI becomes negative and significant. The short-term indirect effect of KAOPEN on EG through FXSI is negative and significant. The significant coefficient of short-term indirect effect confirms partial mediation. It crystalizes that KAOPEN works

[28] Table A4.14 and Table A4.15

through FXSI and affects EG. It implies that financial flows disturb the exchange rate in the short run, which hampers per capita output. Further, we compute the long-term indirect effects to evaluate the mediation of FXSI and QC jointly. The long-term indirect effect coefficient is positive and significant. The significant coefficient confirms the mediation of FXSI and QC for the impact of financial liberalization on economic growth. Finally, we compute the total effect that is the sum of short-and long-term indirect effects. The total effect coefficient is positive and significant. It elucidates that the direct impact dominates and absorbs the adverse effects of exchange rate volatility and enhances per capita output growth. This result is like Rodriguez (2017).

Similarly, the GEP elasticity of FXSI turns into significantly negative one. It illustrates that the actual financial flows stabilize the exchange rate market. However, this finding contradicts the previous work of Dornbusch (1976). However, in line with Sutherland's (1996) model. Besides, the GEP elasticity of EG becomes significant negative. The short- and long-term effects confirm mediations, however with an opposite sign. The GEP estimates overcast the impact of financial liberalization. Bonfiglioli (2008) provides a practical solution for this problem. Following her approach, we include an interaction term of both de jure and de facto measures to cancel out foreign debt's impact. Model 1 of Table A4.15.1 encompasses the results produced using an interaction term (KAGEP). The signs of the elasticities are the same, with few exemptions[29].

Further, the TL elasticity of economic growth transforms into insignificant. The total effect coefficient converts into significant positive. It entails that the overall impact of financial inflows is growth enhancing, as the financial inflows absorb the adverse effects of exchange rate volatility results in economic growth enhancement. This finding is in line with Rodriguez (2017). However, using Bonfiglioli (2008) approach, the results are almost the same[30].

Finally, the FPL elasticity of EG becomes positive and significant and QC elasticity of EG transforms into significant negative. There is a slight change of magnitude and signs of the short-and long-term indirect effects and the total effect. The combined total effect becomes positive and significant. It means that the financial inflows combinedly enhance economic growth by absorbing the adverse effects of exchange rate volatility. Besides,

[29] Table A4.15.1 model 1
[30] Table A4.15.1 model 2

the long-term indirect using FDI and FPL is positive and significant. It also confirms the partial mediation of FXSI and QC jointly. It implies that financial inflows work through FXSI, and influences the quality of capital, which affects the per capita output growth. The direct and indirect effects are significant; that is why we compute the total effect of financial inflows on economic growth. The total effect using FDI, and FPL is positive and significant which explicates that financial inflows such as FDI and FPL captivate the unfavourable effects of exchange rate volatility and enrich per capita output growth. The results produced using FDI and FPL are in line with Rodriguez (2017). However, the long-term indirect effect, on the other hand, is negative and significant. It also confirms the partial mediation of FXSI and QC for the impact of debt on EG.

4.12. Summary

Summing up the debate, we can say that the de jure measure of financial liberalization with both proxies of exchange rate volatility intensifies the exchange rate volatility. This increased volatility abates the quality of the country's capital stock and per capita output growth. However, the direct impact of de jure financial liberalization contributes to economic growth with FXSI; however, it has no impact using ERR. The mediation analysis confirms the short-and long-term mediation of exchange rate volatility (FXSI) and the composition of capital for the impact of financial liberalization on economic growth. Besides, the official financial liberalization captivates the harmful effects of exchange rate volatility and promotes economic growth. However, when we employ ERR, there is no mediation. Further, with KAOPEN, the quality and quantity of capital dampen per capita output growth.

Variously, when we employ de facto measures of financial liberalization, these measures intensify the volatility in the exchange rates except for debt inflows. This is because it is the only capital flow available to all nations, even during the time of crisis, and debt from official institutions often allocates to revert the adverse effects of current account deficits. Hence, debt liabilities stabilize the economy so does the exchange rate market. Besides, this increased volatility in exchange rates reduces country-wide investment and lessens the country's capital stock quality and per capita output growth. Additionally, the actual financial flows directly enhance economic growth in most cases except for debt inflows. Moreover, the direct impact of quality of capital on economic growth is inconclusive as

it is sometimes positive and sometimes negative. At the same time, the quantity of capital (capital accumulation) is crucial for economic growth.

The main objective of this study is to explore the true nature of the relationship between the said variable instead of just exploring the impact of these variables. That is mediation analysis. The short-term mediation is confirmed in all cases; actual financial flows work through exchange rate volatility and hampers economic growth. The long-term indirect effect confirms the mediation of exchange rate volatility and capital quality and, in most cases, when financial flows work through exchange rate volatility and quality of capital dampens economic growth. We also conclude that financial liberalization works as a catalyst in the economy, absorbs the adverse effect of exchange rate volatility, and improves per capita output growth.

(E) Financial Liberalization and Economic Growth: The Role of Governance

In this section, we examine the impact of financial liberalization on economic growth and discuss the moderating role of governance. We estimate equations (3.38) using FE estimator, provided in chapter 3. The dependent variable is per capita output growth (EG). We use both the de jure and de facto financial liberalization measures as one of the essential explanatory variables. The measures of financial liberalization are Chin and Ito's (2008) capital account openness index (KAOPEN), the de jure measure of financial liberalization. The de facto measures we employ in this study is, the gross external position (GEP) developed by Lane and Milesi-Ferretti (2007). It is computed as a sum of total foreign assets and liabilities as a ratio of total output, following Leblebicioglu and Madariaga (2015), Rodriguez (2017), and Bonfiglioli (2008).

The other essential independent variables are level of governance (IGOV) and its interaction with financial liberalization (IGOV*FL). We include the interaction term to investigate whether level of governance enhances the growth benefits of financial liberalization or not. The expect that at low (high) levels of governance financial liberalization negatively (positively) affects EG.

We use a different set of control variables in the equation (3.38). These variables are human capital (HC); we include this as growth theories suggest that labour disaggregation increases the explanatory power of production function and enhances economic growth, and one of the primary determinants of output growth (Romer, 1986; Lucas, 1988; Mankiw et al. 1992 and Barro, 1991). Further, we include physical capital accumulation to examine the impact of the quantity of capital on economic growth, proxied by gross fixed capital formation as a ratio of total output (INV). Trade openness (TO) is used because TO affects economic growth even in the absence of financial liberalization. We include inflation (INF) to account for the impact of price stability as the main aim of monetary authorities is to stabilize prices in the country. Correspondingly, we include government final consumption expenditures as total output ratio (GOV) to incorporate fiscal policy impacts on economic growth. Besides this, we use domestic credit as a ratio of total output (PRI) to proxy domestic financial development. Finally, we include the initial value of per capita output $RGDPPC_0$ to account for the overall development level and convergence level in the economy. We use

parsimonious model approach and follow specific to general approach in eliminating those variables which have no significant impact on EG.

4.13. Role of Governance for the Impact of Financial Liberalization on Economic Growth using De jure Measure

In this subsection we analyze the role of governance for the impact of financial liberalization on economic growth using the FE method and discuss the estimation results.

Table 4.9 contains the estimation results of one model—the KAOPEN, a de jure measure of financial liberalization is used in model (1). This model has ten equations, baseline model, specific model and parsimonious or general model, presented in columns 'a' through 'k'. In each model the dependent variable is EG. The independent variable in all columns of both models is financial liberalization. Other explanatory variable is IGOV, the level of governance.

Table 4.9 describes the estimation using KAOPEN, the de jure measure of financial liberalization. The model 1a represents the baseline model. Model 1b to 1j represents the specific model, whereas model 1k represents the general or parsimonious model. Initially we regress the baseline model without any control variable then we estimate the specific model including control variables one by one. If the control variable is insignificant, then we try other control variable. Finally, after this exercise we estimate the general model.

In model 1a, the impact of KAOPEN on EG is negative but insignificant. It means that a slight increase in financial liberalization by one-unit reduces economic growth by less than 1 unit. Similarly, the impact of IGOV on EG is positive but insignificant. However, the impact of the interaction term IGOV*KAOPEN is positive and significant. It implies that when level of governance increased by one-unit financial liberalization contributes to economic growth by 0.75 units. In model 1b through 1j, we include various control variables one by one and check the results again. For instance, in model b, we include HC, the HC elasticity of EG is negative but insignificant. Further, the coefficient of KAOPEN, IGOV and IGKA remains the same as of model 1a. In the same pattern we include and exclude the control variables. In model 1b through 1j, the sign of coefficient of KAOPEN is negative.

Table 4.9: Impact of Financial Liberalization on Economic Growth and the Role of Governance using De jure Measure

Model (1)	Baseline Model	Specific Model									General Model
	1 a	1 b	1 c	1 d	1 e	1 f	1 g	1h	1 i	1 j	1 k
VARIABLES	EG	EG	EG	EG	EG	EG	EG	EG	EG	EG	EG
KAOPEN	-0.0591 (0.393)	-0.0283 (0.683)	-0.0556 (0.422)	-0.1215* (0.094)	-0.072 (0.296)	-0.1159 (0.120)	-0.2035*** (0.009)	-0.1228* (0.092)	-0.0659 (0.344)	-0.1162* (0.100)	-0.1215* (0.094)
IGOV	0.0925 (0.106)	0.0943 (0.101)	0.1075* (0.063)	0.1034* (0.065)	0.0920* (0.093)	0.1054* (0.069)	0.1178** (0.038)	0.1076* (0.060)	0.0535 (0.386)	0.0948 (0.107)	0.1034* (0.065)
IGOV*KAOPEN	0.0754** (0.029)	0.0705** (0.043)	0.0685** (0.049)	0.0907** (0.010)	0.0842** (0.017)	0.0879** (0.018)	0.1023*** (0.006)	0.0922** (0.010)	0.0978** (0.010)	0.0924** (0.010)	0.0907** (0.010)
HC		-1.1782 (0.127)			-2.4157*** (0.005)						
INV			0.4417 (0.145)			0.3234 (0.270)					
TO				0.4802** (0.035)	0.6509*** (0.006)	0.4013* (0.070)	0.3492 (0.103)	0.5383** (0.024)	0.7892*** (0.005)	0.5923* (0.054)	0.4802** (0.035)
INF							-0.3119** (0.015)				
GOV								-0.395 (0.190)			
PRI									-0.3219*** (0.008)		
RGDPPC_0										-0.1409 (0.442)	
Constant	0.6235*** (0.000)	2.3354** (0.043)	-0.7803 (0.398)	-1.3858 (0.135)	1.4482 (0.171)	-2.0741* (0.079)	0.0133 (0.990)	-0.5969 (0.559)	-1.4665 (0.130)	-0.6318 (0.563)	-1.3858 (0.135)
Observations	388	379	380	384	376	380	370	381	351	384	384
R-squared	0.027	0.039	0.042	0.045	0.069	0.052	0.065	0.054	0.078	0.047	0.045
Country ID	74	71	74	74	71	74	73	74	74	74	74

Notes: As for Table 4.8. EG is economic growth. IGOV is governance indicator. IGOV*KAOPEN is the interaction term. We use specific to general approach and construct the parsimonious model. All control variables are in log form except KAOPEN, IGOV, IGOV*KAOPN and EG. We estimate our model using FE estimator.

However only level of significance changes in model 1d, 1g, 1h and 1j when we use TO, TO-and-INF, TO-and-GOV, TO-and-$RGDPPC_0$ respectively.

Further, the sign of IGOV is positive in all columns; however, when we move from specific to general approach the level of significance changes. On the other end, interaction term's impact on economic growth is positive and significant in all the columns of model 1. After performing this exercise, we finally get our general or parsimonious model, presented in model 1k. In this model the impact of KAOPEN on economic growth is negative and significant. It indicates that official announcement to open cross border asset trade lowers economic growth. Our results are in line with Rodrik (1998) and Ahmed (2016).

Additionally, the IGOV impact on economic growth is positive and significant. It means that level of governance enhances economic growth. In the same pattern the impact of the interaction term IGOV *KAOPEN on economic growth is positive and significant. It indicates that governance plays a significant role in the economy and helps countries to extract the maximum benefits from financial liberalization. In other words, as level of governance boosts the growth enhancing effects of financial liberalization further improves. This finding is like the current literature on financial liberalization, governance, and economic growth.

That is an effective role of governance is must to get maximum benefits of financial liberalization to enhance economic growth North (1990); Rodrik et al. (2004); Kunieda et al. (2011); Friedrich et al. (2013) and Njikam (2017). Besides, the TO elasticity of EG is positive and significant which entails that openness to trade enhances economic growth. This result is like the theoretical model of Sachs and Warner (1995) and the empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008).

As we observed from Table 4.9, the coefficient of the interaction term is significant. We aim to explore the moderating role of governance that is why we compute the conditional effect. Conditional effect is computed by taking the first order derivative of equation (3.38) as,

$$\frac{\partial EG}{\partial KAOPEN} = -0.1215 + 0.0907\, IGOV$$

We use three levels of governance: 25^{th} percentile (low), 50^{th} percentile (average), and 75^{th} percentile (high) as shown in Table 4.11. In Table 4.11, model 1, at low level of

governance, KAOPEN reduces the per capita output growth as shown by the negative and significant coefficient. However, as the level of governance improves, KAOPEN contributes to EG. However, at average level the impact is insignificant.

