



Does Trade Openness promote Economic Growth? An Econometric Investigation of/for Indian Economy.

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ABSTRACT:

Examining the short- and long-term relationships between GDP and its determinant variables—gross capital formation (GFC), trade openness (TO), inflation (INF), and foreign direct investment—was the justification for this study (FDI). The interest variable (TO) has a considerable positive influence on GDP, as indicated by the long-run estimations. Similarly, it is discovered that FDI and the GFC have a substantial role in long-term GDP explanation. It was discovered that inflation was not statistically significant. One may argue that Indian policymakers should create such policies that will further integrate India's market with the outside world based on empirical data.

Keywords: Trade Openness, Economic growth, Time Series model, Econometric Technique.

JEL: C22, P45, O4, B23

Introduction:

Right from the days of Globalization, trade has achieved huge importance in building the economies. Over the decades, nations have prioritized various policies to incorporate the national economy to the global economies by opening various trade channels. It has been supported by theoretical and empirical evidence that trade openness have contributed to a very large extent to growth of economies in both emerged and emerging nations (Malefane, 2020 and Marelli & Signorelli, 2011). According to the traditional economic ideas of David Ricardo and Adam Smith, there are definite economic benefits from specialties and that commerce internationally contributes significantly to enhanced economic growth. Well-known classical theories—the absolute advantage theory developed by Adam Smith in his book "Wealth of Nations" and the comparative advantage theory of David Ricardo—suggest that nations may achieve greater economic growth if they practice free trade. However, Neo-classical theories recommend that by creating commodities in which such nations specialize with economical use of resources (one of the well-known Neo-classical theory of Heckscher-Ohlin trade theory (Owolabi, 2011). The theory of comparative advantage is reinforced by modern theories via recognizing economies of scale as a significant basis for economic growth (Berkum & Meijl, 1998; Owolabi, 2011). Depending upon the degree of trade openness, technological advancement and output recuperation (Grossman & Helpman, 1991). Vulnerabilities of nations, transport and financial relationships, exposure to threats and assisting spread of such threats are increased by trade but simultaneously trade has played a key role in productivity and thereby growth furthermore helping nations to create those reserve that need to be prevented from threats and survive from tremors. Economic fortune and development depends profoundly on the exports of the nations. (Lloyd & MacLaren, 2002) contend that the speedy growth of East Asian nations were to a certain extent a result of their timely trade openness as less trade openness will hold back the economic growth.

The study of a vast body of academic and empirical research on the trade-growth relationship was confirmed by (Roubini & Martin, 1992). The widely held belief is that financial development and trade openness have a favourable impact on economic growth. It is asserted that the countries that export the produce than to sell it to their own natives have consistently higher economic growth rates. "The type of the link between economic growth and trade openness has remained an open subject," notwithstanding the surplus labour (Rodriguez & Rodrik, 2001). As far as empirical evidence is concerned, there are two sets of thoughts. One of the ideas supported the significance of trade liberalization and its potential to spur economic expansion (Bahmani-Oskooee & Niroomand, 2010; Das & Biru, 2011; Harrison, 1996a; Lee, Ricci, & Rigobon, 2004). Whereas, the other set of thought realized that economic growth is impaired by trade openness (Gries, Kraft, & Meierrieks, 2008; Hye, Wizarat, & Lau, 2016; Zahonogo, 2017). Frankel and Romer (1999) opined that economic growth is well driven by exports as well as imports. It is furthermore believed that foreign exchanges are being provided by exports as imports do not provide them. Thus, the current study would aim to provide a response to the question of whether trade openness genuinely promotes economic growth or not. The remainder portion of this study is organized as: section 2 throws a light on literature review, section 3 details data and research methodology, section 4 discusses the data analysis and interpretation and last section will discuss the conclusion, matrix of literature review and references.

Review of Literature:

Trade openness has gained tremendous thrust since globalization. Trade between nations serves as a medium for the distribution of knowledge, and as such, more open economies should have higher growth rates. Trade can take the form of imports or exports and is an alternative to growth-enriching interactions (aspiration reciprocation of ideas through exports or acquisition of foreign technology through worthy imports). It is said that more the economy is open, there are likely more chances to apply steady macroeconomic strategies which is in coherence with (Fischer, 1992). One of the studies of (Bond, Jones, & Wang, 2005) revealed that trade openness has endorsed nations to manufacturing enlargement, returns to scale escalation, and gaining in-depth study of money matters.

