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THE NEXUS BETWEEN FINANCIAL DEVELOPMENT AND INCOME INEQUALITY IN PAKISTAN

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ABSTRACT
The study examines the nexus between financial development (FD) and income inequality in Pakistan captured by the Gini coefficient. On the basis of 1990–2020 data and the ARDL-ECM approach, the findings reveal that FD raises income inequality, where a 1% increase raises the Gini coefficient by 0.16% (long-run) and 0.17% (short-run). Trade openness (TO), foreign direct investment (FDI), and gross national income (GNI) reduce inequality. An increase of 1% in FDI reduces the Gini index by 0.005%, whereas TO and GNI reduce it by 0.05% and 0.04%, respectively. The findings suggest that FD can be enhanced by increasing exports and improving access to the financial market to close income disparities. Policymakers must counterbalance inequality with FD by adopting policies of inclusive growth.
Keywords: Financial Development, Income Inequality, Gini Coefficient, Trade Openness, Foreign Direct Investment, ARDL-ECM Model

1. INTRODUCTION

Experts often view financial development as important for growth that includes everyone, yet in Pakistan the economy remains quite unequal, even after many changes within the banking and capital sectors since the 1990s (Nasir, 2024). While financial deepening increased during three decades, the Gini coefficient at 0.35–0.40 showed the challenge of making a change in income equality (Alshubiri, 2021). It contradicts the Greenwood-Jovanovic hypothesis which holds that financial development increases inequality first and then decreases it. Despite the much-talked-about 'trickle-down' effect, helping common people in Pakistan, many are still uncertain about who benefits from financial growth (Rashid & Intartaglia, 2017).

Even though cross-country studies focus on the inequality effects of finance, the details in developing economies with poor institutions and lots of informal settings require study in each country (Beck et al., 2004). Pakistan, having given grants to rich people through the state (Husain, 2009), leaving out the rural poor from microfinance and experiencing financialization after 2008, is a good case for study (Bharti & Malik, 2022). Because inequality of income and wealth is rising, it harms social harmony and threatens sustainable progress in Pakistan, going against the commitments in the Sustainable Development Goals (SDGs) (Zeewaqar, 2024).

This work tries to fill some important gaps by studying the connection between financial growth and income inequality in Pakistan over a period of 32 years (1990–2022). In contrast to previous studies that centered on particular moments or only one measure of inequality, our research applies a multi-dimensional ARDL/ECM method, working with the Gini coefficient from 2000 to 2015 while controlling for inflation, trade openness (TO), foreign direct investment (FDI) and gross national income (GNI). We are able to observe key shifts caused by liberalization in the 1990s and the rise of digital banking after 2010 which helps us understand how different groups receive the benefits of growth. As opposed to the positive theories, we found that financial development made income inequality worse, both soon

after and in the long run, in Pakistan. A 1% rise in FD causes the Gini to rise by 0.17% at first and 0.16% later, revealing banks act in exclusive ways. Alternatively, trade openness and FDI help to equalize income levels. Because of these conclusions, Pakistan should look at its financial strategy again and prioritize giving all citizens access—not just expanding the financial sector—to help development be equitable.

2. LITERATURE REVIEW

The global community has been grappling with a persistent rise in both financial development and income disparity over the past few decades. Research indicates that while income inequality has surged in many countries, it has diminished in many others due to systematic financial development initiatives. This outlines the evident correlation between financial development (FD) & income inequality. So many scholars and economists have thoroughly examined this phenomenon, offering diverse opinions and conclusions. When data is gathered from populations with divergent living standards across developed and developing countries, the results are naturally different and less uniformed, which could sometimes lead to confusion. The study of financial development and income inequality is complex because many different factors influence it. For instance, financial liberalization, banking system structure, foreign direct investment (FDI), inflation levels, and trade openness etc. Each of these factors have their own impact on economic development and income inequality. Understanding the complexities of global economics help researchers gain valuable insights for policy making and future research. (Rehman et al,. 2008) investigated the factors contributing to income inequality from 1975 to 2002 across different levels of economic development in different countries. They divided the national financial panel into four different subpanels, representing states with higher income, upper income, lower income, and lower-middle-income levels. The study concluded that there is a negative relation between income inequality and financial development, irrespective of the development stages. However, the association between income growth and development exhibited a weak U-shaped pattern (Rehman et al., 2008). (Ang, 2009) discusses the impact of financial liberalization on income inequality in India from 1957 – 2004. The study says that a two-way causal relationship exists between the two variables implying that alteration in the financial policies might impact the poor's access to financial institutes (Ang, 2009). (Batuo et al,. 2010) in their study conducted between 1990 to 2004, where they examined data from twenty-two African nations to determine the relationship between financial development and income inequality. The results of the study revealed that as nation's financial system grows, income inequality diminishes. Furthermore, the study highlighted the importance of education in making income distribution more uniform (Enowbi Batuo et al., 2010). (Bittencourt, 2010) investigated that the consequence financial development had over income inequality in Brazil for a time period of ten years between 1980's to 1990's. The results show that financial development, which is accomplished through both long to short-term investments, has been associated with a fall in income inequality during the investigated period (Bittencourt, 2010).

(Jauch et al,. 2016) analyzed the linkage between financial development and income inequality of 138 industrialized and developing economies over the period between 1960-2008. According to their findings, financial development influenced the income inequality positively (Jauch & Watzka, 2016). Additionally, (Shahbaz et al,. 2015) investigated the links between financial development and income inequality in Iran. Their paper used ARDL approach to check short-run and long-run relationships. The result of the study shows that Globalization and inflation tends to improve the income inequality. Whereas, financial development improvement consequently vanished the income inequality (Shahbaz & Islam, 2011).

