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THE IMPACT OF MACRO ECONOMIC VARIABLES ON ECONOMIC GROWTH OF PAKISTAN

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ABSTRACT

The main objective of this study to examine the relationship between GDP, imports, exports, inflation and interest rate on the economic growth of Pakistan. Pakistan's economic growth has been unstable in recent decades, delaying its ability to reduce poverty and improve living standards. This study investigates the impact of macro-economic variables (GDP, imports, exports, inflation and interest rate) on economic growth of Pakistan from 1960 to 2022. The data was collected from world development indicator (WDI). Using an Auto regressive Distributed Lag (ARDL) model, this research has examines the long term effects of these variables on Pakistan's economic growth. The Augmented Dickey-Fuller (ADF) unit root test is applied in this model. ARDL bond test confirmed the long run relationship between variables. The results show that exports, inflation and interest rate have a negative and insignificant impact on economic growth in the long term, while imports positive and significant impact on economic growth. The study also reveals that there are significant long term relationship between variables. The results of this study is that policymakers should focus on promoting exports, maintaining low inflation and encouraging investment through favorable interest rates to achieve sustainable economic growth in Pakistan.

Keywords: GDP, Export, Import, Inflation, Interest rate

1. Introduction

Researchers used GDP as one of the most important indicator of a country's economic growth. All financial decision-makers and government use GDP as a planning and policy formulation indicator. GDP is the current market price of all services and commodities produced by a country over a particular time period (Mohsin and Naseem, 2018). There is a great influence of macro-economic variable on the growth of Pakistan's economy. Therefore study investigated in this study by considering GDP as proxy of economic growth and Imports, Exports, inflation and interest rate are the most important macroeconomic indicators affect by the GDP of a country (Mustapa, 2020).

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The main purpose of this study is to investigate the impact of some important macroeconomic variables on economic growth of Pakistan for the period of 1960 to 2022. Similar empirical investigation conduct by (Iqbal and Zahid 1998) indicate domestic resource was best alternative of finance growth. Macroeconomic variable was helping factor in sustainable growth of a country. Another study (Chughtai, Malik et al. 2015) investigated the impact of major economic variables on economic growth of Pakistan; the variable of this study was inflation rate, Imports, Exports and interest rate, empirical study collect data from economic survey of Pakistan, World Bank, federal Bureau of statistics for the period of 1981 to 2013. The technique used in this study was multiple linear regression model indicated macroeconomic factor enhance the economic development of Pakistan. Both inflation and interest rate are negative and imports positive impact on economic growth of Pakistan.

GDP is an indicator of economic that is determined every year refer to annual GDP of Country, total monetary worth of product and services of a country is called annual GDP (Ijirshar 2019). GDP is a term of Gross Domestic Product that was a vital tools used by economists to measure the economic development of a country. Domestic product determine with market price of all commodities and services of a country for specific period of time. Imports have positive and inflation less impact on economic growth of a country (Ang, Piazzesi et al. 2006, Mohsin and Naseem 2018).

Using a sample of five countries from the MSCI developed markets index, emerging markets index, and frontier markets index, respectively, from 1970 to 2020, the study examined the effects of GDP growth, GDP per capita, inflation, foreign direct investment, exports, imports, interest rates, foreign debt, and foreign reserves on exchange rate regimes. The study uses machine learning (ML)—binary logit (quadratic hill climbing)—to examine how macroeconomic factors affect exchange rate regimes. The empirical findings support the notion that developed markets are the outcome of timely and accurate exchange rate regime decisions made by the markets of Australia, Hong Kong, Japan, New Zealand, and Singapore. One important issue that prevents emerging and frontier markets from growing in line with developed markets is that they never adopt exchange rate regimes three, four, and six. Emerging and frontier markets face significant pressures from foreign debt, inflation, and foreign reserves (Jamil, Rasheed et al. 2023).

Classical and neoclassical economists believe that participation in international trade is the key to economic growth. Many reasons can be put forward to support this views the business supports the economy by increasing imports and exports, which directly leads to economic development (Khan, Akhtar et al. 2019). With a focus on Pakistan, an empirical study uses the Granger causality test and simple regression analysis to investigate the causal relationship between imports and economic growth as well as the effect of economic growth on imports. Imports and economic growth are causally related, and evidence of a bidirectional causal relationship between imports and economic growth in Pakistan has been discovered. Similarly, the outcome demonstrated that imports and economic growth in Pakistan are significantly correlated. The positive and significant relationship between the variables, as determined by Granger's causality test, indicates that imports of capital goods—such as machinery, chemicals, equipment, and the like—translate into economic productivity and growth, while imports of consumer goods also indirectly support export-oriented productivity (Khan, Akhtar et al. 2019).

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Pakistan exported goods worth 57 billion dollars from the world in 2017, which shows the important role of domestic imports. Imports are used as a production process in the industry. Therefore, it can be said that maritime can be useful in promoting growth, which is also the aim of this study. Data from 1985 to 2016 were obtained for Pakistan and the relationship between imports and economic growth was investigated. The growth rate is accepted as the difference between imports, exports, interest rate and inflation rate. ARDL techniques are used for both short and long term dynamic perspectives (Mujahid, Begam et al. 2019). The empirical study has successfully assessed the economic growth in Pakistan. The research proves that logistics can play a significant role in determining the higher growth of domestic production than exports as raw material, intermediate products and products have the greatest impact on exports. Although more imports lead to a larger balance of payments deficit, the supply of capital and intermediate goods should be encouraged and the supply of consumer goods should not fall and enhances the economic growth of a country (Mujahid, Begam et al. 2019).

The gross domestic product stated as the value of final goods and services that were produced within countries boundaries during the time period of one year. High raise in general price level of goods and services over specific time period in a country economy is called inflation. There are two types of inflation; first one is cost pull and second is demand pull inflation. Demand-pull inflation occurs when there is same aggregate demand-supply of goods and services in the economy. On the other hand, cost pull inflation take placed when cost of inputs material raise. Thus, Inflation was a macroeconomic variables and very significant effect on economic growth (Shahid 2014).

