

RESEARCH ARTICLE

EXAMINING THE IMPACT OF MACRO ECONOMIC FACTORS ON ECONOMIC GROWTH IN PAKISTAN: A STUDY OF INFLATION, EXCHANGE RATES, TRADE DYNAMICS, AND FOREIGN DIRECT INVESTMENT

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Abstract : This study investigates the impact between inflation, exchange rate, export, import, FDI and economic growth in Pakistan. This study examines the economic growth of Pakistan from 2001 to 2023, with inflation, exchange rate, export, import, FDI serving as independent variables and economic growth as the dependent variable. First, we estimate group statistics of the variables and conduct Augmented Dickey–Fuller (ADF) test to assess the unit root test of variables. The Least Square method (including NLS and ARMA models) and Granger Causality tests to analyze the relationship between variables. The Granger causality analysis reveals unidirectional causality from inflation rate and FDI to GDP. Meanwhile, a bidirectional causality exists between exchange rate and GDP, as well as between import and GDP. However, no significant causal relationships were found between the other variables. Furthermore, the Least Square (NLS and ARMA) method indicate that inflation rate has a significant negative impact on economic growth of Pakistan, while the exchange rate, export and FDI have a significant positive impact on economic growth of Pakistan. Policymakers can use these insights to formulate effective policies aimed at enhancing macroeconomic stability and promoting long-term prosperity in Pakistan.

Keyword: Inflation, Exchange Rate, Import, Export, FDI, GDP, ADF, Granger Causality, NLS and ARMA, Pakistan.

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INTRODUCTION

The relationship between macroeconomic variables and economic growth has been a topic of great interest among researchers and policymakers. Examining the impact of inflation, exchange rates, import, export and FDI on economic growth is very important for formulating effective policies and promoting sustainable development in any country. The purpose of this research is to investigate the specific context of Pakistan and provide evidence on the impact of inflation, exchange rates, import, export and FDI on economic growth in the country.

1.1 Overview

Pakistan's economic growth has been influenced by various factors, including inflation, exchange rate, imports, exports, and foreign direct investment (FDI). Several studies have investigated the relationships between these variables and their impact on the country's economic development.

Inflation, particularly in food prices, has emerged as a significant obstacle to Pakistan's economic progress. High inflation rates erode the purchasing power of citizens and hinder economic growth. Studies have found a negative relationship between inflation and GDP growth in Pakistan, with a 1% increase in inflation leading to a 0.29% decrease in GDP.

The relationship between exchange rate and economic growth has been a subject of interest in Pakistan. The country has experienced fluctuations in its exchange rate, which have affected the cost of imports and exports, as well as the competitiveness of its products in the global market. Research suggests that a 1% increase in the exchange rate leads to a 0.55% reduction in GDP.

Pakistan has consistently maintained a trade deficit, with imports exceeding exports. This has put pressure on the country's foreign exchange reserves and current account balance. Studies have found that imports have a negative impact on economic growth, while exports have a positive effect. Improving the standard of exporting goods and maintaining a balance of trade is crucial for Pakistan's economic development.

Foreign direct investment (FDI) has been seen as a potential driver of economic growth in Pakistan. It can bring in much-needed capital, technology, and expertise. Research has found a positive relationship between FDI and GDP growth, with a 1% increase in FDI leading to a 0.37% increase in GDP. However, Pakistan has struggled to attract significant amounts of FDI due to various factors, such as political instability, security concerns, and an unfavorable business environment.

1.1 Background and Researches

As of September 2023, Pakistan's economy is facing several challenges, including high inflation, low economic growth, and a large trade deficit. The country's economy heavily depends on agriculture, which accounts for about 20% of the country's GDP, and the services sector, which accounts for about 60% of the GDP. The manufacturing sector, which is crucial for economic growth, accounts for only about 20% of the GDP.

Inflation is an important macroeconomic variable that has a significant impact on economic growth. High inflation can lead to a decrease in the purchasing power of consumers, which can lead to a decrease in economic growth. The government has been implementing various policies to control inflation, but the results have been mixed. Inflation in Pakistan has been volatile, with rates ranging from 3.7% to 19.87% over the past decade.

Exchange rate is another important macroeconomic variable that affects economic growth. The exchange rate determines the value of the country's currency in relation to other currencies. A high exchange rate can lead to a decrease in exports, which can lead to a decrease in economic growth. The government has been implementing various policies to control the exchange rate, but the results have been mixed. Over the past 23 years, Pakistan has experienced significant fluctuations in its exchange rate. The exchange rate volatility has been a key factor impacting the country's economy with rates ranging from 60 to 280 Pakistani rupees per US dollar.

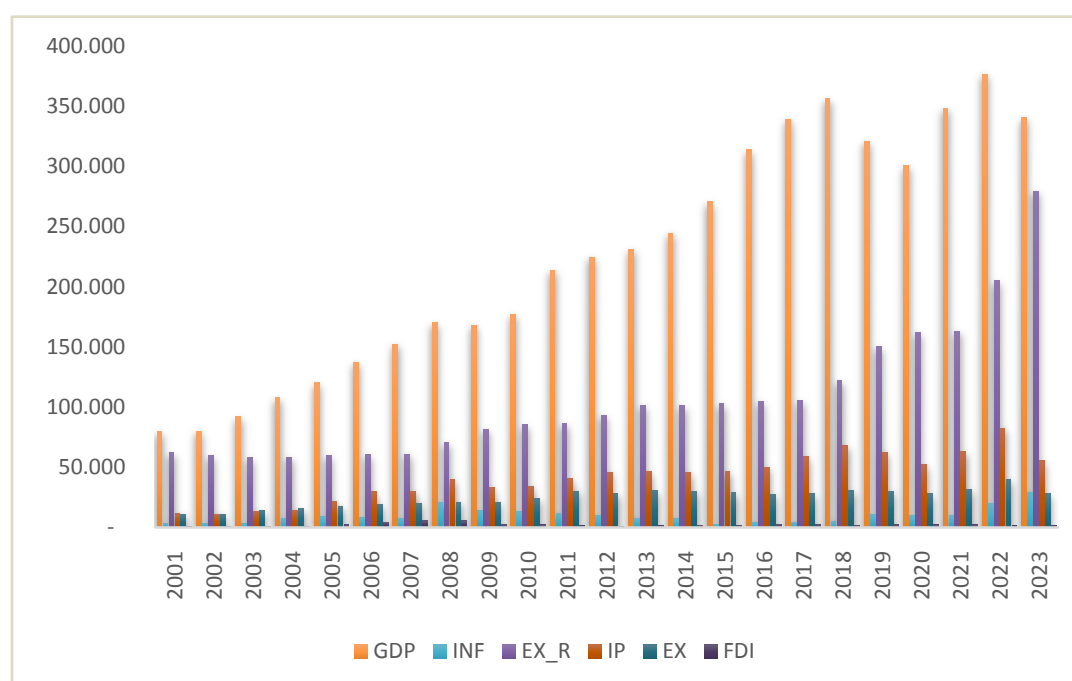
Import and export are also important macroeconomic variables that affect economic growth. Pakistan has been facing a large trade deficit, which means that the country is importing more than it is exporting. This can lead to a decrease in economic growth. The government has been implementing various policies to promote exports and reduce imports, but the results have been mixed. Pakistan's exports have been stagnant over the past decade, while imports have been increasing. The trade deficit shrank by 30% to \$14.9 billion during the first eight months of the current fiscal year, as reported by the Pakistan Bureau of Statistics (PBS) and the Ministry of Commerce. In March 2024, Pakistan's Trade Balance recorded a deficit of 2.2 USD billion, compared to a deficit of 1.7 USD billion in the previous month.

Pakistan has experienced fluctuations in FDI inflows and its impact on economic growth over the past decades. After its independence in 1947, Pakistan faced various political and economic challenges that affected its ability to attract and benefit from FDI. FDI can play a vital role in the economic development of a host country like Pakistan. FDI can help fill the gap between domestic savings and investment, bring in new technologies and

management skills, and generate employment and government revenue through taxes. FDI inflows have generally been declining, with \$1.42 billion recorded in 2022, \$2.15 billion in 2021, and \$2.06 billion in 2020. The major sources of FDI in Pakistan have been the United States and the United Kingdom, with their shares fluctuating over the years, ranging from as low as 8.8% for the US and 4.7% for the UK to as high as 63.7% and 35.2%, respectively. More recently, China has emerged as the largest investor in Pakistan, particularly in infrastructure projects under the China-Pakistan Economic Corridor (CPEC).

Research has been conducted on the impact of inflation, exchange rate, import, export and FDI on economic growth. These studies have highlighted the complex and multifaceted nature of the relationships between these macroeconomic factors and economic growth. For instance, research has shown that trade openness, exchange rates, and FDI can be promoters of economic growth, while high inflation and trade deficits may have a negative impact. Furthermore, studies have indicated a positive and significant influence of FDI on the economy, while inflation has been found to have a negative impact. Additionally, the dynamic relationship between inflation, exchange rate, FDI, and GDP has been a subject of investigation, emphasizing the multifaceted nature of these interactions. These findings underscore the need for further research to better understand the role of these macroeconomic factors in shaping Pakistan's economic growth.