(de Haan et al,. 2018) while assessing the panel data analysis for 91 countries between 1973 and 2005. They found a correlation between financial advancement, liberalization, banking crisis and income inequality. In conclusion, they found that the financial liberalization gets better after the financial development however, it aggravates income discrimination in an economy (De Haan et al., 2018). Similarly, (Seven et al,. 2016) examined the financial systems of the banking and stock markets for the period of fifteen years in these 45 countries, with the aim to determine the effect on poverty reduction and income inequality. The data covered the period 1998 through 2011, which included 45 different countries. The findings showed that the higher the degree of the bank-based banking, the more unequal distribution within the society, however, the obtained evidence from the research showed no correlation between the structure of the stock market and the income disparity (Seven & Coskun, 2016). In China (Jung et al,. 2019) found a link between financial development and income disparity, the study utilized data spanning from 1998 to 2014 using spatial dependence modeling technique. The study indicated that financial development was declining linked to income inequality (Jung & Vijverberg, 2019). In another study (Altunbaş et al,. 2019) looked at the 121 economies across 1971-2015 with different income levels to know the relationship between financial development and income inequality. The findings suggest that although financial development could make the level of income disparity rise even more in the countries with high- and low-income levels, no change was seen in the countries belonging to the upper middle-income groups (Altunbaş & Thornton, 2019).

While focusing on the similar issue in the Unites States (Bittencourt et al,. 2019) had collected data from 50 states in the country from 1976 to 2011 exploring the same issue. The results indicates that growth in financial development and its levels were highly significant indicators of income inequality while the unemployment rate was found to be a

negligible indicator (Bittencourt et al., 2019). (Tsaurai et al,. 2019) analyzed the connection between financial development and income disparity, taking the impact of inflation into account in South Eastern Europe. The study relied on secondary sources of data ranging from 2004 to 2014, and it found that the measure of financial development accelerated inequality while the measure of inflation occasionally reduced the income inequality (Tsaurai & Nyoka, 2019). The relationship between financial development and income inequality was also assessed by (Destek et al,. 2020) in Turkey between 1990 and 2015. Four financial development indicators (bank, bond market and stock market, and the overall financial development) alongside real income, they found bidirectional relationships between them. The study shows that government spending and wages of net employees lead to income inequality reduction, while inflation which has a positive effect of short interval but decline in a long run (Destek et al., 2020). (Thornton et al,. 2020) examined data over 35 years period from 1980-2015 in 119 countries was pooled and funneled to this study in order to test the relationship between financial development and income inequality. Investigation was ended by this statement that financial development slows down the inequality on long-term (Thornton & Di Tommaso, 2020). Based on the following IMF classification (Kavya et al,. 2020) had examined data from eighty-one countries. This includes 20 high-income countries, 48 were middle income countries and 16 lower-income countries spanning from 1984-2014. The study reveals that the economic development or financial growth are not going to bring about the reduction of income inequalities as this case is evident across the highly-developed economies too (Kavya & Shijin, 2020). Furthermore, (Zhang et al,. 2019) studied data through 143 countries' covering the period from 1961 to 2011, the research that is being conducted examines the connection between financial development, poverty, and the level of inequality that exists. Findings evidenced growing financial stability as an independent pillar, while depth and efficiency had significant positive effects on poverty and income distribution, with a special emphasis on access. In fact, the creation of banking system leads to a higher income polarization given that the influence of stock markets in income distribution is considerably less significant. Further the arguments indicate that financial liberalization was an adverse effect for the lower strata of the society (Zhang & Naceur, 2019). (Muzammil et al,. 2018) conducted research to examine the impact of trade openness on income inequality, using panel data from 104 developing and developed nations during 1980 and 2014. The results of the study demonstrate that trade openness significantly reduces income inequality in both developed and developing countries (Muzammil et al., 2018). In another study by (Goh et al,. 2019) examined the effect of trade openness on income inequality. Sixty-five developed and developing countries were analyzed from a period of 1984 to 2012. The study findings reveal that if trade openness increases the income inequality tends to increase as well; factors like institutional quality plays a significant role effecting the income imbalance (Goh & Law, 2019).

(Topuz et al,. 2020) examined empirical evidence from 1987 to 2016 to show the relationship between openness to trade and income inequality, The study showed that in the beginning of the trade liberalization period, inequality in Turkey decreased. Correspondingly, the higher profits of entrepreneurs caused a surge of income inequality. Besides that, the study has revealed that inequality normally goes down with the liberalization process in the line with these factors mentioned: per capita income and financial development (Topuz & Dağdemir, 2020). It has been observed that income inequality can also effect economic growth of the country. Using timeseries data from 1975 to 2013 the study analyise the emperical analysis of income inequality on economic growth for Pakistan. The econometric model of ARDL and Cointegration is used in this study. The findings shows a positive ad significant relationship between economic growth and income disparity (Majeed, 2016) (Majeed, 2016).

Most of the researcher use different techniques to analyise the imapct of fianncail development of income inequalities. Most use literacy rate that can reduce the gap between income class in the societies. Other use the direct imapct through emperical analysis while having some control variables. It is necessary to check the imapct of other economic indicators on income inequaity to obtain the better results. This study find the few literature on gross national income and its association with income inequality. The study investigate the nexus between financial development and other economic variables like foreign direct investment, trade liberalization, inflation, and gross national income.

3. METHODOLOGY

Different economic theories have predicted that how financial development can affect the income inequality. For instance, (Greenwood et al,. 1990) found an inverted u-shape relationship between wealth disparity and financial development. Their model showed the interplay between economic growth, wealth distribution and financial development, where the financial intermediaries facilitate the trading activities. Trading through the financial intermediaries allowed higher and more secure returns by spreading the risk across many individuals. However, in the initial stage using of financial intermediaries is very costly. Due to high cost only, the rich can afford to invest at the early stage of economic development. This implies that financial intermediaries are almost nonexistent at the initial stage resulting a very slow economic growth.