Trade openness has always played a fundamental role in policy making. The World Bank and the International Monetary Fund have insisted—backed by a number of empirical data points and the import-directed growth and export-directed growth hypotheses—that trade openness is a crucial component of any fundamental adjustment program (Balassa, 1985; Greenaway & Nam, 1988; Mishra, Sharma, & Smyth, 2010; Ram, 1987; Salvatore & Hatcher, 2007). The endogenous growth theories explain the relationship between trade openness and economic growth and provide a theoretical framework for a practical investigation. Conversely, the neo-classical growth theory fails to see any connection between trade openness and economic growth. But according to the new growth theories, trade openness increases economic growth by increasing the amount of spillover (Romer, 1990).

(Kumar, 2014) looked for a connection between trade openness, financial development, and economic growth. Based on empirical evidence, they concluded that trade openness influences growth and financial development, which suggests that trade leads to growth in the financial sector. It was discovered that trade liberalization significantly and favorably affects economic growth after pooled OLS regression and panel data techniques were used to attempt to understand the empirical relationship between trade openness and economic growth for 71 developed and developing countries from the year 1980 to 2009 (Dao, 2014). In addition to it, (Marelli & Signorelli, 2011) concluded that economic growth is positively affected by trade openness. Conversely, (Hye & Lau, 2015) find that while trade openness promotes economic growth in the short term, it causes problems in the long run. Based on developed and developing economies, (Ioanna Vlastou, 2010; Kim, Lin, & Suen, 2010) concluded that across developed economies, trade openness has a positive influence on economic growth but in the case of developing economies it troubles the economic growth. However, a number of experts have come to the conclusion that trade openness and economic growth do not significantly correlate (Eris & Ulasan, 2013; Menyah, Nazlioglu, Wolde-Rufael, et al., 2014; Ulasan, 2015; Yanikkaya, 2003). Because of this, the relationship between trade openness and economic growth is still unclear, opening up the possibility for more empirical research. Enormous research have utilized exports and imports split by GDP i.e., trade shares in GDP, and demonstrate a positive correlation between trade Openness and economic growth (Frankel & Romer, 1999; Harrison, 1996; Irwin & Tervio, 2002). Moreover, empirical research indicates that nations with a greater focus on exports tend to have longer-term economic growth (Chang, Kaltani, & Loayza, 2009; Dollar & Kraay, 2004; Freund & Bolaky, 2008; Lee et al., 2004). (Das & Paul, 2011) sought to explore the trade-growth nexus in 12 rising Asian nations from the year 1971 – 2009 and found out that there exists a considerable and beneficial influence of trade openness on economic growth. Similarly, (Hamdi & Sbia, 2013) demonstrated a one-way causal relationship between trade openness and economic development over the long and short terms in the instance of the Algerian economy. In an investigation of the relationship between trade openness and economic development in OECD countries, (Birinci (2013) discovered bidirectional causation. Similarly, (Liu, Song, & Romilly, 1997) discovered a reciprocal relationship between trade liberalisation and economic development in China. After researching the economies of East Asia, (Jin, 2000) found shaky evidence linking trade openness to long-term economic growth. Another research conducted in China's eastern coastline districts by Jin (2004) demonstrated the beneficial effects of trade openness on economic growth. Furthermore, he found that in the island regions of china trade openness troubles economic growth. (M. Ali, Kamran, & Khalid, 2012) sought to examine, on an annual basis, the impact of exports on the development of Luxemburg (a member of the European Union) between 1975 and 2009. Their analysis resulted into positive and significant association of exports on economic growth which showed that with every unit increase of export there is positive increase of .17 in economic growth. Using a multivariate auto-regressive VAR model, (Dritsakis & Adamopoulos, 2004) experimentally investigated the causal link between the level of openness, financial development, and economic growth in Greece during the years 1960–2000. The co-integration analysis's findings indicate that there is only one co-integrated vector between openness, GDP, and financial development. (Rahman, Saidi, & Ben Mbarek, 2017) discovered a bidirectional causal relationship between trade openness and economic growth after examining the effects of trade openness in significant emerging and developed countries. (Swamy & Dharani, 2018) examined 24 advanced economies between 1983 and 2013 using a variety of econometric approaches. They found that while financial development had varying effects on economic growth incorporating a number of moderators, trade openness was the most effective positive mediator. (Ali, 2013) discovered that trade openness has a negative impact on Sudan's economic growth in his research on the country's economic development. Bojanic (2012) examined the link between indicators (Financial development, trade openness and Economic growth) using the Granger Causality test, co-integration test, and error correction model. Moreover, annual time series data was used from the year 1940-2010. The practical result showed a long-term correlation between the aforementioned metrics, with trade openness and economic growth being the causative relationship (which means that trade openness leads to growth in the given economy).