Table 1. Graph of GDP, Inflation, Exchange rate, Export, Import and FDI.



1.2 Topic Details

Inflation, particularly in food prices, has emerged as a significant obstacle to Pakistan's economic progress. High inflation rates erode the purchasing power of citizens and hinder economic growth. Rising food costs present a challenge for Pakistan, impacting government aid to the poor and exacerbating current account and budget deficits.

Pakistan has experienced fluctuations in its exchange rate, affecting the cost of imports and exports. Studies suggest that a surge in the exchange rate can boost exports, leading to increased demand for goods and potentially improving economic growth.

Pakistan has maintained a trade deficit, with imports surpassing exports. This trade imbalance puts pressure on foreign exchange reserves and the current account balance. While imports have a negative impact on economic growth, exports play a positive role in generating foreign exchange earnings and contributing to economic development.

FDI is crucial for economic progress in Pakistan, bringing in capital, technology, and expertise. However, the country has faced challenges in attracting significant FDI due to factors like political instability and security

concerns. FDI is seen as a growth propelling factor, filling the saving-investment gap, enhancing productivity, and creating employment opportunities.

The overall economic growth of Pakistan is influenced by inflation, exchange rate fluctuations, imports, exports, and FDI. Studies have shown that these factors play a significant role in driving GDP growth and economic development. Policymakers need to focus on maintaining stable inflation rates, exchange rates, promoting exports, attracting FDI, and implementing growth-promoting policies to enhance economic stability and growth in the country.

1.3. Problem Statement

The economic landscape of Pakistan is influenced by various factors such as inflation, exchange rate fluctuations, trade imbalances, and foreign direct investment (FDI). Understanding the intricate relationships between these variables and their impact on economic growth is crucial for policymakers, investors, and businesses. The problem statement for the research topic "The impact of inflation, exchange rate, import, export, foreign direct investment on economic growth of Pakistan" is as follows:

Economic Challenges in Pakistan: Pakistan faces significant economic challenges, including high inflation rates, volatile exchange rates, trade deficits, and limited foreign direct investment. These challenges have implications for the country's economic growth, stability, and development. Addressing these issues requires a comprehensive understanding of how inflation, exchange rates, imports, exports, and FDI interact and influence the overall economic performance of Pakistan.

Inflation and Economic Growth: High inflation rates in Pakistan have a detrimental effect on the purchasing power of its citizens and hinder economic growth. The persistent inflationary pressures impact consumer spending, investment decisions, and overall economic stability. Understanding the relationship between inflation and economic growth is essential for formulating effective monetary policies and strategies to mitigate inflationary pressures.

Exchange Rate Volatility: Fluctuations in the exchange rate can have significant implications for Pakistan's trade balance, competitiveness in the global market, and overall economic performance. A volatile exchange rate can impact the cost of imports and exports, affecting the country's current account balance and foreign exchange reserves. Managing exchange rate stability is crucial for promoting economic growth and enhancing trade competitiveness.

Trade Imbalances: Pakistan's trade deficit, with imports exceeding exports, poses challenges for the country's economic development. The imbalance in trade can strain foreign exchange reserves, impact the current account balance, and hinder economic growth. Analyzing the impact of imports and exports on economic growth is essential for developing strategies to address trade imbalances and promote sustainable economic development.

Foreign Direct Investment Challenges: Despite the potential benefits of foreign direct investment in driving economic growth, Pakistan has struggled to attract significant FDI due to various factors such as political instability, security concerns, and an unfavorable business environment. Enhancing the inflow of FDI is crucial for leveraging external capital, technology, and expertise to stimulate economic growth and development.

Research Gap and Need for Analysis: While individual studies have explored the impact of inflation, exchange rate, imports, exports, and FDI on economic growth in Pakistan, there is a need for a comprehensive analysis that integrates these variables. Understanding the combined impact of these factors on economic growth is essential for formulating holistic policies and strategies to address the economic challenges facing Pakistan.

1.4 Research Aims and Objectives

To analyze the impact of inflation on economic growth. understand how inflation rates in Pakistan affect economic growth. Examine the relationship between inflation and GDP growth. Identify the implications of high inflation on the country's economic stability. To investigate the role of exchange rate in economic growth. Analyze how exchange rate fluctuations impact Pakistan's trade balance. Explore the effects of a volatile exchange rate on imports and exports. Understand the relationship between exchange rate stability and economic growth. To assess the influence of imports and exports on economic growth. Investigate the impact of trade imbalances on Pakistan's economic development. Analyze how imports and exports contribute to GDP growth. Examine the role of exports in generating foreign exchange earnings. To evaluate the significance of foreign direct investment (FDI) in economic growth. Understand the importance of FDI in driving economic progress in Pakistan. Analyze the effects of FDI on GDP growth and productivity. Investigate the challenges and opportunities in attracting FDI to Pakistan. To examine the overall economic growth of Pakistan in relation to the variables. Analyze the combined impact of inflation, exchange rate, imports, exports, and FDI on

economic growth. Identify growth-promoting policies and strategies within these variables. Provide insights for policymakers to enhance economic stability and sustainable growth in Pakistan.

Evaluate the impact of trade openness on economic growth. Analyze how trade openness influences economic growth in Pakistan. Examine the relationship between trade openness and GDP growth. Inspect the influence of exchange rate on economic growth. Investigate how exchange rate fluctuations affect economic growth. Analyze the role of the exchange rate in promoting exports and enhancing economic performance. Identify strategies to achieve a balance of payments in Pakistan. Analyze the implications of trade deficits on the country's economic stability. Examine the Relationship of Inflation with Economic growth. Investigate the impact of inflation on GDP growth. Analyze the relationship between inflation rates and economic development. Observe the behavior of foreign direct investment towards economic growth. Analyze how FDI influences economic growth in Pakistan. Examine the role of FDI in enhancing productivity and creating employment opportunities. Investigate long-run relationships among the variables. Explore the long-run relationships between inflation, exchange rate, imports, exports, FDI, and economic growth. Analyze the dynamics of these variables over time and their impact on economic development. Evaluate growth promoter policies within the Variables. Identify policies and strategies that promote economic growth within the variables of inflation, exchange rate, imports, exports, and FDI.

1.5 Significance of the Research

Pakistan is a developing country that has been facing various economic challenges for decades. The country has a high inflation rate, which has a direct impact on the purchasing power of the people. The interest rate is also high, which makes it difficult for businesses to borrow money and invest in new projects. The exchange rate of the Pakistani rupee is volatile, which affects the country's imports and exports. The country's import bill is high, which puts pressure on the country's foreign exchange reserves. The country's export sector is also facing challenges due to various factors such as lack of competitiveness, energy crisis, and political instability. The country's FDI inflows are also low, which limits the country's ability to invest in new projects and create employment opportunities. Finally, the country's unemployment rate is high, which is a major concern for policymakers.

Therefore, this research aims to investigate the impact of inflation, interest rate, exchange rate, import, export, FDI, and unemployment rate on the economic growth of Pakistan.

Earlier researches have also highlighted the importance of examining the impact of these variables on economic growth. For example, a study by Akinlo (2004) found that inflation and interest rates have a negative impact on economic growth in Nigeria. Another study by Bahmani-Oskooee and Ratha (2004) found that exchange rate depreciation has a positive impact on economic growth in developing countries.

Furthermore, research specific to Pakistan has also been conducted in this area. For instance, a study by Hussain and Malik (2017) found that inflation has a negative impact on economic growth in Pakistan, while a study by Ali et al. (2018) found that exports have a positive impact on economic growth in Pakistan.

Understanding the impact of these macroeconomic factors on economic growth can help policymakers formulate appropriate policies to promote sustainable economic growth in Pakistan.

The existing literature provides a foundation for exploring these relationships in the context of Pakistan's economy, but further research is needed to better understand the role of these factors in shaping Pakistan's economic growth.

The findings of this research can potentially offer valuable insights for policymakers and stakeholders in formulating effective economic policies to promote sustainable and healthy economic growth in Pakistan.

These research aims and objectives is to contribute to a better understanding of the complex and multifaceted relationships between these macroeconomic factors and economic growth in Pakistan.

Overall, the significance of this research lies in its potential to offer a deeper understanding of the complex interrelationships between key economic factors and their influence on Pakistan's GDP, ultimately informing policymaking, enhancing economic resilience, and fostering sustainable economic growth in the country.

1. Literature Review

This literature review aims to provide a comprehensive analysis of the existing literature on the impact of interest rates, inflation, exchange rates, import, export, FDI and un-employment on economic growth. The review will examine the methodology and empirical results of previous studies to identify the key factors that affect economic growth.