As the economy reaches the intermediate phase of the conomic growth the financial intermediaries begin to develop more. At this stage, the rate of savings and economic growth increases in the economy however, the wealth disparity among the rich and poor widens. This is because the poor people cannot save and accumulate wealth as swiftly as rich

people in the economy. In this phase of economic development an increase in demand for the financial services is observed. In response, the financial sector grows, improving the efficiency and by lowering the trasaction cost more people has access to financial services and income gap between rich and poor also begins to decrease. Economic development when reaches the advanced stage, the financial intermediaries are more efficient and cost effective, providing greater access to more people. Consequently, an inverted U-shaped relationship is shown, where at the initial stage of financial development the wealth disparity is high and it is low when financial development reaches advanced stage of economic development.

The secound theory is is based on the imperfections in the financial markets. (Galor et al,. 1993) (Greenwood et al., 1990) developed a two sector model in which wealth distribution is linked to inheritence passed down by generations and indisvibility of investment in the human capital. At early stage an individual must choose between working as an unskilled labor or investing in human capital, education and acquiring a skill to become a skilled labor. When the secound stage begins, individuals are now employed either as skilled or unskilled labor mostly dependent on the level of education, how they spend their earnings and the wealth left for future generation. In this model, to guage who will remain skilled or unskilled, wheather they can invest in human capital is determined by the amount of inheritence the individual recieves. Individuals who received little to no inheritence has to borrow money to finance human capital. However, this phenomenon comes with a requirement of collateral and involves cost related monitoring, supervision and enforcement. This implies that, individuals with enough inheritence who can fund their education has no reason to borrow, while those with less inheritence has to borrow. Due to the financial market imperfections, the poor underinvest in human capital accumulation ending up being unskilled and leaving no inheritence for the future generation.

(Banerjee et al,. 1993) (Banerjee & Newman, 1993) developed a model based on how the occupational choices can alter economic development. Individual recieves initial wealth as inheritence as a will from their parents upon reaching maturity and they can apply for loans when they become economically active, however they need to submit a collateral due to imperfect contract enforcement. This leads to credit rationng meaning an individual can borrow only a limited amount. Consequently, occupations that require substantial initial capital are inaccessible to the poor. Hence, the poor would work for a wealthier employers as wage earners substituting for financial contract. This scenario causes occupational choices to be influenced by initial wealth distribution, which affects the saving behaviour and risk exposure of an individual.

These two theories suggest in case where the financial market were perfect the society would reach social efficiency. This would allow the talented youth with high potential from poor background and promising enterpreneurs to access capital regardless of their initial inheritence. Thus, resulting in to a negative linear relationship between financial development and wealth disparity. However, this can not be the case because the financial market imperfections exist. Education and enterpreneurship are tied to family connections, networks and initial inheritence. Thus, the financial development consequently will lead to inequality widening hypothesis of financial development.

(Kuznets, 1955) had also explored the reltion between wealth disparity and economic development, suggesting an invrted U-shaped curve. The theory suggests that per capita income in rural agriculture sector is low, compared to industrial sector in an urban area. This leads to migration of man power from rural to urban area. The kuznet hypothesis predicted that income inequality would rise in the transional period from agricultural to pre-industrialization. As the industrialization progresses different factors improve the economic situation. Over time new generation adapt to urban life, gain skill through better education and secure high salaried employment opportunities. This results in to an inverted U-shape relationship between wealth disparity and economic development. Income inequality will be high in the initial stage however, when economy reaches the stage of full industrialization the wealth disparity will decline.

Each theory shows a conection between income inequality and financial development through different mechanisms. We will test these theories on our model to chech which one applies in context of Pakistan.

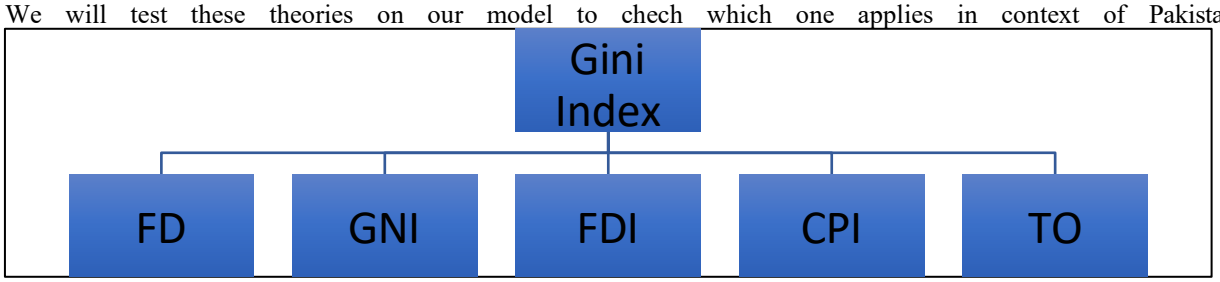

Figure 1: Conceptual Framework

Variables Unit and Symbols

The below table shows the units of the variables and symbols used for variables in the model and analysis tables.

Table 1: Variables Unit and symbols

Variable	Symbol	Unit
Financial Development	FD	Percentage of GDP
Income Inequalities	GINI	Index Number
Gross National Income	GNI	Percentage
Trade Openness	TRADE	Percentage of GDP
Inflation	CPI	Index Number
Foreign Direct Investment	FDI	Percentage of GDP

Construction of the Variables

This section will explain the dependent and independent variables used in the analysis with their definitions, followed by previous literature. Financial development is the independent variable whereas income inequality is the dependent variable. The control variables include gross domestic product (GDP), inflation (CPI), trade openness (TRADE) and Gross National Income (GNI).

Financial development

It is a process through which a country's financial system transforms and become advance over time. This progress contributes to the overall growth and efficiency of the financial sectors. The development involves the expansion and diversification of the financial institutes. There are several dimensions of financial development which has been described in the empirical literature. To measure financial development different proxies were used for example the domestic credit to private sector percentage of gross domestic product (GDP), this ratio has widely been used in finance growth literature (Balcioglu, 2018), (Suanes, 2016).