A study was conducted in 42 sub-Saharan African nations from the year 1980-2012 to understand the impact of trade openness on economic growth by (Zahonogo, 2017), three trade proxies were used to understand the linkage which showed that trade openness positively affect economic growth only up-to a certain level , beyond which the impact deteriorates. (Malefane, 2020) used the ARDL bound testing model in an effort to assess the impact of trade openness on economic growth in Botswana. Four different trade-based indicators and a composite index have been employed as trade-openness alternatives. The findings underscored the significance of overall commerce and exports in supporting Botswana's economic expansion; nevertheless, it was discovered that imports did not provide any impetus.

(Motallah, Ghazi, & Bounoua, 2015) looked into the relationship between economic freedom, foreign direct investment, and financial development (referred to as the "triptych") and economic growth in 12 MENA countries between 1995 and 2012. It was discovered that financial development, though limited in its impact, significantly boosts investments and savings while also recognizing efficient resource distribution. On the other hand, economic freedom has a major and beneficial impact on economic growth since it encourages competition and permits the more effective use of resources. It was furthermore discovered that more investments and higher trade freedoms is linked to well-functioning of the financial system (Menyah, Nazlioglu, & Wolde-Rufael, 2014).

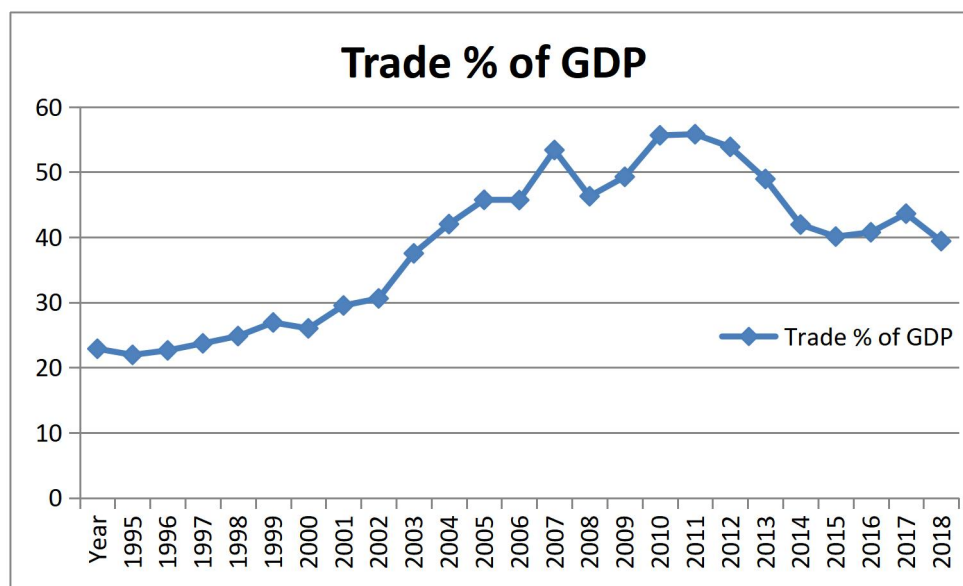
Prior to the 1990s, trade's share of GDP in India declined; however, following the 1990s, the government of India implemented trade liberalization policies and swiftly eliminated several restrictions aimed at reviving the country's export-oriented economy. (Topalova, 2004) revealed that in case of India the trade liberalization improves the productivity of firm which in turn results into development of economic welfare in India. Hye and Lau (2015) evaluated the relationship between trade and growth in India from 1971 to 2009 using ARDL and came to the conclusion that while trade openness boosts economic growth in the short term, it has negative long-term effects. Furthermore, it was established that in both short-run, as well as long-run unidirectional causation was discovered going from trade openness to economic growth. (Mallick & Behera, 2020) supported that variations in trade openness result in uneven economic growth in India prior to the trade restructuring era 1960-1990 and after—trade restructuring era 1991-2018. Furthermore, a unidirectional link was observed between trade openness and Economic development in India and therefore the relevance of trade-share in GDP in India. The relationship between trade openness and economic growth in India has been studied using trade openness indicators (real exports, imports, and exports plus imports) by Ved & Sudesh (2007). It was discovered that there is bi-directional causality between trade openness indicators and economic growth. Furthermore, it was endorsed that economic growth is improved by better quality of trade openness. According to Pradhan (2011), there is a long-term steady relationship between financial development, exports, and economic growth from an Indian perspective.