Sustained and high economy growth with low inflation was the fundamental objective of the macro-economic policy makers. Thus, inflation has been one of the most important researched topics in macro-economics for the last few decades because it has serious implication for the growth of gross domestic product. The main aims of empirical study to estimate the relationship between GDP- Gross Domestic Product and Inflation in Pakistan estimation period from 1990 to 2015 by apply ADF, Granger Co-integration, and indicated a strong positive and significant association between growth of gross domestic product and Inflation of Pakistan. Further indicated a unit increase an inflation rate wills caused by 0.27 unit increased gross domestic product in Pakistan (Ijaz 2021).

The relationship between interest rate, inflation and output economic growth has been one of the most crucial and debatable macro-economic focused among policy makers and economists. Economic growth imitates the capacity of a country to raise the level of output. The inflation and interest rate was the two important and significant macro-economic variables as the performance of these two variables has a huge effect on economic growth (Mensah and Okyere 2015). Empirical study argued domestic interest rates react to inflation rate and output gaps especially under inflation targeting in the long run (Gülşen and Özmen 2020).

Empirical study was an initial attempt to understand the impact of both inflation and interest rate on output growth in Pakistan. In this study, study applied monthly based data of interest rate, inflation and industrial production from January 1991 to May 2020. Empirically explore in traditional study the relationship between these important macroeconomic variables only for the long run and short run. Primarily employed the autoregressive distributed lag (ARDL) two causality tests (Granger causality Toda-Yamamoto) and

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Cointegration test to check the Cointegration properties and causal relationship among these variables individually. After confirming the long term causality and significant effect from the ARDL bound test, study applied wavelet analysis time series growth, inflation and interest rate indicated in short run unidirectional and long run bi-directional and significant relationship between inflation and economic growth of Pakistan (Hayat, Ghulam et al. 2021). The main neutral of our study is to examine the relationship among these important macroeconomic variables at different and frequency scales using the wavelet transformation method. Percival and Walden (2000) used wavelet methods for time series analysis which is very important for various fields such as engineering, science, finance and economics. The wavelet transformation method enables to study this dynamic relationship across different frequencies and time horizons. The researchers investigate the causal relationship between growth and the interest rate and growth and inflation in the short run, medium run, long run and very long run (Vacha and Barunik 2012; Aloui and Hkiri 2014). Thus, in this reseach the reasearchers answer the following questions. Does inflation adversely affect economic growth in the case of Pakistan? does the interest rate stimulate economic growth in Pakistan? is the relationship between economic growth and inflation a long run phenomenon? Does the interest rate affect economic growth only in the short run?

Based on the comprehensive study of the debate between monetarists and structulists and following the trend of inflation and growth in Pakistan and expect that the the relationship in growth-inflation is negative in Pakistan and also expect the monetarists' view. Naeem et al (2021) arguesd that Pakistan is a developing country where there have no strict environmental policies implemented for the benefit of attractive economic growth. The economists believe that interest rate badly affect economic growth as evidenced by past research. This relationship may be a long run or short run phenomenon. The economists used monthly data from January 1991 to May 2020 to find the relationship between the interest rate, inflation and economic growth in the case of Pakistan. after checking the cointegration and causality among these three variables, than examined the co-movement between growth and inflation, growth and the interest rate by using the cross-wavelet power spectrum and cross-wavelet coherence.

There has been significant debate on the being and nature of the inflation and growth relationship in the literature. With the development of the macroenominc literature, the view of economists on this relation is changed. The classical economists believed that inflation baskets growth by increasing firms' cost of production. However, Keynes disagreed with this view and stated that the relation of inflation and growth is positive in the short run. On the other hand, monetarists believe that this relation is always negative. On the contrary, structulists maintain that inflation is vital to improve output growth. Thus, it is obvious that economic theories reach a variety of assumptions about the reaction of output growth to inflation. Therefore, it is vital to check this relation empirically using different time limits. The theoretical debate on the interest rate and growth relation is also wide.there are a number of theories that discuss the negative relationship between the interest rate and economic growth over investment channels.According to Tobin's monetarygrowth model, a higher return on money leads to reducing the demand for capital in the medium run. The neoclassical theory of investment explaims this negative relationship as the higher rate of interest causes an increase in firms' cost of capital. The high cost of production goes to reduce output. The real business cycle theory reveals that technology blows cause increase in

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the interest rate. A higher rate of interest negatively affects the output as areduction in the labor supply.

Problem statement: Imports, Exports, inflation and interest rate are the main sources in the macroeconomics that influence economic growth of a country. So, we see that the high level of inflation and imports, interest rate and low exports level are the create problems for the economy. Pakistan has face serious challenges and problems of those indicators instability and this study overlook the issue and conclude solution.

Research Gap: The relationship between Import, Export, interest rate, inflation and output economic growth has been one of the most crucial and debatable macro-economic topic among policy makers and economists. Economic growth indicated the capacity of a country to raise the level of output. The Import, Export, inflation and interest rate were most important and significant macro-economic variables as the performance of these variables has a huge effect on economic growth (Mensah and Okyere 2015). Empirical study argued domestic interest rates react to inflation rate and output gaps especially under inflation targeting in the long run (Gülşen and Özmen 2020).

Objectives of the Study: To assess the performance of macro-economic variables.
To explore the relationship between imports and economic growth of Pakistan.
To explore the relationship between exports and economic growth of Pakistan.
To explore the relationship between Inflation and economic growth of Pakistan.
To explore the relationship between interest rate and economic growth of Pakistan.

Research Questions: the follow potential research objective estimate in this study.
How does the Macro-economic variable influence performance of economic growth of Pakistan?
What is the role of the Macro-economic variable in enhancing performance of economic growth of Pakistan?
Why the Macro-economic variables influence performance of economic growth of Pakistan?
When the Macro-economic variable influence performance of economic growth of Pakistan?

Research significance: The significance of studying the impact of macroeconmic variables on pakistans economic growth lies in understanding how factors like inflation, interest rate fiscal policies influence the overall economic stability and development. This analysis helps in formulating effective policies to foster sustainable growth in the country.