Research by NurulashikinRomli, Suhana Mohamed & Zuraidah Ahmad (2022) examines the impact of export, import, and population on economic growth in Malaysia over a period of 62 years. This study utilizes secondary

data from world development indicators then analyzed using the Eviews software, including descriptive, correlation, and multiple regression analyses. The multiple regression analysis shows that imports and population have a positive effect on economic growth, while exports have a negative impact. The Pearson correlation coefficient indicates a strong positive correlation between exports, imports, population, and economic growth. The study highlights the significance of population in influencing Malaysia's economic growth over the past 62 years. The findings suggest that Malaysia has a trade deficit due to imports exceeding exports, and the study recommends limiting imports and promoting exports to boost economic growth. The study concludes that population is the most significant predictor of economic growth in Malaysia, followed by imports. Exports also play a significant role in economic growth. The study recommends that policymakers consider the impact of population and imports when drafting economic policies for the country.

Study contributes new insights by highlighting the significant impact of population, imports, and exports on Malaysia's economic growth over a 62-year period, emphasizing the importance of population dynamics in driving economic growth. By using the gross domestic product growth rate as a proxy for economic growth, the research supports the Sustainable Development Goal of decent work and economic growth, providing a comprehensive analysis of the relationship between exports, imports, and economic growth in Malaysia. The study expands on existing research by including population as an independent variable alongside exports and imports, demonstrating the crucial role of population in predicting economic growth and suggesting the need for policy interventions to leverage population dynamics for sustainable economic development.

Practical Implications of the Paper suggest that policymakers in Malaysia should prioritize population dynamics, imports, and exports when formulating economic policies to foster sustainable economic growth. Policymakers should consider implementing strategies to boost exports, control imports, and leverage population growth to enhance economic development. Immediate corrective actions, such as export subsidies and import restrictions, should be taken when the balance of payments (BOP) results decline, particularly when imports exceed exports. Governments can use tools like low-interest loans, tax breaks, and tariffs to manage trade imbalances effectively. The study underscores the importance of careful planning and strategy formulation before implementing economic policies to mitigate potential negative impacts on economic growth. Policymakers should consider revising fiscal and monetary policies or devaluing the currency as last-resort measures to address balance of payments deficits.

The study results found that population and imports had a positive impact on economic growth in Malaysia, while exports had a negative effect. According to the Pearson correlation coefficient, all variables (exports, imports, and population) exhibited a strong positive correlation close to 1, indicating a significant relationship with economic growth. Multiple regression analysis results revealed that exports negatively impacted Malaysia's economic growth, whereas imports and population had a positive effect. The findings suggest that Malaysia has a trade deficit due to imports exceeding exports, highlighting the need to limit imports and promote exports to transform the trade balance into a surplus, thereby boosting economic growth indirectly. The results of the study align with previous research by Noor and Ramli, supporting the positive impact of imports on economic growth, but contradict findings from other studies regarding the effect of exports on economic growth.

The study concluded that population was the most significant predictor of economic growth in Malaysia from 1960 to 2021, followed by imports, while exports also played a significant role. Immediate corrective actions were recommended in cases where the balance of payments (BOP) results decline significantly, particularly when imports surpass exports, suggesting export subsidies and import restrictions as potential measures to address trade imbalances. Policymakers were advised to carefully structure and plan strategies related to exports and imports to avoid adverse effects on economic growth, emphasizing the importance of revising fiscal and monetary policies before resorting to currency devaluation. The study highlighted the significance of considering factors such as inflation, interest rates, and environmental aspects like carbon dioxide emissions in future research to provide a more comprehensive understanding of economic growth dynamics in Malaysia. Recommendations were made for the Malaysian government to prioritize factors such as imports and population when formulating economic policies, emphasizing the need for continued research on these variables to enhance economic growth strategies.

The limitations of the paper "Impact of Export, Import, and Population on Economic Growth in Malaysia" include the following: Limited Scope: The study focuses specifically on Malaysia and covers the period from 1960 to 2021, which may limit the generalizability of the findings to other countries or different time frames. Data Limitations: The study relies on data analysis using Eviews 12, which may have inherent limitations in terms of data accuracy, completeness, or reliability, potentially affecting the robustness of the results. Variable Selection: While the study considers exports, imports, and population as key variables impacting economic

growth, there may be other important factors not included in the analysis that could influence the results. Causality: The study establishes relationships between variables but may not definitively prove causality between export, import, population, and economic growth, as causation can be complex and influenced by various other factors. Sample Size: The study uses 62 observations, which might be considered relatively small for a study covering a period of over 60 years, potentially impacting the statistical power and reliability of the results. Methodological Considerations**: While the study employs multiple regression analysis, there could be methodological limitations or assumptions that might affect the accuracy or interpretation of the results. External Factors: The study does not extensively address external factors such as political changes, global economic conditions, or technological advancements, which could also play a significant role in influencing economic growth.

Another research by RiskaHawang, Rahmatia&Fatmawati (2021) examines the impact of inflation, interest rates, and exchange rates on economic growth in Indonesia through the People's Business Credit. The research approach uses a quantitative approach which is carried out in the form of path analysis with time series data over 14 years. The data collection technique used is library research, means data is obtain from research journals, theses, dissertations and other published books related to this research. The simultaneous linear regression analysis using the Amos software to estimate the direct or indirect effects of People's Business Credit on economic growth. The purpose is to determine whether there is an influence between variables, but the findings suggest that inflation, interest rates, and exchange rates do not have a significant impact on Indonesia's economic growth. The implemented policies, such as stabilizing the rupiah exchange rate, inflation, and interest rates, have a positive effect on the distribution of People's Business Credit, leading to an increase in economic growth in Indonesia. Overall, the study concludes that while inflation, interest rates, and exchange rates do not directly impact economic growth in Indonesia, the policies implemented to stabilize these factors can indirectly contribute to increased economic growth through the distribution of People's Business Credit.

Study contributes to the understanding of economic growth dynamics in Malaysia by analyzing the interplay between export, import, population, and economic growth over a significant period. By focusing on these key variables, the study sheds light on the intricate relationships that influence economic development in the Malaysian context. Through regression analysis and data from 1960 to 2021, the paper attempts to uncover the impact of export, import, and population on economic growth, providing insights into the effectiveness of policies aimed at stabilizing exchange rates, inflation, and interest rates. Despite its limitations, such as the specific focus on Malaysia and the methodological constraints, the paper offers valuable implications for policymakers and researchers interested in understanding the factors driving economic growth in the Malaysian economy. The findings contribute to the ongoing discourse on economic policy formulation and implementation, highlighting the importance of considering multiple variables in shaping sustainable economic growth strategies.

The paperhas several practical implications for policymakers, financial institutions, and entrepreneurs in Indonesia. The study's findings suggest that inflation, interest rates, and exchange rates do not directly affect Indonesia's economic growth, but they do influence the distribution of People's Business Credit, which in turn impacts economic growth. These implications are crucial for understanding how to stabilize the economy and promote sustainable growth.Policymakers: The study's results emphasize the importance of implementing policies that stabilize the rupiah exchange rate, inflation, and interest rates. By doing so, policymakers can create a favorable environment for the distribution of People's Business Credit, which can increase economic growth.Financial Institutions: The findings suggest that financial institutions should consider the impact of interest rates on credit distribution. Lower interest rates can increase the demand for credit, leading to higher economic growth. Financial institutions can adjust their interest rates accordingly to support economic growth.Entrepreneurs: The study highlights the importance of People's Business Credit in supporting micro, small, and medium enterprises (MSMEs). Entrepreneurs can benefit from the government's subsidy of People's Business Credit, which can empower them to expand their businesses and contribute to reducing unemployment and increasing economic growth.

The paper presents the key findings:Inflation: does not directly or indirectly affect Indonesia's economic growth through the distribution of People's Business Credit (KUR). Mild inflation below 10% can actually encourage economic growth by motivating entrepreneurs to increase production and profits. However, high long-term inflation has negative impacts like making domestic goods more expensive than imports and weakening enthusiasm for saving.Interest rates: also, do not directly or indirectly influence economic growth through KUR distribution. High interest rates increase production costs, making goods more expensive and less affordable, which can lead to declining company revenues and sluggish trade. Banks may also prefer investing in financial markets rather than extending credit at high rates.The rupiah exchange rate: similarly has no direct or indirect

effect on economic growth via KUR. Unstable exchange rates make it difficult to set policies, so maintaining a stable currency is important for macroeconomic support. The increase in credit to the real sector: does not significantly impact the rise in real sector output. Real sector institutions' readiness to optimize credit and improve production technology are thought to be more important factors driving output growth.

The conclusions drawn from the paper are:

Inflation Impact: The study finds that inflation, whether directly or indirectly through the distribution of People's Business Credit, does not significantly affect Indonesia's economic growth. Mild inflation below ten percent can actually stimulate economic growth by encouraging entrepreneurs to increase production and profits. However, high long-term inflation can have adverse effects, such as making domestic goods more expensive than imports and weakening savings motivation.

Interest Rate Influence: The research indicates that interest rates, whether directly or indirectly through People's Business Credit distribution, do not have a substantial impact on Indonesia's economic growth. High interest rates can lead individuals to invest funds rather than expand their businesses, affecting economic growth negatively. The interest rate plays a crucial role in business decisions and monetary policy, with high rates increasing production costs and prices, potentially hindering market absorption and trade.