Income Inequality

Income distribution is the unequal distribution of money or income per capita within the population of an economy and the distribution of resources in a society. In previous studies, different indicators have been employed for income inequality such as Lorenz curve, Gini coefficient and log-normal distribution. This study utilizes the Gini coefficient which is widely used in most empirical research works. The Gini coefficient is defined as the area between the Lorenz curve and the line of perfect equality, and its values are between 0 and 1. The Gini value of 0 means complete equality, meaning everyone is paid the same while the Gini value of 1 means the highest inequality, where one person is paid all the income. Most of the empirical evidence explained that income inequality diminishes as financial development increases. (Shahbaz et al, 2011) also accepted that the enhancement of financial development diminishes wealth disparity. Most of the values of Gini Coefficient were missing, therefore the values has been added through the method of intrpoliation and than cross checked its garph with the graph illustrated by UNDP report (Pasha, 2018).

Gross National Income (GNI)

Gross National Income GNI) is the sun if value added y all individual producers with all taxes on different products excluding subsidies that were not included in the valuation of output. It also consist of net receipts of basic income that are the compensation of employees and their property income from abroad.

Trade openness

Trade openness is the sum of country's export and imports of goods and services and dividing the total by GDP. A lower ratio indicates low degree of international trade vice versa. By assessing trade openness, one is able to determine the direction of a country's economic policies and whether they encourage or discourage trade. According to (Fukuda et al., 2017) International trade plays a crucial role in the attainment of economic goals of both the developed and the developing nations.

Inflation

Inflation is the process by which the average price level of goods and services in an economy increases over a period of a year. When the general price level rises persistently, the amount of goods and services that can be purchased using one unit of currency is lower, thus decreasing the purchasing power of money. Inflation is measured using the Consumer Price Index (CPI); this is the annual rate of increase in the price of a sample of goods and services that are likely to be purchased by the average consumer in a given year. High inflation mostly affects the poor and the middle class, since they have fewer options to protect themselves from the high prices compared to the upper class. (Rehman et al,. 2008) in their study concluded that inflation leads to a higher cost burden to low-wage earners hence a decline in their purchasing power and therefore helps in increasing economic disparity.

Foreign Direct Investment

Foreign direct investment (FDI) refers to a category of investment of on individual or a

Data type and Data source

The nature of data used in the study is timeseries data from year 1990 to 2022. The data is been taken from World Development Indicators (WDI).

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Empirical model

The econometric model follows the Autoregressive Distributed Lag Model (ARDL) model for estimation. The model selection has been adopted according to the nature of data and stationarity results. When time series data is stationary at different level, then ARDL model and cointegration is suitable for regression analysis. Cointegration is applied to check the long run relationship in the model estimation. The model is developed from the basic function form of the variables.

Functional form

The functional form for the model is given below

Gini Index = f (FD) *(1)*

Where Gini Index is used as a proxy for income inequality. FD is financial development, domestic credit as a percentage of GDP is used as a proxy for financial development (FD).

Econometric Model

The econometric model is given below

$$Gini_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 GNI_{it} + \beta_3 FDI_{it} + \beta_4 TRADE_{it} + \beta_5 FD_{it} + \varepsilon_{it} \quad (2)$$

Where

Gini = Gini Coefficient
INF = Inflation
GNI = Gross National Income
FDI = Foreign Direct Investment
TRADE = Trade Openness
FD = Financial Development
ε_{it} = Error Term

ARDL Model

Mentioned below is the ARDL model used during regression analysis.

$$\Delta Gini = \beta o + \sum_{i=1}^{n} \beta_1 \Delta lnINF + \sum_{i=1}^{n} \beta_2 \Delta lnGNI + \sum_{i=1}^{n} \beta_3 \Delta lnFDI + \sum_{i=1}^{n} \beta_4 \Delta lnTRADE + \sum_{i=1}^{n} \beta_5 \Delta lnFD + \lambda lnINF + \lambda lnGNI + \lambda lnFDI + \lambda lnTRADE + \lambda lnFD + \varepsilon_t \quad (3)$$

4. RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistics are the important part of the regression analysis. It can be checked before the estimation and it gives valuable insights of the data. Most of the data consist of outliers that can exaggerate the results and make it biased. Interpretation based on such analysis can lead to the wrong direction. Descriptive statistics can detect the outliers in the data set and it also shows the normal distribution of the data set. The data is normally distributed when the standard deviation of each variable is less than its mean, the values of kurtosis is less or equal to three and Jarque-Bera (JB) probability is greater than 0.05 than the data is considered normal.

Table 2: Descriptive statistics table

	TO	INF	FDI	GINI	GNI	FD
Mean	30.74	89.87	0.93	30.67	4.16	19.50
Median	31.32	60.20	0.70	30.00	4.21	19.29
Minimum	38.50	262.60	3.04	34.00	8.19	25.47
Maximum	21.46	18.00	0.31	28.70	-1.36	13.88
Standard Dev.	4.78	66.03	0.66	1.43	2.09	4.15
Kurtosis	1.96	2.78	3.24	2.44	3.15	1.32
Jarque-Bera	1.64	4.34	6.45	2.76	0.44	3.88
JB- Probability	0.43	0.11	0.54	0.25	0.79	0.14

Source: Author own Analysis

The above table of descriptive statistics shows the normality and the skewedness of the data some of the most important components are discussed here. Here the trade openness (TO) has mean 30.74 with 4.78 standard deviation and Kurtosis (K) value of 1.96, and also the Jarque-Bera probability is 0.43 which is greater than 0.05. So the variable statistic are normally distributed. The inflation (INF) is another macroeconomic indicator of the study having mean 89.87 with 66.03 standard deviation and its kurtosis value is 2.78. While the JB probability is 0.11. Similarly foreign direct investment (FDI) has a mean 0.93, standard deviation 0.66. The kurtosis value 3.24 is greater than kurtosis value of normal distribution i.e. (k is equal to 3), but the JB- probability is 0.54 that is greater than 0.05. Gini index is another important variable of the study have mean 30.67, its standard deviation value is 1.43 and kurtosis value is 2.44. The JB- probability of Gini index is 0.25. Gross nation income (GNI) has mean 4.16 with standard deviation 2.09 and its

kurtosis value is 3.15 which is greater than the normally distributed value of kurtosis but the JB- probability is 0.79 that is greater than 0.05 which mean that the data is normal. Financial Development (FD) is also the important explanatory variable of the study having mean 19.50 and standard deviation 4.15 and kurtosis 1.32. The JB-probability is 0.14 which is also great than 0.05, it means that the data set is normal.