4.14. Role of Governance for the Impact of Financial Liberalization on Economic Growth using De facto Measure

In this subsection we analyze the role of governance for the impact of financial liberalization on economic growth using the FE method and discuss the estimation results.

Table 4.10 encompasses the regression results using the GEP measure of financial liberalization. Model 1a represents the baseline model. Model 1b to 1i represents the specific model, whereas model 1j represents the general or parsimonious model. Initially we regress the baseline model without any control variable then we estimate the specific model including control variables one by one. The insignificant coefficient of control variable means that it eliminates from the model, and we try other control variable. Finally, after this exercise we estimate the general model.

In model 2a, the baseline model, the impact of GEP on EG is positive but insignificant. Besides, the impact of IGOV on EG is positive and significant. However, the interaction term, IGOV*GEP is negative but insignificant. We include various control variables one by one in model 1b through 1i and observe any significant change in our baseline model. As we move from model 1b through 1i the sign of the coefficient of GEP remains the same. Elseways, the level of significance changes. For example, in model 2b, 2d, 2e, 2f, 2g, 2h and 2i when we use HC, TO-and-HC, TO-HC-and-INV, TO-HC-and-INF, TO-HC-and-GOV, TO-HC-and-PRI and TO-HC-and-$RGDPPC_0$. In contrast, the coefficient of IGOV becomes insignificant in majority of models. Besides, the interaction term coefficient remains insignificant in models 1b through 1i.

Model 2j contains the estimation results of our general or parsimonious model we derived after performing the above-mentioned exercise. The relationship between GEP and EG is positive and significant. It means that a slight increase in the financial flows cause an increase in economic growth by three units. Similarly, the level of governance enhances economic growth by promoting foreign investment in the country, as shown by the positive coefficient of IGOV. Finally, the coefficient of interaction term is insignificant. Though, the interaction term (IGOV*GEP) is insignificant, the estimation of total

Table 4.10: Impact of Financial Liberalization on Economic Growth and the Role of Governance using De facto Measure

	Model (2)									
	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j
	Baseline Model	**Specific Model**								**General Model**
VARIABLES	**EG**	**EG**	**EG**	**EG**	**EG**	**EG**	**EG**	**EG**	**EG**	**EG**
GEP	0.002 (0.148)	0.0028* (0.081)	0.0016 (0.218)	0.0029** (0.043)	0.0027* (0.054)	0.0030* (0.071)	0.0028** (0.036)	0.0033** (0.027)	0.0028** (0.043)	0.0030* (0.071)
IGOV	0.1033* (0.090)	0.0992 (0.121)	0.1172* (0.051)	0.0972 (0.115)	0.0916 (0.135)	0.1043* (0.089)	0.0918 (0.132)	0.0638 (0.330)	0.1164* (0.075)	0.1043* (0.089)
IGOV*GEP	-0.0005 (0.569)	-0.0007 (0.517)	-0.0005 (0.529)	-0.0007 (0.444)	-0.001 (0.255)	-0.0007 (0.495)	-0.001 (0.215)	-0.0008 (0.397)	-0.0007 (0.430)	-0.0007 (0.495)
HC		-1.2114 (0.140)		-2.6122*** (0.003)	-2.3994*** (0.010)	-3.6687*** (0.000)	-2.5660*** (0.004)	-2.4842*** (0.002)	-4.6300*** (0.000)	-3.6687*** (0.000)
TO			0.3692* (0.085)	0.6227*** (0.006)	0.5502** (0.022)	0.5709** (0.017)	0.6683*** (0.004)	0.7484*** (0.003)	0.3866 (0.102)	0.5709** (0.017)
INF						-0.3956*** (0.003)				-0.3956*** (0.003)
GOV							-0.2965 (0.269)			
PRIV								-0.1183 (0.248)		
$RGDPPC_0$									0.5887** (0.043)	
INV					0.2256 (0.418)					
Constant	0.6597*** (0.000)	2.4541** (0.047)	-0.9101 (0.308)	1.9192* (0.097)	1.1976 (0.428)	4.7740*** (0.000)	2.4378* (0.063)	1.687 (0.132)	0.7708 (0.584)	4.7740*** (0.000)
Observations	388	379	384	376	373	365	374	343	376	365
R-squared	0.017	0.03	0.032	0.059	0.062	0.096	0.064	0.073	0.078	0.096
Country ID	74	71	74	71	71	70	71	71	71	70
Notes: As far Table 4.9. GEP is Gross External Position. IGOV * GEP is the interaction term.										

derivative in Table 4.11 shows that the conditional effect of GEP on EG is positive and significant except the high level of governance where it is positive but insignificant.

This result is in line with the theoretical and empirical literature (North, 1990; Rodrik et al., 2004 and Friedrich et al., 2013). The TO elasticity of EG is positive and significant. It entails that trade liberalization boosts economic growth. This result is like the theoretical model of Sachs and Warner (1995) and the empirical work of Frankel and Romer (1999) and Wacziarg and Welch (2008). Similarly, the INF elasticity of EG is negative and significant. It implies that price instability is harmful to the economy. This result is like the theoretical findings of Roubini and Sala-i-Martin (1995) and the empirical findings of Barro (1995). Elseways, the HC elasticity of economic growth is negative and significant. It elucidates that human capital accumulation negatively affects economic growth. This result is not surprising as many studies earlier found the same negative effect. This result is in line with the findings of Benhabib and Spiegel (1994), Pritchett (2001), and Kumar (2006). These studies confirm the negative association between human capital and growth.

This study explores the moderating role of governance that is why we include the interaction term of financial liberalization and level of governance. However, β_4 is insignificant in all columns of Table 4.10. That is why we check for the conditional effects. The conditional effects are calculated by taking total derivative of equation (3.38) as,

$$\frac{\partial EG}{\partial GEP} = 0.0030 - 0.0007\, IGOV$$

For this we use three levels of governance: high, low and average, as shown in model (2) of Table 4.11. The coefficient of low and average level of governance is positive and significant; however, the coefficient of high level of governance is insignificant. It implies that at low and average level of governance financial liberalization improves economic growth.

Table 4.11: Conditional Effects of Financial Liberalization on Economic Growth

	Dependent Variable Economic Growth					
	Model (1) **KAOPEN**			Model (2) **GEP**		
	Coefficients	95% Confidence interval		Coefficient	95% Confidence Interval	
Low Governance	-0.1251* (0.084)	-0.2671	0.0169	0.0024** (0.043)	0..0001	0.0047
Average Governance	0.0251 (0.639)	-0.0797	0.1299	0.0019* (0.100)	-0.0006	0.0043
High Governance	0.1154* (0.088)	-0.0169	0.2479	0.0016 (0.265)	-0.0012	0.0045

4.15. Summary

Summing up the debate, we come up with the opinion that de jure measure of financial liberalization hampers economic growth in the economy which have low level of governance. However, with the improved level of governance the financial liberalization contributes positively to the economic prosperity of the country. While the de facto measures of financial liberalization improve economic growth, however, the measure of financial liberalization matters for economic growth for instance, KAOPEN negatively affects economic growth. The conditional effect confirms that financial liberalization matter for economic growth in the presence of better institutions.

Chapter 5

Conclusion and Policy Implications

In this chapter, we conclude this study, by highlighting the findings from our mediation and moderation analysis of financial liberalization and economic growth and providing a discussion on the policy implications and future directions of research.

5.1. Conclusion

There is little consensus in the contemporary literature regarding the negative impact of financial repression on global economic and financial stability and the mitigation of these negative impacts by easing the strong controls of authorities over financial markets, such as abolishing capital controls and permitting cross-border financial transactions. This discussion has spanned more than three decades. Researchers add various new features to the existing literature and summarize two distinct and relevant perspectives on the effect of financial liberalization on economic growth. First, the 'allocative efficiency view' relies heavily on the predictions of the neoclassical growth model, namely capital flows from countries with ample capital to countries with constrained capital whose interest rates are higher. The financial flows into developing countries momentarily cut the cost of capital, promote investment, and boost economic growth; however, they permanently raise the standard of life in such nations (Fischer, 2003; Obstfeld, 1998; Summers, 2000).

Second, the instability perspective According to this viewpoint, the rising financial liberalization exacerbates the crisis and becomes a formidable obstacle to global financial stability (Rodrik, 1998; Bhagwati, 1998; Stiglitz, 2002). These forecasts result in capital controls and other limitations, such as the introduction of the Tobin tax on international asset exchange. Either the literature supports the extreme positions discussed above, or it rests between the two extremes. Researchers discovered that capital account liberalization is detrimental to the economy (Ahmed 2016; Gourinchas and Jeanne, 2006). Alternatively, some scholars promote financial liberalization (Quinn, 1997; Gehringer, 2013; De Nicolo and Juvenal, 2014). Moreover, middle-of-the-road research suggest that the relationship between financial liberalization and growth (output or

productivity) is conditional and dependent on certain preceding conditions (Klein and Olivei, 2008; Bumann et al., 2013; Trabelsi and Cherif, 2017).

The literature analyzes the role of financial liberalization on economic growth using various components, variables, and methodologies. For instance, following the neoclassical growth model, economic growth is obtained through two essential factors: capital accumulation and total factor productivity (TFP) growth, which would be affected by financial liberalization and enhance growth. However, they generated a piece of mixed evidence. Some researchers favour capital accumulation for economic growth (Mankiw et al., 1992; Barro and Martin, 1995). Some studies favour TFP growth to get the maximum benefit from financial liberalization (Hall and Jones, 1999; Kose et al., 2009a; Bonfiglioli, 2008). Some researchers think both components are necessary to attain growth (Bekaert et al., 2011; Edwards, 2001); however, a country's income level determines which channel is vital for economic growth in which group of the country (Li, 2012; Bhatia and Sharma, 2019).

Besides the two conventional elements (capital accumulation and TFP), some researchers provide evidence of a novel component that would enhance growth: the 'composition of capital' or the quality of capital. The basic idea is to disaggregate capital into quality and quantity to improve the explanatory power of the production function. The literature on the said component shows that the quality of capital can explain an essential share of variation in TFP across countries, and it helps financial liberalization affects productivity. These studies find that capital inflows help to increase the quality of capital, which enhances productivity (Caselli and Wilson, 2004; Leblebicioglu and Madariaga, 2015).

Based on the predictions of the neoclassical growth model and aftermath of the financial liberalization process, we explore whether financial liberalization improves economic growth directly or there exists mediation of exchange rate volatility. Moreover, financial liberalization directly affects economic growth, or it works through the exchange rate volatility or increased quality of capital or both channels. We include seven proxies for financial liberalization divided into a broad category of de jure and de facto measures. Further, we have three de facto measures of exchange rate volatility. Furthermore, we examine the moderating role of governance for the effect of financial liberalization on economic growth.

We use unbalanced panel data for 105 countries from 1976 to 2017, for which the data on import, exports, and production of the specific type of capital goods is available. We use five-year non-overlapping averages to incorporate the business cycle effects. For mediation analysis, we follow Biorn's (2004) methodology, a relatively new method to estimate unbalanced panel data; the SUR model estimates a system of equations with one-way random effects. Additionally, for moderation analysis we employ the FE method.

We conclude that de jure measures of financial liberalization in total enhance the volatility in the exchange rate. In return, this condenses the overall investment in the country; therefore, reducing the quality of capital. However, financial flows aftermath of policy adoption to open cross border financial transactions improves the quality of capital. We examine the exchange rate volatility channel for the impact of financial liberalization on the composition of capital, and our results confirm the mediation. That is, exchange rate volatility is a valuable channel through which official financial liberalization affects the quality of capital. At the same time, the financial flows curtail the adverse effects of exchange rate volatility and enhance quality of capital except when KAOPEN is used with ERR and FXSI.

In the same pattern, the actual financial liberalization process in total intensifies the volatility in the exchange rate, however, with some exceptions. That is, 'debt inflows' with all three measures of exchange rate volatility are negative. It means that debt inflows mitigate excess volatility in the exchange rate. This increased volatility abates the investment in a higher quality of capital, reducing the overall quality of capital stock. Besides, the actual financial flows in total enhance the country's quality of capital, and we can also conclude that the nature of financial inflows matters for the composition of capital. When countries try to stabilize the exchange rate market along with financial flows, the debt and FPL inflows hampers the quality of capital. Finally, de facto financial liberalization measures confirm the mediation of exchange rate volatility with a negative sign. That is, financial liberalization, when works through exchange rate volatility, hampers the quality of capital stock because of a decline in investment levels. Finally, in most cases, the total effect confirms that financial flows absorb the adverse effects of exchange rate volatility, contribute to the country's quality of capital, and enable them to grow faster.

In addition to this, we conclude that the impact of financial liberalization, the composition of capital, and economic growth is complex, and to understand this, one should be very careful. The results produced by this study show that the de jure measures improve the country's quality of capital, yet it harms per capita output growth. On the contrary, the actual capital inflows measured using different proxies improve the country's capital quality and boost economic growth. As we were curious about the exact nature of the relationship between the said variable, the mediation analysis confirms the negative impact of financial liberalization on economic growth using de jure measures. At the same time, the de facto measures confirmed the positive partial mediation of the quality channel. Further, these measures intensify the benefits of the quality of capital on the overall economic prosperity.