Exchange Rate Significance: The study reveals that the rupiah exchange rate, either directly or indirectly through People's Business Credit, does not significantly influence economic growth in Indonesia. Stable exchange rates are essential for setting effective policies, as fluctuating rates can complicate policy-making. The exchange rate's role in economic growth is highlighted, emphasizing the importance of a strong economic structure that can withstand various economic challenges.

Credit Distribution and Economic Growth: The research suggests that the increase in credit distribution to the real sector does not have a significant impact on output growth. Instead, the readiness of real sector institutions to optimize credit funds and enhance production technology are considered more critical factors driving output growth. This underscores the importance of efficient credit utilization and technological advancements in fostering economic growth.

The limitations of the paper are:

Limited time period: The study only covers the period from 2007 to 2020, which may not capture longer-term trends and relationships between the variables.

Specific focus on Indonesia: The research is focused solely on the Indonesian economy, limiting the generalizability of the findings to other countries.

Exclusion of other factors: The paper only examines the effects of inflation, interest rates, and exchange rates on economic growth through People's Business Credit distribution, but does not consider other potentially influential factors.

Reliance on secondary data: The study uses secondary data obtained from the Central Statistics Agency (BPS), which may have limitations in terms of accuracy, completeness, and reliability.

Simultaneous equation model assumptions: The simultaneous equation models used in the analysis rely on certain assumptions, such as linearity and independence of errors, which may not always hold true in real-world economic scenarios.

Interpretation of insignificant results: While the paper finds that inflation, interest rates, and exchange rates do not directly or indirectly affect economic growth, the interpretation of these insignificant results could be further elaborated.

Lack of policy recommendations: The paper does not provide specific policy recommendations based on the findings, which could limit its practical implications for policymakers.

Another research by Mariana Hatmanu, Cristina Cautisanu & Mihaela Ifrim (2020) examines the impact of interest rate, exchange rate and European business climate on economic growth in Romania: an ARDL approach with structural breaks. Study analyses the data regarding the industrial production index, the monetary policy interest rate, the real exchange rate and the Euroarea business climate indicator for the period over 17 years. The data were collected from the websites Eurostat and the National Bank of Romania. Results from the ARDL model show that the monetary policy interest rate, real exchange rate, and European business climate have significant influences on economic growth. Paper also mentioned the use of Granger causality test or Toda-Yamamoto approach to analyze causality relationships between variables. The significance tests of the short-run or long-run coefficients can identify causality relationships between variables. In the short run, the interest rate has a negative influence on economic growth, while the exchange rate has a positive influence. The business climate in the Euro area has mixed effects on economic growth. The results are consistent with economic theory and previous empirical analyses, indicating that interest rate reduction can stimulate economic activity in the short run, but attentiveness is needed to avoid inflation and financial instability in the long term. The study also validated the positive relationship between the exchange rate and economic growth in the short run, particularly for developing countries. However, the long-term effects of currency depreciation, such as financial instability and inflation, limit the sustainability of this relationship. The findings highlight the significance of managing interest and exchange rates to sustain economic growth in Romania, considering the interdependence between the internal and external business environment.

The key contribution of the paper is Interest Rate Impact: The study questions the effectiveness of manipulating interest rates to stimulate economic recovery during a recession, with findings showing mixed effects on output in different countries. It emphasizes the short-term significance of the relationship between the monetary policy interest rate and economic growth, indicating a significant impact in the short run. Exchange Rate Influence: The paper discusses the significant impact of the exchange rate on economic growth in Romania, with findings suggesting a unidirectional relationship between them. It highlights the positive relation between real exchange rate undervaluation and economic growth, especially in emerging economies, emphasizing the importance of exchange rate stability for economic growth. Business Climate and Investments: The study underscores the importance of the business climate in attracting investments, pointing out that factors like price stability, exchange rate predictability, and economic stability influence investor confidence and decisions to start businesses in foreign countries. It identifies a virtuous cycle where foreign direct investments contribute to economic growth and vice versa, emphasizing the role of investments in stimulating economic growth through knowledge diffusion and human capital enhancement.

The paper offers several practical implications for policymakers and economic stakeholders in Romania: Monetary Policy Implications: The study highlights the significant short-term impact of the monetary policy interest rate on economic growth in Romania. Lowering interest rates can stimulate economic activity by decreasing the cost of credit and encouraging consumption and investment in the short run. However, the authors caution that while interest rate reductions may boost growth in the immediate term, they could also lead to distortions in relative prices and malinvestments in the long run. Policymakers should carefully balance the short-term benefits with potential long-term risks. Exchange Rate Management: The real exchange rate is found to have a positive influence on economic growth in Romania, especially in the short term. This suggests that maintaining a competitive exchange rate level and avoiding excessive volatility is important for sustaining growth. The results imply that exchange rate appreciation, if driven by improved competitiveness, does not necessarily preclude economic growth. Policymakers should focus on enhancing productivity and competitiveness to support a stable and growth-friendly exchange rate. Attracting Foreign Direct Investment: The study emphasizes that price stability, exchange rate predictability, and overall economic stability are crucial for attracting foreign direct investments (FDI). Investors are more likely to start businesses in countries with a favorable business climate. Policymakers should prioritize creating a stable macroeconomic environment and implementing structural reforms to improve the business climate and attract FDI, which can contribute to economic growth through knowledge spillovers and human capital development. Monitoring European Business Climate: Given Romania's growing economic integration with the European Union, the authors highlight the importance of considering the European business climate in domestic policy decisions. Trends in the Euro area's GDP and consumer/business confidence indicators provide valuable information about the external environment. Monitoring the European business climate can help policymakers anticipate potential spillover effects and adjust policies accordingly to maintain Romania's growth trajectory in line with European developments.

The paper presents several key findings regarding the relationship between various economic factors and economic growth in Romania: Short-term Interest Rate Impact: The study found that the interest rate has a significant negative influence on industrial production index (IPI) in the short run. Lowering interest rates can stimulate economic activity by decreasing the cost of credit and encouraging consumption and investment in the short term. However, the authors caution that while interest rate reductions may boost growth in the immediate term, they could also lead to distortions in relative prices and malinvestments in the long run. Exchange Rate Influence: The real exchange rate is found to have a positive influence on IPI, especially in the short term. This suggests that maintaining a competitive exchange rate level and avoiding excessive volatility is important for sustaining growth. The results imply that exchange rate appreciation, if driven by improved competitiveness, does not necessarily preclude economic growth. European Business Climate: The European business climate indicator (BCI) has a significant positive impact on IPI in the short run, with the highest positive effect observed in the 2nd period. The results highlight the importance of considering the European business climate in domestic policy decisions given Romania's growing economic integration with the EU. Causality Analysis: Granger causality tests confirm the existence of unidirectional causality from the interest rate, exchange rate and business climate indicator to IPI. This means that these factors are cause factors for economic growth in Romania.

The paper draws several key conclusions regarding the relationship between various economic factors and economic growth in Romania: Short-term Interest Rate Impact: The study found that the interest rate has a significant negative influence on industrial production index (IPI) in the short run. Lowering interest rates can stimulate economic activity by decreasing the cost of credit and encouraging consumption and investment in the

short term. However, the authors caution that while interest rate reductions may boost growth in the immediate term, they could also lead to distortions in relative prices and malinvestments in the long run. **Exchange Rate Influence:** The real exchange rate is found to have a positive influence on IPI, especially in the short term. This suggests that maintaining a competitive exchange rate level and avoiding excessive volatility is important for sustaining growth. The results imply that exchange rate appreciation, if driven by improved competitiveness, does not necessarily preclude economic growth. **European Business Climate:** The European business climate indicator (BCI) has a significant positive impact on IPI in the short run, with the highest positive effect observed in the 2nd period. The results highlight the importance of considering the European business climate in domestic policy decisions given Romania's growing economic integration with the EU. **Causality Analysis:** Granger causality tests confirm the existence of unidirectional causality from the interest rate, exchange rate and business climate indicator to IPI. This means that these factors are cause factors for economic growth in Romania.

The limitations of the paper are **Limited Scope:** The study focuses specifically on the impact of interest rates, exchange rates, and the European business climate on economic growth in Romania. This narrow focus may limit the generalizability of the findings to other countries or regions. **Data Limitations:** The analysis covers the period from January 2003 to December 2019, which may not capture more recent economic developments or changes in policy dynamics that could affect the relationships studied. The presence of structural breaks in the data, such as those related to the economic and financial crisis of 2008, could introduce biases or challenges in interpreting the results, potentially affecting the robustness of the conclusions. **Model Assumptions:** The paper employs the ARDL approach with structural breaks, which relies on certain assumptions about the relationships between variables and the stationarity of data. These assumptions may introduce limitations in the model's accuracy and predictive power. **Causality Interpretation:** While the study explores the causal relationships between interest rates, exchange rates, and economic growth, the direction of causality can be complex and subject to interpretation biases. Causal relationships in economics are often intricate and may not be fully captured by statistical models. **Sample Size and Statistical Power:** The paper mentions the consideration of critical values for the ARDL Bounds test based on sample size. Small sample sizes can impact the statistical power of the analysis and the reliability of the results, potentially affecting the robustness of the conclusions. **Model Validation:** The validation of the model involves various tests for residual components, such as normality, serial correlation, and homoscedasticity. However, the adequacy of these tests in capturing all potential model shortcomings or biases may be a limitation in fully validating the model.