Table 3: Correlation coefficient

	TO	INF	FDI	GINI	GNI	FD
TO	1.00					
INF	-0.38	1.00				
FDI	0.36	-0.16	1.00			
GINI	-0.01	-0.13	-0.16	1.00		
GNI	-0.33	0.10	-0.10	0.07	1.00	
FD	0.66	-0.78	0.57	0.04	-0.19	1.00

Source: Author own Analysis

The above table shows the correlation coefficients between the independent variables. The correlation coefficient must between +1 and -1. The value zero indicate no correlation and +1 shows perfect correlation among the independent variables. The strong correlation between two independent variable can cause a problem of multicollinearity in the date set. The issue of multicollinearity is only the diagnostic test that can be checked before model estimation because it's a data problem. This issue can be detected when the values of correlation coefficient between exogenous variables is greater than 0.6. Here in the above values, no values is found greater than 0.6, therefore there no multicollinearity issue of the data set.

Stationarity of the Data

One of the assumption of the time-series analysis is to check the stationarity of the data. Stationary means when the mean of the data, variance of the data set and the autocorrelation in the model does not change with respect to time. When these three components are constant over time than the data in considered as stationary. It also gives the direction of model estimation. When all the data is stationary at level I (0), ordinary least square method will be followed. When all variables are stationary at first difference I (1) Johnson cointegration will be followed. When data is stationary at with mixed ordered i.e. I (0) and I (1) than Auto regressive distributive lag model (ARDL) will be followed. Stationarity can be checked through various methods like, Augmented Dickey fuller test (ADF) test and Phillips Perron (PP) test. Here, ADF test is used and the results are mentioned below.

Table 4: Augmented Dickey- Fuller (ADF) Test

Variables	At level I(0)		At First Difference I(1)	
	T-Statistic	Probability	T-Statistic	Probability
TO	--	--	-5.0444	0.0003***
INF	--	--	-4.8649	0.0007***
FDI	--	--	-4.9652	0.0003***
GINI	3.4423	0.0018***	--	--
GNI	4.3580	0.0167**	--	--
FD	--	--	-4.6426	0.0008***

Source: Author own Analysis

H_0: The data is non-stationary

H_1: The data is stationary

The above table shows that some variables i.e. Gini index (GINI) and Gross National Income (GNI) are stationary at level I(0) as their probability values are less than 0.05 (Significance level) and reject the null hypothesis while the other variables are stationary at first difference I(1). Some variables are stationary at level I (0) and some are stationary at first difference I(1), therefore the Auto regressive distributed lag (ARDL) model is followed.

Table 5: Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	25.33	NA	1.01e-08	-1.38	-1.095	-1.29
1	175.57	225.36	3.09e-12	-9.54	-7.54*	-8.93
2	229.13	57.38*	1.31e-12*	-10.79*	-7.08	-9.66*

Source: Author own Analysis

The above table show the different lag selection criteria factors in ARDL model. Akaike information criteria (AIC) is mostly followed for maximum lag selection and Schwarz information criteria (SC) are followed for minimum lag selection. AIC show the ideal lag length with minimum value of -10.79. So AIC is followed for lag selection criteria in this case.

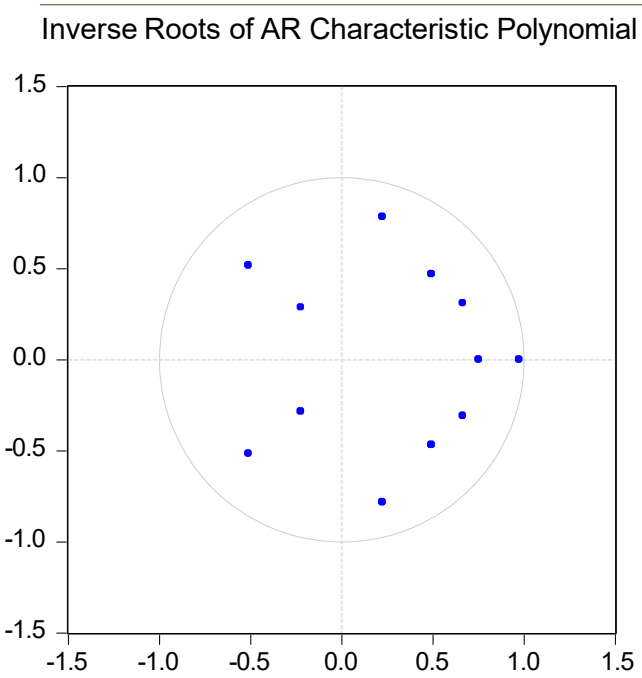

Figure 1: Polynomial test

Source: Author own Analysis

The polynomial chart shows the lag structure of the Autoregressive roots graph. When all the indicators (dots) are inside the circle than there is no problem for further estimation at the desired level of lags.

Table 6: F-Bound Test

ARDL cointegration bound test is used to check the long run cointegration in the model

F-statistic	5.031	
	Critical value Bounds	
Significance level	**Lower bound values**	**Upper bound values**
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Author own Analysis

The Bound test of cointegration shows the long run cointegration in the time series model analysis and it can be check through by the comparison of F-Statistic value and the upper bound values at any significant level. Generally significant level of 5 percent is considered. When the F-statistic value is greater than the upper bound values than there a long run cointegration in the model. Similarly when the value of F-statistics is less than lower bound values than there is no cointegration or long run relationship in the model. While if the value of F-statistic is between the upper bound value and lower bound values than the results in inclusive. Here in above table the value of F-statistics is 9.03, which is greater than the upper bound value. So it can be concluded that there is a long run cointegration in the model.

