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The Dynamic Relationship Between Trade Liberalization and Economic Growth in Pakistan: ARDL and ECM Approach

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ABSTRACT

The have a have a take a observe analyzed the impact of trade liberalization on economic increase in Pakistan. The experiential assessment is completed via the usage of time series statistics from 1980-2015. Autoregressive Distributed Lag (ARDL) certain attempting out to Cointegration is used to understand the long term and quick run dating amongst mounted and independent variable. The effects advise that there can be a long time first-class and extremely good dating amongst alternate liberalization and economic boom in Pakistan. The outcomes moreover advise that there can be a horrible and big dating amongst alternate and monetary boom in short run. This is due to the prone battle manipulate institutions and shortage of satisfactory organization withinside the usa. The horrible impact is due to the raw material exports instead of final goods. The short run results verify long time relationships checked with the useful resource of the usage of Error correction model. Export leaning change policies and high-nice strugglefare manage organisation are the insurance recommendations.

Keywords: *Trade Liberalization, Economic Growth, ARDL, Error Correction Model.*

INTRODUCTION

In the contemporary globalized economy, no us of a can hold without active participation in distant places exalternate. Countries continuously modify their change hints to maximize capacity earnings from comparative advantage and international opportunities. Trade liberalization, regularly appeared as openness, has emerged as a critical technique to enhance economic boom international. Nevertheless, however the sizeable literature exploring the nexus amongst trade liberalization and economic growth, the findings live inconclusive and controversial among policymakers. While severa empirical studies have validated a first-rate change-led growth effect in some developing global places (Chaudhry et al., 2010; Utkulu & Ozdemir, 2004), the overall enjoy of developing worldwide places has been hindered thru manner of approach of the protectionist change pointers of advanced global places (Spanu, 2003).

Trade is extensively defined due to the fact the exalternate of merchandise and services amongst human beings or worldwide places, regarding imports and exports in the course of borders (Kumar, 2009). Trade liberalization refers to the removal or bargain of policies which includes tariffs, quotas, and subsidies, thereby allowing a freer float of merchandise and services. The underlying cause stems from the law of comparative benefit, which asserts that mutual income from exalternate stand up at the same time as global places specialize in keeping with their relative efficiencies (Ikenson, 2006). Consequently,

liberal trade hints are predicted to stimulate productivity, foster efficiency, and create opportunities for shared financial prosperity.

Despite its prominence, the concept of trade liberalization is often conflated with trade openness, aleven aleven though the two are not identical. Trade liberalization involves specific insurance movements that facilitate greater exalternate, whilst openness is typically measured thru manner of method of the share of trade relative to GDP. Some students argue that openness is better described in terms of government-imposed barriers to international trade rather than surely trade volume (Stenses, 2006). In financial research, Gross Domestic Product (GDP) is regularly employed as a proxy for economic growth, as it right now shows the general charge of merchandise and services produced internal a u . s . (Samuelson & Nordhaus, 1989). Thus, studying the interaction amongst exalternate openness and GDP growth offers a valuable lens via which to assess the consequences of liberalization rules.

The benefits of alternate openness are multifaceted. According to the World Trade Organization (2003), openness enhances the inexperienced allocation of resources, fosters economies of scale, and improves production conditions thru manner of approach of permitting global places to make the maximum comparative advantages. These static income are complemented thru manner of way of dynamic results, which include learning-with the useful resource of the usage of-doing, technological spillovers, and human capital development. Export-oriented industries, in particular, frequently characteristic conduits for era transfer and knowledge diffusion, thereby assisting long-term productivity growth.

Theoretical perspectives broadly advocate a first-rate link amongst trade openness and financial boom. Liberalization is predicted to enhance competitiveness, widen get proper of access to to international markets, and provide opportunities to overcome domestic period obstacles. Imports of advanced capital gadgets and intermediate inputs can further growth powerful capacity and strain innovation. Additionally, openness facilitates the diffusion of globalwide technological advancements, strengthening long-term financial prospects (Marrewijk, 2012). Empirical findings in massive component manual this argument, specifically withinside the case of superior economies wherein strong institutional frameworks and unique enterprise bases boom the earnings from exalternate.

In contrast, the research of many developing worldwide places stay mixed. While alternate liberalization is regularly portrayed as a purpose pressure of boom, structural constraints, political instability, and susceptible institutional capacities limit its advantages. Edwards (1993) highlighted the worrying conditions in obtaining everyday measures of trade insurance and understanding the appropriate channels thru which liberalization fosters growth in developing countries. Similarly, the African Development Report (2012) said trade as a powerful device of globalization but emphasized that its benefits are unevenly disbursed every inner and during worldwide places. Moreover, in severa African economies, liberalization did now no longer produce the expected boom dividends due to restrained powerful diversification and dependency on primary exports.

Pakistan’s case highlights the ones complexities. Despite its capacity, americaa of a faces significant barriers to growth, together with a narrow commercial enterprise base, dependence on a few commodities, political instability, low investment in research and development, and inadequate human capital. These constraints keep away from the perception of whole advantages from trade liberalization. Previous studies in Pakistan have cautioned great establishments amongst alternate openness and boom, but handiest beneathneath conditions wherein institutional frameworks and supportive hints are nicely in place (Chaudhry et al., 2010).