Hypothesis Testing: The research hypotheses to be tested are:
*H*0: There is no significant relationship between exports and GDP growth.
*H*1: There is a significant relationship between exports and GDP growth.
*H*0: There is no significant relationship between imports and GDP growth.
*H*1: There is a significant relationship between imports and GDP growth.
*H*0: There is no significant relationship between inflation and GDP growth.
*H*1: There is a significant relationship between inflation and GDP growth.

2.0 Literature Review

Chughtai *et al* (2015) investigated the impact of major economic variables on economic growth of Pakistan. The variables used in this study were inflation rate, exchange rate and interest rate. In this study the data was collected from the economic survey of Pakistan, World Bank and federal bureau of statistics during the time period of 1981 to 2013.

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CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.02 No.04 (2024)

Moreover, the technique used in this study was multiple linear regression models. Thus, this study concluded that in Pakistan economic growth both inflation and interest rate has negative impact while exchange rate was positively significant on the economy.

Monetary policy control; production and the exchange rate are unaffected by the level of prices. The only factor that can alter the direction of the consumer price index and exchange rate is monetary policy. The real exchange rate policy was fixed, and currency devaluations, such as those in Japan, were quite effective in promoting stability. Monetary exchange rate and consumer price index system allows the central bank to stabilize a large number of macroeconomic indicators and disruptions (Jamil 2022). A thorough history of the exchange rate regimes of 195 nations; exchange rate regimes' effects on macroeconomic stability and national growth from 1961 to 2020. Per capita GDP, GDP growth, inflation, and foreign trade are some of the new metrics of foreign exchange regimes and undercontrol the income level of high, upper-middle, middle, and lower-middle economies. The Generalized Method of Movements (GMM) is used to examine the effects of exchange rate regimes on economies and macroeconomic stability. The US dollar was by far the most dominant currency in the world. Global nations aim to stabilize exchange rates, lessen currency influence, and remove exchange barriers. There are close connections between a nation's growth and the exchange rate regime it chooses. Exchange rate anchor currencies, such as the US dollar, British pound, euro, Chinese yuan, French franc, and Deutschmark, have a major impact on the growth of nations with varying income levels, while the choice of exchange rate arrangement has no impact on long-term growth of countries. Offer the Chinese Yuan as a potential alternative anchor currency for the global economy and new exchange rate control measures (Jamil 2022).

Faheem,S and Imran.U (2016) investigated the analysis of GDP and macroeconomic variables on economic growth of Pakistan. The variables used in this study were unemployment, foreign direct investment, inflation and GDP. In this study the data was collected from the State Bank of Pakistan, World Bank and Pakistan economic survey during the time period of 1983-2012.Moreover, Ordinary least square model was used to analyze the data. Thus, this study concluded that there was no long run relationship of unemployment with inflation, GDP and import. While in short run causality of inflation on unemployment.

Irshad *et al.,* (2022) investigated the impact of major economic variables on economic growth of Pakistan. The variables used in this study were inflation rate, exchange rate and interest rate. In this study the data was collected from the economic survey of Pakistan, World Bank and Federal bureau of statistics during the time period 1971 to 2020. Moreover, the technique used in this study was multiple linear regression models. Thus, this study concluded the significant positive impact on the economic growth of Pakistan.

Kiberia *et al.,* (2014) explored the impact of macroeconomic variables on GDP growth of Pakistan. The variables used in this study were GDP, foreign direct investment, balance of trade and exchange rate. In this study the data was collected from the state bank of Pakistan and World Bank during the time period of 1980 to 2013. Moreover, the technique used in this study was multivariate regression test. Thus, the study concluded that the inflation and interest rate has negative impact on GDP.

Ramzan *et al.,* (2013) investigated the impact of trade openness and macroeconomics variables on GDP growth of Pakistan. The variables used in this study were GDP, trade openness, employment rate, exchange rate and inflation rate. The annual time series data was

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CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.02 No.04 (2024)

used in this study. Moreover, the technique used in this study was Ordinary least square. Thus, this study concluded that the foreign direct investment and exchange rate have positive impact on GDP growth of Pakistan.

One way to analyzed the role of trade is to examine the impact of imports on economic growth developed countries have prepared an import substitution industrialization strategy to replace imports from domestic production. For this idea, the state needs to impose tariffs and quotas or support production in competition with imports (Hogendorn 1996, Briggs 2024). A country's import policies are determined by economic and non-economic factors. These include overall trade, import, export, capacity development, inflation and development (Rivera-Batiz and Rivera-Batiz 1994).

Jilani *et al*., (2010) explored the impact of macroeconomic variables on GDP growth of Pakistan. The variables of this study were GDP, exchange rate, interest rate and foreign direct investment. In this study the data was collected from World Bank and state bank of Pakistan during the time period of 1980 to 2013. Moreover, the technique used in this study was multivariate regression test. Thus, this study concluded that the relation with GDP of interest and inflation rate were negative.

Hussain *et al.,* (2010) investigated the role of investment in the course of economic growth in Pakistan. The variables used in this study were public investment, private investment, GDP and public consumption. In this study the data was collected from economic survey of Pakistan and state Bank of Pakistan during the period. Furthermore, the technique used in this study was vector auto regressive approach. Thus this study concluded that private and public Investment were positive impact on economic growth of Pakistan but the growth was largely driven by private investment than public investment. In short run the private investment was positively affected the growth of a country but also the negative impact on public investment and government consumption expenditure on the growth.

Ahmad *et al.,* (2013) investigated the imports and economic growth in Pakistan. The variables used in this study were economic growth, inflation rate, foreign direct investment and nominal exchange rate. In this study the data was collected from economic survey of Pakistan and WDI during the time period 1975 to 2011. Moreover, the technique used in this study was ordinary least square. Thus, this study concluded that import has positive affect on economic growth of Pakistan.