At the same time, we conclude the impact of financial liberalization on economic growth through the exchange rate volatility. The de jure measures of financial liberalization exacerbate the volatility in the exchange rates. However, a few exceptions are there; KAOPEN's react differently with different proxies of exchange rate volatility, positive with FXSI and negative with ERR, whereas insignificant with SDER. On the other hand, de jure financial liberalization measures directly enhance per capita output growth in all specifications. Moreover, the increased volatility in the exchange rate (ERR, SDER and FXSI) directly lessens economic growth. The negative mediation of exchange rate volatility is confirmed in all specifications except when we employ KAOPEN with SDER. It means that exchange rate volatility is a valuable channel through which official financial liberalization affects economic growth. However, the total effect confirms that financial liberalization works as a catalyst and captivates all the adverse effects of exchange rate volatility, contributing to economic growth.

Variously, GEP and TL produce incorrect results due to foreign debt from official sources. Therefore, we follow Bonfiglioli's (2008) approach and include an interaction term of de jure and de facto measure. The estimates obtained after the inclusion of the interaction term are more reliable. We conclude that the de facto measures, more specifically, GEP and TL, exacerbate the volatility in the exchange rate; this increased volatility dampens the quality of capital and economic growth. Besides, these actual financial flows enhance per capita output growth directly. However, when we employ SDER as a proxy of exchange rate volatility, GEP and TL dampen economic growth. At the same time, when we employ three components of TL, the evidence is mixed. The

financial inflows alleviate the volatility in the exchange rate in total; however, with some exceptions, that is, specific financial inflows are sensitive to the measure of volatility chosen. Similarly, the impact of these selected financial inflows on economic growth is mixed, and it depends on the exchange rate volatility measure.

Moving on, the mediation of exchange rate volatility is confirmed, and in the majority of cases, it is negative. However, some exceptions are there, and these exceptions are due to the impact of specific financial inflows with different proxies of exchange rate volatility. Finally, the net impact confirms that de facto financial liberalization works as a catalyst and, in most cases, absorbs the adverse effects of exchange rate volatility and enhances economic growth. On the contrary, we concluded that financial inflows exaggerate the adverse effects of exchange rate volatility and hamper economic growth when SDER is used as a proxy of exchange rate volatility.

Moreover, we conclude the impact of financial liberalization on economic growth through both the channels of influence: exchange rate volatility and the composition of capital. The de jure measure of financial liberalization with both proxies of exchange rate volatility intensifies the exchange rate volatility. This increased volatility abates the quality of the country's capital stock and per capita output growth. Besides, the direct impact of de jure financial liberalization is growth enhancement with FXSI; however, it has no impact using ERR. The mediation analysis confirms the short-and long-term mediation of exchange rate volatility (FXSI) on economic growth and the composition of capital. Besides, the official financial liberalization captivates the harmful effects of exchange rate volatility and promotes economic growth. However, when we employ ERR, there is no mediation. Further, with KAOPEN, the quality and quantity of capital dampen per capita output growth.

Elseways, when we employ de facto measures of financial liberalization, financial flows intensify the volatility in the exchange rates except for debt inflows. This is because it is the only capital flow available to all nations even in a time of crisis, and debt from official institutions often allocates to revert the adverse effects of current account deficits. Hence, debt liabilities stabilize the economy so does the exchange rate market. Besides, this increased volatility in exchange rates reduces country-wide investment and lessens the country's capital stock quality and per capita output growth. Additionally, the actual financial flows directly enhance economic growth in most cases except for debt inflows.

Moreover, the direct impact of quality of capital on economic growth is inconclusive as it is sometimes positive and sometimes negative. At the same time, the quantity of capital (capital accumulation) is crucial for economic growth.

The main objective of this study is to explore the true nature of the relationship between the said variable instead of just exploring the impact of these variables; that is mediation analysis. The short-term mediation is confirmed in all cases; that is, actual financial flows work through exchange rate volatility and hampers economic growth. The long-term indirect effect confirms the mediation of capital quality and, in most cases, when financial flows work through exchange rate volatility dampens economic growth. We also conclude that financial liberalization works as a catalyst in the economy, absorbs the adverse effect of exchange rate volatility, and improves per capita output growth.

Finally, this study explores the moderating role of governance for the impact of financial liberalization on economic growth. The de jure measure of financial liberalization hampers economic growth in the economy which have low level of governance and when the level of governance improved financial liberalization contributes to the economic prosperity of the country. On the other hand, the de facto measures of financial liberalization improve economic growth, however, the type of financial flows matter for economic growth for instance, debt and FPL inflows negatively affects economic growth. The conditional effect confirms that financial liberalization matter for economic growth in the presence of quality institutions. Overall, we conclude that presence of quality institution is necessary to enhance economic growth.

5.2. Policy Implications

In 1990, World Bank published a report highlights the importance of economic integration. Since then, there is a sharp increase in the adoption of policies of economic integration (trade and financial liberalization), as the world thinks this policy a key of economic prosperity. However, the frequency of crisis in the economies increases. This is surprising for researchers, and they started thinking on this issue and come up with the opinion that financial liberalization policies are not suitable for developing countries which have less developed financial markets, worse macroeconomic policies and low level of governance (Rodrik et al., 2004; Chinn and Ito, 2006; Bekaert et al., 2005; Kose et al., 2009a).

In this context, our findings may help the policy makers to take care of exchange rate volatility, the composition of capital, and governance while designing economic policies centered on growth enhancing effects of financial liberalization. The above goal can be realized through maintaining the fluctuations in domestic money market and taking care of international money market shocks that may affect the exchange rate volatility. Similarly, the policy makers may like to improve the legal and institutional framework along with financial development, as it ensures property rights and reduce moral hazard problem. It helps countries to improve the quality of capital through increased investment levels.

5.3. Future Directions of Research

As discussed earlier, we employ several proxies of financial liberalization and exchange rate volatility, such as KAOPEN, QUINN, GEP, TL FDI, debt and FPL, the de jure and de facto measures of financial liberalization and ERR, SDER and FXSI, the de facto measures of exchange rate volatility. Due to these proxies the scope of our study is somehow limited as there is no single measure of financial liberalization and exchange rate volatility.

We are at the opinion that future research could be done to construct a comprehensive measure of financial liberalization, exchange rate volatility and governance. Moreover, future research will be done to explore the other channels through which financial liberalization may affect economic growth. Further, the research could be done to investigate the linkage between financial liberalization and the occurrence of crisis. In future, researchers may examine the effects of real exchange rate misalignments for the impact of financial liberalization on economic growth. Moreover, researchers may focus on the prerequisites, the policies adopted prior to financial liberalization to promote economic prosperity.

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Appendix

Table A.1: Variable Definition

Variable Name	Definition	Source
Dependent Variables		
Exchange Rate Regime	Reinhart and Rogoff (2004) coarse exchange rate regime and classification. It ranges from 1 to 4, from rigid to volatile regime and calculated as, $ER_{t,t+5} = \frac{1}{5}\sum_{t=1}^{i=5} ERR_{t+i}$	Author self-calculation by taking coarse exchange rate regime data from Reinhart and Rogoff (2004)
Real Exchange Rate Volatility	The standard deviation of the exchange rate (SDER). It is calculated by taking the standard deviation of the growth rate of REER	Author self-calculation by taking REER data from Darvas 2012
Exchange Rate Stability Index	A continuous measure. It is obtained by adjusting monthly variations in the exchange rate between home and base country to annual standard deviation. It ranges from 0 and 1. We reciprocate it to convert it into a Volatility index	Aizenman et al. (2008)
The Composition of Capital (QC)	It measures of quality of capital. It is obtained through standard growth accounting procedure. The empirical measure is expressed in terms of relative capital ratio. It is calculated by; $QC_i = A_1\left[\sum_{p=1}^{P}\frac{K_{ip}}{K_{i1}}\right]^{(\gamma/1-\gamma)}$	Author self-calculation using data of production, import and exports from UNCTAD and COMTRADE, of specific capital type.
Level and Growth rate of GDP (Y)	Real GDP per Capita at constant prices	World Development Indicator
Explanatory Variables		

Capital Account Openness Index (KAOPEN)	Dejure measure of capital account openness index, constructed through IMF AREAER categorical table. It ranges between -1.8 to 2.54. The smaller value means a close economy.	Chinn and Ito (2008)
Capital Account Openness Index (QUINN)	The Other de jure measure of capital account openness index, constructed by using AREAER text information. It contains the information on strict controls on financial transactions by residents and non-residents of a country. It ranges from 0 – 100. 0 refers closed, while 100 indicated full open economy	Quinn and Toyoda (2008)
Gross External Position	A de facto measure. It is calculated by using country total assets and liability data, such as FDI, FPI, financial derivatives, foreign debt, and foreign exchange reserves as a ratio of total output	Lane and Milesi-Ferretti (2007)
Total Liabilities	A de facto measure, the sum of capital inflows as a ratio of total output	Lane and Milesi-Ferretti (2007)
Foreign Direct Investment	A de facto measure. A component of the total liability. Foreign direct investment inflows to total output	Lane and Milesi-Ferretti (2007)
Debt	A de facto measure and an important component of the total liability. It includes total foreign debt inflows to total output ratio	Lane and Milesi-Ferretti (2007)
Foreign Portfolio Liabilities	A de facto measure and an important component of the total liability. It covers all portfolio equity inflows as a ratio of total output	Lane and Milesi-Ferretti (2007)
Investment (INV)	The gross fixed capital accumulation as a percentage of total output. It is a proxy for physical capital accumulation.	World Development Indicator
Human Capital Index	Mean of the year of schooling and returns to education	Penn World Table 9.1
Governance Indicator (IGOV)	A country level indicator of governance and institutional quality. We use **Political Risk** which access political stability of a country. It includes twelve indicators divided into four group.	Author self-calculation using PCA using ICRG data of Political Risk

	1) Political Conditions. It includes (a) military in politics (b) democratic accountability. 2) Quality of Institutions. It includes (a) corruption, (b) law and order; (c) bureaucratic quality 3) Socio Economic Conditions. It includes (a) government stability, (b) socio economic conditions, (c) investment profile 4) Conflicts. It includes (a) internal conflicts, (b) external conflicts, (c) religious tensions (d) ethnic tensions. It is calculate using PCA.	
Control Variables		
Trade Openness	Trade (sum of imports and exports) percent of total output	World Development Indicator
Domestic Credit	Domestic credit to the private sector by banks refers to financial resources provided to the private sector by banks and other financial institutions, such as loans, purchases of nonequity securities, and trade credits and other accounts receivable as a percentage of GDP.	World Development Indicator
Relative Price of Investment (RPI)	It is the price of investment relative to the price of output	Penn World Table 9.1
Inflation	Inflation, as measured by the consumer price index, reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly	World Development Indicator
Government Expenditures	It includes all general government final consumption expenditures, including government current expenditures for goods and services. It also includes most expenditures on national defence and security, excluding military expenditures that include in government capital formation.	World Development Indicator

Table A.2: Description of Capital Type Categories

Capital Type	ISIC (Rev 2)	Description	Depreciation Rate δ
Fabricated Metal products	381	Cutlery, Hand tools, general hardware, metal furniture and Fixtures, structural metal products, etc.	0.007
Machinery Except Electrical	382	Agriculture machinery and equipment, engines & turbines, metal and wood working machines, office accounting and computing machinery, special industrial machinery and equipment except metal and wood working,	0.175
Electrical Machinery, Communication Equipment, Television and Radio	383	Radio, television, other communicating equipment and apparatus. Electrical houseware appliances and electrical industrial machinery and apparatus.	0.085
Transport Equipment	384	Motor vehicles, bicycles, motorcycles. Aircraft, railroad equipment and ship building and repairing.	0.14
Professional goods	385	Optical goods, photographic equipment, and goods, measuring and controlling equipment, watches and clocks.	0.12

Table A.3: Summary Statistics

Variables	Observations	Mean	Standard deviation	Min	Max
ERR	883	0.600997	0.465271	0	1.609438
SDER	945	0.061204	0.165196	0.00941	1.652604
FXSI	898	0.667248	0.560386	0	3.206912
QC	686	4.669006	0.272227	0.939681	5.278278
GDPPCG	796	0.017508	0.031974	-0.17846	0.105526
KAOPEN	882	0.405408	1.0437	-2.41273	1.472471
QUINN	878	4.000759	0.569575	2.014903	4.60517
GEP	895	7.878377	0.041493	7.314477	8.284269
TL	904	4.2942	1.032696	0	8.148073
FDI	897	2.743546	1.255274	0	7.792503
DEBT	897	3.90143	0.93077	0.585394	7.317456
FPL	893	0.997544	1.260066	0	6.817902
INV	849	3.087102	0.307412	1.108227	4.492965
HC	901	1.425896	0.215403	-0.92703	2.111001
TO	858	4.147386	0.582639	2.178938	6.006653
INF	827	2.84327	0.565907	-0.51202	6.560422
GOV	850	2.648919	0.414172	0.328116	3.652351
PRI	783	3.444436	0.946101	0.505175	5.467014
RPI	790	3.201442	0.912072	0.689844	6.12724