An vital issue frequently overlooked in exalternate-increase studies is the characteristic of human capital and technology transfer. Trade openness can facilitate the inflow of latest technologies, know-how, and abilties, thereby improving productivity and competitiveness. However, withinside the absence of sufficient investment in schooling and skills development, the ability for technology transfer remains underutilized (Chatterji, Mohan, & Dastidar, 2013). Hence, developing worldwide places such as

Pakistan should consider human capital development as a critical mediating factor withinside the exalternate–boom relationship.

The modern-day have a have a take a observe, therefore, seeks to look at the impact of exalternate liberalization on economic growth in Pakistan using time series statistics for the period 1980–2015. Specifically, the look at applies the Autoregressive Distributed Lag (ARDL) positive attempting out approach to analyze cointegration amongst alternate openness (as a proxy for liberalization) and GDP boom (as a proxy for economic performance). Furthermore, it explores the mediating characteristic of generation transfer and training in strengthening this relationship, thereby supplying insurance-relevant insights into the dynamics of exalternate-led boom.

LITERATURE REVIEW

Impact of Trade Liberalization on Economic Growth

The dating amongst alternate liberalization and financial increase has been extensively studied at some stage in particular economies with mixed results. Butcher and Ferrantino (1997) argued that liberalization normally promotes financial growth, in particular in unexpectedly growing economies. Similarly, Utkulu (2004) positioned huge short- and long-term top notch consequences of trade openness on Turkey's growth using cointegration techniques. In contrast, Jang (2003) analyzed Korea's pre-1997 catastrophe information and placed that liberalization negatively affected boom due to crowding-out effects on own circle of relatives investment, while inflation moreover done a terrible position. Evidence from Iran further facilitates the long-run impact of openness; Rahimi (2007), the usage of ARDL bounds testing, concluded that exalternate liberalization, exports, and imports considerably inspired GDP, aleven aleven though training and hard work contributed negatively.

Studies in South Asia moreover highlight diverse findings. For Bangladesh, Khan (2007) and Manni (2012) emphasized high-quality long-run effects of trade and capital on growth, at the same time as economic openness on occasion showed terrible impacts. In India, Chatterji (2011) and Modak and Mukherjee (2014) established that increase in trade volumes and gross consistent capital formation substantially contributed to financial growth, at the same time as inflation and FDI completed a negative position. Likewise, empirical results from Indonesia (Yusoff & Febrina, 2012) and Sub-Saharan Africa (Abdullahi et al., 2013) observed out a pleasant long-run association amongst change openness, investment, and growth, notwithstanding the reality that inflation negatively affected effects.

Evidence from Developing Economies

Empirical studies in Nigeria and Tanzania endorse further complexity. Olaifa (2013) and Eric (2015) positioned that unfastened alternate contributed to financial growth, aleven aleven though exports and imports sometimes exhibited bad correlations. In Tanzania, Mkubwa et al. (2014) identified extensive long-term best effects of liberalization, urging stronger commercial enterprise insurance to maximize benefits. Afghanistan's experience, as analyzed with the resource of the use of Walid et al. (2014), showed a robust powerful linkage amongst openness and GDP growth, with pointers to pursue nearby integration. Similarly, Mano-Bakalinov (2016) and Mangir (2017) referred to considerable best establishments amongst openness and growth in Macedonia and Niger, respectively, with evidence of bidirectional causality the various variables.

Trade Liberalization and Economic Growth in Pakistan

The case of Pakistan has drawn huge scholarly attention. Musleh-ud-Din (2003) provided early evidence of a long-run equilibrium association amongst openness and boom the usage of cointegration methods. Shirazi (2004) confirmed a long-run dating amongst exports, imports, and production. Khan and Qayyum (2007) emphasized the location of exalternate and financial openness, noting huge long-term

impacts on boom. Subsequent studies collectively with Kakar (2011), Javed (2012), and Hussain (2012) reinforced the remarkable linkage amongst exports, imports, and GDP, aleven aleven though with numerous degrees of short-term causality.

More today's evidence highlights mixed consequences. Shaheen et al. (2013) and Ramzan et al. (2013) observed sturdy super relationships amongst openness, gross capital formation, and GDP. However, Ali (2015) and Zafar (2016) cautioned negative long-run effects of trade openness on Pakistan's growth, irrespective of short-term fantastic associations. Chaudhary and Akhter (2015) moreover placed differential impacts in advance than and after financial liberalization, with post-reform trade negatively influencing GDP. These findings recommend that at the same time as liberalization has ability, its effectiveness is based upon on complementary policies.

Trade Policy, Human Capital Development, and Long-Run Economic Growth

Scholars increasingly more greater highlight human capital as a mediating difficulty withinside the exalternate-increase nexus. Chaudhry (2010) showed that in Pakistan, alternate liberalization and human capital at the same time contributed to economic increase, with every short- and long-run causality. Umer (2014) confirmed the ones outcomes, stressing that change, investment, and human capital really precipitated GDP, aleven aleven though constraints negatively affected growth. Similar evidence from Asian worldwide places thru Jadoon et al. (2015) observed out that human capital extensively advanced the benefits of exalternate openness, particularly in advanced economies with well-knowledgeable exertions.