Another research by Mitra Lal Devkota (2019) examines impact of export and import on economic growth: Time series evidence from India. The analysis uses the seasonally adjusted quarterly time series data for India for the period between 1996: Q2 to 2019: Q2, by using augmented dickey fuller, Phillips-perron unit root, Johansen's cointegration and granger causality test under vector error correction model. The paper finds that the time series variables of export, import, and economic growth in India are non-stationary at their levels but stationary at their first differences. There is a long-run equilibrium relationship between export, import, and economic growth in India, as confirmed by the Johansen cointegration test. The Vector Error Correction Model (VECM) results indicate a unidirectional causal relationship from economic growth to import, suggesting that an increase in the nation's income leads to increased spending, including on imports. The empirical findings reject the ELG (Export-Led Growth), GLE (Growth-Led Export), and ILG (Import-Led Growth) hypotheses for India. The study admits that the results should be viewed with caution due to limitations of the causality tests employed and the use of a shorter time period of 24 years of quarterly data. The paper highlights the importance of considering other factors that may affect economic growth and the need for longer time periods for cointegration tests.

It differs from existing literature by considering the time period, data frequency, and methodology, ensuring a more current reflection of India's economic development. The study employs the Granger causality test based on VECM framework to analyze short and long-run causality relationships between export, import, and economic growth in India, a unique approach not seen in previous studies. The research establishes the existence of a long-run equilibrium relationship between the variables and identifies unidirectional causal relationships from GDP to import and from export to import in India. The findings challenge previous hypotheses regarding the relationships between export, import, and economic growth in India, providing valuable insights for future research and policy-making.

The study's findings have practical implications for policymakers and stakeholders involved in India's trade and economic growth. Understanding the unidirectional causal relationship from economic growth to import can help policymakers anticipate and manage the impact of economic changes on import levels in India. The

identification of a long-run equilibrium relationship between export, import, and economic growth provides a basis for developing sustainable trade policies that support economic stability and growth over time. Contrary to some existing literature, the rejection of certain hypotheses in this study highlights the need for a nuanced understanding of the dynamics between export, import, and economic growth in India, guiding policymakers towards more effective decision-making. The study's methodology, including the use of VECM and Granger causality tests, offers a robust framework for analyzing causal relationships in economic data, which can be applied in future research and policy analysis in India and other similar economies.

The study finds that the time series variables (export, import, and economic growth) are non-stationary at their levels but stationary at their first differences, indicating the presence of unit roots in the data. Johansen's cointegration test confirms the existence of a long-run equilibrium relationship among the variables, suggesting a stable relationship between export, import, and economic growth in India. The Vector Error Correction Model (VECM) analysis reveals a unidirectional causal relationship running from economic growth to import in India, implying that an increase in the nation's income leads to higher spending, including on imports. The Granger causality test under the VECM framework supports the presence of unidirectional causal relationships from GDP to import and from export to import, challenging certain hypotheses and providing valuable insights into the dynamics of trade and economic growth in India.

The study concludes that there is a long-run equilibrium relationship between export, import, and GDP in India, as indicated by the Johansen cointegration test, aligning with previous research findings for other countries like Bangladesh, Pakistan, and South Africa. The Granger causality test based on the VECM framework suggests unidirectional causal relationships from GDP to import and from export to import, rejecting certain hypotheses related to export-led growth, import-led growth, and growth-led export in the Indian context. The paper highlights the importance of considering the impact of economic variables like export and import on GDP, providing insights for policymakers and researchers to understand the dynamics of trade and economic growth in India. Despite some limitations in the study, such as the shorter time period analyzed and the exclusion of other factors influencing economic growth, the results offer valuable implications for trade policy formulation and further research in the field.

The study acknowledges the limitation of using only 24 years of quarterly data, which is a relatively shorter time period compared to the recommended 30 years for cointegration tests, potentially affecting the robustness and generalizability of the results. The research focuses solely on the impact of export and import on economic growth in India, neglecting the influence of other factors that could also play a significant role in shaping the country's economic performance, indicating a limitation in the scope of the analysis. The causality tests employed in the study have certain limitations, as mentioned by Sharma and Dhakal (1994), which may affect the interpretation of the results and require cautious consideration when drawing conclusions from the findings. The rejection of certain hypotheses in the study, such as export-led growth, import-led growth, and growth-led export, may indicate a need for further research to explore the complexities of the relationships between trade variables and economic growth in India, suggesting a limitation in fully capturing the dynamics of these interactions.

Research by the LjupcoDavcev, Nikolas Hourvoulides& Jasmin Komic (2018) examines the impact of interest rates and inflation on GDP in FYROM, Bulgaria, and Romania by using a theoretical framework and quantitative analysis. The data was gathered over a period of 14 years from state statistical offices in Bulgaria, Romania and FYROM, and the rest of the data series were collected from the central banks of the three countries, and also from Eurostat. They used cointegration analysis and Granger causality analysis to examine the relationships between interest rates, inflation, and GDP. The analysis reveals that there is no unit root for inflation in Romania and FYROM, indicating that the data series are stationary. In FYROM, there is no Bidirectional Granger causality between variables, but there is Unidirectional causality between GDP and interest rates, as well as between inflation and interest rates. Correlation matrices for the three countries suggest that interest rates and inflation have an impact on GDP, with specific causal relationships identified between them. In Bulgaria, inflation and interest rates have a small negative correlation with GDP, while in Romania, the negative correlation is significantly larger. The correlation between interest rates and inflation in Romania is almost perfect, indicating a monetary policy closely following price level changes. In FYROM, there is a weak relationship between inflation and GDP, and interest rates have a negative correlation with GDP. The variables in Bulgaria seem to be cointegrated, suggesting a long-term relationship among them, while no cointegrating vector is found between GDP and interest rates in Romania and FYROM.

It creates an analytical framework to evaluate the importance of interest rates and inflation on economic growth in the three countries, offering a quantitative assessment of these variables. Utilizing correlation matrices, the

paper reveals the relationships between interest rates, inflation, and GDP in each country. For instance, in Bulgaria, there is a small negative correlation between inflation and GDP, while interest rates and inflation show a strong positive correlation. The paper conducts cointegration and Granger causality analyses, indicating one-way causality relationships between inflation, interest rates, and GDP in the studied countries. For example, in FYROM, there is one-way causality from GDP to interest rates and from inflation to interest rates. Overall, the paper contributes to understanding the monetary and fiscal measures' interplay in developing countries like FYROM, Bulgaria, and Romania, especially in the context of economic growth and currency stability.

The paper has several practical implications based on its research findings. Firstly, it highlights the impact of interest rates and inflation on GDP growth in the studied countries, emphasizing the importance of monetary and fiscal policies in influencing economic growth. The study reveals that changes in interest rates and inflation levels can have significant effects on real GDP and consumer prices over time, as demonstrated by various models and empirical analyses. Moreover, the research underscores the negative relationship between inflation and GDP growth, indicating that high inflation rates, particularly above 40%, can lead to a decline in economic growth. The study suggests that maintaining moderate inflation levels can facilitate faster economic growth, as observed in South Asian countries like Bangladesh, India, Pakistan, and Sri Lanka. Additionally, the paper discusses the non-linear relationship between inflation and economic growth, highlighting threshold values beyond which inflation negatively impacts GDP growth. Furthermore, the paper delves into the concept of cointegration, which is an econometric method used to test the correlation between non-stationary time series variables. By identifying cointegrated relationships among variables, the study reveals long-term equilibrium relationships that can help in understanding the dynamics between interest rates, inflation, and GDP growth. The research employs unit root tests and cointegration analysis to assess the stationarity of variables and the existence of long-term relationships among them, providing insights into the economic dynamics of the studied countries.