Hussain,j and Muhammad (2009) investigated the economic growth and imports in case of Pakistan. The variables used in this study were import, export, growth and exchange rate. In this study the data was collected from IMF and economic survey of Pakistan during the time period of 1982 to 2007. Moreover, the technique used in this study was OLS, F- test, error correlation modeling and co integration analysis. Thus, this study concluded that reserve money was negative impact on economic growth. May reduce the international reserve and increase in domestic reserve.

Liang *et al*.,(2021) investigated the role of exports inflow in economic growth. The variables used in this study were GDP, population growth, government consumption and inflation. In this study the data was collected from Word Bank during the period of 2000 to 2019. Moreover, the method used in this study was regression. Thus, this study concluded that exports inflow has positively effect on economic growth.

Iqbal, z and ghulam, m, z (1998) investigated the macroeconomic determinant of economic growth in Pakistan. The variables used in this study were GDP, import, export and

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.02 No.04 (2024)

foreign debt. In this study the data was collected from Pakistan economic survey during the period of 1959 to 1997. Moreover, the method used in this study was OLS. Thus, this study concluded that the budget deficit has negative relation to both output growth variables, also negatively related the external debt to growth and the domestic resources was the best alternative to finance growth.

Jahangir, m *et al.,* (2020) investigated the effect of exports on economic growth of Pakistan. The variables used in this study were GDP, exports, inflation, financial consumption expenditure and military expenditures. In this study the data was collected from State Bank of Pakistan during the period of 1974 to 2018. Moreover, the co-integration test was used in this study. Thus, this study concluded that the variable such as exports and military expenditure have positive impact on economic growth.

Husnain *et al.,* (2003) investigated the foreign direct investment, exports and domestic output in Pakistan. The variables used in this study were FDI, export, real exchange rate and foreign income. In this study the data was collected from international financial statistic and economic survey of Pakistan during the period 1972 to2001. Moreover, the method used in this study was TYDL argument lag method. Thus, this study concluded that founded the long run relation between domestic growth, FDI and export.

khola, M,G and Imran,N (2015) investigated the impact of exports on economic growth of Pakistan. The variables used in this study were GDP, domestic capital, labor force, foreign capital and total export. In this study the data was collected from State Bank of Pakistan during the period 2008 to 2013. Moreover, the method used in this study was co-integration and regression analysis. Thus, this study concluded that positive relation between exports and growth during the period 2008 to 2013 and also shows positive and long run relation with GDP.

Sohail *et al* (2022) investigated the response of Pakistan's economic growth to macro-economic and variables as asymmetric analysis. The variables used in this study were education index, FDI and infrastructure index. In this study the data was collected from World Bank during the period 1990 to2020. Moreover, the method used in this study was VECM. Thus, this study concluded that the variable like quality of FDI inflow, education and infrastructure development was playing positive role in the economic growth of Pakistan.

Hanif *et al* (2021) investigated macro-economic factors determining the growth of Pakistan. The variables used in this study were GDP, TOT and education. In this study the data was collected from World Bank during the period 1997 to 2019. Moreover, the method used in this study was ARDL and augmented dickey fuller. Thus, this study concluded that the continuous increase in consumer price index will generate inflation and GDP decrease.

Afzal,m (2009) investigated the population growth and economic development in Pakistan. The variables used in this study were population growth, real gross domestic investment growth and export growth. In this study the data was collected from IMF during the period 1950 to 2001. Moreover, the method used in this study was OLS. Thus, this study concluded that the cross countries evidence on population growth and economic growth relationship was not uniform and consistent.

Jawad,m and ghulam,s,k,n (2017) investigated the impact of oil price volatility and macroeconomic variables on economic growth of Pakistan. The variables used in this study were GDP, oil price, trade balance and public sector investment. In this study the data was collected from the World Bank and international financial statistics during the period 1973 to

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.02 No.04 (2024)

2014. Moreover, the method used in this study was correlation coefficient. Thus, this study concluded that the public sector investment and trade balance has negative relation consider with oil price volatility. Price volatility also has weak negative relation with trade balance. Public sector investment has moderate positive relation with trade balance.

Ali *et al* (2015) investigated the macroeconomic instability and its impact on GDP. The variables used in this study were inflation rate, trade deficit, budget deficit and unemployment rate. In this study the data was collected from World Bank and Pakistan economic survey during the period 1980 to 2012. Moreover, the method used in this study was algorithm. Thus, this study concluded that the cyclical output has positive impact on unemployment and in the long run there is positive relationship between GDP and financial development.

Ali,n and hamid,h (2017) investigated the impact of exports on the economic growth of Pakistan. The variables used in this study were GDP, exports, inflation rate, exchange rate and interest rate. In this study the data was collected from World Bank and state bank of Pakistan during the period 1991 to 2015. Moreover, the method used in this study was time series data. Thus, this study concluded that exports has positive impact on the Pakistan's economic growth.

Javed *et al* (2014) investigated the international incidences, macroeconomic variables and their volatility effect on economic growth. The variables used in this study were capital formation, cash surplus, export, FDI and exchange rate. In this study the data was collected from World Bank. Moreover, the method used in this study was least square. Thus, this study concluded that inflation and exchange rate have positive volatility on economic growth.

Aslam *et al* (2018) investigated the impact of inflation rate, imports, exports and tax on the economic growth of Pakistan. The variables used in this study were GDP, inflation, import, export and tax. In this study the data was collected from world development indicator during the period 1977 to 2016. Moreover, the method used in this study was least square. Thus, this study concluded that the import, inflation rate, export and tax have negative relationship with the Pakistan's economic growth but the imports have positive relationship with the economic growth.

3.0 Research Methodology

This chapter details the research methodology used to investigate the impact of macroeconomic variables on the economic growth of Pakistan from 1960 to 2022. It outlines the data sources, the variables under study, the econometric model used, and the methods of data analysis. The research design for this study is quantitative in nature. It involves analyze the impact of macro-economic variables on economic growth of Pakistan. It provides a detail description of research design, data collection process, variable, model specification and techniques employed for data analysis. The data for this study is collect from world development indicator (WDI). The key variables for analysis include GDP, import, export, inflation, interest rate and other relevant economic indicator.