Education, Skills, and Technology Transfer

The function of schooling and capabilities has been emphasised in numerous research. Shah et al. (2015) argued that schooling and fitness shape the spine of human capital development, undoubtedly influencing GDP. Asim (2015) similarly confirmed that better training tiers and fitness spending had sturdy fine consequences on Pakistan's growth, while exchange openness confirmed terrible long-run impacts. The findings advise that at the same time as liberalization creates possibilities for growth, its achievement in large part relies upon at the absorptive ability of home hard work and establishments.

Summary and Research Gap

Overall, literature demonstrates that change liberalization impacts economic growth, but the route and importance of this relationship variety for the duration of international locations and contexts. Some economies enjoy smooth satisfactory consequences, on the equal time as others check mixed or perhaps horrible effects counting on inflation, investment, and institutional factors. For Pakistan, evidence is inconclusive: on the equal time as many studies advise openness enhances growth, others highlight horrible or unstable long-term impacts. Importantly, pretty fewer studies have examined how trade liberalization contributes to growth through human capital accumulation and era transfer. This research therefore addresses this hollow thru investigating the location of human capital as a mediating detail withinside the alternate-growth nexus for Pakistan.

Theoretical Framework

International exchange has prolonged been considered a cornerstone of monetary increase. Classical economists collectively with Smith (1776) emphasized specialization as a deliver of productivity, on the equal time as Ricardo (1817) highlighted comparative gain because the concept for mutual income from exchange. These foundational mind mounted the principle that worldwide places benefit with the useful resource of the usage of producing objects in which they hold relative overall performance and changing them in worldwide markets.

Building on this, neoclassical theories argue that exchange liberalization enhances useful resource allocation, overall performance, and medium-run increase, aleven aleven though prolonged-run impacts rely upon institutional pleasant and structural readiness (Ferrantino et al., 1997). Endogenous growth models add further insight, suggesting that openness to alternate stimulates innovation, permits generation switch, and encourages distant places investment, all of which contribute to sustainable development (McLean & Sheathe, 2002).

At the equal time, students emphasize that the earnings from liberalization are not automatic. Human capital serves as a critical mediating factor, thinking about the reality that expert tough paintings permits international locations to comply new technologies, take in expertise spillovers, and compete effectively in international markets (Chaudhary, 2001). Economies with prone academic and talent-development systems may additionally moreover battle to translate exchange openness into prolonged-term financial increase.

Thus, the framework for this study underscores that alternate liberalization promotes growth most correctly even as complemented via human capital development and supportive institutional systems. This attitude offers the theoretical foundation for analyzing the characteristic of change tips in shaping economic outcomes.

Objectives of the Study

To look at and degree the effect of alternate liberalization on monetary increase in Pakistan.

To evaluation the financial increase enlargement and change liberalization regulations of the Government of Pakistan.

To have a take a observe the mediating position of generation switch/training thru alternate openness on monetary increase.

Research Questions

Is there any effect of change liberalization on financial increase in Pakistan?

What is the route of influence?

What different variables have an effect on monetary increase and what's the diploma in their influence?

Does generation/talent switch via exchange openness play an vital function in financial increase?

Hypotheses of the Study

H_0: There is a terrible dating among change liberalization and era switch/training on financial boom in Pakistan.

H_1: There is a tremendous dating among exchange liberalization and generation switch/schooling on financial increase in Pakistan**.**

MATERIALS AND METHODS

This have a have a take a observe investigates the impact of trade liberalization on financial boom in Pakistan using annual time series information from 1980 to 2015. Secondary records

were amassed from the World Development Indicators (WDI) and Pakistan Economic Surveys.

Variables

The primarily based totally variable is economic boom, measured via GDP growth charge. Independent variables embody trade openness, human capital, physical capital, and difficult paintings force.

Trade Openness (T): Measured due to the fact the ratio of exports and imports to

GDP**.**

Trade openness = TR= (export +import)/GDP * 100

Human Capital (H): Measured via public expenditure on schooling (% of GDP)

Physical Capital (K): Measured with the useful resource of the use of gross consistent capital formation.

Labor Force (L): Measured using the age dependency ratio**.**

Estimation Technique

To check stationarity, the Augmented Dickey-Fuller (ADF) test became employed. Given the mixed integration order of variables (I(zero) and I(1)), the Autoregressive Distributed Lag (ARDL) Bounds Testing Approach was applied (Pesaran et al., 2001). This technique permits for estimation of every short-run and long-run relationships, notwithstanding small sample sizes.

The Error Correction Model (ECM) derived from ARDL become used to capture short-run dynamics and the fee of adjustment in the direction of equilibrium. Diagnostic assessments, such as the Breusch-Pagan-Godfrey check for heteroskedasticity, the Breusch-Godfrey LM take a look at for serial correlation, CUSUM and CUSUMQ checks for model stability, and the Ramsey RESET take a look at for specification errors, were moreover applied.

