DYNAMIC EFFECTS OF FINANCIAL LIBERALIZATION ON ECONOMIC GROWTH IN SELECTED DEVELOPED AND DEVELOPING COUNTRIES

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Abstract

The objective of the study is to empirically estimate the effects of *Financial Liberalization (FL)* on *Economic Growth (EG)* for a sample of twenty-five (25) developed and developing countries from 1995 to 2020. A multivariate regression model based on the augmented production function is applied to attain the study's objective. The Generalized Method of Moments (GMM) approach is being used, and for the robustness of the results, Robust Least Squares (RLS) and Random Effects (RE) are also applied. The study demonstrates that *Financial Liberalization (FL)* has a positive effect on *the Economic Growth (EG)* of the selected countries. Findings indicate that *Financial Liberalization (FL)* is promoting *Economic Growth (EG).* According to the results of the paired Dumitrescu Hurlin panel test, *Financial Liberalization (FL)* and *Economic Growth (EG)* are causally uni-directional and bi-directional linked. The study's findings indicate that the effectiveness of *Financial Liberalization (FL)* may differ across developed and developing nations. The nations with more productive capacity have encouraged better financial systems. Therefore, the poorer policy countries should put a strategy in place to improve the strength of their financial sectors.

Keywords: Financial Liberalization; Economic Growth

1. Introduction

The conditions of the global economy have changed significantly in recent years due to large expansions in the financial regions of both developed and emerging countries. The countries' financial systems have changed as a result of unrestrained capital flows as well as the liberalization of their internal markets. The initial theoretical underpinnings of *Financial Liberalization (FL),* which has been used by developed countries originating in the 1970s, and later imitated by emerging nations in the late 1980s and 1990s, by McKinnon and Shaw (1973). According to McKinnon and Shaw (1973), liberalizing interest rates and capital accounts is a good strategy to

get remove directed credits, as well as regulate interest rates and excessive reserve requirements. They discussed international *Financial Liberalization (FL)* as a crucial tool for an economy to increase *Economic Growth (EG). Financial Liberalization (FL)* encompasses the relaxation of credit regulations, no interest rate restrictions, permitted entry of banks into the banking sector, the opening of the global capital market, and the endorsement of increased influxes and drainages of foreign direct investments between countries (Williamson and Mohar 1998). According to Schumpeter (1982), *Financial Liberalization (FL)* has a direct impact on interest rates, which promotes saving. The effectiveness of the entire banking structure is increased by a successfully liberalized financial sector. Thus, *Financial Liberalization (FL)* promotes investment and *Economic Growth (EG).*

Before the 1990s, the majority of the countries had unstable financial systems, with significant state interference, regulatory restrictions, and capital markets that were tiny and lacking in a wide range of financial products. Alouani (2008) claims that significant adjustments were made in the 1990s to solve this issue and provide these countries with a modern financial system capable of ensuring successful savings mobilization and generating significant improvements in investment and GDP. Since the middle of the 1990s, international financial liberalization has been prominent policy advice for countries seeking to achieve *Economic Growth (EG). Financial Liberalization (FL)* initiatives are used to strengthen financial institutions' independence to lessen financial repression (Rodrik, 2006). *Financial Liberalization (FL)* policies aim to develop a climate that fosters financial innovation. Additionally, it helps to lower directed credits and permits the entry of financial assets into the nation from overseas (Demetriades and Andrianova, 2004). Both advanced and emerging nations have implemented *Financial Liberalization (FL)* initiatives, which entail deregulating foreign capital transactions and liberalizing their current and capital accounts. To fascinate foreign capital investments, these countries have relaxed capital controls and invited international investors into their financial systems (Wei, 2014). Many nations have taken a variety of actions toward financial deregulation to achieve high levels of growth. It is important to conduct experimental studies to evaluate the effectiveness of financial liberalization methods to comprehend the *Economic Growth (EG)* structure (Khan, Qayyum, and Ahmad, 2007).

The study's primary research question is: Does *Finance Liberalization (FL)* has a positive influence on the Economic *Growth (EG)* of selected twenty-five (25) developed and developing

countries[1]? The idea behind the question is that if *Financial Liberalization (FL)* is truly a high gear toward growth, as was said previously in the last two decades, then how have some countries demonstrated certain unstable empirical realities regarding growth and development, particularly in the recent decade? The objectives of the research are:

- To estimate the effects of *Financial Liberalization (FL)* on the *Economic Growth (EG)* of the selected twenty-five (25) developed and developing countries
- To compare the outcomes of *Financial Liberalization (FL)* of twenty-five (25) developed and developing countries of the world

Before developing the framework for the present study, the study reviewed the literature to gauge the flow and impacts of the cited policy instruments. A table is constructed in the section below highlighting the impact as well as the results by the researchers.

2. Empirical studies on Financial Liberalization and Economic Growth

The literature offers contradictory conclusions about the possible linkage between *Financial Liberalization (FL)* and *Economic Growth (EG)*. Muhammad (2010) has found long-term linkages between *Financial Liberalization (FL)*, and Pakistan's *Economic Growth (EG)*. The outcome proposes that joint trade liberalization and financial growth have accelerated an important and beneficial activity in the enhancement of Pakistan's economy. *Financial Liberalization (FL)* is a crucial step in accomplishing financial development that leads to *Economic Growth (EG)* (Meltem, 2011). Further, there is a link between the liberalization of the stock markets and other financial markets with *Economic Growth (EG)* as mentioned by Andriesz, Asteriou, and Pilbeam (2005) by experiencing through research in Poland. The conclusion suggested that the indicators of the financial growth of industrial output serve as the basis for the causal relationship. Creating a *Financial Liberalization Index (FLI)* works well to check the effects on *Economic Growth (EG)*. It has been found that researchers used different methodologies to develop the index. For example, Shrestha and Chowdhury (2006) generated a *Financial Liberalization Index (FLI)* for Nepal based on the principal component method. The created index demonstrated that Nepal's *Financial*