Estimated Model Results

Based on the results of augmented Dickey- Fuller (ADF) test the following model has been estimated to understand the impact of Financial Development on income inequalities. The Gini index as a proxy for income inequalities is a dependent variable in the below model.

Table 7: ARDL Model Long run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNINF	0.025043	0.043869	0.570863	0.0142***
LNGNI	-0.049744	0.042795	-1.162386	0.0581**
LNFDI	-0.005944	0.038019	-0.156351	0.0272***
LNTRADE	-0.058726	0.120419	-0.487679	0.0408***
LNFD	0.164549	0.233187	0.705651	0.0382***
C	4.277404	0.836025	5.116360	0.0000

Source: Author own Analysis

Interpretation And Discussion

The above table 6 shows the long run relationship in the ARDL Model. All the variables were found significant in the model with having long run relationship with Gini Index taken as a proxy for income inequalities. Inflation plays important role in the income inequalities in developing countries.

The purpose of the analysis were to check long run relationship between financial development and Income inequalities. Many studies use domestic credit percentage of GDP as a proxy variable for financial development. According to the findings there is a positive significant relationship between financial development and income inequalities. One percent change in financial development can rise Gini index by 0.16 percent in long run. It means that financial accessibility is easily available for large and rich businesses and companies as compared to small and weak businesses and companies. Various studies mention the lack of education and technical skills for such financial imbalances (Shahbaz et al,. 2011), .

Consumer Price index (CPI) as an inflation have positive and significant relation with income inequalities. One percent change in inflation can increase Gini index by 0.02 percent in long run. Gross National income (GNI) is another indicator that play vital role in measuring the income inequalities in less developing countries. It has a negative and significant relation with Gini index. One percent change in Gross National Income can decrease income inequalities by 0.04 percent in long run. Foreign Direct Investment (FDI) has also a negative and significant relationship with Gini index. One percent change in FDI can decrease income inequalities by 0.005 percent in long run. Similarly, Net export as proxy for Trade Openness (TO) that can possibly accelerate per capita income and can reduce gap between rich and poor is also considered as a useful indicator for the study. In long run there is inverse relationship between net export and income inequalities. One percent change in net export can reduce income inequities by 0.05 percent.

Table 8: ARDL Model Short run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(LNINF)	-0.013968	0.022265	-0.627351	0.0372 ***
D(LNGNI)	-0.027745	0.015971	-1.737201	0.0970**
D(LNFDI)	-0.003315	0.021932	-0.151168	0.0813**
D(LNTRADE)	-0.032755	0.067099	-0.488157	0.6305
D(LNFD)(-1)	0.176247	0.080588	2.187009	0.0402***
CointEq(-1)	-0.557753	0.231638	-2.407870	0.0253***

R-Square	0.820599
Probability F-Statistics	0.00000
Durban Watson stat.	2.096303

Source: Author own Analysis

Interpretation and Discussion

The short run analysis can be interpreted from the above table 7. The Overall model is significant as the probability of F-statistics is (0.000) less than 5 percent. Where the R-square value is 0.82 percent, shows that 82 percent variations in dependent variable (Gini Index). While the Durban Watson value is 2.09 shows that there is no issue of Autocorrelation. The aim of the model was to check the short run relationship in the model specifically between

financial development and Gini Index. Financial development (FD) is significant and has a positive relationship with income inequalities in short run. One percent change in financial development can increase Gini index by 0.17 percent in short run. Inflation (INF) is negative correlation with Gini index in short run. One percent change in inflation can bring 0.013 percent decrease in income inequalities. Gross national income (GNI) has also negative relation with income inequalities in short run. One percent change in GNI can bring 0.12 percent decrease in Gini coefficient. Similarly, Foreign Direct Investment (FDI) has a negative relationship with Gini coefficient. One percent increase in FDI can decrease income inequalities by 0.003 percent in short run. Trade Openness is found insignificant. The value of CointEq (-1) shows the speed of adjustment of the model, from dis-equilibrium to equilibrium. It is the error correction term which is negative and significant. The value of CointEq (-1) is -0.55 that means the model will take 1.8 years from short run disequilibrium towards the long run equilibrium.

Diagnostic tests for model estimation

The following re the some of the diagnostic test applied during estimation to check the issues in regression analysis.

Serial Correlation

Breusch- Godfrey LM test is used to diagnose the serial correlation in the model and the hypothesis for the test are given below.

H_0: There is no serial correlation

H_1: There is serial correlation

Table 9: Breusch-Godfrey LM Test

LM Serial correlation	
Chi Square (probability)	0.32
Durban Watson test value	2.11

Source: Author own Analysis

The Probability value of chi square is greater than 0.05 so accept the null hypothesis and there is no issue of serial correlation in the model and the value of Durban Watson is also 2.11. When the value of Durban Watson lies between 1.80 and 2.20, than there is no issue of auto correlation in the model.

Heteroskedasticity

Breusch- Pagan- Godfrey test is used to diagnose the problem of heteroskedasticity in the model and the hypothesis of the model are given.

H_0: There is no heteroskedasticity

H_1: There is heteroskedasticity

Table 10: Breusch-Pagan-Godfrey Test

Breusch-Pagan-Godfrey Test	
Chi Square (probability)	0.15

Source: Author own Analysis

The chi square probability value is 0.15, greater than 0.05, so accept the null hypothesis. On basis of that value it is concluded that there is no issue of heteroskedasticity in the model.