Augmented Dickey-Fuller take a look at:

Augmented Dickey-Fuller (ADF) test is usually used to check the stationarity of the variables. It developed with the useful resource of the use of Dickey (1981) and Fuller (1979) to check the non-stationarity. The most vital element of these exams is that attempting out non-stationarity is same to sorting out for unit root**.**

Hypothesis:

Ho=Variables have a unit root H1=

Variables have now now no longer a unit root

Decision Criteria

If p-fee of t-information is ≤zero.05 reject null hypothesis.

Selection of Lag duration:

SIC Criteria:

Schwartz Info Criterion (SIC) is used to determine the lag duration selection.

ACF and PACF

This examine used ARMA technique to test the importance of lagged variables. For this cause ACF and PACF lags' price had been checked.

Ordinary Least Square Method:

Ordinary least rectangular is normally referred to as linear regression. Ordinary Least Square (OLS) technique is used wherein regarded unbiased variable estimates an unknown structured parameter from information and making use of the linear model. OLS additionally unearths the road of exceptional match for a dataset.

$Y= \beta o+ \sum j=1\ldots.p\ \beta jXj+ \varepsilon$

Yt = Dependent variable βo= Intercept of the model

Xj= jth explanatory variable ε= random mistakess with (zero to variance $\delta 2$

Why we used ARDL and Cointegration why now no longer OLS:

Autoregressive Distributed Lag (ARDL) model plays an essential function withinside the ultra-modern modeling of non-table certain time-series information. Following are some conditions that complex the software program of ARDL:

- When all of the series are I (zero) table certain. In this case, researcher can surely model the information in their levels, the use of OLS estimation.
- When series are of the same order, included at e.g. I(zero) or I(1) but are not co integrated, in such case researcher will because it need to be difference each series and estimate a stylish regression model the use of OLS.
- But if some of the variables are table certain I(zero) and some are integrated of order one I(1), in this case ARDL is employed to model the statistics appropriately and to get every long run and short run relationships.

Employing ARDL and Bounds Testing in Econometric Analysis:

The principal disparity some of the ARDL and ARDL positive take a look at is that the model is useful at the same time as the variables are table certain or integration order is same and are co-included, or at the same time as the aggregate order is equal but they are now not co- included. We cannot use ARDL at the same time as integrated order of variables is unique (some I (0) and I (1)). While ARDL positive model is used for all situations gave the variables in addition than I (1). This take a look at is used for co-integration among variables having distinct integration orders below I (2).The general form of ARDL model is:

$$\Delta Y = \alpha_t + \sum_{n=1}^{k} \psi_n \Delta Y_{t-n} + \sum_{\square=0}^{k} \beta n \Delta X1t\text{-}n + \sum_{\square=0}^{k} \gamma n X2t\text{-}n + \sum_{\square=0}^{k} \theta n X3t\text{-}n + \tau$$

$_nX_{4t-n} + \mu_t$

Model:

The take a look at used neoclassical boom version which become firstly proposed via way of means of Solow (1956). Later, Mankiw, Romer, and Weil (1992) prolonged this version and encompass the human capital. The trendy version is:

$$Y_t = A_t K_t^{\alpha} H_t^{\beta} L_t^{1-\alpha-\beta} \varepsilon_{1t} \quad 1.$$

At= Total element productiveness at time

Because this examine objectives to research if and the way exchange openness have an effect on monetary increase thru growth in productiveness, we anticipate that general component productiveness may be expressed as a characteristic of exchange openness and different exogenous elements Ct.

$$A_t = f(T_t, C_t, \varepsilon_{2t}) \quad \text{..... 2}$$

$$A_t = T^{\tau} C_t \varepsilon_{2t} \quad 3$$

$$Y_t = C_t, K_t^{\alpha}, H_t^{\beta}, L_t^{\gamma}, T_t^{\tau}, \varepsilon_{3t} \quad \text{four}$$

Where

α= Elasticity of Production with appreciate to Kt.

β= Elasticity of Production with recognize to Capital.

γ= Elasticity of Production with appreciate to Labor Force Participation. τ= Elasticity of Production with recognize to Trade Openness.

After taking herbal log (ln) on each aspects of equ.four offers an estimable linear feature:

$$Y_t = C_{1t} + \alpha \ln K_t + \beta \ln H_t + \gamma \ln L_t + \tau \ln T_t + \varepsilon_{4t} \quad 5$$

Here our co-efficients are regular elasticities, C1t= LnCt are steady parameters.

Final version in line with equ.5:

$$LGDP = \beta_1 + \beta_2\, LTrade + \beta_3\, LHCAP + \beta_4\, LCapital + \beta_5\, LLabor + \mu_t$$ Specification:

Y= GDP increase X1= Trade openness

X2= Human capital X3=

Physical capital

X4= Labor force

RESULTS AND DISCUSSION

Data mentioned withinside the preceding bankruptcy has been presented, analyzed and effects were interpreted on this bankruptcy to reply the have a look at questions.