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Vol.02 No.04 (2024)

Table. 3.1 Measurement of variables

Variables	Proxy used	Source of data
Gross Domestic Product	GDP	WDI
Import	IMP	WDI
Export	EXP	WDI
Inflation	INF	WDI
Interest Rate	IR	WDI

The study focuses on the following macroeconomic variables: Dependent Variable: Gross Domestic Product (GDP): The dependent variable representing economic growth. GDP is widely used economic indicator that measures the total value of goods and services produced within a country's borders over a specific time period, typically a year.
Independent Variables: Exports (EXP): Exports refer to the goods and services produced in one country and sold to another country. Imports (IMP): Imports refer to the goods and services produced in another country and purchased by a country for use or consumption within its border. Inflation Rate (INF): The rate at which the general level of prices for goods and services rises. Interest Rate (IR): An interest rate is a percentage charge on borrowed money or paid on invested funds over a specific time period. The following steps of data analysis: Time series analysis will be employed to examine the patterns, trends, and fluctuations in GDP growth, Import, Export, interest rate, and inflation over the specified time period. This will help in understanding the dynamics of these variables. Analyze the correlation between the independent variables (IMP, EXP, INF, and IR) and GDP to understand the strength and direction of their relationships. Perform multiple linear regression analysis to estimate the coefficients of the model and determine the significance of each variable.
Model Specification: The model specification as follows:
Economic growth Function:
GDP = f (INF, IMP, EXP, IR)

Econometric Model:
$GDP = \beta0+\beta1INF+\beta2EXP+\beta3IMP+\beta4IR+et$

Where:

GDP= Gross Domestic Product INF= Inflation rate IMP= Import EXP= Export IR= Interest rate

$\beta0$ = Intercept et = Error Term $\beta1, \beta2, \beta3, \beta4, \beta5$= Long-run Coefficients

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.02 No.04 (2024)

Table 3.2. Estimation and Interpretation of data: ADF Unit root test

Variables	Data Interpretation
GDP	I (0)
EXP	I (1)
IMP	I (1)
INF	I (0)
IR	I (2)

Techniques:
Unit Root Test (ADF): The Unit Root Test (ADF) checks if a time series is stationary. Auto-Regressive Distributed Lag (ARDL): This method is often used for time-series data to analyze both long-run and short-run relationships between variables.

4.0 Result and Discussion

Historical Trend

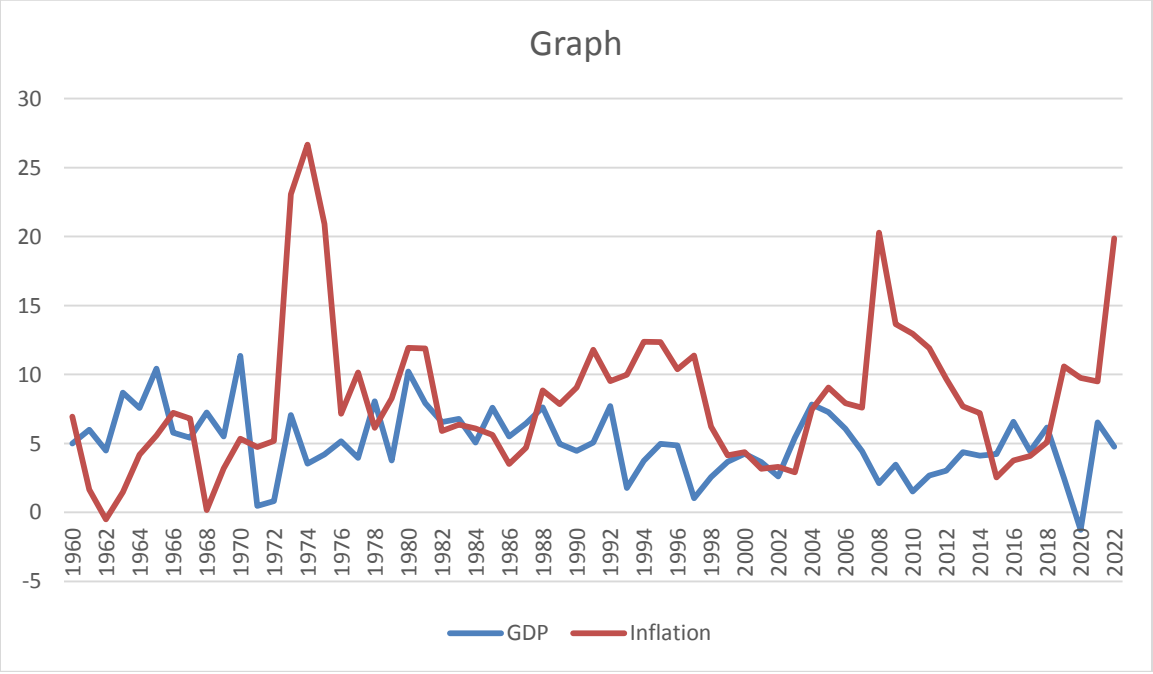

Figure 1 Inflation and Gross Domestic Trend

The Figure 1 showing the Pakistan Historic trend of Inflation and GDP for the period of 1960 to 2022. It indicated the potential influence of Inflation on Gross Domestic Product of Pakistan. There is two line trend, red indicate the Inflation and Blue Indicate Gross Domestic Product of

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CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.02 No.04 (2024)

Pakistan. The result of Figure 1 trending showing when inflation is high Economic Growth of Pakistan slow down and down falls. Similarly when Inflation is goes done economic activities boost up. There we concluded the Inflation and GDP historic trend indicated low in inflation is benefit for economic growth of Pakistan during 1960 to 2022.