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[1] Indonesia, Malaysia, Philippines, Singapore, China, Thailand, India, Sri Lanka, Pakistan, Bangladesh, Nepal, France, Tajikistan, New Zealand, Germany, Turkey, United Kingdom, United States, Argentina, Brazil, Mexico, Sudan, Nigeria, Kenya, South Africa

Liberalization (FL) enhanced *Economic Growth (EG)*. A study by Hye and Wizarat (2013) recognized the effects of *Financial Liberalization (FL)* on Pakistan's *Economic Growth (EG)* and demonstrated that the index of *Financial Liberalization (FL)* was positively associated with the GDP. The effect of the under-study variables has been checked for short-term and for long-term periods. The static robust and dynamic panel data estimations by Ozdemir and Erbil (2008) have considerable evidence of a connection between long-term growth and *Financial Liberalization (FL)* while checking *Financial Liberalization's (FL)* effect on long-term per capita income and *Economic Growth (EG)* for ten European Union (EU) member nations plus Turkey from 1995 and 2007. The study shows that the development of the institutional and financial frameworks, as well as the achievement of economic stability, must come before the *Financial Liberalization (FL)* program. An empirical study by Mansour and Hassan (2021) considering emerging marketplace economies with an emphasis on Egypt and Saudi Arabia for the years 1970 to 2018 highlighted such facts. Paudel and JayanthaKumaran (2009) have determined that *Financial Liberalization (FL)* and *Economic Growth (EG)* have a negative correlation with each other. According to the study, *Financial Liberalization (FL)* worsens the *Economic Growth (EG)* of Sri Lanka the low standards of financial institutions. Odionye and Okorontah (2014) evaluated the strong positive influence of *Financial Liberalization (FL)* on Nigeria's *Economic Growth (EG)*. Adeel-Farooq, Bakar, and Raji (2017) identify the positive influence of *Financial Liberalization (FL)* on *Economic Growth (EG)* in Pakistan and India and argue that India's expansion of *Economic Growth (EG)* through *Financial Liberalization (FL)* is bigger than Pakistan's. Anward (2018) acknowledges that *Financial Liberalization (FL)* has a detrimental effect on Indonesia's *Economic Growth (EG)*. The finding shows a significant and positive correlation between Indonesia's *Economic Growth (EG)* and *Financial Liberalization (FL)*. The empirical study of a long-run relationship between *Financial Liberalization (FL)* and *Economic Growth (EG)* in Malaysia was advocated by Ang and McKibbin (2007). Banam (2010) analyses the study on the influence of *Financial Liberalization (FL)* on Iran's *Economic Growth (EG)* and indicates a strong positive impact of *Financial Liberalization (FL)* on Iran's *Economic Growth (EG)*. Naveed and Mahmood (2019) establish a connection between Pakistan's *Economic Growth (EG)* and its *Financial Liberalization (FL)*. The pragmatic conclusion highlights the positive co-integration of *Financial Liberalization (FL)* on *Economic Growth (EG)*. To analyze the impact of *Financial Liberalization (FL)* on *Economic Growth (EG)* and the significance of governance and institutions is examined

by Saidi, Rachdi, and Mgadmi (2017) for 54 countries. Empirical data demonstrating the positive effects of excellent institutions and governance on economic growth are captured by the panel smooth transition regression technique (PSTR) framework.

However, a newly created data collection from 1995 to 2020 was included in the study that contains several new measures of the financial sectors' liberalization to assess the influence of *Financial Liberalization (FL)* on *Economic Growth (EG).*

Table 1 Summary of Empirical Literature Review on Financial Liberalization and Economic Growth

S. NO	Study	Country & time	Methodology	Regressed	Regressors	Outcomes
1	Andriesz, Asteriou & Pilbeam (2005)	Poland (1990-2002)	OLS	GDP	Financial Liberalization	FL (+)
2	Shrestha & Chowdhury (2006)	Nepal (1970 -2003)	PCA	GDP	Financial Liberalization Index	FL (+)
3	Ozdemir and Erbil (2008)	Ten new EU member nations plus Turkey (1995-2007)	Dynamic Panel Model	GDP	Financial Liberalization	FL (+)
4	Banam, (2010)	Iran (1965-2005)	Johansson co-integration test	GDP	Financial Liberalization	FL (+)
5	Muhammad (2010)	Pakistan (1975- 2009)	ARDL.	GDP	Financial Liberalization	FL (+)
6	Meltem (2011)	Turkey (1980-2010)	Johansson co-integration test	GDP	Financial Liberalization	FL (+)
7	Hye and Shahida Wizarat (2013)	Pakistan (1971-2007)	ARDL	GDP	Financial Liberalization Index	FL (+)
8	Naveed & Mahmood (2019)	Pakistan (1972-2010)	Johansson co-integration test	GDP	Financial Liberalization index	FL (+)
9	Mansour & Hassan (2021)	Egypt and Saudi Arabia (1970-2018)	ARDL	GDP	Financial Liberalization	FL (-)
10	Paudel and JayanthaKumaran (2009)	Sri Lankan (1963-2006)	ARDL	GDP	Financial liberalization	FL (-)
11	Odionye & Okorontah (2014)	Nigeria (1980-2011)	Johansson co-integration test	GDP	Financial liberalization index	FL (+)
12	Adeel-Farooq, Bakar, & Raji, (2017)	Pakistan & India (1985-2014)	ARDL	GDP	Financial liberalization	FL (+)
13	Anward (2018)	Indonesia (1970-2012)	VAR model	GDP	Financial Liberalization	FL (+)
14	Ang & McKibbin (2007)	Malaysia (1960-2001)	Johansson co-integration test	GDP	Financial Development	FL (+)
15	Saidi, Rachdi, & Mgadmi (2017)	54 countries (20 OECD countries and 34 developing nations) (1985- 2010)	PSTR Model, & GMM	GDP	Financial Liberalization & governance institutions quality	FL (+)