Descriptive Analysis and Correlation:

Table no: 1 Descriptive Analysis of Variables

	GDP	**TO**	**PSE**	**GFCF**	**ADR**
Mean	4.860	31.283	2.390	3.524	80.608
Median	4.839	31.635	2.445	4.300	85.660
Maximum	10.215	43.180	3.020	19.901	88.910
Minimum	1.014	24.064	1.840	-7.705	65.300
Std. Dev.	2.150	3.648	0.348	6.319	8.622
Skewness	0.251	0.638	-0.046	0.322	-0.615
Kurtosis	2.602	4.473	2.000	3.086	1.704
Jarque-Bera	0.615	5.699	1.511	0.636	4.788
Probability	0.735	0.057	0.469	0.727	0.091
Sum	174.9	1126.2	86.070	126.88	2901.92
Sum. Sq. Dev	161.87	465.88	4.253	1397.92	2602.30
Observations	36	36	36	36	36

Source: Developed by author

Correlation Table:

Table no: 2 Correlation Table

	GDP	TO	PSE	GFCF	ADR
GDP	1	0.433	-0.119	0.464	0.313
TO	0.433	1	0.112	0.304	0.431
PSE	-0.119	0.112	1	-0.086	0.161
GFCF	0.464	0.304	-0.086	1	0.112
ADR	0.313	0.431	0.161	0.112	1

Source: Developed by author

Augmented Dickey Fuller Test:

(Schwarz Info Criterion)

Table no: 3 Augmented Dickey Fuller Test

Variables	**Level**		**(1st difference)**		**Order of integration**
	t-value	**p-value**	**t-value**	**p-value**	
Gross domestic product	-3.8026	0.0065	-------	------	I(0)
Trade Openness	-2.3491	0.1631	-8.6420	0.0000	I(1)
Public spending on Education	-2.2810	0.1834	-9.7236	0.0000	I(1)
Gross fixed capital formation	-4.3782	0.0014	-------	------	I(0)
Age dependency ratio	-1.4901	0.5264	-5.0739	0.0002	I(1)

Source: Developed by author

H_o=Variables have a unit root H_1=Variables have not a unit root

Decision Criteria:

If p-cost of t-information is ≤0.05 reject null hypothesis. Here p-fee is 0.00 which is <0.05 so we reject null hypothesis. And now this facts has no unit root problem. Some variables are desk bound on stage and a few on 1st difference.

Correlogram

GDP Growth Rate

ACF suggests that effect last up to 4 lags but PACF indicates simplest 1st and 7th lags are extensive so we are able to embody as tons as seven lags and exclusive insignificant lags will exclude.

Trade Openness: The effect goes to 4 lags which can be blanketed but simplest the number one lag is pretty giant in change openness.

Public Spending on Education: The effect goes to second lag so we are able to embody up to two lags of public spending on education.

Gross Fixed Capital Formation: The effect goes to 1st lag so we will include best 1 lag of GFCF.

Age dependency Ratio: The effect goes to 10th lags but excellent 1st lag is vast so we're capable of include most effective sizeable lags and one of a kind will exclude.

Autoregressive Distributed Lag (ARDL) Model:

Table no: 4 Autoregressive Distributed Lag (ARDL) Model

Variables	Coefficients	St. Error	t-values	p-values
GDP(-1)	0.707922	0.273751	2.5860	0.020
GDP(-2)	1.182574	0.327998	3.6054	0.002
DTO(-1)	-0.437001	0.177762	-2.4583	0.026
DPSE(-1)	3.727055	1.299924	2.8671	0.011
DPSE(-3)	-5.360642	1.585684	-3.3806	0.004
GFCF(-1)	-0.274291	0.080527	-3.4062	0.003
GFCF(-2)	-0.278335	0.080895	-3.4407	0.003
DADR	-0.787343	0.480460	-1.6387	0.122

Source: Developed by author

R-squared= 0.777 Durbin Watson statistics= 1.685 F-statistics: 0.010
ARDL automatic Akaike info criteria used for model selection.

MODEL:

$$Y_t=\alpha_0+\beta_1 X_{1\,t-1}+\ldots+\beta_k X_{1\,t-k}+\gamma_1 X_{2\,t-1}+\ldots\gamma_k X_{2\,t-k}+\theta_1 X_{3\,t-1}+\ldots+\theta_k X_{3\,t-k}+\tau_1 X_{4\,t-}$$

$$1+\ldots+\tau_k X_{4t-k}+\mu_t$$

Specification

Y= GDP growth X_1= Trade openness X_2= Human capital X_3= Physical capital X_4= Labor force

K= Number of lags

Analysis and Interpretation of Findings

There isn't always anyt any short-run courting taking walks from impartial variables to financial growth. In the long term previous three hundred and sixty five days of trade openness negatively and notably impacts financial growth. Previous 365 days of public spending on schooling honestly and notably influences, on the identical time as previous three years of public spending on training negatively and considerably impacts economic growth. Previous one and years of gross regular capital formation negatively and significantly affects economic growth. Previous one year of age dependency ratio negatively and insignificantly impacts economic growth.

Decision Criteria: There is no autocorrelation as the value of DW= 1.685

P-Value of F-Statistics:

H_0= Parameters or Coefficient aren't big H_1=

Parameters or coefficient are considerable

If P-Value of F-Statistics ≤ 0.05 we Reject Null speculation and if the P- Value of F-Statistics is not ≤ 0.05 we fail to reject Null speculation.