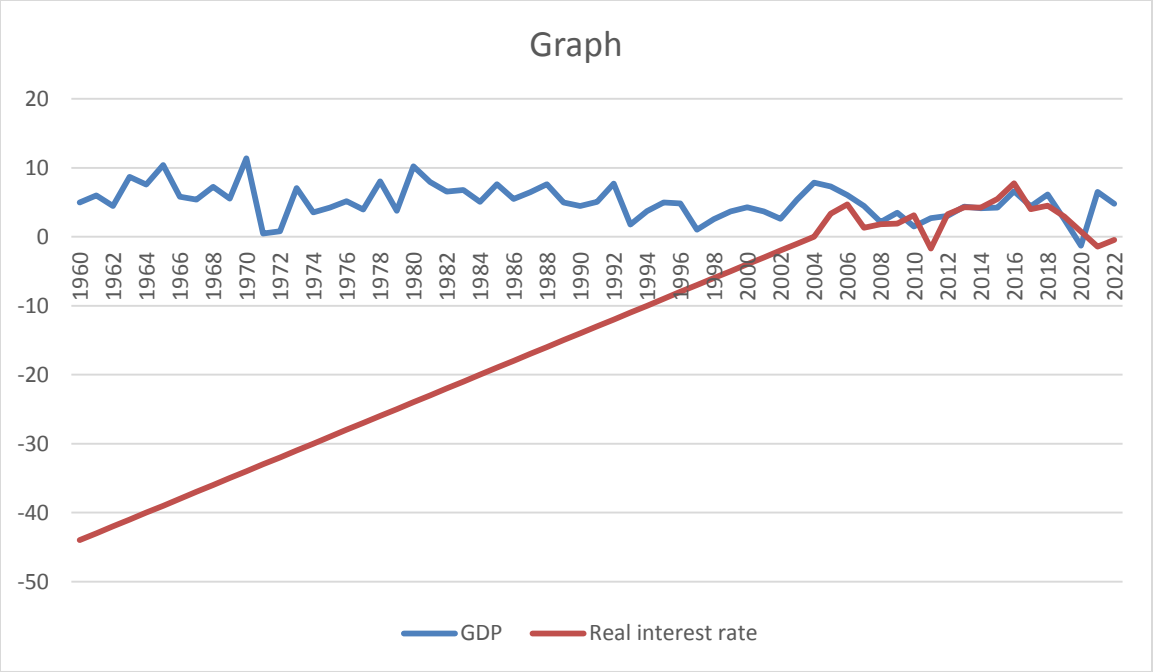

Figure 2 Real Interest Rate and Gross Domestic Product Trend

The Figure 2 showing the Pakistan Historic trend of Real Interest Rate and GDP for the period of 1960 to 2022. It indicated the potential influence of Real Interest Rate on Gross Domestic Product of Pakistan. There is two line trend, red indicate the Real Interest Rate and Blue Indicate Gross Domestic Product of Pakistan. The result of Figure 2 trending showing when Real Interest Rate is high Economic Growth of Pakistan falls and dropped. Similarly when Real Interest Rate is goes done economic activities boost up. There we concluded the Real Interest Rate and GDP historic trend indicated inverse relationship and low in Real Interest Rate is benefit for economic growth of Pakistan during 1960 to 2022.

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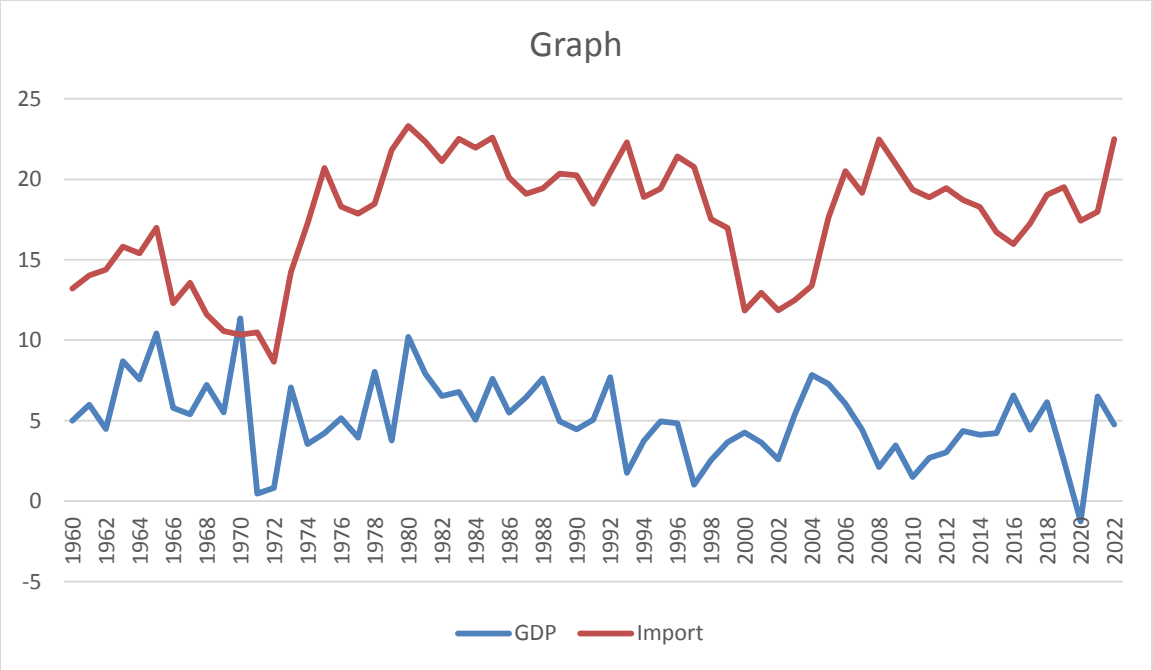

Figure 3 Import and Gross Domestic Product Trend

The Figure 3 showing the Pakistan Historic trend of Import and GDP for the period of 1960 to 2022. It indicated the potential influence of Import of Pakistan on Gross Domestic Product of Pakistan. There is two line trend, red indicate the Import of Pakistan and Blue Indicate Gross Domestic Product of Pakistan. The result of Figure 3 trending showing when Import of Pakistan is high Economic Growth of Pakistan slow down and some time dropped. Because its impact on balance of Payment of Pakistan due to high amount of finance is used to paid import bills. Similarly when Import is goes done economic activities boost up. There we concluded the Imports and GDP historic trend indicated most of time inverse relationship and low in import is benefit for economic growth of Pakistan during 1960 to 2022.