The paper has several key findings based on its analysis of the relationships between interest rates, inflation, and GDP growth in these countries. **Interest Rate Impact on GDP:** A 100 basis point increase in the real short-term interest rate is expected to lead to a decrease in US GDP of 0.09% (using reduced form estimation) and 0.06% (using a vector autoregression model) four to six quarters later. The European Central Bank (ECB) estimates that a 100 basis point increase in the ECB repo rate would result in a decrease of 0.34% in real GDP after the first year and 0.71% after the second year. The National Central Banks (NCB) model predicts a decrease of 0.38% in real GDP after year two, while the National Institute Global Econometric Model (NiGEM) model estimates a decrease of 0.47% in real GDP during year two. Regression analysis for Jordan from 2000 to 2010 found that a one-period lagged interest rate had a significant impact on GDP, with a coefficient of -0.152. **Inflation Impact on GDP:** The paper confirms a negative relationship between inflation and GDP, with an increase in average annual inflation by 10 percentage points per year lowering real GDP growth by 0.2 to 0.3 percentage points per year. High inflation above 40% is found to negatively impact economic growth, while moderate inflation can facilitate faster economic growth. An analysis of the non-linear relationship between inflation and economic growth in Malaysia found an inflation threshold value, supporting the view that the relationship between inflation rate and economic growth is nonlinear. **Cointegration Analysis:** The study employs cointegration analysis to examine the long-run relationships among interest rates, inflation, and GDP growth in Bulgaria, Romania, and FYROM. The results indicate that interest rates and inflation are cointegrated with GDP in Bulgaria and Romania, suggesting long-run equilibrium relationships between these variables. In FYROM, the correlation between inflation and GDP is relatively weak, while interest rates have a strong negative correlation with GDP. **Unit Root Tests:** The paper uses unit root tests, specifically the Augmented Dickey-Fuller (ADF) test, to determine the stationarity of the time series variables. The results show that GDP, inflation, and interest rates in Bulgaria and FYROM are non-stationary, while in Romania, inflation and interest rates are stationary. These findings provide insights into the dynamics of interest rates, inflation, and GDP growth in Bulgaria, Romania, and FYROM, highlighting the importance of monetary and fiscal policies in influencing economic growth.

The paper has key conclusions based on its analysis of the relationships between interest rates, inflation, and GDP growth in these countries: **Long-term Relationships:** In Bulgaria, the variables (GDP, inflation, and interest rates) seem to be cointegrated at the 5% significance level, revealing the existence of long-term relationships among them. However, in Romania and FYROM, there is no cointegrating vector between GDP and interest rates. **Granger Causality:** In Bulgaria, there is one-way Granger causality from inflation to GDP and interest rates, and also from GDP to interest rates. In Romania, there seems to be one-way causality from inflation to GDP and interest rates, and interest rates to GDP. In FYROM, there is one-way causality between GDP and interest rates (GDP Granger causes interest rates) and inflation and interest rates (inflation leads

interest rates). Economic Progress and Challenges: Bulgaria, Romania, and FYROM have made significant economic improvements during the period from 2000 to 2014, but still lag behind other European developed countries in the EU and Eurozone. The three countries have different monetary and fiscal policies, with Bulgaria fixing its currency to the euro, Romania having a generally stable exchange rate with moderate changes, and FYROM also fixing its currency to the euro. Future Research Directions: Further analysis could consider the unique characteristics of each country's variables and policies, and introduce additional variables such as net exports or individual GDP components (consumption, investment, government spending) to reveal more detailed patterns in the relationships. Since the statistical tests applied (ADF, Johansen, and Granger causality) are sensitive to time lags, experimenting with various lags could potentially uncover different patterns in the relationships among the variables.

The paper has several limitations: Limited country coverage: The study focuses only on three countries - Bulgaria, Romania, and FYROM. Expanding the analysis to include more countries in the region or a larger sample could provide more robust and generalizable results. Short time period: The study examines the period from 2000 to 2014, which may not capture long-term trends and relationships. A longer time series could yield more reliable conclusions. Lack of control variables: The analysis does not include other potentially relevant variables that could influence GDP growth, such as fiscal policy measures, exchange rates, or external factors like global economic conditions. Omitting these variables may lead to biased estimates. Sensitivity to time lags: The statistical tests used, such as ADF, Johansen cointegration, and Granger causality, are sensitive to the choice of time lags. Experimenting with different lag structures could potentially uncover different patterns in the relationships among the variables. Assumption of linearity: The study assumes linear relationships between the variables. However, the paper acknowledges that the relationship between inflation and economic growth may be non-linear, as suggested by other studies. Incorporating non-linear models could provide a more accurate representation of the dynamics. Lack of policy implications: While the paper discusses the economic progress and challenges faced by the three countries, it does not provide specific policy recommendations based on the findings. Addressing this gap could enhance the practical relevance of the study. These limitations suggest that further research is needed to corroborate the findings, extend the analysis to a broader context, and provide more comprehensive policy implications.

Another research by Amalendu Bhunia (2016) examines the relationship between inflation, interest rates, and economic growth in India using annual time series data from 1992 to 2015. Research used correlation, ADF and PP unit root tests, cointegration test, vector error correction model, and Granger causality test to analyze the data. Results of the ADF and PP unit root tests show that the macroeconomic variables were not stationary at the level but stationary at the first difference. There is a long-run causality from economic growth to inflation and interest rates in India, indicating that changes in economic growth can influence inflation and interest rates. The findings also suggest a unidirectional causality from economic growth to interest rates, indicating that economic growth has a significant impact on interest rates. The empirical results highlight the importance of maintaining low inflation and favorable interest rates for promoting economic growth in India. The study emphasizes the role of the Reserve Bank of India in controlling the inflation rate and keeping interest rates unchanged to support economic growth. The correlation statistics shows that economic growth is negatively linked with inflation and interest rates, indicating that higher economic growth is associated with lower inflation and interest rates.

It addresses two key research hypotheses: the significant influence of inflation rates and interest rates on India's economic growth. By employing various statistical tests like correlation analysis, unit root tests, cointegration tests, vector error correction model, and Granger causality test, the study confirms a long-run causality from economic growth to inflation and interest rates in India. The findings suggest that maintaining low inflation and optimal interest rates can promote economic growth in India, providing valuable insights for policymakers and the Reserve Bank of India. The study contributes to the existing literature by highlighting the importance of a robust financial policy that supports the real sector of the economy for dynamic financial activities, based on the observed association between interest rates and economic growth.

The research underscores the significance of maintaining low inflation and optimal interest rates in India to promote economic growth, offering valuable guidance for policymakers and the Reserve Bank of India. By confirming a long-run causality from economic growth to inflation and interest rates, the study suggests that implementing policies to control inflation and interest rates can positively impact economic growth in India. The findings emphasize the need for a strong financial policy that supports the real sector of the economy, facilitating dynamic financial activities and contributing to overall economic growth. Understanding the negative correlation between economic growth and inflation/interest rates can aid policymakers in formulating

strategies to stabilize these macroeconomic variables, thereby fostering a conducive environment for sustainable economic development in India. The research provides empirical evidence supporting the idea that efficient control of inflation rates and interest rates can lead to improved economic conditions in India, highlighting opportunities for policy revisions and economic reforms.

The study utilized stationarity tests like Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) tests on macroeconomic variables, revealing that the variables were non-stationary at the level but stationary at the first difference. Cointegration tests under the Johansen approach confirmed a long-run association among GDP growth rate, inflation rate, and interest rate in India. Correlation analysis indicated a significant negative correlation between economic growth in India and inflation/interest rates, suggesting a relationship between these variables. The vector error correction model results showed a long-run causality from economic growth to inflation and interest rates, while the Wald test indicated no short-run causality between economic growth and these variables. Pairwise causality tests revealed a unidirectional causality from economic growth to interest rates, emphasizing the importance of controlling interest rates for economic growth in India.

The study focused solely on the Indian economy, limiting the generalizability of the findings to other countries or regions. The research used annual time series data from 1992 to 2015, which may not capture short-term fluctuations or recent economic developments, potentially affecting the current relevance of the results. The paper primarily relied on statistical analyses and econometric models, which may overlook qualitative factors or behavioral aspects that could influence the relationship between inflation, interest rates, and economic growth. The study did not delve into the specific mechanisms or channels through which inflation and interest rates affect economic growth in India, leaving room for further research to explore these dynamics in more detail. The research did not consider external factors or global economic trends that could impact the relationship between inflation, interest rates, and economic growth in India, potentially limiting the comprehensive understanding of these interconnections.

The existing literature provides a foundation for understanding the role of these macroeconomic factors in shaping Pakistan's economic growth. By conducting a comprehensive analysis, this research aims to contribute to a deeper understanding of how these factors collectively influence economic growth in Pakistan. The findings of this study can potentially offer valuable insights for policymakers and stakeholders in formulating effective economic policies to promote sustainable and healthy economic growth in Pakistan.

2. Hypothesis

The hypotheses of the research study are presented below.

Hypothesis 1: Inflation has a significant impact on economic growth.

Hypothesis 2: The exchange rate has a significant impact on economic growth.

Hypothesis 3: The import has a significant impact on economic growth.

Hypothesis 4: The export has a significant impact on economic growth.

Hypothesis 5: FDI has a significant impact on economic growth.

3. Research Methodology

This study is based on a quantitative research design, specifically path analysis with time series secondary data collected annually from (2001 – 2023) to determine the relation between inflation, exchange rate, export, import and FDI towards economic growth in Pakistan that we have collected from World Development Indicators (Databank) and Macrotrends.net. The variables used in this study are detailed in table 4.1. The collected data are analyzed using Eviews software, including descriptive statistics, unit root test - Augmented Dickey-Fuller, Granger Causality test and Least Square (NLS and ARMA) Method test.