Here P-Value of F-Statistics = 0.010 so we reject Null speculation. Hence all of the coefficients are statistically tremendous.

R-Squared:

If R-Squared = near 1 this is great outfitted line.

If R-Squared = near zero that isn't satisfactory geared up line.

Here R-Squared is zero.777 so variables affect77.7% on monetary growth.

The consequences confirmed that during long-run 77.7% variant in based variables defined via way of means of unbiased variables.

Bound Testing:

Table no: 5 Bound Testing

Test Statistics	Value	Significance	I(0)	I(1)
F-statistics	6.68	10%	2.496	3.346
K	4	5%	2.962	3.910
		1%	4.068	5.250

Source: Developed by author

Critical values: Narayan (2005)

Hypothesis:

Ho= No co-integrating courting exist

H1= Co-integration courting exist

Decision Criteria:

If the price of calculated F-Statistics is extra than the pinnacle positive value rejects null hypothesis and if rate of calculated F-Statistics is plenty much less than lower certain we fail to reject null hypothesis. Hence F-Statistics =3.seventy 3 it truly is higher than better positive price 3.40 9 we reject null hypothesis. So there is cointegration exist among variables in prolonged run.

Diagnostic Testing:

Normality:

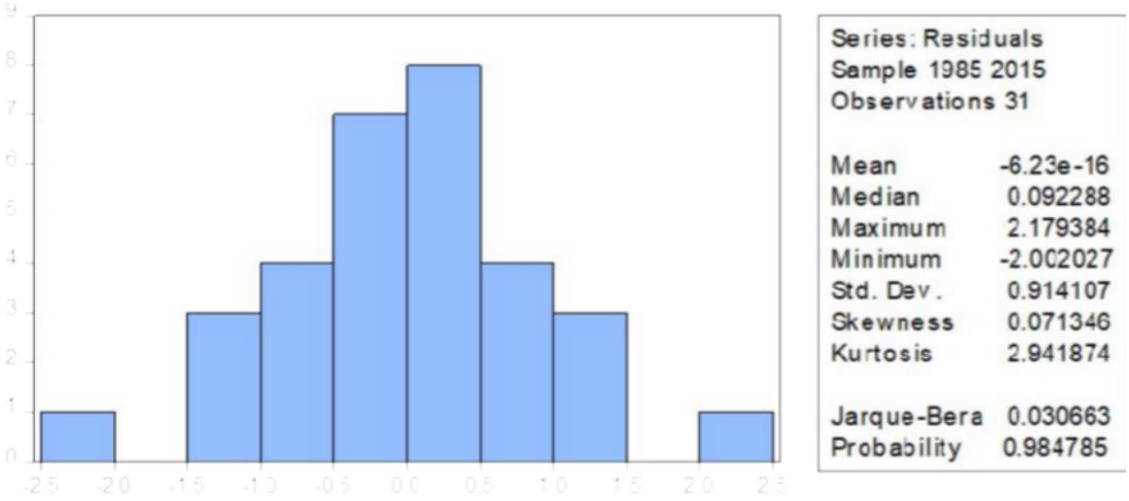
Hypothesis testing:

Ho=mistakes are usually allotted H1=mistakes

aren't typically dispensed

If P-cost of J.B is ≤ 0.05 than reject null speculation Graph no. 1

Normality Test

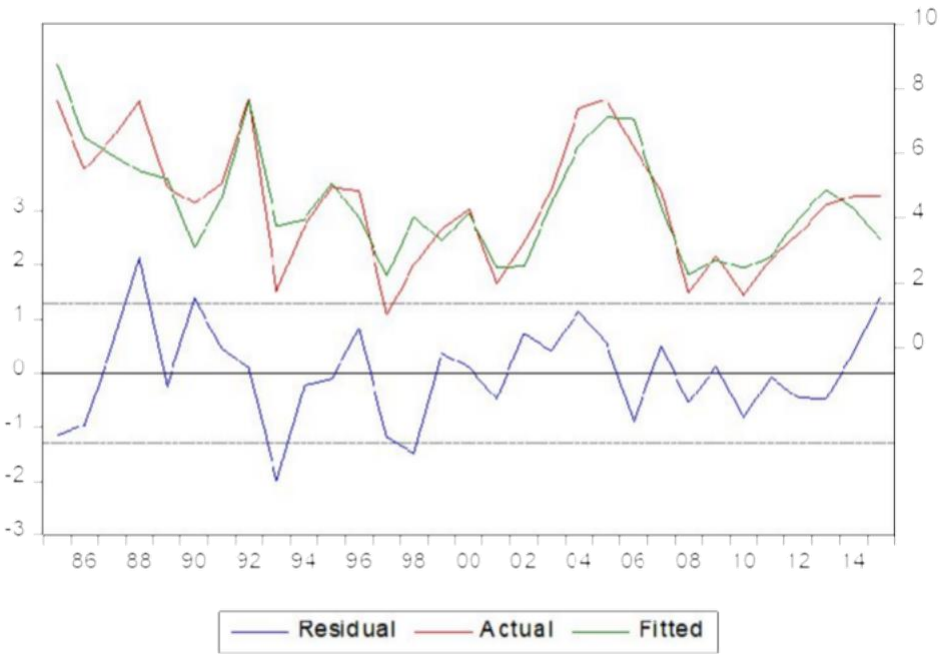


Source: Developed by author

Here p-value of J.B is 0.98 which is not ≤0.05 hence we fail to reject null hypothesis. Errors are normally distributed.