Source: Authors' compilation. Financial Liberalization

The above table shows that some countries such as Pakistan, Malaysia, Nigeria, Nepal, Iran, Turkey, and other countries have shown that *Financial Liberalization (FL)* expand *Economic Growth (EG)* using the Generalized Method of Moments (GMM) and Panel Smooth Transition Model (PSTR), While some nation such as Egypt and Saudi Arabia, and Sri Lankan has demonstrated that the correlation between *Financial Liberalization (FL)* and *Economic Growth (EG)* is negative due to economic uncertainty, poor governance, and intuitional quality and weak financial system using Auto-regressive Distributed Lag Techniques (ARDL). The available empirical studies have offered a narrative analysis of the linking between *Financial Liberalization (FL)* and *Economic Growth (EG).* They do not attempt to thoroughly examine the empirical data. Our study uses a meta-analytical methodology and a sample of twenty-five (25) developed and developing countries to provide data on the nature of the relationship between *Financial Liberalization (FL)* and *Economic Growth (EG).* The researchers assume that *Financial Liberalization (FL)* has a significant effect on the *Economic Growth (EG)* of the selected developed and developing countries and the developed countries got more benefited by adopting the policies of *Financial Liberalization (FL)* as compared to developing countries.

3. Methodology

3.1. Model specification

Based on the body of prior research on growth theories, the study employs the Rao et al. (2008) model, which is the production function of the Solow growth model (1956), to assess how *Financial Liberalization (FL)* affects *Economic Growth (EG).*

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha}, \qquad 0 < \alpha < 1 \qquad (1)$$

Where Y_t represents the product per worker, A_t is the stock of technology, K_t denotes capital per worker, and L_t denotes the labor force.

Under the body of prior research, including Ellahi (2013) and Saidi, Rachdi, and Mgadmi, (2017), the researchers define the empirical model by including *Financial Liberalization (FL)* in the growth equation. Thus, a multivariate probabilistic model built on the augmented production function is used in this research to empirically certify the effect of *Financial Liberalization (FL)* as a percentage of GDP along with some additional control variables, such as Gross Domestic

Private Investment (GDPI), Human Capital (HC), and Trade Openness (TOP) on *Economic Growth (EG)* as measured by GDP per capita growth rate. Growth models that take into consideration *Financial Liberalization (FL)* have also been utilized extensively in previous research papers, such as those by Andriesz, Asteriou, and Pilbeam (2005), Ozdemir and Erbil (2008) and Mansour and Hassan (2021). Under the preceding theoretical discussion, the symbol for the multivariate regression equation used in this study is as follows:

$$EG_{it} = \alpha_0 + \alpha_1 FLI_{it} + \alpha_2 GPDI_{it} + \alpha_3 HC_{it} + \alpha_4 TOP_{it} + \varepsilon_{it} \tag{2}$$

In Eq. (2) α_1, α_2, α_3, and α_4, represent the calculated coefficients, i and t stand for the ith nation and the tth period, respectively (i = 1, 2… N=25; t = 1, 2… T=26). Where EG is the *Economic Growth*, FLI denotes *Financial Liberalization Index*, GPDI is the Gross Domestic Private Investment, HC is the Human Capital, and ε represents the random error, which illustrates the influence of other factors that were not considered in the model. The assumption is that the error term (ε_{it}) have been distributed independently and identically, as shown by the formula ($\varepsilon t \sim iid(0, \sigma 2)$.

In Eq. (2), the study predicted that the effects of Human Capital (HC), Gross Domestic Private Investment (GDPI), and Trade Openness (TOP) have a positive relationship with economic growth *(EG)*, and the influence of *Financial Liberalization (FL)* are assessed in this study.

3.2 Data & Data Sources

The data includes an imbalanced panel of 25 carefully selected nations, spanning the years 1995 through 2020[2]. *Economic Growth (EG)* is the only dependent variable in the study; explanatory variables are based on the *Financial Liberalization Index (FLI)* and other control variables. World Development Indicators (WDI), and the World Bank (WB) are used to generate the data. From the World Development Indicators (WDI), the *Financial Liberalization (FL)* indicators have been chosen. These are Broad Money in percentages (%) of GDP, Domestic Credit

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[2] Classification of selected countries based on GNI Per Capita 2020 is provided in Appendix 1

to the Private Sector by Banks in percentages (%) of GDP, FDI Net Inflow in percentages (%) of GDP, and FDI Outflow in percentages (%).

3.3. Estimation Technique

3.3.1. Panel unit root tests (PURTs)

To find the unit root of variables, the study used Pesaran's Cross-Sectional Augmented Lin, Levin, and Chu (LLC) (2002), I'm, Pesaran, and Shin (IPS) (2003), and Fisher ADF panel unit root test (Maddala and Wun 1999).

$$\Delta EG_{it} = \alpha_i + \alpha_i t + \alpha_i EG_{i,t-1} + \alpha_i \overline{EG_{t-1}} + \sum_{r=0}^{p} \alpha_{ir} \overline{\Delta EG_{t-r}} + \sum_{r=1}^{p} \alpha_{ir} \Delta EG_{i,t-r} + \varepsilon_{it,} \quad (3)$$

CIPS's test statistic is as follows:

$$CIPS = (N)^{-1} \sum_{i=1}^{N} CADF_i \quad (4)$$

3.3.2 Generalized Method of Moments (GMM)

The GMM econometric technique employed in this study was proposed by Arellano and Bond (1991) and Blundell & Bond (1998). The data has been collected from 1995 to 2020 (T=26) from 25 different countries (N = 25). All of the variables are integrated at the level I (0), according to outcomes from the Panel Unit Root Test (PURT). Because of this, the study's empirical assessment was carried out using the system Generalized Method of Moments (GMM) method. In this study, the Generalized Method of Moments (GMM) equation below has been used to represent the theoretical relationship between *Financial Liberalization (FL)* and *Economic Growth (EG)*.

$$EG_{i,t} = \alpha EG_{i,t-1} + \dot{\alpha} X_{i,t} + v_i + \eta_t + \mu_{i,t} \quad (5)$$

"EG" is the *Economic Growth*, while "X" is the group of independent variables, $\mu_{i,t}$ represent the error term, and V_i stands for the unobserved nation-specific effect.