4.1 Descriptive Statistics

Descriptive statistics offer a quantitative description of a data collection (Table-1), focusing on its main features and characteristics. These statistics include measurement of mean, median, range, variance, standard deviation, skewness and kurtosis.

4.2 Unit Root Test

The primary purpose of a unit root test is to determine the stationarity of a time series data. It helps investigate the presence of a unit root, which indicates that a variable is non-stationary. If the unit root test results in rejecting the null hypothesis of a unit root, it implies that the series is stationary. If the null hypothesis is not rejected, it suggests that the series is non-stationary and exhibits a trend.

4.3 Granger Causality Test

The Granger Causality test is used to determine whether one time series is useful in forecasting another. It investigates the causal relationship between two variables. The null hypothesis in a Granger Causality test is that the first variable, does not Granger-cause the second variable.

4.4 Least Square (NLS and ARMA)

The Least Squares (NLS and ARMA) methods used for estimating non-linear regression models, including those with autoregressive and moving average (ARMA) components.

4.5 Measurement of Study Variables

Variables	Particulars	Proxy	Description
Dependent Variable	Economic Growth	GDP	Economic growth (GDP) is measured as the final goods and services produced in a specific time period by a country in percentage change of billions of US\$.
Independent Variable	Inflation	INF	Inflation (INF) measured as consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.
Independent Variable	Exchange Rate	EX_R	Exchange rate (EX_R) measured as an annual average based on monthly averages (local currency units relative to the U.S. dollar).
Independent Variable	Export	EX	Exports (EX) are measured as goods and services produced by a country and sold to another country in billions of US \$.
Independent Variable	Import	IP	Imports (IP) are measured as goods and services bought by a country in billions of US\$.
Independent Variable	Foreign Direct Investment	FDI	Foreign Direct Investment (FDI) is measured as ownership stake of foreign company or project made by an investor, company or government in our country in billions of US\$.

4.6 The Equation Model for This Research Is as Follows:

Economic Growth (GDP) = $\beta_0 + \beta_1 * \text{Inflation (INF)} + \beta_2 * \text{Exchange Rate (EXR)} + \beta_3 * \text{Import (IP)} + \beta_4 * \text{Export (EX)} + \beta_5 * \text{Foreign Direct Investment (FDI)} + \varepsilon$

Where:

- β_0 is the intercept.
- $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are the coefficients of the independent variables (which indicate the direction and magnitude)
- ε is the error term (captures the impact of all other factors that affect economic growth that are not included in the model)

4. Results Analysis and discussions

This section covers the estimation and analysis of data for the period 2001–2023 to assess the impact of inflation, exchange rate, import, export and FDI on GDP in Pakistan. First, we present the graphical movements for the variables over the past 23 years. After that, we cover the group statistics of variables, and unit root test, performing and analyzing Augmented Dickey–Fuller (ADF) test. Then we perform the Granger Causality test to analyze the relation between variables and then we analyze the Least Square (NLS and ARMA) Method.

5.1 Groups Statistics

Below table shows the group statistics of the variables.

Table.1 Group Statistics

5.2 Unit Root Tests

	GDP	INF	EX_R	EX	IP	FDI
Mean	224.5153	9.525204	105.7376	24.48615	41.48649	2.078870
Median	224.3835	7.921100	93.39520	27.81607	45.59446	1.887000
Maximum	376.5328	29.20000	279.5312	39.41545	82.28214	5.590000
Minimum	79.48440	2.529300	57.75200	10.60027	11.07308	0.378000
Std. Dev.	98.48128	6.466397	54.90237	7.396896	19.26281	1.358971
Skewness	0.013419	1.458079	1.662285	-0.329411	0.033496	1.427064
Kurtosis	1.624182	5.030822	5.581079	2.420012	2.361448	4.504797
Jarque-Bera	1.814696	12.10204	16.97662	0.738331	0.395060	9.976693
Probability	0.403593	0.002355	0.000206	0.691311	0.820755	0.006817
Sum	5163.851	219.0797	2431.964	563.1815	954.1893	47.81400
Sum Sq. Dev.	213368.4	919.9144	66313.94	1203.710	8163.227	40.62964
Observations	23	23	23	23	23	23

We use unit root tests to find whether a time series variable is non-stationary. A stationary time series is one whose statistical properties, such as mean, variance, autocorrelation, are all constant over time. If there is a unit root then the series are non-stationary. If the probability is less than 5% results in rejecting the null hypothesis of a unit root, it implies that the series is stationary, there is no unit root. If the probability is more than 5% the null hypothesis is not rejected, it suggests that the series is non-stationary and exhibits a trend.

Table.2 Unit root of GDP

At level

we can see from probability that we reject the null hypothesis and conclude that the data series are stationary,

Null Hypothesis: GDP has a unit root		
Exogenous: Constant		
Lag Length: 2 (Automatic - based on SIC, maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.106856	0.0423
Test critical values:		
1 % level	-3.808546	
5 % level	-3.020686	
10 % level	-2.650413	

there is no unit root.

At first difference

we can see from probability that we reject the null hypothesis and conclude that the data series are stationary,

Null Hypothesis: D(GDP) has a unit root		
Exogenous: Constant		
Lag Length: 1 (Automatic - based on SIC, maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.582581	0.0161
Test critical values:		
1 % level	-3.808546	
5 % level	-3.020686	
10 % level	-2.650413	

there is no unit root.

Table.3 Unit root of Inflation

At level

we can see that there is a unit root, we do not reject the null hypothesis, so the data sets are non-stationary.

Null Hypothesis : INF has a unit root

Exogenous : Constant

Lag Length: 0 (Automatic - based on SIC , maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.450234	0.8835
Test critical values :	1 % level	-3.769597
	5 % level	-3.004861
	10 % level	-2.642242

At first difference

we can see from probability that we reject the null hypothesis and conclude that the data series are stationary,

Null Hypothesis : D(INF) has a unit root

Exogenous : Constant

Lag Length: 0 (Automatic - based on SIC , maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.011742	0.0062
Test critical values :	1 % level	-3.788030
	5 % level	-3.012363
	10 % level	-2.646119

there is no unit root.

Table.4 Unit root of Exchange Rate

At level

we can see that there is unit root, we do not reject the null hypothesis, so the data sets are non-stationary.

Null Hypothesis : EX R has a unit root

Exogenous : Constant

Lag Length: 3 (Automatic - based on SIC , maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	0.902235	0.9931
Test critical values :	1 % level	-3.831511
	5 % level	-3.029970
	10 % level	-2.655194

At first difference

we can see that there is a unit root, we do not reject the null hypothesis, so the data sets are non-stationary.

Null Hypothesis : EX has a unit root

Exogenous : Constant

Lag Length: 2 (Automatic - based on SIC , maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.102466	0.2457
Test critical values :	1 % level	-3.808546
	5 % level	-3.020686
	10 % level	-2.650413

Table.5 Unit root of Export**At level**

we can see that there is a unit root, we do not reject the null hypothesis, so the data sets are non-stationary.

Null Hypothesis : D(EX_R) has a unit root		
Exogenous : Constant		
Lag Length : 2 (Automatic - based on SIC , maxlag=4)		
Null Hypothesis : D(EX) has a unit root		
Exogenous : Constant		
Lag Length : 1 (Automatic - based on SIC , maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.861162	0.0011
Test critical values :	1 % level	-3.808546
	5 % level	-3.020686
	10 % level	-2.650413

At first difference

we can see from probability that we reject the null hypothesis and conclude that the data series are stationary, there is no unit root.

Table.6 Unit root of Import**At level**

we can see that there is a unit root, we do not reject the null hypothesis, so the data sets are non-stationary.

Null Hypothesis : IP has a unit root		
Exogenous : Constant		
Lag Length : 2 (Automatic - based on SIC , maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.428286	0.5478
Test critical values :	1 % level	-3.808546
	5 % level	-3.020686
	10 % level	-2.650413

At first difference

we can see from probability that we reject the null hypothesis and conclude that the data series are stationary,

Null Hypothesis : D(IP) has a unit root		
Exogenous : Constant		
Lag Length : 1 (Automatic - based on SIC , maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.636162	0.0000
Test critical values :	1 % level	-3.808546
	5 % level	-3.020686
	10 % level	-2.650413

there is no unit root.

Table.7 Unit root of FDI**At level**

we can see that there is a unit root, we do not reject the null hypothesis, so the data sets are non-stationary.

Null Hypothesis : FDI has a unit root		
Exogenous : Constant		
Lag Length : 1 (Automatic - based on SIC , maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.801193	0.0751
Test critical values :	1 % level	-3.788030
	5 % level	-3.012363
	10 % level	-2.646119

At first difference

we can see from probability that we reject the null hypothesis and conclude that the data series are stationary,

Null Hypothesis: D(FDI) has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.242358	0.0316
Test critical values:		
1% level	-3.788030	
5% level	-3.012363	
10% level	-2.646119	

there is no unit root.