Residuals

Graph no. 2



Graph shows that errors are normally distributed.

Heteroskedasticity:

Table no: 6 Heteroskedasticity test: Breusch-Pagan- Godfrey

F-statistics	1.8090	Prob. F(15,15)	0.1311
Obs* R-squared	19.964	Prob. Chi-Square(15)	0.1733
Scaled explained SS	4.5384	Prob. Chi-Square(15)	0.9954

Source: Developed by author

Hypothesis testing:

Ho= No Heteroskedasticity H_1= Heteroskedasticity exist

If P-value of LM is ≤ 0.05 reject null hypothesis. Here p-value of LM is not ≤0.05 hence we fail to reject null hypothesis. There is no Heteroskedasticity.

Serial Correlation:

Table no. 7: Breusch-Godfrey Serial Correlation LM Test

F-Statistics	0.3513	Prob. F(2,13)	0.7102
Obs*R-squared	1.5896	Prob. Chi-Square(2)	0.4517

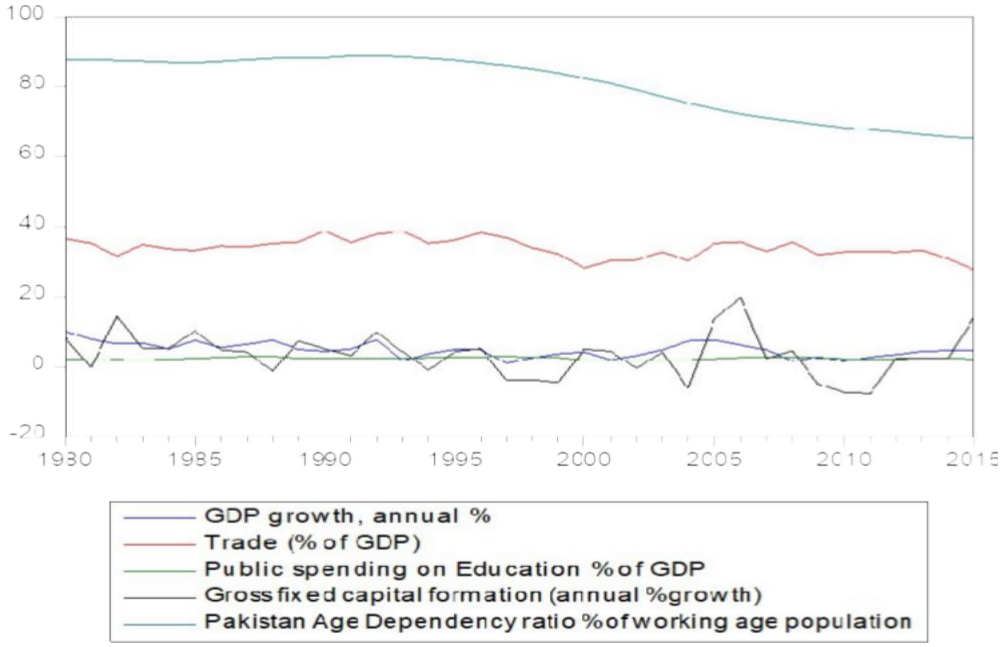
Source: Developed by author

Hypothesis Testing:

Ho= No serial Correlation H_1= Serial Correlation exist

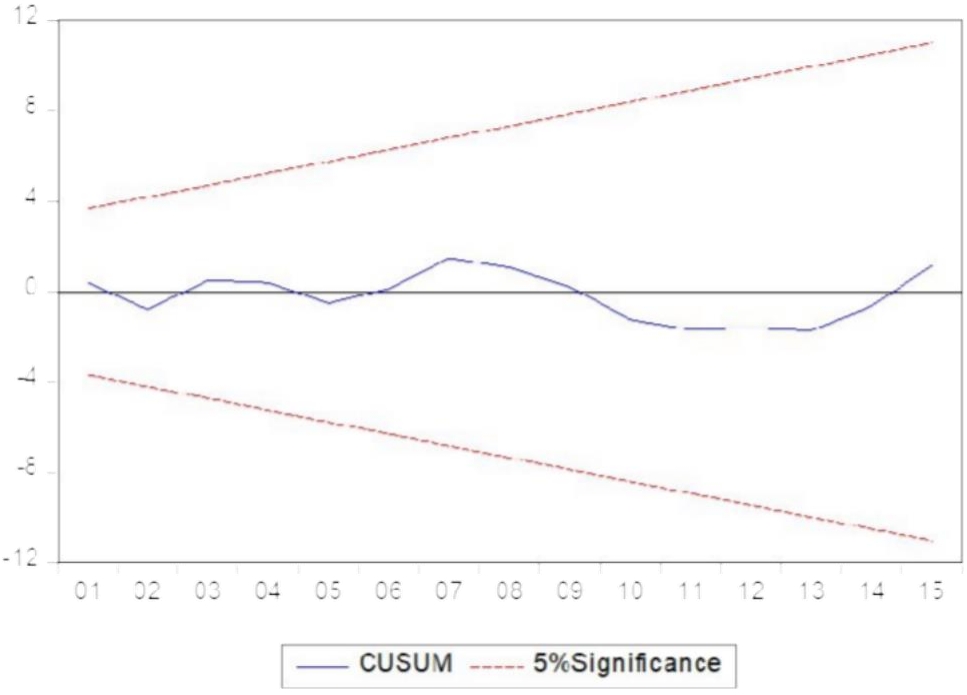
If P-value of LM is ≤ 0.05 reject null hypothesis. Here p-value of LM is 0.45 which is not ≤0.05 hence we fail to reject null hypothesis. There is no serial correlation.