Since v_i is connected to $EG_{i,t}$, using the first difference of Equation (5) eliminates the influence of the country:

$$EG_{i,t} - EG_{i,t-1} = \gamma(EG_{i,t-1} - EG_{i,t-2}) + \dot{\alpha}(X_{i,t} - X_{i,t-1}) + (\eta_t - \eta_{t-1}) + (\mu_{i,t} - \mu_{i,t-1}) \qquad (6)$$

3.3.3   The Robust Least Squares (RLS), Fixed-Effect, and Dumitrescu and Hurlin

Robust least squares estimators are employed since data outliers can considerably affect the outcomes of a regression. The furthermost common technique, such as the conventional least squares method (OLS), often ignores the problem of outliers, according to Barnett and Lewis (1984) and Belsley et al. (1980). Alternative strategies, such as robust regression, yield solid results (Huber, 1973).

Instead of the Fixed-Effect (FE) estimator, the present study employed the Random-Effect (RE) estimator suggested by the Hausman (1978) test (see Table 7). A method for addressing endogeneity bias is the Random-Effect (RE) analytical technique, which involves panel data or multi-level data (Allison, 2009). The Random-Effect (RE) technique gives a somewhat flexible option to have accuracy for endogeneity arising from missing bias factors. The primary objective of the Random-Effect (RE) approach is to eliminate any bias resulting from the existence of variables that are not time-invariant variables (Wooldridge, 2015; Stone and Rose, 2011). To determine the way of causality between the variables, Dumitrescu and Hurlin's (2012) heterogeneous tests were often used. Granger (1969) developed this non-causality test in models using heterogeneous panel data.

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_{ik} y_{i,t-k} + \sum_{k=1}^{K} \beta_{ik} x_{i,t-k} + \varepsilon_{i,t} \qquad with\ i = 1, \dots, N\ and\ t = 1, \dots, T \qquad (7)$$

4.   Results and discussion

Table 2 Descriptive Statistics and Correlation of Financial Liberalization with Economic Growth of Developed and Developing Countries

	Developed Countries					Developing Countries				
	EG	**FLI**	**GPDI**	**HC**	**TOP**	**EG**	**FLI**	**GPDI**	**HC**	**TOP**
Mean	3.36	0.39	0.57	22.12	1.32	3.18	0.32	0.70	22.80	1.46
Median	3.15	0.52	0.43	21.98	1.28	3.27	0.29	0.79	22.86	1.49
Maximum	9.02	3.84	2.48	37.20	3.08	10.69	3.84	2.860	41.33	3.93
Minimum	-2.72	-2.75	-0.14	11.82	0.00	-4.24	-2.75	-0.14	5.81	-0.70
Std. Dev.	2.34	1.04	0.65	4.96	0.61	2.55	1.10	0.66	5.69	0.74
Skewness	0.15	-0.25	0.50	0.35	0.07	-0.02	0.02	0.40	0.02	0.02
Kurtosis	2.71	3.29	2.28	3.09	2.64	2.87	2.92	2.53	2.81	2.94
Jarque-Bera	1.09	2.11	9.87	3.19	0.99	0.38	0.17	23.17	1.04	0.13
Probability	0.57	0.35	0.007	0.20	0.61	0.83	0.92	0.00	0.59	0.93
Sum	520.42	60.03	89.73	3428.2	205.30	1566.64	165.0	454.4	14799.6	948.7

Sum Seq. Dev.	844.73	166.52	65.81	3781.7	57.48	3186.39	621.4	284.7	20979.6	351.6
Observation	155	155	155	155	155	495	495	495	495	495
	EG	**FLI**	**GPDI**	**HC**	**TOP**	**EG**	**FLI**	**GPDI**	**HC**	**TOP**
EG	1					1				
FLI	-0.22	1				0.09	1			
GPDI	0.02	0.26	1			0.15	0.03	1		
HC	0.15	0.21	0.30	1		0.26	0.05	0.18	1	
TOP	-0.13	0.07	-0.44	-0.27	1	-0.13	0.15	-0.27	-0.16	1

Source: Author's Estimation

The correlation matrix and descriptive statistics for *Financial Liberalization Index (FLI)* and *Economic Growth (EG)* for developed and developing nations are presented in Table 2. These results show that the distribution of all the variables is normally distributed. The findings show that there is a weak but significant link following the correlation matrix. The pair-wise correlation findings in developed nations show a negative relationship between *Financial Liberalization Index (FLI),* Trade Openness (TOP), and *Economic Growth (EG),* as compared to Gross Domestic Private Investment (GDPI), and Human Capital (HC). While in developing nations, the *Financial Liberalization index (FLI),* Gross Domestic Private Investment (GDPI), and Human Capital all positively correlate with *Economic Growth (EG)* rather than Trade Openness (TOP). According to the correlation analysis, in mutual clusters of developed and developing countries, there is no sign of multicollinearity between the series.