To investigate the relationship between economic freedom and economic growth, panel data analysis was used in 17 Middle Eastern and East Asian nations between 2000 and 2009 (Razmi & Refaei, 2013). Trade openness was shown to have a strong and positive correlation with economic growth and was regarded as one of the key growth indicators. Furthermore, the analysis's findings demonstrated a high and positive correlation between the total economic freedom score and economic growth. As was previously said in detail, there is no agreement in the theoretical and empirical reviews, and results differ between nations. This study aims to establish a consensus about the relationship between trade openness and economic growth in the context of the Indian economy.

Data and Methodology:

The data for the study has been extracted from the World Bank for the year 1995 to 2019 for India. Time-series analysis would be employed to understand the impact of Trade Openness (TO), Gross Capital Formation (GFC), Inflation (INF) and Foreign Direct Investment (FDI) on Economic Growth (GDP). A model is specified with GDP as a function of Trade openness (TO), Gross Capital Formation (GFC), Inflation (INF), and Foreign Direct Investment (FDI). The model is defined as:

$$\text{GDP} = f(\text{TO}, \text{GFC}, \text{INF}, \text{FDI}) \quad (1)$$



Estimation Procedure:

Stationarity and Unit Root testing: The stationarity of the variables must be verified in order to use the ARDL model. Time Series data that is stationary at level or at first difference is best suited for ARDL model. (Nkoro & Uko, 2016) restricted the model for being employed on variables

integrated at second order. Although there are other theoretical approaches to verify that variables are stationary, in this study the Augmented Dickey Fuller test (ADF) has been utilized to ascertain whether the variables have any unit roots.

Autoregressive Distributed Lag Model (ARDL):

ARDL model (Pesaran & Shin, 1995) and Johansen Co-integration approach (Johansen & Juselius, 1990) are two techniques to comprehend the long-term connection between the dependent and independent variables. As far as this study is concerned, ARDL method has been used to understand the empirical relationship between the used variables. Autoregressive Distributed Lag Model (ARDL) technique is considered when variables are integrated at level, first difference or combination of both. This technique is statistically more appropriate for co-integration relationship in small samples (Nkoro & Uko, 2016). Furthermore, ARDL method is free from residual correlation which means it has less endogeneity. (Jalil et al, 2013). ARDL technique is more suitable in integrating maximum lags, for data creating process from general to specific econometric techniques (Laurenceson and Chai (2003). Furthermore, in order to investigate the short run and long run relationship between the variables (sankaran et al 2019), ARDL technique is more preferable than the traditional techniques. In assessing the ARDL model, the finest lag length was chosen using the Akaike Information Criterion (AIC).

Autoregressive Distributive Lag Bound Test Approach:

The ARDL bounds testing approach is specified as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \sum_{j=0}^q \gamma_j \Delta X_{t-j} + \varepsilon_t$$

The common long run form of ARDL model is presented as:

$$GDP_t = \beta_{01} + \sum_1^a \beta_{11} GDP_{t-1} + \sum_0^b \beta_{21} TO_{t-1} + \sum_0^c \beta_{31} GFC_{t-1} + \sum_0^d \beta_{41} INF_{t-1} + \sum_0^e \beta_{51} FDI_{t-1} + \varepsilon_{1t}$$

Where a, b, c, d and e are the optimal lag length of respective variables considering the AIC (Akaike Information Criterion).