Graph no. 3



Stability Tests (Cusum Test)

Graph no. 4



Above graph shows that the model line lies between the both red lines it means parameters or coefficients of model are stable.

Ramsey Reset Test

Table no. 8

	Value	Df	Probability
t-statistics	1.5569	14	0.1418
F-statistics	2.4240	(1, 14)	0.1418

Source: Developed by author

Hypothesis Testing:

Ho: Model is strong H1: Model isn't solid

If p-price of F-information is ≤0.05 reject null speculation. The outcomes shows that chance cost of F-facts is 0.14 that is more than 0.05. Hence we fail to reject null speculation and version is strong.

Autoregressive Distributed Lag Model (long run form):

Table no: 9 Restricted Constant and No Trend

Variable	**Coefficient**	**Std. Error**	**t-statistics**	**Prob.**
DTO	0.4429	0.1516	2.9201	0.010
DPSE	2.3494	1.5744	1.4921	0.156
GFCF	0.3840	0.0651	5.8919	0.000
DADR	0.4528	0.2239	2.0217	0.061
C	3.9267	0.2818	13.932	0.000

Source: Developed by author

The long-run findings of the version imply that each one variables exert a good sized effect on monetary increase, excluding public spending on schooling, which indicates a weaker influence. Overall, the country's monetary boom is undoubtedly stimulated and supported through the unbiased variables blanketed withinside the analysis. Trade openness demonstrates a sturdy and fantastic impact on GDP increase, in which a 1% boom in exchange openness ends in a 0.44% upward push in GDP. Public spending on training emerges as the second one maximum influential factor, highlighting its important position in improving boom; specifically, a one-unit boom in academic expenditure contributes to a 2.34% upward thrust in long-time period GDP increase. Similarly, a one-unit boom withinside the age dependency ratio, serving as a proxy for labor, outcomes in a 0.45% boom in long-run monetary increase. Physical capital additionally promotes boom, with a tremendous contribution of 0.38%. Moreover, the velocity of structural adjustment closer to equilibrium is captured with the aid of using the mistake correction time period (ECT), that is statistically huge at –1.722, confirming a surprisingly speedy adjustment system lower back to long-run balance whilst short-run disequilibria occur.

Autoregressive Distributed Lag Model (ARDL) Error Correction Regression:

Table no.10 Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-statistics	Prob.
D(GDP(-1))	-2.0580	0.3237	-6.3573	0.0000
D(GDP(-2))	-0.8738	0.1829	-4.7753	0.0002
D(GDP(-3))	-0.3836	0.1149	-3.3361	0.0045
D(DTO)	-0.3178	0.1075	-2.9566	0.0098
D(DPSE)	1.7672	0.8017	2.2040	0.0436
D(DPSE(-1))	9.5393	1.4592	6.5371	0.0000
D(DPSE(-2))	8.0406	1.4492	5.5481	0.0001
D(DPSE(-3))	2.8246	1.0470	2.6977	0.0165
D(GFCF)	-0.1049	0.0571	-1.8353	0.0864
D(GFCF(-1))	0.2847	0.0669	4.2500	0.0007
CointEq(-1)*	-1.7228	0.3300	5.2194	0.0001

Source: Developed by author

CONCLUSION AND POLICY RECOMMENDATION

The look at tested the effect of change liberalization on financial increase in Pakistan the usage of time collection statistics from 1980–2015 thru the ARDL bounds trying out approach. The findings discovered a wonderful and great long-run dating among alternate liberalization and monetary increase, suggesting that more openness to change contributes to Pakistan's monetary performance. This suggests that exchange liberalization can function an critical motive force of boom while complemented via way of means of powerful financial and institutional policies.

Based at the results, numerous coverage measures are encouraged to maximise the advantages of alternate liberalization. Pakistan have to sell labor-extensive export sectors to create employment possibilities and make certain that tariff discounts aren't offset with the aid of using cuts in crucial improvement expenses like fitness and education. Stable funding policies, measures to lessen change deficits, and techniques to diversify exports from agriculture closer to production and offerings are crucial. Strengthening human capital via vocational training, enhancing political stability, and lowering reliance on outside debt are similarly vital. For destiny research, pupils might also additionally enlarge the scope with the aid of using inclusive of different determinants together with debt, funding, alternate openness, and human capital indices, at the side of academic signs like IQ-primarily based totally exams and math/technology ratings to higher seize the function of getting to know in financial boom.

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