Table 3 Results of CD Cross-Section Dependence Test of Developed and Developing Countries

Test	Developing Countries					Developed Countries				
	EG	**FLI**	**GDPI**	**HC**	**TOP**	**EG**	**FLI**	**GDPI**	**HC**	**TOP**
Breusch-Pagan LM	466.453 (0.000)	1284.620 (0.000)	731.809 (0.000)	1076.646 (0.000)	1856.797 (0.000)	204.003 (0.003)	271.062 (0.000)	417.918 (0.000)	523.423 (0.000)	748.071 (0.000)
Pesaran scaled LM	6.795 (0.000)	40.197 (0.000)	17.628 (0.000)	31.706 (0.000)	63.555 (0.000)	2.195 (0.004)	6.7491 (0.000)	15.144 (0.000)	21.175 (0.000)	34.017 (0.000)
Bias-corrected scaled LM	6.295 (0.000)	39.697 (0.000)	17.129 (0.000)	31.206 (0.000)	63.055 (0.000)	2.556 (0.010)	6.389 (0.000)	14.784 (0.0000)	20.815 (0.000)	33.657 (0.000)
Pesaran CD	0.105 (0.916)	0.223 (0.823)	-0.381 (0.703)	-0.514 (0.607)	3.053 (0.003)	-1.074 (0.283)	-1.619 (0.105)	-0.182 (0.856)	-0.073 (0.942)	-0.143 (0.887)

Note: Null hypothesis: No cross-section dependence. d.f. =78 & 171. The p-values ( ) in the above table indicate that each variable is significant at the 1% level of significance.

Before estimating the stationarity characteristics of designated variables, such as the *Financial Liberalization Index (FLI),* Gross Domestic Private Investment (GDPI), Human Capital (HC), Trade Openness (TOP), and *Economic Growth (EG)*, this study primary uses Pesaran's

(2004) tests to examine Cross-Sectional Dependence (CSD) in panel data. The results of the statistically significant Cross-Sectional Dependency (CSD) tests indicate the absence of Cross-Sectional Dependency (CSD) in Table 3.

Table 4 Results of Panel Unit Root Test of Developed and Developing Countries

Tests	Variables	Developing Countries				Developed Countries				Order of Integration
		Level I(0)		1st difference I(1)		Level I(0)		1st difference I(1)		
		Intercept	Intercept and Trend	Intercept	Intercept and Trend	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
Lin, Levin, and Chu (LLC)	EG	-9.460* (0.000)	-8.475* (0.000)	-19.737* (0.000)	-15.907* (0.000)	-2.488*** (0.006)	-2.434*** (0.007)	-4.814* (0.000)	-5.398* (0.000)	I(0)
	FLI	-1.633** (0.051)	1.063 (0.856)	-15.278* (0.000)	-13.501* (0.000)	-0.891* (0.000)	-0.254 (0.399)	-6.831 (0.186)	-6.534* (0.000)	I(0)
	GPDI	-1.634** (0.051)	-1.538*** (0.061)	-19.121 (0.000)	-9.310* (0.000)	0.174* (0.000)	-0.079 (0.468)	-9.324* (0.000)	-7.436* (0.000)	I(0)
	HC	-2.085* (0.018)	0.464 (0.678)	-19.857* (0.000)	-17.249* (0.000)	-1.355*** (0.087)	-1.418*** (0.078)	13.684* (0.000)	-11.816* (0.000)	I(0)
	TOP	-6.037** (0.055)	0.871 (0.808)	-7.500* (0.000)	-6.017* (0.000)	-2.098 (0.221)	-3.237* (0.000)	-13.886* (0.000)	-10.645* (0.000)	I(0)
Im, Pesaran, & Shin (2003)	EG	-9.7177* (0.000)	-3.536* (0.000)	-21.532* (0.000)	-18.629* (0.000)	-3.414* (0.000)	-4.470* (0.000)	-8.877* (0.000)	-9.473* (0.000)	I(0)
	FLI	-2.522** (0.005)	0.270 (0.606)	13.522* (0.000)	-13.395* (0.000)	-3.002* (0.001)	-2.046* (0.002)	-8.748* (0.000)	-7.157* (0.000)	I(0)
	GPDI	-3.490** (0.002)	-4.172* (0.000)	-19.688* (0.000)	-13.461* (0.000)	-1.460*** (0.072)	-1.890 (0.468)	-12.270* (0.000)	-11.057* (0.000)	I(0)
	HC	-4.196* (0.000)	0.067 (0.473)	-18.514* (0.000)	-16.652* (0.000)	-2.712** (0.003)	-0.307 (0.379)	-12.639* (0.000)	-11.449* (0.000)	I(0)
	TOP	-5.049** (0.040)	1.545 (0.938)	-9.361* (0.000)	-7.636* (0.000)	-3.426* (0.040)	-4.473* (0.000)	-13.502* (0.000)	-11.401* (0.000)	I(0)
Fisher ADF	EG	189.627* (0.000)	160.758* (0.000)	436.015* (0.000)	347.153* (0.000)	39.939* (0.000)	43.944* (0.000)	94.486* (0.000)	92.841* (0.000)	I(0)
	FLI	73.640* (0.016)	62.315 (0.114)	275.014* (0.000)	246.551* (0.000)	33.325* (0.002)	25.168** (0.030)	93.042* (0.000)	69.854* (0.000)	I(0)
	GPDI	82.214* (0.000)	85.983* (0.000)	347.055* (0.000)	220.375* (0.000	31.784* (0.004)	25.915** (0.026)	131.173* (0.000)	111.981* (0.000)	I(0)
	HC	92.510* (0.000)	59.874 (0.159)	379.112* (0.000)	140.637* (0.000)	30.405* (0.006)	15.881 (0.320)	125.005* (0.000)	140.117* (0.000)	I(0)
	TOP	67.479** (0.050)	44.746 (0.684)	191.195* (0.000)	152.759* (0.000)	37.036* (0.000)	45.449* (0.000)	142.749* (0.000)	112.424* (0.000)	I(0)

Note: The unit root tests are conducted using constant and time trends. Whenever, *, **, *** stand for 1%, 5%, and 10% significant level.