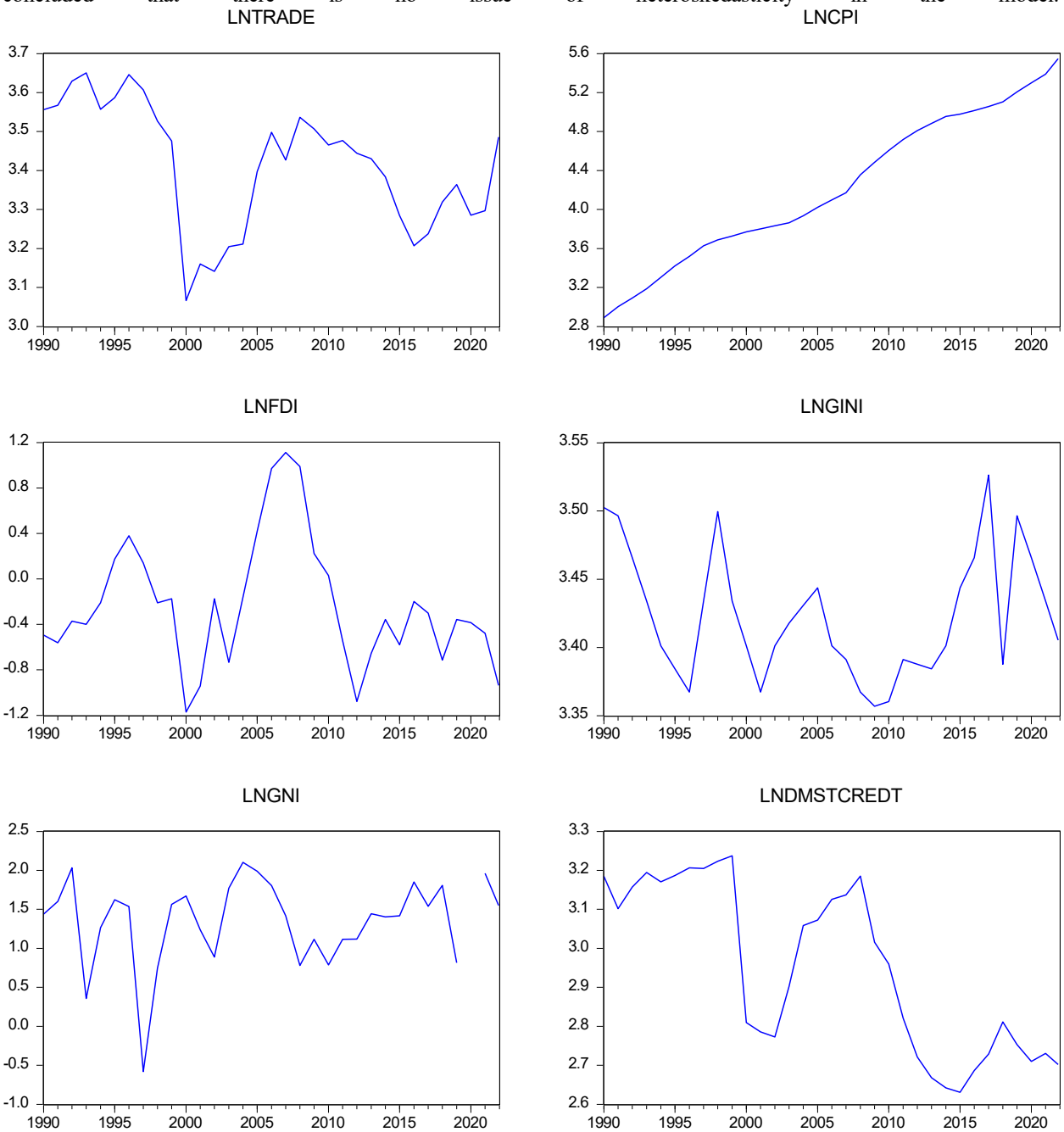

Figure 2: Graph of Variables

Source: Author own Analysis

Normality

Histogram shows the normality of the residuals and the normal distribution of the data. Here the figure do not depict the normal distribution of the data as it is not a perfect bell shape figure and there is a gape in the figure which is not the characteristics of normal distribution. Although the before regression, log has been taken to make the data linear. The decision can the concluded on the basis of the Jarque-Bera probability value. When the P-value is greater than significance level (P>0.05), accept the null hypothesis otherwise reject it. Here the value is 0.28 which is greater than 0.05 so accept the null hypothesis and on the basis of that value, distribution of the variable is normal.

H_0: The distribution of variable is normal

H_1: The distribution of Variable is not normal. **Figure 4: Histogram Normality graph**

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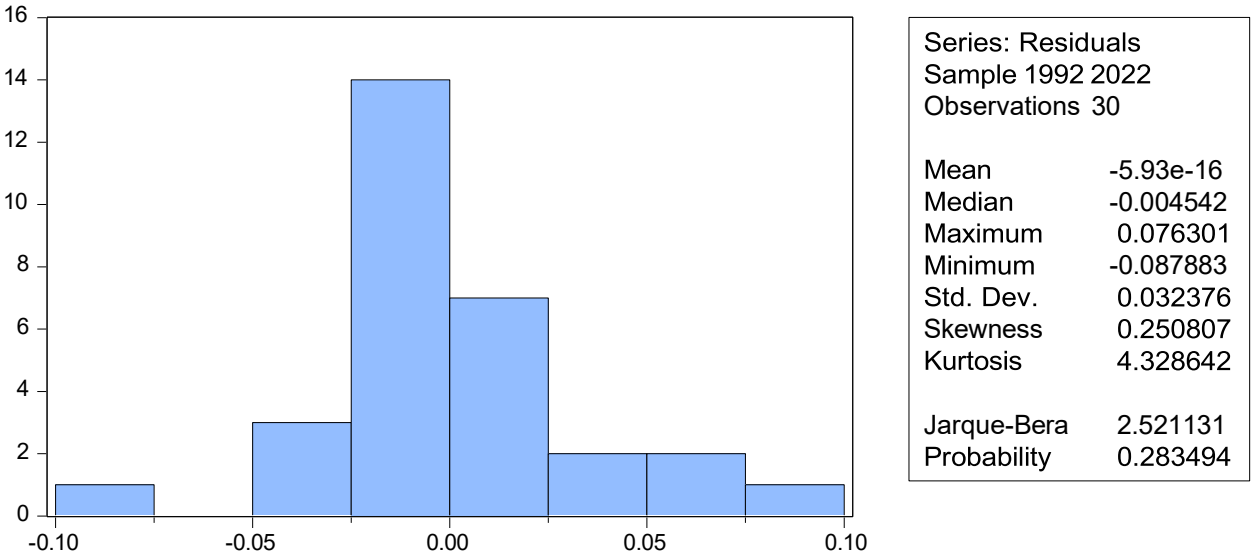

Figure 3: Histogram Normality graph

Source: Author own Analysis

Stability tests

The stability tests shows the unbiasedness results in long run. It has an important role to avoid the misspecification of the model. Cumulative sum of Recursive Residuals (CUSUM) and Cumulative sum of Recursive Residuals Square techniques were applied to check the long run stability of the model and the results shows stable results.