Data analysis and interpretation:

In order to assess the stationarity of data, Unit Root testing was utilized. To verify the unit root, Augmented Dickey-Fuller (ADF) has been utilized.

Table 1.1 ADF at level

Series	ADF test statistic with intercept	Critical Values at 1%,5% and 10% level of significance respectively
LGDP	-7.144 (0.000)***	(-3.68, -2.97,-2.62)
LTO	-1.997 (0.2860)	(-3.68, -2.97,-2.62)
LGFC	-2.735 (0.0849)*	(-3.78, -3.01, -2.64)
LINF	-3.578 (0.0143)***	(-3.73, -2.99, -2.63)
LFDI	-5.0157 (0.0004)***	(-3.68, -2.97,-2.62)

Note: ***, ** & * represent 1%, 5% and 10 % significance levels respectively.

Table 1.2 ADF test at First Difference

Series	ADF test statistic with intercept	Critical Values at 1%,5% and 10% level of significance respectively
DLGDP	-5.081 (0.0004)***	(-3.71, -2.98, -2.62)
DLTO	-4.454 (0.0016)***	(-3.69, -2.97, -2.62)
DLGFC	-3.391 (0.0382)**	(-4.29, -3.21, -2.74)
DLINF	-6.341 (0.0000)***	(-3.69, -2.97, -2.62)
DLFDI	-4.882 (0.0001)***	(-3.69, -2.97, -2.62)

Note: ***, ** & * represent 1%, 5% and 10 % significance levels respectively

Table 1.1 and 1.2 show outcome of unit root at level and at first difference for ADF tests.

Order of Integration:

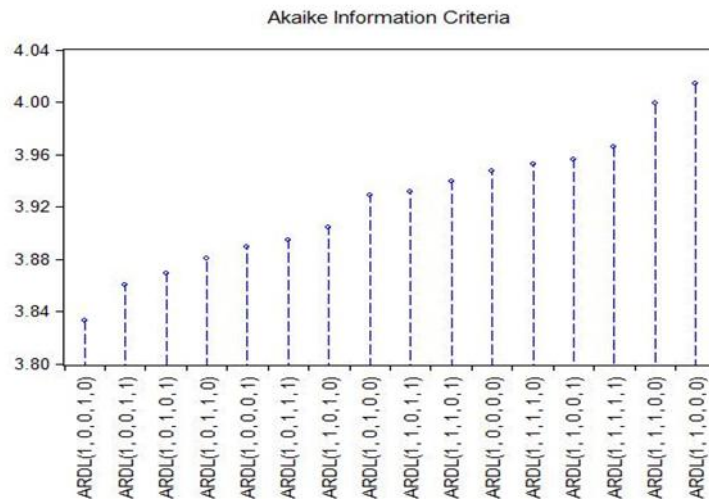
Table 1.3 Order of Integration

<i>Variable Name</i>	<i>Order Of Integration</i>
LGDP	I(0)
LTO	I(1)
LINF	I(1)
LGFC	I(0)
LFDI	I(0)

Table 1.3 makes it evident that the variables utilized in the study have mixed order of integration (I(0) and I(1)). As a result, ARDL (Auto Regressive Distributive Lag) would be used to evaluate the data for long- and short-term relationships because no variable has second order integration.

Lag Selection (Automatic-Based on Lowest AIC)

The maximum number of lags were based on the lowest Akaike Information Criterion (AIC) for both dependent and independent variables. Akaike Info Criterion (AIC) spontaneously selected ARDL (1,0,0,1,0) as it has the lowest AIC value of 3.83.