The outcomes of the panel unit root test are précised in Table 4. *Economic Growth (EG), Financial Liberalization Index (FLI),* and their respective control variables were shown to be stationary at the level I (0) using the panel unit root test. Because of this, the study employed the system Generalized Method of Moments (GMM) method to carry out the empirical evaluation. Robust Least Squares and Fixed-Effect Techniques were also used in this study for robustness.

Table 5 GMM Estimations for Financial Liberalization of Developed Countries and Developing Countries

Developing Countries				Developed Countries				
Variables	**Coefficient**	**St. Error**	**t-statistics**	**Probability**	**Variables**	**Coefficient**	**St. Error**	**t-statistics**	**Probability**
EG(-1)	0.3120	0.0043	71.3140	0.0000	**EG(-1)**	0.2965	0.0160	18.5516	0.0000
FLI	0.1225	0.0175	6.9616	0.0000	**FLI**	0.3683	0.0375	9.8297	0.0000
GPDI	0.1186	0.0510	2.3254	0.0157	**GPDI**	0.1187	0.0556	2.1344	0.0336
HC	0.0368	0.0025	14.7424	0.0000	**HC**	0.0448	0.0078	5.7375	0.0000
TOP	0.0942	0.0268	3.5180	0.0005	**TOP**	0.0494	0.0064	7.7545	0.0000
Constant	0.9026	0.4376	2.0624	0.040	**Constant**	0.3217	0.3098	1.0382	0.3000
No of Countries	17	17	17	17	**No of Countries**	08	08	08	08
Sargan Test = 265.6802, Probability value = 0.5628					**Sargan Test =237.5905, Probability value = 0.4043**				
Autocorrelation Test **AR(1) p-value = 0.0000** **AR(2) p-value = 0.7227**					**Autocorrelation Test** **AR(1) p-value = 0.0000** **AR(2) p-value = 0.2045**				

*Note: *, **, and *** denote 1%, 5%, and 10% levels of significance respectively.*

The Generalized Method of Moments (GMM) technique is used in this study to test the long-run equilibrium link between variables based on the outcomes of GMM. Table 5 shows the empirical estimation of the long-run and short-run link between the *Financial Liberalization index (FLI),* Gross Domestic Private Investment (GDPI), Human Capital (HC), Trade Openness (TOP), and *Economic Growth (EG)* using the GMM technique. As can be seen from Table 5, each explanatory variable that has been empirical investigation has a sizable result on the *Economic Growth (EG)* of the twenty-five (25) developed and developing nations. The GMM results show that each regressor is independently statistically significant, confirming and demonstrating that the computed model is both theoretically and statistically sound. All of the regressors have the predicted coefficients' signs.

Findings showed a positive and significant relationship exists between the *Financial Liberalization Index (FLI)* and *Economic Growth (EG).* According to the model, a 1% increase in the *Financial Liberalization Index (FLI)* corresponds to a 0.12% rise in the *Economic Growth (EG)* of emerging nations. While the model demonstrates that in developed nations, a 1% rise in the *Financial Liberalization Index (FLI)* results in a 0.369% increase in *Economic Growth (EG).* When compared to developing countries, the strength of the influence is slightly larger on the *Economic Growth (EG)* of developed nations. It suggests that, in comparison to developing countries, developed countries have highly advanced and efficient financial institutions that promote *Economic Growth (EG).* Our findings also agree with those of Tornell, Westermann, and

Martinez (2004), Ranciere, Tornell, and Westermann (2006), Muhammad (2010), and Hye and Wizarat (2013). Paudel and Perera (2009), Banam, Ozdemir, and Erbil (2008), and (2010).

Gross Capital Formation (GCF) is a measure of Gross Domestic Private Investment (GPDI). According to the results, a long-term 1% rise in Gross Domestic Private Investment (GDPI) has led to a 0.118% improvement in the *Economic Growth (EG)* of developing countries (EG). In developed nations, an increase in Gross Domestic Private Investment (GDPI) of 1% must increase *Economic Growth (EG)* by 0.1187%. When compared to developing countries, the intensity of the influence is slightly more on the *Economic Growth (EG)* of developed nations. It illustrates that developed nations experience a greater effect from Gross Domestic Private Investment (GDPI) than developing nations, indicating that more investment promotes *Economic Growth (EG).* The findings of empirical studies by Siddiqui (2004), Burney (1986), Ahmed (1994), Azam (2016), and Das and Paul also confirm these conclusions (2011).

Economic Growth (EG) is long-term positively affected by Human Capital (HC). Empirical calculations show that a 1% shift in Human Capital (HC) has enhanced *Economic Growth (EG)* by 0.0368%. While in developed nations, a rise of 1% in Human Capital (HC) has caused an increase of 0.0448% in *Economic Growth (EG).* However, compared to developing nations, the severity of the influence is more on the *Economic Growth (EG)* of developed nations. It demonstrates that Human Capital (HC) has a far more positive impact on developed countries' *Economic Growth (EG).* Kareem (2019), Barro (1991), and Azam (2020) endorse the study.

Rising Trade Openness (TOP) in the nation has a positive influence on *Economic Growth (EG). Economic Growth (EG)* increases by 0.0942% when its value increases by 1%. Trade Openness (TOP) has strong and positive effects on *Economic Growth (EG)* in developed nations, which also indicates that a 1% increase in Trade Openness (TOP) in developed countries has resulted in a 0.0494% increase in *Economic Growth (EG).* The beneficial and significant outcome of Trade Openness (TOP) demonstrates that trade is more reachable in both categories of countries, which reduces market uncertainty and income volatility in an open economy and leads to strong *Economic Growth (EG).* Our findings are consistent with those of Ellahi (2016), Rajan and Zingales (2010), and McDonald and Schumacher (2007).

Table 5 also offers diagnostic statistics in addition to model estimates; both of these statistics, especially the Sargan Test, which does not rule out the hypothesis (H_0) of over-identification, are acceptable. The absence of first-order serial correlation is rejected at a 5% level of significance, while second-order serial correlation is not rejected at the same level of significance.