Table A3.1: Correlation Matrix

Variables	ERR	SDER	FXSI	QC	EG	KAOPEN	QUINN	GEP	TL	FDI	DEBT	FPL	INV	HC	TO	INF	GOV	PRI	RPI
ERR	1																		
SDER	0.071	1																	
FXSI	0.781	0.037	1																
QC	0.038	0.069	0.018	1															
EG	0.116	-0.017	0.060	-0.038	1														
KAOPEN	-0.129	-0.304	0.005	-0.098	0.012	1													
QUINN	-0.082	-0.151	-0.024	-0.071	-0.003	0.720	1												
GEP	-0.029	-0.018	-0.014	-0 079	0.103	0.174	0.176	1											
TL	-0.227	-0.275	-0 190	-0.016	-0 087	0.411	0.424	0.123	1										
FDI	-0.215	-0.134	-0.170	0.078	0.043	0.370	0.462	0.199	0.780	1									
DEBT	-0.225	-0.30	-0.205	-0.028	-0.146	0.349	0.324	0.019	0.926	0.537	1								
FPL	0.008	-0.233	0.058	-0 157	0.070	0.431	0.397	0.308	0.603	0.561	0.412	1							
INV	0.123	0.090	0 068	-0.079	0.339	-0.005	-0.049	0.113	-0.086	0 039	-0.157	0.123	1						
HC	0.137	-0.135	0.208	-0.103	0 048	0.559	0.550	0.159	0.395	0 407	0.273	0.590	0.055	1					
TO	-0.274	-0.178	-0.243	0.066	0.092	0.335	0.305	0.212	0.614	0.672	0.494	0.343	0 166	0.301	1				
INF	0.210	0 338	0.216	0.079	-0.116	-0.446	-0.278	-0.126	-0 359	-0.358	-0.251	-0.469	-0.105	-0.284	-0.282	1			
GOV	-0.163	-0.298	-0.066	-0.099	-0.154	0.272	0 164	-0 022	0.190	0.104	0 173	0.248	-0.091	0.409	0.147	-0.298	1		
PRI	0.004	-0.244	0 047	-0 122	0 008	0.462	0.350	0.222	0.468	0 420	0.350	0.699	0.175	0.606	0.344	-0.470	0.386	1	
RPI	0 022	0.018	0.022	0 159	0 227	-0.352	-0 361	-0.052	-0.352	-0.298	-0.278	-0.496	-0.116	-0.589	-0.068	0.337	-0.398	-0.469	1

Figure A.1: Capital Account Liberalization in Neoclassical Growth Model

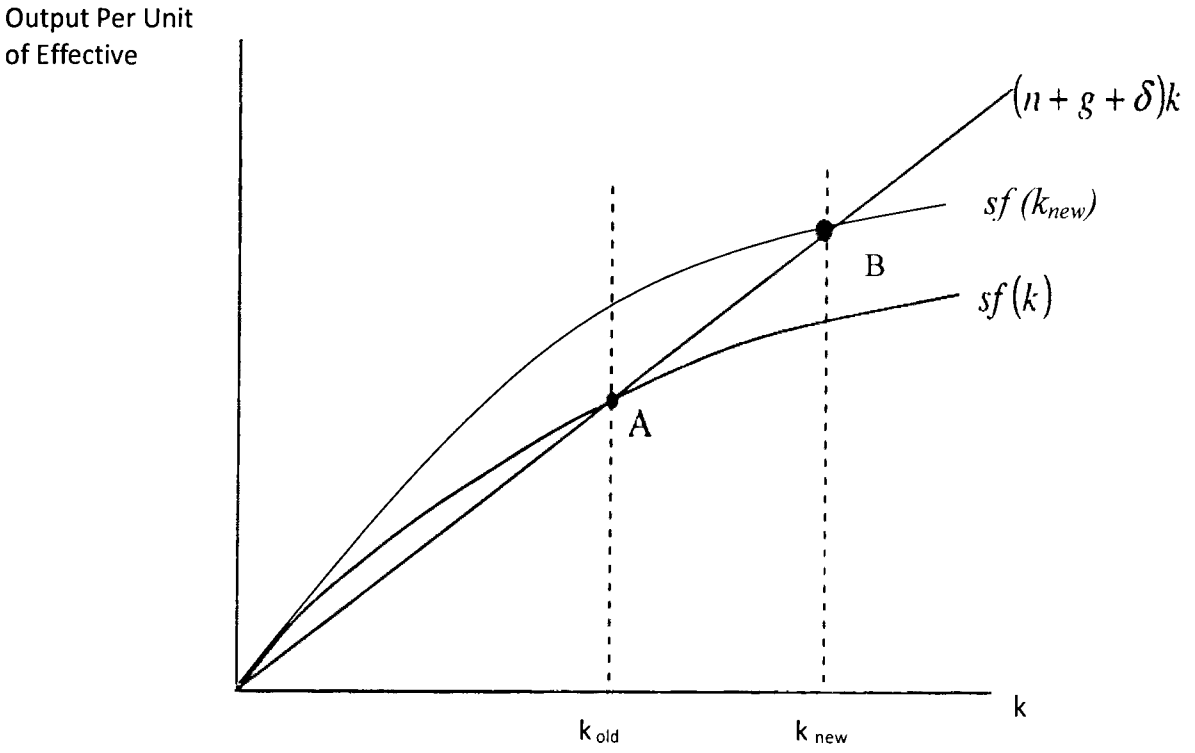
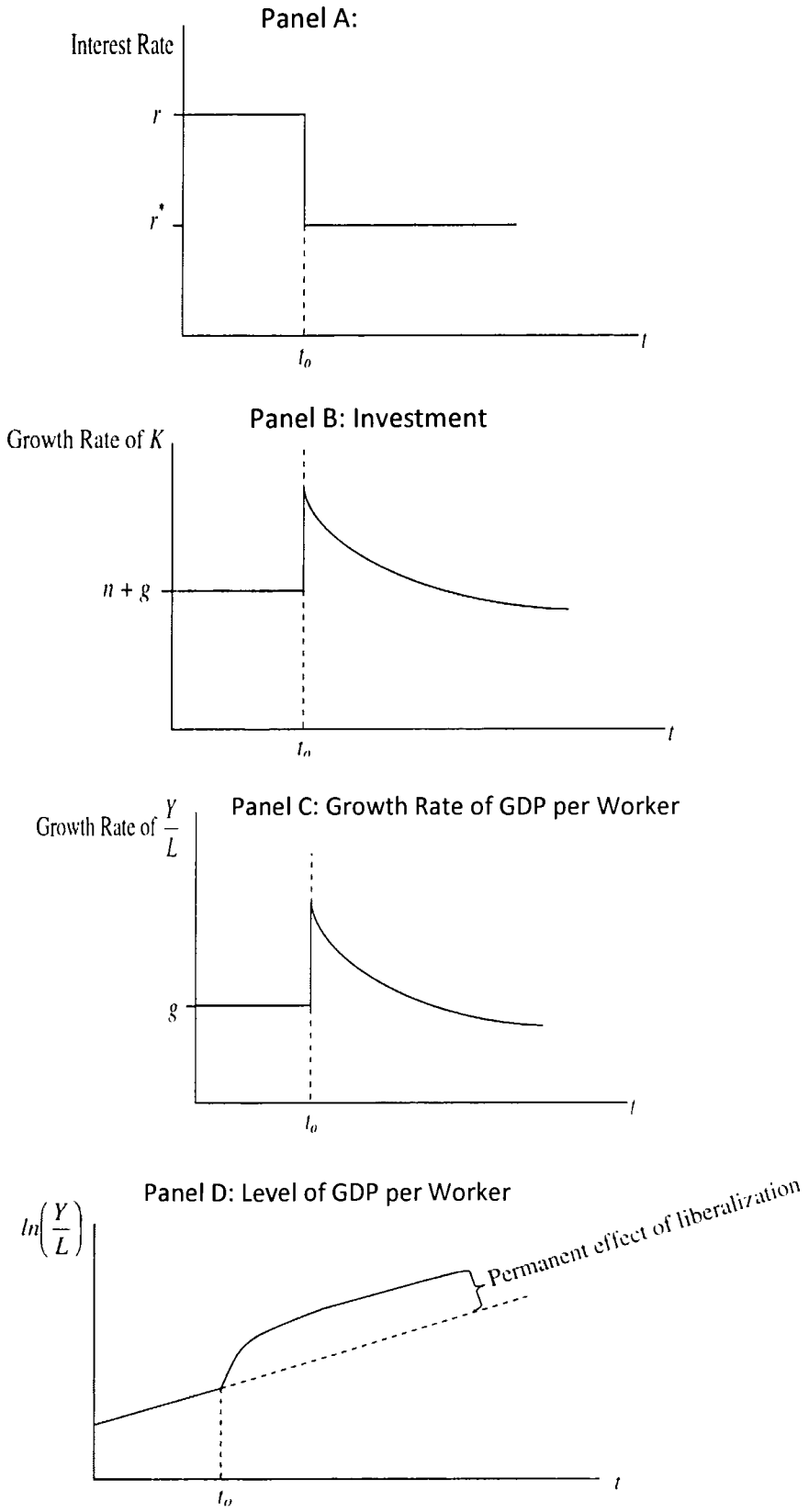


Figure A.2: The Impact of liberalization on Cost of Capital, Investment and Growth



A3.1:Derivation of Neoclassical Model:

we assume Cobb-Douglas production function with labour augmenting technological progress.

$$Y = F\,(K, AL) \tag{A1}$$

where Y is output, K capital stock, and AL is effective labour. Explicitly, equation (1) can be written as,

$$Y = K^{\alpha} AL^{1-\alpha} \tag{A2}$$

where, $\boldsymbol{\alpha}$ is share of capital and $(1 - \boldsymbol{\alpha})$ is the share of labour.

Expressing the above model in per unit of effective labour,

$$\frac{1}{AL}Y = \frac{1}{AL}(K^{\alpha} AL^{1-\alpha})$$

$$y = f(k) = k^{\alpha} \tag{A3}$$

Where, $y = {}^{Y}/_{AL}$ is the output per unit of effective labour. k= ${}^{K}/_{AL}$ is the amount of capital per unit of effective labour.

We assume that labour (L), capital stock (K) and knowledge (A) change over time. Initial level of K, A and L are known and positive. Further, L and A grow at a constant rate, n and g.

$$\hat{L}_t = n \tag{A4}$$

$$\hat{A}_t = g \tag{A5}$$

where $\hat{L}_t$ is labour growth rate and $\hat{A}_t$is the growth rate of knowledge that is total factor productivity.

Output is divided into two parts, that is consumption and investment. Savings (s) is the fraction of output converted into investment and it is assumed to be given. We interpret it as one unit of output saved becomes the part of investment and as a result increases capital stock of a country by one unit. Existing capital stock should be depreciated at the rate of δ

$$\hat{K}_t = sY_t - \delta K_t \tag{A6}$$

Capital per unit of effective labour k is, easier to focus as compared to K which is the unadjusted capital stock of an economy.

k= $K/_{AL}$, using chain rule we get,

$$\hat{k}_t = \frac{\hat{K}_t}{A_t L_t} - \frac{K_t}{(A_t L_t)^2}\left[A_t \dot{L}_t + L_t \dot{A}_t\right] \quad \text{(A7)}$$

$$\hat{k}_t = \frac{\hat{K}_t}{A_t L_t} - \frac{K_t}{(A_t L_t)} * \frac{\dot{L}_t}{L_t} - \frac{K_t}{(A_t L_t)} * \frac{\dot{A}_t}{A_t} \quad \text{(A8)}$$

$K/_{AL}$ is simply k from $\hat{k}_t = sf(k_t) - (n + g + \delta)k_t$, $\dot{L}_t/_{L_t}$ and $\dot{A}_t/_{A_t}$ are n and g respectively. $\hat{K}_t$ is from equation A6. By substituting these values in equation in equation A8 we get,

$$\hat{k}_t = \frac{sY_t - \delta K_t}{A_t L_t} - k_t n - k_t g \quad \text{(A9)}$$

$$\hat{k}_t = s\frac{Y_t}{A_t L_t} - \delta k_t - n k_t - g k_t \quad \text{(A10)}$$

$Y/_{AL}$ is given by f(k)

$$\hat{k}_t = sf(k_t) - (n + g + \delta)k_t \quad \text{(A11)}$$

At steady state $\hat{k}_t = 0$ that is $sf(k_t) - (n + g + \delta)k_t = 0$. When we take the derivative of $\hat{k}_t$ with respect to k_t we get,

$$\frac{\partial \hat{k}_t}{\partial k_t} = f'(k_t) + \delta \quad \text{(A12)}$$

$$f'(k_{ss}) = MPK + \delta \quad \text{(A13)}$$

$$f'(k_{ss}) = r + \delta \quad \text{(A14)}$$

A3.2:Derivation of Equation 3.13

We reproduce this derivation of equation 3.13 following Caselli and Wilson (2004).

$$\xi_{ip} = \frac{K_{ip}}{K_i} = \frac{A_{ip}^{\gamma/(1-\gamma)}}{\sum_j A_{ij}^{\gamma/(1-\gamma)}} \tag{3.13}$$