5.3 Granger Causality

We use the Granger Causality test to determine the causal relationship between variables. The null hypothesis in a Granger Causality test is that the first variable, (X) does not Granger-cause the second variable, (Y). If the p-value of the Granger Causality test is less than the chosen significance level (5%), then the null hypothesis is rejected, indicating that the first variable (X) does Granger-cause the second variable (Y). If the p-value is greater than the significance level, the null hypothesis is not rejected, meaning there is no evidence that the first variable (X) Granger-causes the second variable (Y).

Table.8 Granger Causality

The Granger causality analysis reveals unidirectional causality from inflation rate and FDI to GDP. Meanwhile,

Pairwise Granger Causality Tests			
Date: 04/25/24 Time: 23:55			
Sample: 2001 2023			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
INF does not Granger Cause GDP	21	4.33800	0.0312
GDP does not Granger Cause INF		0.79414	0.4690
EX_R does not Granger Cause GDP	21	13.5178	0.0004
GDP does not Granger Cause EX_R		5.06725	0.0197
EX does not Granger Cause GDP	21	1.89680	0.1823
GDP does not Granger Cause EX		1.19938	0.3271
IP does not Granger Cause GDP	21	8.47173	0.0031
GDP does not Granger Cause IP		10.7994	0.0011
FDI does not Granger Cause GDP	21	0.50131	0.6149
GDP does not Granger Cause FDI		0.16955	0.8455

a bidirectional causality exists between exchange rate and GDP, as well as between import and GDP. However, no significant causal relationships were found between the other variables.

5.4 Least Square (NLS and ARMA) Method

Table.9 LS Method

Dependent Variable: GDP				
Method: Least Squares				
Date: 04/25/24 Time: 23:52				
Sample: 2001 2023				
Included observations: 23				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.014448	0.639982	3.147666	0.0059
INF	-0.013676	0.005364	-2.549798	0.0207
EX R	0.512274	0.158131	3.239559	0.0048
EX	0.028120	0.010415	2.700061	0.0152
IP	0.006319	0.005327	1.186130	0.2519
FDI	0.064304	0.024198	2.657384	0.0166
R-squared	0.960309	Mean dependent var		5.303962
Adjusted R-squared	0.948635	S.D. dependent var		0.504262
S.E. of regression	0.114286	Akaike info criterion		-1.280774
Sum squared resid	0.222040	Schwarz criterion		-0.984558
Log likelihood	20.72890	Hannan-Quinn criter.		-1.206276
F-statistic	82.26092	Durbin-Watson stat		1.365651
Prob(F-statistic)	0.000000			

Our results obtained through the Least Square (NLS and ARMA) method indicate that inflation rate has a significant negative impact on economic growth of Pakistan, these results are consistent with the result described in the research by the Ljupco Davcev, Nikolas Hourvoulides & Jasmin Komic (2018) examines the impact of interest rates and inflation on GDP in FYROM, Bulgaria, and Romania, result shows that the inflation rate has a significant negative impact on economic growth. Another research by Amalendu Bhunia (2016) examines the relationship between inflation, interest rates, and economic growth in India, the result shows that inflation rate has a significant negative impact on economic growth. Another research by the Xiuyun and Muhammad Nouman Shafiq (2020) examines the impact of Foreign Direct Investment, Capital Formation, Inflation, Money Supply and Trade Openness on Economic growth of Asian countries, result shows that the inflation has a significant negative impact on economic growth.

Our results shows that the exchange rate has a significant positive impact on economic growth of Pakistan, these results are consistent with the result described in the research by Mariana Hatmanu, Cristina Cautisanu & Mihaela Ifrim (2020) examines the impact of the monetary policy interest rate, real exchange rate, and business climate in the Euro area on economic growth in Romania, result shows that the exchange rate has a significant positive influence on economic growth.

Our results shows that the export has a significant positive impact on economic growth of Pakistan, these results are consistent with the results described in the research by Alfred Leonard, Tanti Novianti and Sri Mulatsih (2021) Analysis of the impact of Exports and Investment on Indonesian Economic Growth, results shows that export has a significant positive impact on economic growth.

Our results shows that the FDI has a significant positive impact on economic growth of Pakistan, these results are consistent with the results described in the research by Panagiotis Pegkas (2015) examines the impact of FDI on economic growth in Eurozone countries, the result shows that the FDI has a significant positive impact on economic growth. Another research by the Xiuyun and Muhammad Nouman Shafiq (2020) examines the impact of Foreign Direct Investment, Capital Formation, Inflation, Money Supply and Trade Openness on Economic growth of Asian countries, result shows that the FDI has a significant positive impact on economic growth.

5. Conclusion

Based on the findings derived from the analysis conducted in our study, comprehensive conclusions can be drawn regarding the influence of various macroeconomic variables on the economic growth of Pakistan.

Result obtained from least square (NLS and ARMA) method we can conclude that the inflation has significant negative impact on the economic growth of Pakistan, while the exchange rate, export and FDI have a significant positive impact on the economic growth of Pakistan. The inflation rate has a significant negative impact on economic growth suggests that high inflation rates can lead to reduced consumer purchasing power can hinder GDP growth. The exchange rate has a significant positive impact on Pakistan's economic growth suggest that a favorable exchange rate can boost exports, attract foreign investment, and improve competitiveness in international markets, thereby contributing positively to GDP growth. The exports have a significant positive influence on economic growth in Pakistan suggest that an increased export activities can lead to higher foreign exchange earnings, job creation, and enhanced productivity in domestic industries, all of which contribute to GDP expansion. The FDI has a significant positive effect on Pakistan's economic growth suggest that the foreign direct investment brings in capital, technology, expertise, and market access, stimulating economic development, creating employment opportunities, and fostering innovation, thus positively impacting GDP growth.

Results obtain from granger causality analysis reveals unidirectional causality from inflation rate and FDI to GDP. Meanwhile, a bidirectional causality exists between exchange rate and GDP, as well as between import and GDP. However, no significant causal relationships were found between the other variables. Unidirectional causality from inflation rate to GDP suggests that changes in inflation might lead to changes in GDP, but not vice versa. In Pakistan, high inflation can erode purchasing power and discourage investment, potentially slowing economic growth (GDP). However, economic growth itself might not directly influence inflation in the short term. Unidirectional causality from foreign direct investment to GDP suggests that FDI inflows might have a positive impact on Pakistan's GDP. FDI can bring new capital, technology, and expertise, which can boost productivity and economic activity. Bidirectional causality exchange rate and GDP suggests a more complex relationship. A weaker Pakistani Rupee (depreciation) can make exports cheaper and imports more expensive. This could stimulate exports and potentially lead to higher GDP. However, a weaker Rupee can also lead to inflation by making imports more expensive. Conversely, strong economic growth (higher GDP) might attract foreign investment and increase demand for the Rupee, leading to appreciation. Bidirectional causality imports and GDP suggests a two-way relationship. Higher GDP might lead to increased demand for imports, as consumers and businesses have more money to spend. Conversely, imports can be a source of investment goods and raw materials, which can contribute to economic growth (GDP). No significant causality between other variables included in the study. This doesn't necessarily mean there's no connection, but it might indicate a weaker or more complex relationship that Granger causality couldn't detect.

In conclusion, the findings from our research highlight the importance of managing inflation rate to avoid negative repercussions on economic growth in Pakistan. Moreover, leveraging a favorable exchange rate, promoting exports, and attracting foreign direct investment are crucial strategies for fostering sustainable economic growth and development in the country. Policymakers can use these insights to formulate effective policies aimed at enhancing macroeconomic stability and promoting long-term prosperity in Pakistan.

6. Recommendation

Analysis conducted in the study regarding the influence of various macroeconomic variables on the economic growth of Pakistan, the following recommendations can be made:

Inflation Management: Given the significant negative impact of inflation on economic growth, it is crucial for policymakers in Pakistan to focus on managing inflation rates effectively. Implementing measures to control inflation can help maintain consumer purchasing power and support GDP growth.

Exchange Rate Policies: Leveraging a favorable exchange rate can play a vital role in boosting exports, attracting foreign investment, and enhancing competitiveness in international markets. Policymakers should consider strategies to maintain a competitive exchange rate to support economic growth.

Export Promotion: Promoting exports is essential for driving economic growth in Pakistan. Increasing export activities can lead to higher foreign exchange earnings, job creation, and improved productivity in domestic industries. Encouraging export-oriented policies can contribute significantly to GDP expansion.

Foreign Direct Investment (FDI) Attraction: Fostering an environment conducive to foreign direct investment is crucial for stimulating economic development in Pakistan. FDI brings in capital, technology, expertise, and market access, which can drive innovation, create employment opportunities, and positively impact GDP growth.

Policy Formulation: Policymakers should utilize the insights from the study to formulate effective policies aimed at enhancing macroeconomic stability and promoting long-term prosperity in Pakistan. By aligning policies with the findings on inflation, exchange rates, exports, and FDI, Pakistan can work towards sustainable economic growth and development. By implementing these recommendations and aligning policies with the insights derived from the study, Pakistan can strengthen its economic foundations, attract investments, boost exports, and ensure sustainable growth for the future.

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