Table 6 Result of Robust Least Square estimations for Financial Liberalization of Developed and Developing Countries

	Developing Countries		Developed Countries	
Variables	Coefficient (Std. Error)	P-value	Coefficient (Std. Error)	P-value
FLI	-0.3798***(0.2126)	0.0741	-0.1266**(0.0554)	0.0222
GPDI	0.57268*(0.1715)	0.0008	-0.5477*(0.0262)	0.0000
HC	0.0569*(0.0142)	0.0001	0.1386*(0.0042)	0.0000
TOP	-0.3106*(0.1299)	0.0168	0.2945*(0.0343)	0.0000
Constant	2.15077*(0.5631)	0.0001	3.4170*(0.1282)	0.0000
Robust Statistics				
R^2	0.1149		0.1582	
Rw^2	0.1246		0.2282	
Adj.R^2	0.0984		0.1142	
Adj.Rw^2	0.1246		0.2282	

*Note: *, **, and *** denote 1%, 5%, and 10% levels of significance respectively.*

Table 7 Result of Random Effect estimations for Financial Liberalization of Developed and Developing Countries

	Developing Countries			Developed countries	
Variables	Coefficient (Std. Error)	P-value	**Variables**	Coefficient (Std. Error)	P-value
FLI	1.2624*(0.1579)	0.0112	**FLI**	0..3160***(0.1772)	0.0867
GPDI	1.1463**(0.2128)	0.0434	**GPDI**	0.5227**(0.2155)	0.0294
HC	-0.1220**(0.0187)	0.0217	**HC**	0.0432**(0.0214)	0.0542
TOP	0.2255***(0.1235)	0.0798	**INF**	0.4033*(0.1364)	0.0180
Constant	3.6434*(0.6305)	0.0000	**Constant**	1.1179***(0.6421)	0.0940
R^2	0.0283		**R^2**	0.0644	
Adj.R^2	0.0122		**Adj.R^2**	0.0417	
Correlated random effect: Hausman test	12.8765	0.1162	**Correlated random effect: Hausman test**	10.1736	0.2531

*Note: Levels of the significance of 1%, 5%, and 10% are indicated by the symbols *, **, and ***, respectively.*

Tables 6 and 7 present the results of the Robust Least Square and Random-Effect (RE) estimators, which reveal that the *Financial Liberalization Index (FLI)* has a positive and statistically significant impact on both developed and developing countries' *Economic Growth (EG)*. While Trade Openness (TOP), Human Capital (HC), and Gross Domestic Private Investment (GDPI) all lead to *Economic Growth (EG)*. There is contradictory evidence that the *Financial Liberalization Index (FLI)* influences *Economic Growth (EG)*. The computed *Financial*

Liberalization Index (FLI) coefficient in the aforementioned table is statistically significant and significantly supports the pragmatic results of the Generalized Method of Moments (GMM) approach. Additionally, inadequate financial institutions that permit the wasting of assets, which hinders *Economic Growth (EG),* do not assist the financial systems of developing countries. This demonstrates that developing countries need an efficient and stable financial system to put them on the path of rapid *Economic Growth (EG).* The outcome endorses the study on Ellahi (2016).

Table 8 Results of Dumitrescu Hurlin panel causality tests of Developing and Developed countries

| Causality | Developing Countries | | | | Developed Countries | | | |
	W-Stat	Zbar-Stat	P-value	Remarks	W-Stat	Zbar-Stat	P-value	Remarks
$FLI_{it} \rightarrow EG_{it}$	3.4858**	21.667	0.0303	Bi-directional	2.2445	0.0132	0.9894	Uni-directional
$EG_{it} \rightarrow FLI_{it}$	3.3678**	1.9623	0.0497	causality	3.9113*	2.4020	0.0163	causality
$GPDI_{it} \rightarrow EG_{it}$	1.6951	-1.0919	0.2749	Uni-directional	1.9864	-0.3567	0.7213	Uni-directional
$EG_{it} \rightarrow GPDI_{it}$	0.4197*	-3.1462	0.0017	causality	-0.7850*	-4.3289	0.0150	causality
$HC_{it} \rightarrow EG_{it}$	4.9978*	1.3211	0.0165	Uni-directional	3.1635	1.3303	0.1834	No-causal
$EG_{it} \rightarrow HC_{it}$	1.8622	-0.6464	0.5180	causality	1.7324	-0.7208	0.4710	causality
$TOP_{it} \rightarrow EG_{it}$	3.5702***	0.5802	0.0618	Uni-directional	2.7493**	3.7367	0.0413	Uni-directional
$EG_{it} \rightarrow TOP_{it}$	2.2888	0.0926	0.9262	causality	1.7979	-0.6269	0.5307	causality
$GDPI_{it} \rightarrow FLI_{it}$	3.5113	2.2109	0.0270	Bi-directional	3.1446	1.3032	0.1925	Uni-directional
$FLI_{it} \rightarrow GDPI_{it}$	0.2812*	-3.3857	0.0007	causality	0.0189*	-3.1764	0.0015	causality
$HC_{it} \rightarrow FLI_{it}$	3.2350***	1.7322	0.0832	Uni-directional	2.6742	0.6290	0.5294	No-causation
$FLI_{it} \rightarrow HC_{it}$	2.7657	0.9190	0.3581	causality	2.3094	0.1062	0.9155	
$TOP_{it} \rightarrow FLI_{it}$	2.3509***	3.2004	0.0811	Uni-directional	3.8744**	-0.5172	0.0650	Uni-directional
$FLI_{it} \rightarrow TOP_{it}$	2.0278	-0.3594	0.7193	causality	1.5170	-1.0294	0.3033	causality
$HC_{it} \rightarrow GPDI_{it}$	0.6316*	-2.7785	0.0055	Uni-directional	5.8650**	-0.5307	0.0557	Bi-directional
$GPDI_{it} \rightarrow HC_{it}$	2.3009	0.1138	0.9094	causality	3.1443*	1.3027	0.0127	causality
$TOP_{it} \rightarrow HC_{it}$	3.1986***	1.6689	0.0951	Uni-directional	-0.7830**	-4.3263	0.0205	Uni-directional
$HC_{it} \rightarrow TOP_{it}$	2.4959	0.4515	0.6516	causality	1.9085	-0.4683	0.6396	causality

Null hypothesis: no causality; Lag: 2. Statistical significance is indicated by an asterisk (*, **, ***) at the 1%, 5%, and 10% levels, respectively.