Figure 4: CUSUM

Source: Author own Analysis

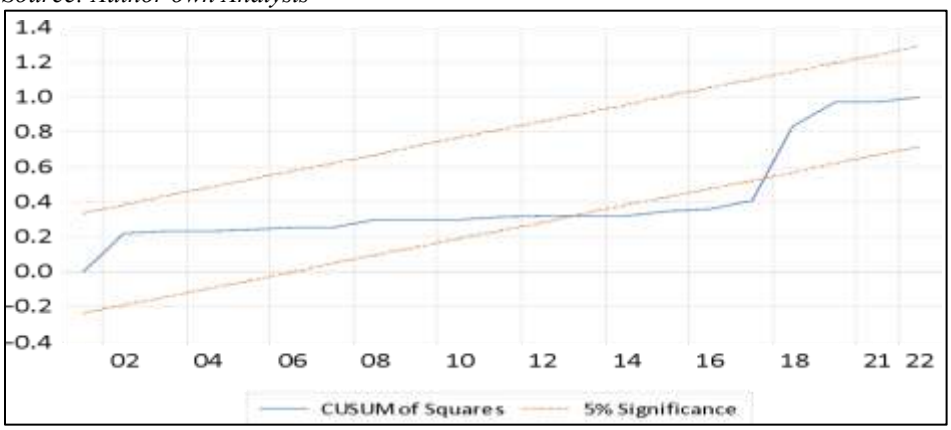

Figure 5: CUSUMSQ

Source: Author own Analysis

5 CONCLUSION AND RECOMMENDATIONS

Income inequality is one of the important objective for many developing and developed countries. Many countries are actively working on reducing the income gap between rich and poor and their policies are effective because of efficient law enforcement and legislation. Access to finance plays a vital role in reducing these imbalances. It has been observed that countries having high literacy rate has low income inequalities. Education is the second important factors that can possibly reduce income imbalances in the country. Individual having good business ideas can get loan from different institutions if they have the knowledge of access to the financial institutes (Casti, 2017)

Achieving equalities in among societies is one of the sustainable development goals SDG's objective. Income inequality gap can be reduce by improving economic indicators. Most of the studies find different macroeconomic variables and their effect on income inequality. This study also investigate the most reviewed macroeconomic indicators that can effect income gap. The main objective of the study was to examine the impact of financial development on income inequality and also to check the impact of other important variables i.e. Gross National Income, Foreign Direct Investment, Inflation rate and Trade openness on income inequalities.

The time series data of all the desired variables was taken from World Development Indicator and World Bank website. Time period of 32 years from 1990 to 2022 was considered to check the latest trends and association among variables. To empirically analyses data, proper methodology has been followed. All the assumptions of regression analysis were considered. The data has been tested for the issue of multicollinearity before estimation. The descriptive statistics shows the linearity, and skewness of the data. Stationarity has been checked with the help of Augmented Dickey Fuller test. The results shows the stationary of data at different levels i.e. I (0) and I (1) that leads to the ARDL Model.

ARDL and Cointegration is applied to check the long run relationship the variable and Error correction Method ECM is applied to check the short run relationship between variables. The results shows positive relationship between income inequalities and financial development while other considered variable shows negative relations with income inequality. Diagnostics tests were followed to check the issue of serial correlation, autocorrelation and heteroskedasticity in the model estimation. Normality graph shows the nation distribution of the data and CUSUM and CUSUMSQ were check the stability of the residuals.

The main objective of the study was to analyze the long run relation between financial development and income inequality. Financial development is the important variable of the study. The proxy used for financial development is domestic credit to private sector as a percentage of GDP that is positively associated with income inequality in Pakistan. This might be access of loan and opportunities of credit accessibility at high turnover rates for large companies. It leads for businesses and face less risk of lending loans, such businesses can increase their salaries for employees. Similarly, small businesses having less accessibility to loan set their wages rate loan and this can possibly cause income inequality. On the basis of the results policies of accessibility to loans should be equally available for all kind of businesses specifically such opportunities should be ensured for small and medium enterprises. The other macro-economic indicators i.e. foreign direct investment and gross shows negative and significant relationship with income inequalities in case of Pakistan. It means there is an inverse relation between income disparity and foreign direct investment. Foreign investment is also important for economic growth. It is also important for technological advancement in the country. Besides these positive points, FDI also provide employment opportunities. On the basis of the results of the estimation policy of FDI in Pakistan should be favorable for investors so that it can attract maximum FDI. Other macroeconomic variables i.e. trade openness, gross national income were also significant and have an inverse relation with income inequality. On the basis of the results of regression analysis polices should take effective steps to improve all those variables that can reduce the income gap in Pakistan.

This study is limited to few important indicators that have impact on income inequality. On the basis of previous literature these variables were considered. During the review of different literatures some of the important variables that were considered in different parts of the world. To make the study more worthy other macroeconomic and socio-economic variables like employment level, education level, number of government initiates to tackle income inequalities can be considered. Furthermore, this study can be possible by comparing the same indicators with other countries. The role of government initiatives is important for such studies. One can critical evaluate the role of government in reducing inequalities by critical evaluate the outcomes of public polices and its role in financial sector.

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