Here for our convenience, we drop the country superscripts *i*, for each intermediate good of type *p* the marginal product of labour is equal to the wage rate ω; or

$$X(1-\alpha)\left(\sum_j x_j\right)^{(1/\gamma)-1} A_p^{\gamma} L_p^{(1-\alpha)\gamma-1} K_p^{\alpha\gamma} = \omega$$

Solving for L_p, summing over all sectors, and imposing the market-clearing condition $\sum p$ Lp = L; we can solve for the ω: Substituting back into the above equation we get,

$$\rho_p = \frac{L_p}{L} = \frac{A_p^{\gamma/1-(1-\alpha)\gamma} K_p^{\alpha\gamma/1-(1-\alpha)\gamma}}{\sum_j A_j^{\gamma/1-(1-\alpha)\gamma} K_j^{\alpha\gamma/1-(1-\alpha)\gamma}} = \frac{A_p^{\gamma/1-(1-\alpha)\gamma} \xi_p^{\alpha\gamma/1-(1-\alpha)\gamma}}{\sum_j A_j^{\gamma/1-(1-\alpha)\gamma} \xi_j^{\alpha\gamma/1-(1-\alpha)\gamma}}$$

We assume that the marginal product of capital is equalized across sectors, or

$$A(1-\alpha)\left(\sum_j x_j\right)^{\left(\frac{1}{\gamma}\right)-1} A_p^{\gamma} L_p^{(1-\alpha)\gamma-1} K_p^{\alpha\gamma-1} = r$$

Dividing this by the pricing equation for labour we find the conventional result that the capital labour ratio is equalized across sectors,

$$\frac{K_p}{L_p} = \frac{K}{L}$$

which implies that,

$$\xi_p = \rho_p$$

Hence, we must solve the system of equations,

$$\xi_p = \frac{K_p}{K_1} = \frac{A_p^{\gamma/1-(1-\alpha)\gamma} \xi_p^{\alpha\gamma/1-(1-\alpha)\gamma}}{\sum_j A_j^{\gamma/1-(1-\alpha)\gamma} \xi_j^{\alpha\gamma/1-(1-\alpha)\gamma}}$$

A3.3:Derivation of Exchange Rate Volatility and Growth Model

We reproduce Aghion et al. (2009) model and Rodriguez (2017) extends this model

A3.3.1. A simple framework

In this subsection, we use a simple framework that generalizes how exchange rate volatility and financial liberalization affect productivity growth. Rodriguez (2017) extend Aghion et al. (2009) model and introduce the financial credit markets. In this model, Aghion et al. (2009) identifies the mechanism that exchange rate volatility disturbs the profits and makes profits volatile, resulting in a decline in economic activities, leading to a decline in country-wide investment levels. A useful example can be found in the pass-through literature, including Dornbusch (1987), Giovannini (1988), Krugman and Baldwin (1987), Feenstra (1989) and Rodriguez (2017). An exporter working in a condition where wages are fixed, when the exchange rate becomes more volatile, the exporter find it challenging to translate this into the cost of import. In this case, variations in the exchange rate led to an equivalent variation in the profits of an exporter. It discourages future investments because of a higher cost of capital related to domestic and international financing. We carry forward two facts from Aghion et al. (2009). First, in the presence of sticky wages, volatility is measured by the movements in the nominal exchange rate. Second, innovation by the entrepreneurs who could absorb liquidity shocks in the short run raise productivity. The following is a summary of essential insights. Initially, nominal wages are fixed, and firms cannot change nominal exchange rates. The ability of firms to borrow is commensurate with their current income, which is directly affected by wages. Fluctuations in the exchange rate reduce the current income of firms, which limits their ability to borrow. This ability to borrow depends on the level of financial development and financial liberalization in the economy.

A3.3.1.1. The Environment of Profit

Likewise, Aghion et al. (2009) and Rodriguez (2017) assume the economy with only one good is identical to the world good and produced by using half labour and half capital. Individuals are risk-averse and accumulate wealth, which they consumed at the end of their life. In this model, the primary determinant of growth is the innovation adopted by the entrepreneur. Firms are price takers in the foreign market, and the price in foreign currency

of any good is given by P_t^* at any time *t*. The value of goods sold in domestic currency when purchasing power parity holds as,

$$P_t = S_t P_t^*$$

Where P_t is the domestic price level and S_t is the nominal exchange rate. P_t^* is normalized to 1. Therefore, under a fixed exchange rate regime, $P_t = S_t$, S_t, is constant; however, when the exchange rate regime is flexible, S_t is random with an expected value;

$$E(S_t) \equiv \bar{S}.$$

As Aghion et al. (2009) and Rodriguez (2017) indicated that, under the consequences of innovation and growth, the variations in nominal exchange rate S_t would lead to variations in the profitability of firms, this is because of nominal wages, which are inflexible for one period and fixed before the realization of S_t. Therefore, in the short run, firms' faces exchange rate risk as their profits are exposed to exchange rate risk as a variation in S_t determine the sales amount of firms

The real wage at the beginning of period *t* equals some reservation value,

$$wA_t$$

Where $w < 1$ refers to the labour productivity adjusted reservation utility and A_t, is current aggregate productivity. Then

$$\frac{W_t}{E(P_t)} = wA_t$$

Where W_t is the nominal wage rate preset at the beginning of period *t* and $E(P_t)$ is the expected price level. Since $E(P_t) = E(S_t) \equiv \bar{S}$, then $W_t = w\bar{S}A$. At the beginning of individuals first period. The individuals who became entrepreneurs decide how much labour to hire, given a nominal wage. The crucial feature is that this decision occurs after realizing the aggregate shocks. As in Aghion et al. (2009) and Rodriguez (2017), at the end of their first period, entrepreneurs face a liquidity shock; not all are able to survive it and innovate in the second period.

Let ρ_t be the proportion of entrepreneurs who innovate and determine the growth rate of the economy. For analytical simplicity, the choice of production technology of an entrepreneur born at date t in the first period is given by

$$y_t = A_t\sqrt{I_t},$$

Where I_t is the labour input at time t. The sum of profits at time t is,

$$\Pi_t = P_t y_t - W_t I_t = A_t S_t \sqrt{I_t} - w\bar{S}A_t I_t.$$

In the second period, the entrepreneur realizes the value of innovation $v_{t+1}$with probability ρ that depends upon her ability to cover the liquidity shock at the end of the first period. In an economy with credit constraints, the ability to overcome the liquidity shock depends directly upon the first-period profit realization and hence upon both the level of employment and the aggregate shock. Therefore, the optimal level of employment in the first period is chosen by the entrepreneur by maximizing her net present value

$$\max_{I_t}(A_t S_t\sqrt{I_t} - w\bar{S}A_t I_t + \beta\rho E_t v_{t+1}) \qquad \text{(A3.31)}$$

β, denotes the discount rate of the entrepreneur.

A3.3.1.2. Innovation, Liquidity Shock and Equilibrium Profits

The evolution of productivity depends on the innovation capacity of the entrepreneur. Given some factor $\gamma > 1$, a successful innovator has productivity

$$A_{t+1} = \gamma A_t.$$

Aghion et al. (2009) assume that the value of innovation $v_{t+1}$is proportional to the productivity level achieved by a successful innovator; that is,

$$v_{t+1} = vP_{t+1}A_{t+1}, \text{ with } v > 0.$$

Furthermore, the liquidity cost of innovation is proportional to productivity as

$$C_t^i = c^i P_t A_t,$$

where C_t^i is the (nominal) liquidity shock, and c^i is independently and identically distributed across firms, with a uniform distribution function F over the interval $[0, \bar{c}]$. To overcome the

liquidity shock, entrepreneurs can potentially borrow domestically or internationally. However, credit constraints prevent them from borrowing more than a multiple

$\mu + \mu^* - 1$ of current cash flow Π_t,

where μ is financial development and μ* is financial liberalization, respectively. The borrowing constraints are no longer binding if μ and μ* become large. Hence, the funds available for innovative investment at the end of the first period are at most equal to

$\mu\Pi_t + \mu^*\Pi_t$

and therefore, the entrepreneur will innovate whenever:

$(\mu + \mu^*)\Pi_t \geq C_t^i$, with $C_t^i = c^i P_t A_t$

Thus, the probability of innovation ρ_t can be defined as

$$\rho_t = F[\frac{(\mu+\mu^*)\Pi_t}{S_t A_t}] \qquad \text{(A3.32)}$$

Given ρ_t , the entrepreneur will choose the level of employment I_t that maximizes (A3.31) yielding

$I_t = (\frac{S_t}{2w\bar{S}})^2$

and therefore, equilibrium profits are

$\Pi_t = (\frac{1}{4w\bar{S}})A_t {S_t}^2 = \psi A_t {S_t}^2$ with $\psi = (\frac{1}{4w\bar{S}})$.

Notice that equilibrium profits are increasing in the nominal exchange rate S_t. From (A3.32) the probability of innovation is then expressed as:

$$\rho_t = F[(\mu + \mu^*)\psi S_t] = Pr[(\mu \pm \mu^*)\psi S_t \geq c^i \qquad \text{(A3.33)}$$

Furthermore, given the distributional assumption for c^i, it is possible to rewrite the probability of innovation as,

$$\rho_t = \begin{cases} \mathbf{1} & \boldsymbol{if}\ \tilde{\rho_t} \geq 1 \\ \tilde{\rho_t} & 0 < \tilde{\rho_t} < 1 \\ \mathbf{0} & \boldsymbol{if}\ \tilde{\rho_t} \leq 1 \end{cases} \qquad \text{(A3.34)}$$

Where $\widetilde{\rho_t} = \frac{1}{c^i}[[(\mu + \mu^*)\psi S_t]$. Notice that the probability of innovation depends on the nominal exchange rate. In particular, the innovation probability ρ_t declines with the occurrence of a domestic currency devaluation. However, this decline is mitigated by a higher financial development (μ) or financial openness $(\mu)^*$.

A3.3.1.2. Productivity Growth

Productivity growth depends on the proportion of firms (A3.34) that satisfy the innovation condition

$(\mu + \mu^*)\Pi_t \geq c^i P_t A_t$.

Hence, following Aghion et al. (2009), the expected productivity at date $t+1$ is defined as

$E(A_{t+1}) = E(\rho_t)\gamma A_t + 1 - E(\rho_t)A_t$.

Thus, the expected rate of productivity growth is given by,

$$g_t = \frac{E(A_{t+1}) - A_t}{A_t} = (\gamma - 1)E(\rho_t) \qquad \text{(A3.35)}$$

The movement from a fixed to a flexible exchange rate reduces average productivity growth. However, when μ and μ^* become large, the negative impact of exchange rate flexibility on productivity growth becomes progressively smaller.

The expected rate of productivity growth is proportional to the expected proportion of innovating firms. Hence, the comparison between fixed and flexible exchange rates can be reduced to analyzing the difference between the corresponding expected innovation probabilities,

$\Delta_t = \bar{\rho} - E(\rho_t)$,

where $\bar{\rho} = F[(\mu + \mu^*)(\frac{1}{4w})]$ and $E(\rho_t) = \{F[\frac{(\mu+\mu^*)S_t}{4w\bar{S}}]\}$.

Embedded in this comparison is the fact that the only aggregate shock considered is exchange rate risk premium shocks to the exchange rate. The proof follows Aghion et al. (2009). The first part of the proposition uses the form of the distribution function F.

When $\rho < 1$, then $E(\rho_t) = E\{F[\frac{\rho S_t}{\bar{S}}]\}$.

Thus, if $\rho_t < 1$ then ρ_t would be linear in S_t and therefore $E(\rho_t) = E(\bar{\rho}) = \bar{\rho}$.

However, from (A3.34), there are values of S_t for which $\rho_t = 1$, then ρ_t is a concave function of S_t and therefore, by Jensen's inequality, $E(\rho_t) < \bar{\rho}$. The second part of the proposition follows from the fact that $\bar{\rho}$ and $E(\rho_t)$ converges to 1 as μ and μ* become larger. In fact, $\bar{\rho} = 1$ when $(\mu + \mu^*) \geq 4wc$; so, for such levels of μ and μ^*, the negative impact of exchange rate flexibility on productivity growth decreases with μ and μ^*, since $E(\rho_t)$ increases with μ and μ^*. Notice that the main results rely on the asymmetry entailed by the liquidity constraint and the concavity of the proportion of innovating firms (ρ): as the levels of financial development and openness increase, resulting in credit constraints decreasing to zero, and ρ tending toward 1, moving from a fixed to a flexible exchange rate regime does not produce any further growth effect.