Bounds Testing Approach:

Table 1.4 Bounds Testing (F-stat for testing the long run relationship)

<i>Test Statistic</i>	<i>Value</i>	<i>K</i>
F-Statistic	5.530120	4

Table 1.5 Critical Value Bounds

<i>Significance</i>	<i>I(0) Bound</i>	<i>I(1) Bound</i>
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Given that the F-statistic (5.530120) in Table 1.4 is greater than the upper bound critical value (5.06) at the 1 percent significance level, it is evident that the dependent variable (GDP) and the independent variables have a long-term connection (GFC, TO, INF and FDI).

ARDL Method:

Short Run Relationship: The ECT (Error Correction Term) short-run ARDL approach is described as:

$$\Delta GDP_t = \alpha_{01} + \sum_1^a \alpha_{11} \Delta GDP_{t-1} + \sum_0^b \alpha_{21} \Delta TO_{t-1} + \sum_0^c \alpha_{31} \Delta GFC_{t-1} + \sum_0^d \alpha_{41} \Delta INF_{t-1} + \sum_0^e \alpha_{51} \Delta FDI_{t-1} + \delta ECM_{t-1} + \varepsilon_{1t}$$

Whereas the short-run coefficient is produced by a significant value of the independent variable, the long-run link can only be verified if the coefficient of ECT is less than 1, negative, and statistically significant.

Table 1.6: Error Correction Representation of Selected ARDL (1,0,0,1,0)

Variables	Coefficient	Std Error	t-statistic	Prob.
D(INF)	0.094004	0.101533	0.925846	0.3650
D(GFC)	0.136351	0.048460	2.813685	0.0104
D(LTO)	-5.093101	3.790403	-1.343683	0.1934
D(FDI)	1.230996	0.604765	2.035494	0.0546
ECT(-1)	-0.782415	0.182564	-4.285710	0.0003

The prefix (D) in the independent variables: D(INF), D(GFC), D(LTO) and D(FDI) approve their rationality as the short run coefficients. Moreover, ECT (-1) demonstrates how quickly adjustments are made to restore the stable (long-term) equilibrium. In theory, a significant and negative result for ECT (-1) is predicted.

Additionally, the short-term impact of inflation on GDP is negligible, as indicated by the positive but small coefficient of inflation (D(INF)). However, at the five percent and ten percent significance levels, respectively, gross capital formation (GFC) and foreign direct investment (FDI) have a positive and substantial short-term influence on GDP. In the near run, Trade Openness is negative and inconsequential in explaining the D (GDP).

Conclusively, the coefficient of ECT (-1) is negative and significant at 1 percent level of significance, authenticating the presence of long term link between dependent and independent factors. The value of ECT (-1) is -0.78 which implies that more than 78% disequilibrium in LGDP in the previous phase will be inevitably adjusted in the present phase. Moreover, ECT (-1) also confirms the occurrence of long run impact from independent variables to dependent variable.

Long Run Relationship:

Table 1.7: Long Run Coefficients of Selected ARDL (1,0,0,1,0)

Variables	Coefficient	Std Error	t-statistic	Prob.
INF	0.120146	0.142799	0.841362	0.4096
GFC	0.174269	0.074817	2.329260	0.0299**
LTO	2.921428	1.69781	1.72070	0.0921*
FDI	1.573328	0.902017	1.744233	0.0957*
C	-3.830114	5.644831	-0.678517	0.5049

Note: ***, ** & * represent 1%, 5% and 10 % significance levels respectively.

Table 1.7 shows the long run evaluations of the derived ARDL (1,0,0,1,0) model. For determining the coefficients of the variables, Akaike information Criterion has been employed. Positive and negligible is the inflation coefficient. In the long run, however, GFC, FDI, and LTO have a positive and significant impact on LGDP because their coefficients have positive and significant effect at the five percent, one percent, and ten percent levels of significance, respectively.

Diagnostic Testing:

Proper diagnostic tests have been used to check the stability of ARDL (1,0,0,1,0).

Normality: Table 1.9: Jarque-Bera test

Mean	Median	Max	Min	Std dev	Skewness	Kurtosis	Jarque-Bera	Prob
-3.43e-15	-0.040818	2.167038	-2.795493	1.304231	-0.514676	2.464978	1.570114	0.456094

Null Hypothesis for Jarque-Bera test is that Residuals are Normally Distributed. With a probability of 0.456094 and a Jarque-Bera test value of 1.570114 (Table 1.9), we are unable to reject the null hypothesis at the five percent significance level, indicating the reliability of the model.