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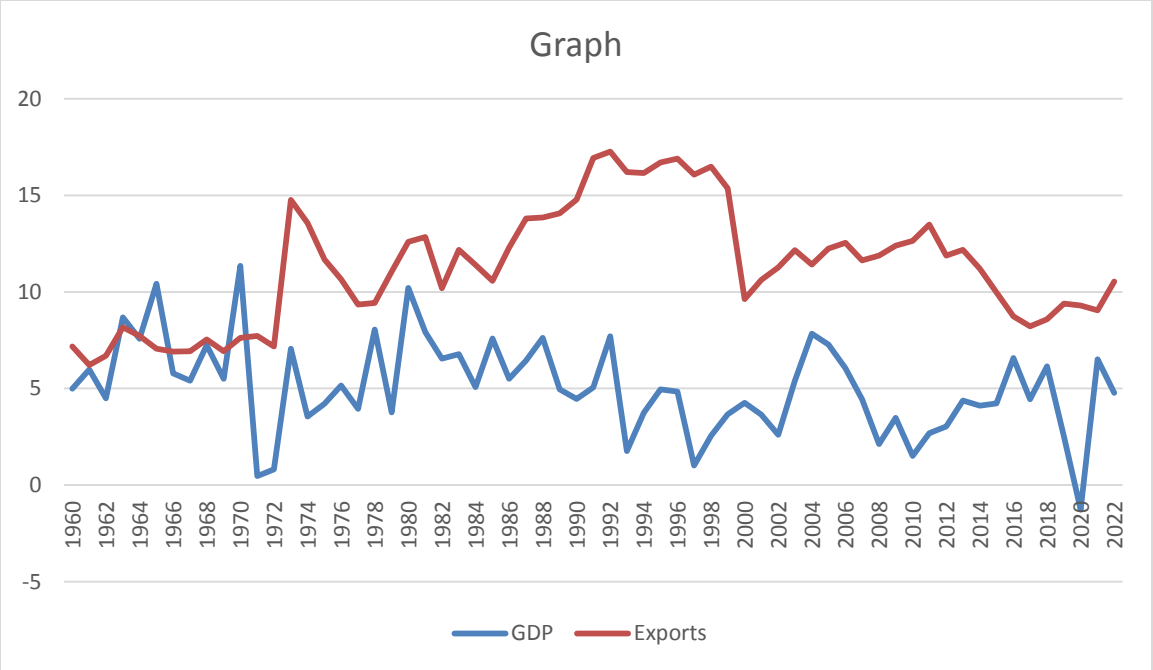

Figure 4 Exports and Gross Domestic Product Trend

The Figure 4 showing the Pakistan Historic trend of Exports and GDP for the period of 1960 to 2022. It indicated the potential influence of Export of Pakistan on Gross Domestic Product of Pakistan. There is two line trend, red indicate the Exports of Pakistan and Blue Indicate Gross Domestic Product of Pakistan. The result of Figure 4 trending showing when Exports of Pakistan is high Economic Growth of Pakistan raised. Because its impact on Balance of Payment of Pakistan, high amount of finance come to country in shape of exports product receipts. Similarly when Export is goes up economic activities boost up. There we concluded the Export and GDP historic trend indicated most of time positive relationship and high Export is benefit for economic growth of Pakistan during 1960 to 2022.

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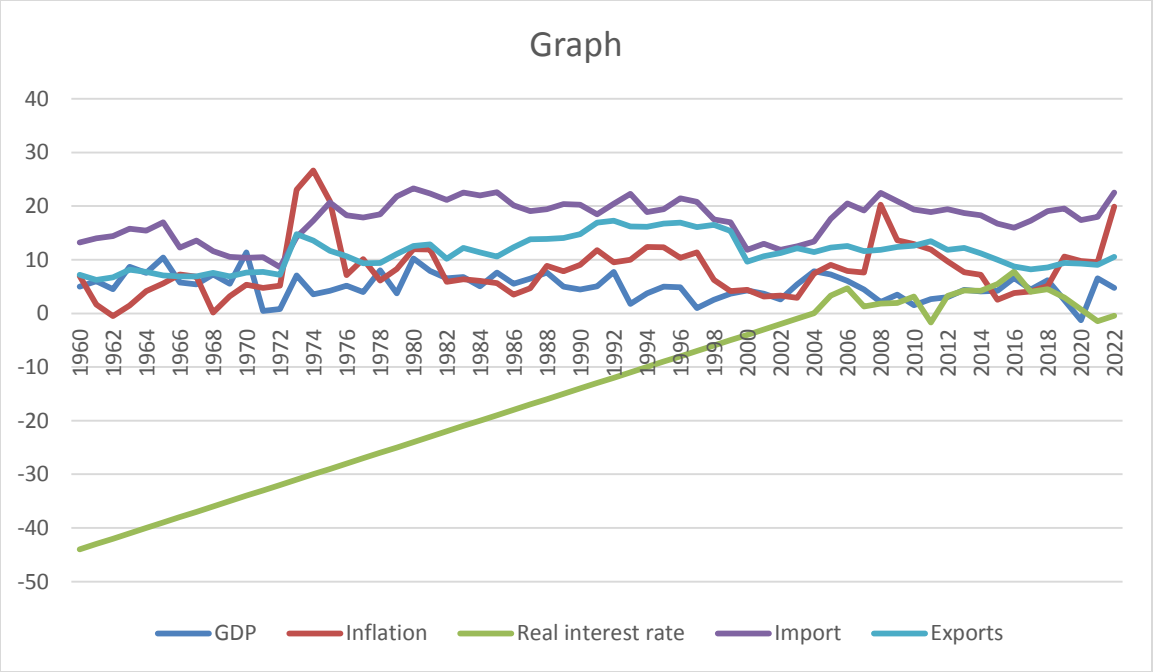

Figure 5 Combine Macro-Economic Indicators; Inflation, Real Interest Rate, Export and GDP