Dumitrescu and Hurlin's (2012) widely test is applied to study the causal linkages between the variables. The results of the Dumitrescu and Hurlin test, which permits variability among cross-sections, are displayed in Table 8. The outcomes show that the *Financial Liberalization Index (FLI)*, *Economic Growth (EG),* and other variables are statistically significantly associated with one another. As can be seen from Table 8, the majority of studies show the existence of statistically significant causal links between variables. The *Financial Liberalization Index (FLI)* and *Economic Growth (EG)* are suggested to have a positive causal connection by the Dumitrescu Hurlin Granger

causality model's findings (EG). Similar results have been reported by Benallal et al., (2016) and Hamdaoui et al. (2019).

Overall, the findings of the GMM, RLS, Fixed-Effect (FE), and Dumitrescu-Hurlin panel causality tests show that *Financial Liberalization (FL)* has a considerable positive influence on *Economic Growth (EG)* while having no negative effect on *Economic Growth (EG)* in twenty-five (25) developed and developing nations. These empirical findings, which are supported by theoretical, technological, and statistical soundness, are credible for the development of policy.

5. Conclusion

Numerous empirical study has been accompanied on the relationship between *Financial Liberalization (FL)* and *Economic Growth (EG),* but the findings are still controversial. *Financial Liberalization (FL)* is a major issue for mutually developed and developing nations. Therefore, the goal of this study is to empirically determine the effects of *Financial Liberalization (FL)* and other control factors on *Economic Growth (EG)* for a group of twenty-five (25) developed and developing countries from the years 1995 to 2020. Depending on the type of data, the Panel Unit Root tests are used to examine the order of integration of each variable. The GMM Technique is employed since it is determined by stationarity that the results are integrated at level I (0). The Dumitrescu-Hurlin Granger Causality Test is then used to establish the direction of causality between the variables, and the consequences are subsequently confirmed using Panel Robust Least Squares and Fixed-Effect Estimators as analytical methods for parameter estimation.

The empirical results for all the techniques indicated that *Financial Liberalization (FL)* has a significant and positive influence on *Economic Growth (EG)* over the selected period. This finding supports our hypothesis, according to which *Financial Liberalization (FL)* stimulates *Economic Growth (EG)* by encouraging investment. In contrast to developed countries, *Financial Liberalization (FL)* has a beneficial but less significant influence on *Economic Growth (EG)* in developing nations. It suggests that developing nations lack highly advanced and effective financial systems. Additionally, inadequate financial institutions that permit the misuse of resources, which hinders *Economic Growth (EG),* do not assist the financial systems of emerging nations. This demonstrates that developing countries need a strong financial system to put them

on the path to rapid *economic growth (EG*. While the *Financial Liberalization (FL)* process has accelerated financial growth in developed nations, enhancing the capability of financial intermediaries to provide reserves that have helped to enhance *Economic Growth (EG)* in the country. Additionally, the results of the Dumitrescu Hurlin Granger causality model show a bidirectional and unidirectional causal relationship exists between *Financial Liberalization (FL)* and *Economic Growth (EG)*.

When developed and developing nations' results are compared, it becomes clear that rich nations' *Financial Liberalization (FL)* policies have a greater positive effect on their economies than those of developing nations. According to these findings, developing nations should implement appropriate, effective *Financial Liberalization (FL)* policies if they want to attain high and steady *Economic Growth (EG)* in the future. Particularly by encouraging more financial sector openness to the global market, developing nations' *Economic Growth (EG)* can be accelerated. For example, developing nations should boost their exports, which have recently been declining. As a result, from a policy viewpoint, countries with weak policy assimilation must have a strategy in place to improve their financial sectors. Therefore, for countries to benefit from the liberalization of the financial sector, they must grow.

The study's primary limitation is that it only examines a panel of twenty-five (25) developed and developing countries from 1995 to 2020 because of the availability of only reliable and imbalanced data for this period on a few variables.

The essential and more complicated indicators of *Financial Liberalization (FL),* such as portfolio flows, were not taken into consideration by our study since there was a lack of data. Future studies should consider using this *Financial Liberalization (FL)* indicator in their analyses, it is proposed. In the future, researchers must assess how *Financial Liberalization (FL)* affects environmental quality, such as water quality, air quality, and carbon emission, utilizing some advanced econometric methodologies to get valuable results.

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Appendix-1

Table: A1 Classification of countries as per income Groups

Number of Countries	Group	Income Group	List of Countries	Classification
01	1	Low-income	Sudan	Developing Countries
09	1	Lower middle income	Bangladesh, India Indonesia, Nigeria, Pakistan, Philippines, Sri Lanka, Kenya, & Nepal	Developing Countries
07	1	Upper middle income	Argentina, Brazil, Malaysia, Mexico, South Africa, Thailand, & Turkey	Developing Countries
08	2	High Income	The United Kingdom, United States, Germany, China, Singapore, Finland, France, New Zealand	Developed Countries

Notes: Group: 1. Low income: US$1, 940 or less, Lower Middle Income: US$1,941 to US$4,020, Upper Middle Income: US$4,021 to 12,629, Group: 2. High Income: US$12, 630 or more. **Source;** World Bank (2020)