Table A.4: List of Countries

S. No	Name	Income Group	S. No	Name	Income Group		Name	Income Group
1	Albania	UMI	41	Hong Kong	HI	81	Romania	HI
2	Algeria	LMI	42	Hungary	HI	82	Rwanda	LI
3	Argentina	UMI	43	Iceland	HI	83	Saudi Arabia	HI
4	Australia	HI	44	India	LMI	84	Senegal	LMI
5	Austria	HI	45	Indonesia	UMI	85	Sierra Leone	LI
6	Bahrain	HI	46	Iran	UMI	86	Singapore	HI
7	Bangladesh	LMI	47	Ireland	HI	87	Slovak Republic	HI
8	Barbados	HI	48	Israel	HI	88	South Africa	UMI
9	Belgium	HI	49	Italy	HI	89	Spain	HI
10	Botswana	UMI	50	Jamaica	UMI	90	Sri Lanka	LMI
11	Bulgaria	UMI	51	Japan	HI	91	Sudan	LI
12	Burkina Faso	LI	52	Jordan	UMI	92	Suriname	UMI
13	Cambodia	LMI	53	Kazakhstan	UMI	93	Swaziland	LMI
14	Cameroon	LMI	54	Kenya	LMI	94	Sweden	HI
15	Canada	HI	55	Korea, Rep.	HI	95	Switzerland	HI
16	Chile	HI	56	Kyrgyz Republic	LMI	96	Tanzania	LMI
17	China	UMI	57	Lao PDR	LMI	97	Thailand	UMI
18	Colombia	UMI	58	Lebanon	UMI	98	Tunisia	LMI
19	Costa Rica	UMI	59	Liberia	LI	99	Turkey	UMI
20	Cote d'Ivoire	LMI	60	Libya	UMI	100	Uganda	LI
21	Cyprus	HI	61	Lithuania	HI	101	United Kingdom	HI
22	Czech Rep,	HI	62	Madagascar	LI	102	United States	HI
23	Denmark	HI	63	Malaysia	UMI	103	Uruguay	HI
24	Dominican	UMI	64	Malta	HI	104	Venezuela, RB	UMI
25	Ecuador	UMI	65	Mauritius	HI	105	Zambia	LMI
26	Egypt	LMI	66	Mexico	UMI			
27	El Salvador	LMI	67	Morocco	LMI			
28	Estonia	HI	68	Mozambique	LI			
29	Ethiopia	LI	69	Nepal	LMI			
30	Fiji	UMI	70	Netherlands	HI			
31	Finland	HI	71	New Zealand	HI			
32	France	HI	72	Nicaragua	LMI			
33	Gabon	UMI	73	Nigeria	LMI			
34	Gambia	LI	74	Norway	HI			
35	Georgia	UMI	75	Pakistan	LMI			
36	Germany	HI	76	Panama	HI			
37	Ghana	LMI	77	Paraguay	UNI			
38	Greece	HI	78	Philippines	LMI			
39	Guatemala	UNI	79	Poland	HI			
40	Honduras	LMI	80	Portugal	HI			

Table A4.1: Impact of Financial Liberalization on the Composition of Capital Through Exchange Rate Volatility (ERR)

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	ERR	QC	ERR	QC
GEP (Total Assets + Total Liabilities /Y)	0.1204*** (0.000)	0.1212*** (0.000)		
TL			0.0504*** (0.000)	0.2189*** (0.000)
KAGEP (Capital account Openness * GEP)		-0.0080*** (0.000)		
KATL (Capital account Openness * TL)				-0.0199*** (0.000)
ERR		-0.3341*** (0.000)		-0.3507*** (0.000)
Control Variables				
TO	-0.2042*** (0.000)	0.0954*** (0.000)	-0.3091*** (0.000)	-0.1216 (0.201)
PRI	-0.1963*** (0.000)	0.0177 (0.956)	0.1847*** (0.000)	0.0513* (0.069)
RPI		0.3146*** (0.000)		0.3313*** (0.000)
$RGDPPC_0$		0.3617*** (0.000)		0.2739*** (0.000)
QC_0		0.1225* (0.061)		-0.0311*** (0.000)

Indirect and Total effects				
GEP	-0.040*** (0.000)	0.0812*** (0.000)		
TL			-0.018*** (0.001)	0.201*** (0.000)
Number of Observations	429	429	504	504
Number of Countries	105	105	105	105

Notes: As of Table 4.2 except the interaction term that is, KAGEP (KAOPEN/QUINN * GEP) and KATL (KAOPEN/QUINN*TL). .

Table A4.2: Impact of Financial Liberalization (De Jure Measures) on the Composition of Capital Through Real Exchange Rate Volatility (SDER).

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	SDER	**QC**	**SDER**	**QC**
KAOPEN	0.0169*** (0.000)	0.0633*** (0.000)		
QUINN			0.0666*** (0.000)	0.2599*** (0.000)
SDER		-1.3236*** (0.000)		-0.3268* (0.094)
Control Variables				
TO	-0.0123*** (0.000)	0.2450*** (0.000)	-0.2258*** (0.000)	0.3098*** (0.000)
PRI	-0.0531*** (0.000)	0.0037 (0.847)	-0.0574*** (0.000)	0.0193 (0.127)
RPI		0.3302*** (0.000)		0.1200*** (0.000)
$RGDPPC_0$		0.2039*** (0.000)		
QC_0		0.0415*** (0.001)		0.1072*** (0.000)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
KAOPEN	-0.022*** (0.000)	0.041** (0.011)		
QUINN			-0.022* (0.100)	0.282*** (0.000)
Number of Observations	522	522	526	526
Number of Countries	105	105	105	105

Notes: As of Table 4.1 SDER is Standard Deviation of REER, a proxy of exchange rate volatility.

Table A4.3: Impact of Financial Liberalization (De Facto Measures) on the Composition of Capital Through Real Exchange Rate Volatility (SDER)

Variables	Model (1)		Model (2)		Model (3)	
	1a	1b	2a	2b	3a	3b
	SDER	QC	SDER	QC	SDER	QC
GEP	0.0104*** (0.000)	0.1152*** (0.000)				
TL			-0.0938*** (0.000)	0.1033*** (0.000)		
FDI /GDP					0.1140*** (0.000)	-0.0288* (0.092)
DEBT/GDP					-0.0202*** (0.000)	-0.0262 (0.187)
FPL/GDP					-0.0060*** (0.000)	-0.1671*** (0.000)
SDER		2.9878*** (0.000)		1.0334*** (0.000)		-1.1526*** (0.000)
Control Variables						
TO	-0.0141*** (0.000)	-0.0405*** (0.000)	0.0706 (0.219)	0.1280*** (0.000)	-0.0234*** (0.000)	0.2331*** (0.000)
PRI	-0.0139*** (0.000)	0.0037 (0.525)	-0.0498*** (0.000)	0.1593*** (0.000)	-0.0169*** (0.000)	0.2414*** (0.000)
RPI		0.3809*** (0.000)		0.3461*** (0.000)		0.2702*** (0.000)
$RGDPPC_0$		0.0075*** (0.000)		0.2926*** (0.000)		0.2553*** (0.000)
QC_0		0.0183*** (0.000)		0.0390*** (0.000)		0.0004 (0.980)

Indirect and Total effects						
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**	**Indirect Effect**	**Total effect**
GEP	0.031*** (0.000)	0.146*** (0.000)				
TL			-0.097*** (0.000)	0.006 (0.645)		
OL					-0.101*** (0.001)	-0.322** (0.037)
FDI					-0.131*** (0.001)	-0.160*** (0.000)
DEBT					0.023*** (0.000)	-0.003 (0.872)
FPL					0.007*** (0.002)	-0.160*** (0.000)
Number of Observations	529	529	525	525	526	526
Number of Countries	105	105	105	105	105	105

Notes: As of Table 4.2, SDER is exchange rate volatility.

Table A4.3.1: Impact of Financial Liberalization on the Composition of Capital Through Real Exchange Rate Volatility (SDER).

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	SDER	QC	SDER	QC
GEP	0.0231*** (0.000)	0.6528*** (0.000)		
TL			0.0611*** (0.000)	0.0579*** (0.001)
KAGEP (Capital account Openness * GEP)		0.0022* (0.096)		
KATL (Capital account Openness * TL)				-0.0009* (0.085)
SDER		-0.2254* (0.100)		-3.2981*** (0.000)
Control Variables				
TO	-0.0241 (0.456)	0.0813*** (0.000)	-0.0784 (0.220)	0.7985*** (0.000)
PRI	-0.0099*** (0.000)	0.0054 (0.555)	-0.0644*** (0.000)	0.0694*** (0.000)
RPI		0.0252*** (0.005)		0.2181*** (0.000)
$RGDPPC_0$		0.3134*** (0.000)		0.3585*** (0.000)
QC_0		-0.0054 -0.476		-0.0013 (0.944)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
GEP	-0.005*** (0.000)	0.427*** (0.000)		
TL			-0.202* (0.870)	0.260* (0.960)
Number of Observations	526	526	524	524
Number of Countries	105	105	105	105
Notes: As of Table A4.1, SDER is exchange rate volatility.				

Table A4.4: Relationship between Financial Liberalization (De Jure Measures), Exchange Rate Volatility (FXSI), and the Composition of Capital

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	FXSI	**QC**	**FXSI**	**QC**
KAOPEN	-0.0628 (0.201)	-0.0572*** (0.004)		
QUINN			0.2853*** (0.000)	0.5070*** (0.000)
FXSI		0.7226 (0.159)		-0.2526*** (0.000)
Control Variables				
TO	-0.0989*** (0.000)	0.0890*** (0.000)	-0.2545*** (0.000)	0.0662** (0.012)
PRI	0.2290*** (0.000)	-0.1599*** (0.000)	0.0089 (0.404)	-0.1117*** (0.000)
RPI		0.3649*** (0.000)		0.2870*** (0.000)
$RGDPPC_0$		0.4565*** (0.000)		0.1161*** (0.000)
QC_0		-0.1398*** (0.000)		0.1263*** (0.000)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
KAOPEN	-0.045*** (0.001)	-0.103*** (0.000)		
QUINN			-0.072*** (0.000)	0.435*** (0.000)
Number of Observations	514	514	515	515
Number of Countries	105	105	105	105

Notes: As of Table 4.1. FXSI is exchange rate stability index used as exchange rate volatility measure.

Table A4.5: Impact of Financial Liberalization (De Facto Measures) on the Composition of Capital Through Exchange Rate Volatility (FXSI)

Variables	Model (1)		Model (2)		Model (3)	
	1a	1b	2a	2b	3a	3b
	FXSI	**QC**	**FXSI**	**QC**	**FXSI**	**QC**
GEP	0.3484*** (0.000)	-0.0616*** (0.004)				
TL			-0.1114*** (0.000)	0.2299*** (0.000)		
FDL/GDP					-0.0659*** (0.000)	0.0456*** (0.003)
DEBT/GDP					-0.2519*** (0.000)	-0.1939*** (0.000)
FPL/GDP					0.1104*** (0.000)	-0.0061 (0.637)
FXSI		0.8054*** (0.000)		0.0062 (0.825)		-0.7284*** (0.000)
Control Variables						
TO	-0.2811*** (0.000)	0.1937*** (0.000)	0.1252 (0.321)	0.1223 (0.101)	-0.2206*** (0.000)	0.1799*** (0.000)
PRI	-0.2363*** (0.000)	0.1976*** (0.000)	0.1507*** (0.000)	-0.1592*** (0.000)	-0.1493*** (0.000)	-0.0888*** (0.000)
RPI		0.3146*** (0.000)		0.3057*** (0.000)		0.2928*** (0.000)
$RGDPPC_0$		0.2357*** (0.000)		0.4563*** (0.000)		0.3169*** (0.000)
QC_0		0.0198* (0.051)		-0.0719*** (0.000)		0.1009*** (0.000)

Indirect and Total effects						
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**	**Indirect Effect**	**Total effect**
GEP	0.281*** (0.000)	0.219*** (0.000)				
TL			-0.001 (0.826)	0.229*** (0.000)		
OL					0.151*** (0.000)	-0.322** (0.037)
FDI					0.048*** (0.000)	0.094*** (0.000)
DEBT					0.183*** (0.000)	-0.010* (0.098)
FPL					-0.080*** (0.000)	-0.086 (0.430)
Number of Observations	518	518	517	517	518	518
Number of Countries	105	105	105	105	105	105

Notes: As of table 4.1. FXSI is exchange rate volatility.

Table A4.5.1: Impact of Financial Liberalization on the Composition of Capital Through Exchange Rate Volatility (FXSI).

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	FXSI	QC	FXSI	QC
GEP	0.1068*** (0.000)	0.0273*** (0.000)		
TL			0.1675*** (0.000)	0.0208 (0.261)
KAGEP (Capital account Openness * GEP)		-0.0163*** (0.000)		
KATL (Capital account Openness * TL)				0.0337*** (0.000)
FXSI		-0.6170*** (0.000)		-0.0341*** (0.000)
Control Variables				
TO	-0.4677*** (0.000)	-0.2946 (0.101)	-0.7135*** (0.000)	0.0427 (0.138)
PRI	0.1847*** (0.000)	0.1329*** (0.000)	0.1983 (0.730)	0.1626*** (0.000)
RPI		0.0247*** (0.005)		0.3194*** (0.000)
$RGDPPC_0$		0.0786*** (0.000)		0.1752*** (0.000)
QC_0		0.5164 (0.476)		-0.3162*** (0.000)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
GEP	-0.099** (0.050)	0.126** (0.020)		
TL			-0.006*** (0.000)	0.015* (0.098)
Number of Observations	437	437	436	436
Number of Countries	105	105	105	105

Notes: As of Table A4.1 except FXSI, a proxy of exchange rate volatility.