The Figure 5 showing the Pakistan Historic trend of Macro-Economic Indicators; Inflation, Real Interest Rate, Export and GDP for the period of 1960 to 2022. It indicated the potential influence of Macro-Economic Indicators on Gross Domestic Product of Pakistan. There is five line trend, red indicate the Inflation of Pakistan, Green Indicate the Real Interest Rate of Pakistan, Purple indicate Import, Sky Blue indicate Export of Pakistan and Blue Indicate Gross Domestic Product of Pakistan. The result of Figure 5 trending showing when Inflation, Real Interest Rate, Import of Pakistan is high Economic Growth of Pakistan Falls down. Because high rate of Inflation and Real interest rate reduced the purchasing power of people of Pakistan and Import Increase the Balance of Payment Bills. On the other hand, Export increased the economic growth of Pakistan. Because exports impact on Balance of Payment of Pakistan, high amount of finance come to country in shape of exports product receipts. There we concluded the Inflation, Real Interest Rate, Imports falls down trend benefit for economic growth of Pakistan and Exports raising trend positive and high Export is benefit for economic growth of Pakistan during 1960 to 2022.

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CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.02 No.04 (2024)

Table 4.1. 1 ARDL Long Runs Estimation;

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-1.749414	0.245586	-7.123421	0.0000
Imports	0.272394	0.064603	4.216444	0.0001
EXP	-0.234953	0.096291	-2.440022	0.0195
INF	-0.318868	0.060557	-5.265609	0.0000
IR	-0.029509	0.015270	-1.932525	0.0608
C	4.351104	1.086448	4.004889	0.0003

EC=GDP–(-0.234953*EXP+0.272394*IMP-0.318868*INF-0.029509*IR+4.351104)

R-squared	0.647807	F-statics	3.494774
Adjusted R-squared	0.462443	Prob. (f-statistic)	0.000443
Durbin-Watson stat	2.129953		

The Table 4.1.1 showing the ARDL model's long run estimation results for Pakistan's economic growth result showing the exports, inflation and interest rate insignificantly impact on GDP. A 1% increase in exports decreases GDP by approximately 0.235%, with a p-value of 0.0195, indicating statistical significance. Conversely, a 1% increase in imports boosts GDP by about 0.272%, with a highly significant p-value of 0.0001. Inflation has a detrimental effect, as a 1% rise in inflation reduces GDP by around 0.319%, also highly significant with a p-value of 0.0000. The coefficient for GDP suggests an adjustment mechanism in the ARDL model. These findings highlight the importance of these macroeconomic variables in Pakistan's economic growth.

Table 4.1 2 ARDL Bound Test

Test Statistic	Value	Signif.	I (0)	I (1)
F-statistic	9.499595	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	3.37

Table 4.1.2 showing the ARDL Bounds Test results that the F-statistic is 9.499595, which is significantly higher than the critical values at all significance levels (10%, 5%, 2.5%, and 1%). For example, at the 5% significance level, the critical values are 2.56 for I(0) and 3.49 for I(1). Since the F-statistic surpasses the upper bound value (I(1)) across all levels, it confirms the

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CJSSR
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Vol.02 No.04 (2024)

existence of a long-run co integration relationship among the variables, indicating a stable long-term equilibrium.

5.0 Conclusion:

This study analyzed the impact of macro economic variables on economic growth of Pakistan using time series data from 1960 to 2022. There are two way of estimation are used to estimate macro economic indicator impact on Economic growth of Pakistan. First is Historic Trend of macro economic indicators and second ARDL estimation of macro economic indicator with gross domestic product of Pakistan.

Therefore, the Pakistan Historic trend of Macro-Economic Indicators; Inflation, Real Interest Rate, Export and GDP for the period of 1960 to 2022. It indicated the potential influence of Macro-Economic Indicators on Gross Domestic Product of Pakistan. The finding of trend shows when Inflation, Real Interest Rate, Import of Pakistan is high Economic Growth of Pakistan Falls down. Because high rate of Inflation and Real interest rate reduced the purchasing power of people of Pakistan and Import Increase the Balance of Payment Bills. On the other hand, Export increased the economic growth of Pakistan. Because exports impact on Balance of Payment of Pakistan, high amount of finance come to country in shape of exports product receipts. There we concluded the Inflation, Real Interest Rate, Imports falls down trend benefit for economic growth of Pakistan and Exports raising trend positive and high Export is benefit for economic growth of Pakistan during 1960 to 2022.

The Auto Regressive Distributed Lag (ARDL) Model finding indicated Import has positive impact on Economic Growth of Pakistan. While, Export, inflation and interest rate have negative impact on Economic Growth of Pakistan. The analysis of data that there is a negative relationship between inflation and economic growth in long term. The coefficient of interest rate show negative relationship with GDP. This study using by technique Auto Regressive Distributed Lag (ARDL) relationship between dependent variable and independent variables.

Gross Domestic Product (GDP) and inflation stationary at the level, while Import and Export stationary at the1st difference and Interest rate stationary at the 2nd difference. Import has significant impact on Gross Domestic Product (GDP) in Pakistan. The economic growth of Pakistan is significantly affected by the independent variables which are inflation rate Import and export. The conclusion of this research shown that exports, inflation, interest rate have an insignificant and negative relationship with the economic development of Pakistan but the imports has positive relationship with economic growth. Estimation technique should be used for examining dynamic relationship or the impact of Import, Export, inflation and interest rate on the economic growth of Pakistan.

Based on the findings, several recommendations for policymakers are suggested to enhance Pakistan's economic growth: Diversify the export base and promote value addition in export goods to mitigate the negative impact of exports on GDP. Facilitate the import of capital goods, raw materials, and technology by reducing tariffs and non-tariff barriers to support domestic industries. Implement effective monetary and fiscal policies to control inflation, as high inflation negatively affects GDP. Optimize interest rates to balance stimulating growth and controlling inflation, avoiding excessive low rates that could cause inflationary pressures. Strengthen economic institutions and create a robust policy framework to enhance macroeconomic policy effectiveness and investor confidence.

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