Serial Correlation LM test:

The null hypothesis for serial correlation LM test is that there is no serial correlation in the model.

Table 1.10: Breusch- Godfrey Serial Correlation LM test

Obs* R-Squared	Prob. Chi-Square
.931676	0.3433

Obs*R-Squared has a value of 0.9316763 with a probability of 0.3433. Consequently, it is not possible to reject the null hypothesis that there is no serial connection at the 5 percent significance level.

Heteroscedasticity Testing:

Null hypothesis for Heteroscedasticity is that residuals are homoscedastic which means that there is no heteroscedasticity left in the model.

Table 1.11: ARCH Test: Heteroscedasticity Testing

Obs* R-Squared	Prob. Chi-Square
6.550749	0.3644

The model for the Obs* R-Squared value 6.550749 and its probability 0.3644 does not exhibit heteroscedasticity. Therefore, at the five percent significance level, we are unable to reject the null hypothesis.

Stability Testing:

The CUSUM and CUSUMSQ have been used to verify the stability of the long run coefficients of a specified Autoregressive Distributive Lag (ARDL) (1,0,0,1,0), including its short run dynamics. Figures (1.2) and (1.3)'s graphical representations demonstrate that, at the five percent significance level, CUSUM and CUSUMSQ both fall inside the critical boundaries. As a result, the null hypothesis is not rejected, supporting the stability of the long-run coefficients of the independent variables (FDI, LTO, GFC, and INF) that affect LGDP.

Figure 1.2: Plot of Cumulative Sum of Recursive Residuals

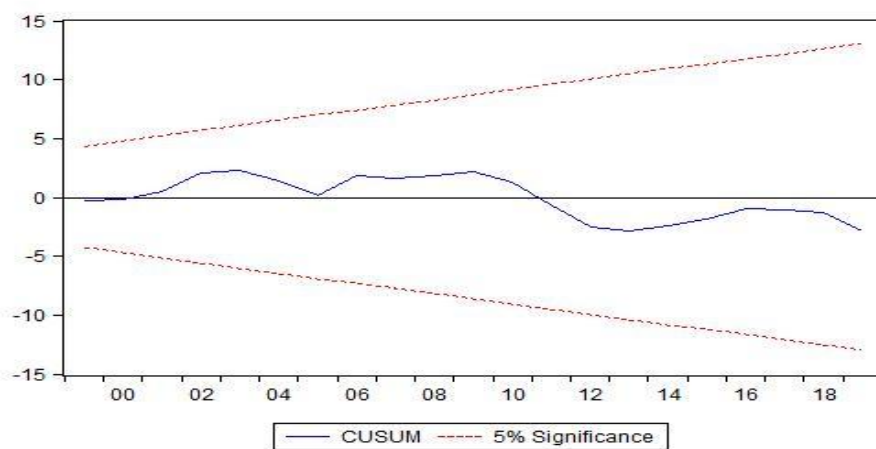
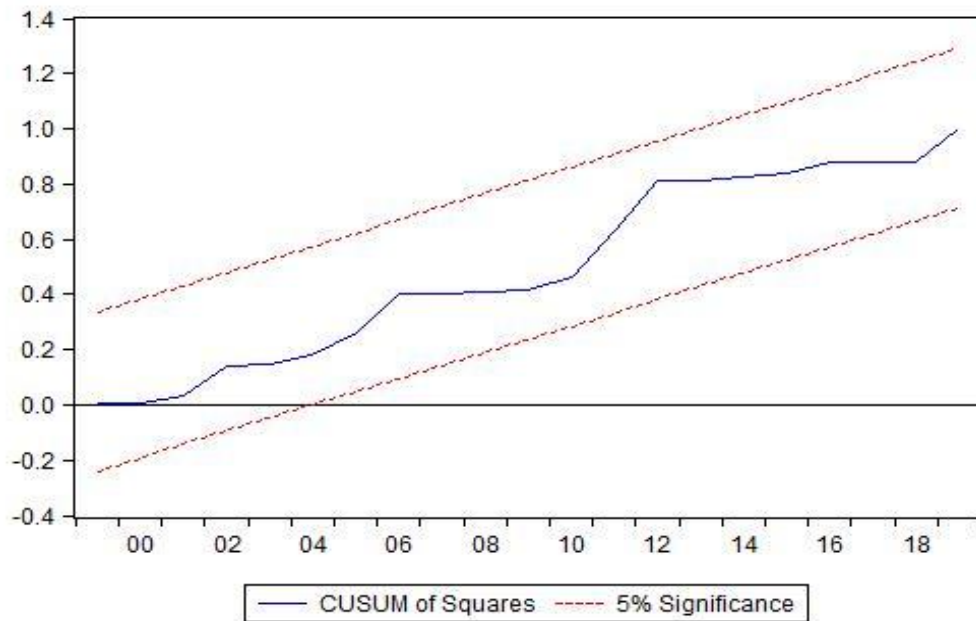