Table A4.6: Comparison of Different De Jure and De Facto Measures

Measure	Scale/Countries /Years	Description	Advantages	Disadvantages
KA	0-1/ 91/ 1995-2005	De Jure Ordinal, Capital Account measure. Coding of AREAER text from 1995-2005. Includes restrictions on six types of instruments.	Transparent coding and construction, multiple dimensions, controls by residency. Directions of flows by asset categories.	Intercoder reliability (text). Limited sample coverage. Expensive to replicate and extend
KAOPEN	-1.80 - 2.54/ 181/ 1970-2017	De Jure Categorical, Financia l current and Capital account. Based on PCA of binary indicators in AREAER. Multiple exchange rates, current account, surrender of export proceeds and 5-years average of IMF_BINARY (SHARE)	Easy to replicate. Comprehensive measure of globalization. Available for all IMF member countries available in AREAER.	Intercoder reliability (table). Structural breaks in Table 1995 1996. 5-year average of IMF dummies. Mixes different types of financial restrictions.
QUINN	0 – 100 /122/ 1949-2015	De jure, Interval, Capital account. Coding of AREAER text. Includes information about restrictions on residents and nonresidents	Residents, nonresidents: severity of restrictions balancing of all categories of financial transactions. Broad sample with extensive period.	Intercoder reliability (text). Costly to replicate
FOI	0-12 / 187/ 1970-2007	De jure, Categorical Financial current and Capital Account. Extension of Johnston and Tamirisa (1998) backward methodology from 1997-1965. Binary subcomponents of	Large sample size. Inward-outward distinction. Gradated index	Intercoder reliability (text and table). Nontransparent coding method. Not available publicly.

		AREAER are added to produce a score.		
IF	Varies/179/ 1995-2011	De jure. Categorical/ordinal. Investment freedom.	---------	Not recommended for use in panel data.
EQUITY	0-1/ 95/ 1980-99	De jure, Categorical, Equity market. Binary measure based on chronology of official Equity Market Liberalization dates compiled by Bekaert et at. (2005).	Provide precise dates of equity market liberalization dates in chronological order.	Smaller sample. Specific to equity market. Binary measure does not capture the variations in liberalization. Reversals not accounted for.
KOF	20-99/ 141/ 1970-2017	Blended de facto/ de jure. Categorical/Ordinal. Based on "actual flows" of trade. FDI, portfolio and remittances plus restrictions on imports, tariffs taxes on trade and capital account restrictions.	Extensive measure covering trade and financial variables.	Too broad a measure for some financial globalization applications. 50% of information is trade based. Persistent serial correlation. Not easily available.
FORU	0-1 (reversed)/ 31/ 1989-2006	Blended de facto/ de jure. Measures degree of restriction on foreign access to a country's equity markets	Monthly frequency. Clearly defined measure of equity market invest ability.	Limited sample size. Specific to equity market liberalization.
GEP	39%-19.975% / 145/ 1970-2017	De facto. A sum of total assets and liabilities as a ratio of GDP.	Comprehensive time and country coverage. Differentiation by key asset categories	Banking center nations exhibits extreme values in many cases. Many series characterized by explosive properties.
Source: Quinn et al. (2011)				

Table A4.7: Impact of Financial Liberalization on Economic Growth Through the Composition of Capital

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	QC	Economic GROWTH	QC	Economic GROWTH
GEP	0.6525*** (0.000)	0.0450*** (0.000)		
TL			0.1883*** (0.000)	0.0108*** (0.000)
KAGEP (Capital Account Openness * GEP)		-0.0008*** (0.000)		
KATL (Capital Account Openness * TL)				-0.0104** (0.013)
QC		0.0683*** (0.000)		0.2729*** (0.000)
INV		0.0118*** (0.000)		0.4012*** (0.000)
Control Variable				
HC		0.0683*** (0.000)		-1.2401*** (0.000)
TO	0.0188*** (0.000)	0.0119*** (0.000)	0.2767*** (0.000)	0.1243*** (0.000)
INF		-0.0017 (0.216)		-0.0217 (0.407)
GOV		-0.0138*** (0.000)		0.0091 (0.743)
PRI	0.0284** (0.038)	0.0066*** (0.000)	0.0123* (0.099)	-0.0874*** (0.000)
RPI	0.0729*** (0.000)		0.1860*** (0.000)	
$RGDPPC_0$		-0.0022*** (0.000)		0.3653*** (0.000)

Indirect and Total effects				
	Indirect Effect	Total effect	Indirect Effect	Total effect
GEP	0.043*** (0.000)	0.089*** (0.000)		
TL			0.002*** (0.000)	0.006* (0.086)
Number of Observations	416	416	417	417
Number of Countries	105	105	105	105

Notes: As of Table 4 3 KAGEP (KAOPEN/QUINN * GEP) and KATL (KAOPEN/QUINN*TL)

Table A4.8: Impact of Financial Liberalization on Economic Growth Through Exchange Rate Regime

	Model (1)		Model (2)	
	1a	**1b**	**2a**	**2b**
Variables	**ERR**	**Economic Growth**	**ERR**	**Economic Growth**
GEP	0.1559*** (0.000)	0.2368*** (0.000)		
TL			0.1712*** (0.000)	0.1116*** (0.000)
KAGEP (Capital Account Openness * GEP)		-0.0155*** (0.000)		
KATL (Capital Account Openness * GEP)				0.0193*** (0.000)
ERR		-0.6887*** (0.000)		-0.5361*** (0.000)
INV		0.0609*** (0.000)		0.1789*** (0.000)
Control Variables				
HC		0.2657*** (0.000)		0.1162*** (0.000)
TO	-0.5633*** (0.000)	-0.3589 (0.111)	-0.3551*** (0.000)	-0.1554*** (0.000)
INF		-0.1210*** (0.000)		-0.1180*** (0.000)
GOV		0.0049 (0.116)		0.0932*** (0.000)
PRI	0.4456 (0.155)	0.3395*** (0.000)	-0.1087*** (0.000)	-0.003 (0.643)
RPI		0.0767*** (0.000)		-0.0849 (0.436)
$RGDPPC_0$		-0.0878*** (0.000)		-0.0032 (0.727)
Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
GEP	-0.107*** (0.000)	0.129*** (0.000)		
TL			-0.092*** (0.000)	0.020*** (0.000)
Number of Observations	448	448	448	448
Number of Countries	105	105	105	105

Notes: As of Table 4.5. KAGEP (KAOPEN/QUINN * GEP) and KATL (KAOPEN/QUINN*TL).

Table A4.9: Impact of Financial Liberalization (De Jure Measures) on Economic Growth Through Real Exchange Rate Volatility (SDER)

Variables	Model (1)		Model (2)	
	1a	**1b**	**2a**	**2b**
	SDER	**Economic Growth**	**SDER**	**Economic Growth**
KAOPEN	-0.0003 (0.536)	0.0021*** (0.007)		
QUINN			0.0323*** (0.000)	0.0298*** (0.000)
SDER		-1.0605*** (0.000)		-0.9208*** (0.000)
INV		0.0201*** (0.000)		0.0187*** (0.000)
Control Variables				
HC		0.0233*** (0.000)		0.0630*** (0.000)
TO	-0.0036*** (0.000)	-0.0023*** (0.000)	-0.0145*** (0.000)	-0.0063*** (0.000)
INF		-0.0106*** (0.000)		-0.0059*** (0.000)
GOV		-0.0170*** (0.000)		-0.0201*** (0.000)
PRI	-0.0071*** (0.000)	0.0049*** (0.000)	-0.0065*** (0.000)	0.0023** (0.030)
RPI				
$RGDPPC_0$		-0.0020*** (0.000)		-0.0152*** (0.000)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
KAOPEN	0.0003 (0.536)	0.002*** (0.000)		
QUINN			-0.030*** (0.000)	0.0001* (0.098)
Number of Observations Number of Countries	526 105	526 105	538 105	538 105
Notes: As of Table 4.5. SDER is exchange rate volatility.				

Table A4.10: Impact of Financial Liberalization (De Facto Measures) on Economic growth Through Real Exchange Rate Volatility (SDER)

Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
	SDER	**EG**	**SDER**	**EG**	**SDER**	**EG**
GEP	0.0108*** (0.000)	0.0212*** (0.000)				
TL			-0.0009 (0.303)	-0.0028*** (0.000)		
FDI/GDP					0.0001 (0.837)	-0.0066*** (0.000)
DEBT/GDP					-0.0016** (0.030)	-0.0041*** (0.000)
FPL/GDP					-0.0016*** (0.005)	0.0050*** (0.000)
SDER		-0.3958*** (0.000)		0.5552*** (0.000)		-0.9942*** (0.000)
INV		0.0423*** (0.000)		0.0378*** (0.000)		0.0166*** (0.000)
HC		0.0233*** (0.000)		-0.0539*** (0.000)		0.0078* (0.100)
TO	-0.0072*** (0.000)	0.0016 (0.111)	-0.001 (0.436)	-0.0060*** (0.000)	-0.0077*** (0.000)	0.0002 (0.915)
Inflation		0.0052 (0.242)		-0.0053* (0.058)		-0.0034*** (0.004)
GOV		-0.0077*** (0.000)		-0.0187*** (0.000)		-0.0123** (0.000)
PRI	-0.0057*** (0.000)	0.0058*** (0.000)	-0.0014* (0.076)	0.0086*** (0.000)	-0.0027*** (0.000)	0.0044*** (0.000)
RPI		0.0108*** (0.000)		0.0087*** (0.000)		0.0059*** (0.000)
$RGDPPC_0$		-0.0025*** (0.000)		0.0066*** (0.000)		-0.0045*** (0.000)
Indirect and Total effects						
	I.E	**Total Effect**	**I.E**	**Total effect**	**I.E**	**Total Effect**
GEP	-0.004*** (0.000)	-0.026*** (0.000)				
TL			-0.001 (0.303)	-0.003*** (0.000)		
OL					0.003*** (0.000)	-0.010*** (0.000)
FDI					-0.0001 (0.837)	-0.007*** (0.000)
DEBT					0.002** (0.030)	-0.003*** (0.001)
FPL					0.002*** (0.005)	0.007*** (0.000)
Number of Observations	466	466	467	467	465	465
Number of Countries	105	105	105	105	105	105

Notes: As of Table 4.6. SDER, exchange rate volatility. EG (economic growth). I.E (Indirect effect).

Table A4.10.1: Impact of Financial Liberalization on Economic growth Through Real Exchange Rate Volatility (SDER)

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	SDER	EG	SDER	EG
GEP	0.0088*** (0.000)	-0.0102*** (0.000)		
TL			0.0104*** (0.000)	-0.0009 (0.569)
KAGEP (Capital Account Openness * GEP)		0.0005*** (0.000)		
KATL (Capital Account Openness * TL)				0.0003*** (0.000)
SDER		-0.7417*** (0.000)		-0.9168*** (0.000)
INV		0.0410*** (0.000)		0.0113*** (0.000)
HC		-0.0154 (0.219)		0.0099* (0.060)
TO	-0.0047*** (0.000)	-0.0064*** (0.000)	-0.3551*** (0.000)	-0.0096*** (0.000)
INF		-0.0021 (0.119)		-0.0146*** (0.000)
GOV		-0.0014 (0.317)		0.0171*** (0.000)
PRI	-0.0046*** (0.000)	0.0047*** (0.000)	0.0064 (0.111)	0.0041*** (0.000)
RPI		0.0115*** (0.000)		0.0188*** (0.000)
$RGDPPC_0$		-0.0002 (0.741)		-0.0001 (0.883)

Indirect and Total effects				
	Indirect Effect	Total effect	Indirect Effect	Total effect
GEP	-0.001*** (0.000)	-0.022*** (0.000)		
TL			-0.010*** (0.000)	-0.011*** (0.000)
Number of Observations	448	448	465	465
Number of Countries	105	105	105	105

Notes: As of Table 4.6. SDER is exchange rate volatility. KAGEP (KAOPEN/QUINN * GEP) and KATL (KAOPEN/QUINN*TL).