Figure 1.3: Plot of cumulative sum of squares of recursive



residuals

Conclusion:

Investigating the short- and long-term relationships between GDP and its determinant variables—gross capital formation (GFC), trade openness (TO), inflation (INF), and foreign direct investment—was the aim of this study (FDI). The interest variable's (TO) considerable positive influence on GDP was validated by long-run estimations. Similarly, it is discovered that, over time, FDI and the GFC have a significant role in explaining GDP. Conversely, it was discovered that inflation was not statistically significant. One may argue that Indian authorities should create policies that further integrate India's market with the rest of the globe based on empirical data.

Matrix for trade openness and Economic growth:

Serial No.	Author and year	Title	Methodology	Conclusions
1.	Malefa Rose Malefane (2020)	Trade openness and economic growth in Botswana: Evidence from co-integration and error correction modelling	ARDL, Co-integration and error correction modelling	Overall trade openness has significant and positive impact on economic growth in both short as well as long run.
2.	Nguyen Thi Van Anh, Hoang Thanh Tung, Vu Thuy Hien (2020)	The Impact of Exports on Economic Growth in Vietnam	Least square method (E-views)	Positive impact on economic growth was found.
3.	Bashir Al Hemzawi and Natacha Umutohi (2021)	Impact of exports and imports on the economic growth: A case of Rwanda	Ordinary Least Square linear regression	The study revealed significant and positive association between trade openness and economic growth
4.	Mohammad Javad Razmi and Ramiar Refaei (2013)	The Effect of Trade Openness and Economic Freedom on Economic Growth: the Case of Middle East and East Asian Countries	Static panel regression model	It was found that economic freedom as well as trade openness has positive impact on economic growth
5.	Enrico Marelli and Marcello Signorelli (2014)	China and India: Openness, Trade and Effects on Economic Growth	Fixed effect models	Openness has significantly and positively promoted growth

6.	MOHSEN BAHMANI-OSKOOEE AND FARHANG NIROOMAND (2010)	Openness and economic growth: an empirical investigation	Johansen-Juselius cointegration technique	The results showed that there exists a positive relationship between trade openness and economic growth
7.	Thomas Gries, Manfred Kraft and Daniel Meierrieks(2008)	Financial Deepening, Trade Openness and Economic Growth in Latin America and the Caribbean	Granger causality (VAR/VECM Framework)	No evidence of trade induced growth was found
8.	Lingaraj Mallick and Smruti Ranjan Behera (2020)	Does trade openness affect economic growth in India? Evidence from threshold co-integration with asymmetric adjustment	Asymmetric error-correction model with threshold co-integration	The economic growth responds asymmetrically to changes in trade openness in India
9.	Muhammad Shahbaz, Khalil Ahmad and Pervaz Azim(2011)	Exports-Led Growth Hypothesis in Pakistan: Further Evidence	ARDL bounds testing approach to co-integration and error correction method (ECM)	Exports are positively correlated with economic growth confirming the validity of exports-led growth hypothesis.
10.	Qazi Muhammad Adnan Hye, Dr Shahida Wizarat and Wee-Yeap Lau	The Impact of Trade Openness on Economic Growth in China: An Empirical Analysis	ARDL Method and Rolling regression method	Trade openness is positively related to economic growth in both short as well as long run.

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