Table A4.11: Impact of Financial Liberalization (De Jure Measures) on Economic Growth Through Exchange Rate Volatility (FXSI)

Variables	Model (1)		Model (2)	
	1a	**1b**	**2a**	**2b**
	FXSI	**Economic Growth**	**FXSI**	**Economic Growth**
KAOPEN	0.0921*** (0.000)	0.0621*** (0.003)		
QUINN			0.0801*** (0.000)	0.0573*** (0.001)
FXSI		-0.6158*** (0.000)		-0.5489*** (0.000)
INV		-0.0003 (0.896)		0.0511*** (0.000)
Control Variables				
HC		0.0818*** (0.000)		-0.0320*** (0.000)
TO	-0.0519*** (0.000)	-0.0433*** (0.000)	-0.2074*** (0.000)	0.1479*** (0.000)
INF		-0.0252*** (0.000)		-0.0053*** (0.000)
GOV		-0.0296*** (0.000)		0.0350*** (0.000)
PRI	0.1721 (0.151)	0.1224*** (0.000)	0.2089 (0.435)	0.0187*** (0.008)
RPI		-0.0135*** (0.000)		- -
$RGDPPC_0$		0.0091*** (0.000)		-0.0330*** (0.000)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
KAOPEN	-0.057*** (0.000)	0.005*** (0.000)		
QUINN			-0.044*** (0.000)	0.013*** (0.000)
Number of Observations	526	526	610	610
Number of Countries	105	105	105	105

Notes: As of Table 4.5. FXSI is exchange rate stability index, a proxy of exchange rate volatility

Table A4.12: Impact of Financial Liberalization (De facto Measures) on Economic Growth Through Exchange Rate Volatility (FXSI)

Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
	FXSI	**EG**	**FXSI**	**EG**	**FXSI**	**EG**
GEP	0.0433*** (0.000)	0.1119*** (0.000)				
TL			0.1339*** (0.000)	-0.0371*** (0.000)		
FDI/GDP					0.0071*** (0.002)	0.0634*** (0.000)
DEBT/GDP					-0.0853*** (0.000)	-0.001 (0.822)
FPL/GDP					-0.0408*** (0.000)	-0.0718*** (0.000)
FXSI		-0.5903*** (0.000)		0.1202*** (0.000)		-0.5913*** (0.000)
INV		0.0465*** (0.000)		0.0140*** (0.000)		0.0283*** (0.002)
HC		-0.4418*** (0.000)		0.1742*** (0.000)		0.0770*** (0.009)
TO	-0.1513*** (0.000)	-0.0089 (0.298)	-0.2836*** (0.000)	0.0141*** (0.000)	-0.1053* (0.099)	-0.0026 (0.774)
INF		-0.1161*** (0.000)		0.0136*** (0.000)		-0.1018*** (0.000)
GOV		-0.0005 (0.242)		-0.1169*** (0.000)		-0.0160** (0.044)
PRI	-0.0774* (0.090)	0.0339*** (0.000)	-0.1983* (0.065)	0.0049** (0.029)	0.0006 (0.851)	0.0225*** (0.000)
RPI		-0.0961*** (0.000)		-0.0047*** (0.000)		- -
$RGDPPC_0$		-0.0121** (0.005)		-0.0101*** (0.000)		-0.0381*** (0.000)
Indirect and Total effects						
	I.E	**Total effect**	**I.E**	**Total effect**	**I.E**	**Total effect**
GEP	-0.026*** (0.000)	0.086*** (0.000)				
TL			0.016*** (0.000)	-0.021*** (0.000)		
OL					-0.003*** (0.000)	-0.010*** (0.002)
FDI					-0.010*** (0.002)	0.153*** (0.000)
DEBT					0.005*** (0.000)	0.004*** (0.000)
FPL					0.024*** (0.000)	-0.069*** (0.000)
Number of Observations	459	459	458	458	613	613
Number of Countries	105	105	105	105	105	105

Notes: As of Table 4.6. FXSI is exchange rate stability index. EG is economic growth. I.E is indirect effect.

Table A4.12.1: Impact of Financial Liberalization on Economic Growth Through Exchange Rate Volatility (FXSI)

Variables	Model (1)		Model (2)	
	1a	1b	2a	2b
	FXSI	**EG**	**FXSI**	**EG**
GEP	0.1268*** (0.000)	0.1243*** (0.000)		
TL			0.0354*** (0.005)	0.0281*** (0.003)
KAGEP (Capital Account Openness * GEP)		-0.0014*** (0.000)		
KATL (Capital Account Openness * TL)				0.0039*** (0.000)
FXSI		-0.6322*** (0.000)		-0.7648*** (0.000)
INV		0.0999*** (0.000)		0.0893*** (0.000)
HC		-0.4270 (0.685)		0.4138*** (0.000)
TO	-0.1872*** (0.000)	-0.0469 (0.101)	-0.0503*** (0.001)	0.1340*** (0.000)
INF		-0.1334*** (0.000)		-0.0284*** (0.000)
GOV		0.0084 (0.503)		0.0335*** (0.000)
PRI	-0.0834*** (0.000)	0.0910*** (0.000)	-0.0990*** (0.000)	0.0453*** (0.000)
RPI		-0.0690 (0.144)		0.0079*** (0.000)
$RGDPPC_0$		-0.0125*** (0.000)		-0.0492*** (0.000)

Indirect and Total effects				
	Indirect Effect	**Total effect**	**Indirect Effect**	**Total effect**
GEP	-0.080*** (0.000)	0.044*** (0.001)		
TL			-0.027*** (0.005)	0.001* (0.098)
Number of Observations	457	457	518	518
Number of Countries	105	105	105	105

Notes: As of Table 4.6. FXSI is exchange rate stability index, the interaction term that is, KAGEP (KAOPEN/QUINN * GEP) and KATL (KAOPEN/QUINN*TL).

Table A4.13: Impact of Financial Liberalization on Economic growth Through Exchange Rate Regime and the Composition of Capital

Variables	Model (1)			Model (2)		
	1a	**1b**	**1c**	**2a**	**2b**	**2c**
	ERR	**QC**	**EG**	**ERR**	**QC**	**EG**
GEP	0.0788*** (0.000)		0.0070* (0.074)			
TL				0.2222*** (0.000)		0.1086*** (0.000)
KAGEP (Capital Account Openness * GEP)			-0.0083*** (0.000)			
KATL (Capital Account Openness * TL)						0.0789*** (0.000)
ERR		-0.2798*** (0.000)	-0.2068*** (0.000)		-0.7936*** (0.000)	-0.0795** (0.033)
QC			-0.2529*** (0.000)			0.5168*** (0.000)
INV			0.0321*** (0.000)			0.0460 (0.332)
Control Variables						
HC			0.0201*** (0.000)			0.1620* (0.000)
TO	-0.2296*** (0.000)	0.0291*** (0.000)	0.2659*** (0.000)	-0.2246*** (0.000)	0.6346*** (0.000)	-0.6181 (0.333)
INF			-0.0009* (0.870)			-0.0600 (0.138)
GOV			-0.0212*** (0.000)			-0.1126*** (0.004)
PRI	0.0138 (0.424)	0.1857*** (0.000)	0.0586*** (0.000)	0.1130 (0.789)	0.1559*** (0.000)	0.1852* (0.980)
RPI		0.0061*** (0.000)	0.0006 (0.947)		0.2482*** (0.000)	0.0059 (0.970)
$RGDPPC_0$			-0.0019 (0.109)			0.1050*** (0.000)

Short- and Long-Term Indirect Effects and Total effect						
	Short Term	Long Term	Total effect	Short Term	Long Term	Total effect
GEP	-0.016*** (0.000)	0.006*** (0.000)	0.003*** (0.000)			
TL				-0.018** (0.037)	-0.090*** (0.000)	0.003*** (0.000)
Number of Observations	403	403	403	303	303	303
Number of Countries	105	105	105	105	105	105
Notes: As of Table 4.7 and 4.8. KAGEP (KAOPEN/QUINN * GEP) and KATL (KAOPEN/QUINN*TL).						

Table A4.14: Impact of Financial Liberalization on Economic Growth Through Exchange Volatility (FXSI) and Composition of Capital

Variables	Model (1)			Model (2)		
	1a	1b	1c	2a	2b	2c
	FXSI	**QC**	**EG**	**FXSI**	**QC**	**EG**
KAOPEN	0.1354*** (0.000)		0.0425* (0.066)			
GEP				-0.4278*** (0.000)		-0.1580*** (0.000)
FXSI		-0.2595*** (0.000)	-0.3683*** (0.000)		-0.0521* (0.056)	-0.3246*** (0.000)
QC			-0.3044*** (0.000)			-0.0930*** (0.000)
INV			-0.0631* (0.066)			0.0339*** (0.000)
HC			0.0043 (0.876)			0.3250*** (0.000)
TO	0.0022 (0.532)	0.5592*** (0.000)	0.3422*** (0.000)	-0.7164 (0.115)	0.7426*** (0.000)	0.0678*** (0.005)
INF			-0.1112*** (0.000)			-0.3741*** (0.000)
GOV			-0.0420 (0.118)			-0.4469*** (0.000)
PRI	-0.1337*** (0.000)	0.1686*** (0.000)	-0.0114 (0.538)	0.2489 (0.765)	0.2220*** (0.000)	-0.0387** (0.046)
RPI		0.3105*** (0.000)	0.0489 (0.000)		0.2659*** (0.000)	
$RGDPPC_0$			-0.1849*** (0.000)			-0.0510*** (0.001)

Short- and Long-Term Indirect Effect and Total effect						
	Short Term	**Long Term**	**Total effect**	**Short Term**	**Long Term**	**Total effect**
KAOPEN	-0.050*** (0.000)	0.011*** (0.000)	0.003* (0.068)			
GEP				0.139*** (0.000)	-0.002* (0.059)	-0.021*** (0.000)
Number of Observations	473	473	473	478	478	401
Number of Countries	105	105	105	105	105	105
Notes: As of Table 4.7. FXSI is exchange rate stability index, a measure of exchange rate volatility.						

Table A4.15: Impact of Financial Liberalization on Economic Growth Through Exchange Rate Volatility (FXSI), and the Composition of Capital

Variables	Model (1)			Model (2)		
	1a	1b	1c	2a	2b	2c
	FXSI	QC	EG	FXSI	QC	EG
TL	0.0493*** (0.002)		0.0256 (0.229)			
FDI/GDP				0.2452*** (0.000)		0.0096*** (0.002)
DEBT/GDP				-0.2054*** (0.000)		-0.0138*** (0.004)
FPL/GDP				0.1290*** (0.000)		0.0174*** (0.000)
FXSI		-0.5958*** (0.000)	-0.4767*** (0.000)		-0.0499* (0.088)	-0.0467*** (0.063)
QC			-0.1417*** (0.000)			-0.1740*** (0.000)
INV			-0.0089** (0.037)			0.0323*** (0.000)
HC			0.0453*** (0.000)			-0.0206 (0.113)
TO	-0.1068*** (0.000)	0.6804*** (0.000)	0.0715*** (0.000)	0.1261 (0.958)	0.7592*** (0.000)	0.1437*** (0.000)
INF			-0.0256*** (0.000)			-0.0159*** (0.000)
GOV			-0.0006 (0.870)			-0.0069*** (0.002)
PRI	0.2205 (0.209)	0.3547*** (0.000)	0.1383*** (0.000)	-0.0598** (0.012)	0.2007*** (0.000)	0.0311*** (0.000)
RPI		0.3164*** (0.000)	0.0554 (0.478)		0.2673*** (0.000)	0.0572*** (0.000)
$RGDPPC_0$			0.0038** (0.014)			-0.0025** (0.021)

ort- and Long-Term Indirect Effect and Total effect						
	Short Term	Long Term	Total effect	Short Term	Long Term	Total effect
TL	-0.024*** (0.002)	0.004*** (0.003)	0.006*** (0.000)			
OL				-0.008*** (0.000)	-0.001* (0.099)	0.005*** (0.004)
FDI				-0.011*** (0.000)	0.002* (0.091)	0.0002* (0.098)
DEBT				0.009*** (0.000)	-0.002* (0.091)	-0.006*** (0.000)
FPL				-0.006* (0.072)	0.001* (0.094)	0.013*** (0.000)
Number of Observations	403	403	403	401	401	401
Number of Countries	105	105	105	105	105	105

Notes: As of Table 4.7. FXSI is exchange rate stability index.

Table A4.15.1: Relationship Between Financial Liberalization, Economic growth, Exchange Rate Volatility (FXSI) and the Composition of Capital

Variables	Model (1)			Model (2)		
	1a	**1b**	**1c**	**1a**	**2b**	**2c**
	FXSI	**QC**	**EG**	**FXSI**	**QC**	**EG**
GEP	0.4164*** (0.000)		0.0142*** (0.000)			
TL				0.0117 (0.468)		0.0145* (0.093)
KAGEP (Capital Account Openness * GEP)			-0.0041*** (0.000)			
KATL (Capital Account Openness * TL)						-0.0022*** (0.000)
FXSI		-0.0091 (0.658)	-0.3186*** (0.000)		-0.9513*** (0.000)	-0.6733** (0.000)
QC			0.0190*** (0.000)			-0.0932*** (0.000)
INV			0.0582*** (0.000)		0.1789*** (0.000)	0.0397*** (0.000)
Control Variables						
HC			-0.3833 (0.654)			-0.2006 (0.652)
TO	-0.5067*** (0.000)	1.1693*** (0.000)	0.1482*** (0.000)	-0.1681*** (0.000)	0.2524*** (0.000)	-0.0744*** (0.000)
INF			-0.0687*** (0.000)			-0.0600 (0.138)
GOV			-0.0489*** (0.000)			-0.1126*** (0.004)
PRI	0.1303 (0.109)	0.2168*** (0.000)	0.0183 (0.354)	-0.3540*** (0.000)	0.6442*** (0.000)	0.3128*** (0.000)
RPI		0.0138*** (0.000)	0.1680 (0.211)		0.6006*** (0.000)	0.0659 (0.870)
$RGDPPC_0$			-0.0571*** (0.000)			-0.0047*** (0.007)
Short- and Long-Term Indirect Effect and Total effect						
	Short Term	Long Term	Total effect	Short Term	Long Term	Total effect
GEP	-0.133*** (0.000)	-0.0001*** (0.000)	0.009*** (0.000)			
TL				-0.008 (0.468)	0.001 (0.469)	0.008*** (0.000)
Number of Observations	474	474	474	408	408	408
Number of Countries	105	105	105	105	105	105

Notes: As of Table 4.7 and 4.8. KAGEP (KAOPEN/QUINN * GEP) and KATL (KAOPEN/QUINN*TL).