**SPCRD GLOBAL
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Sustainable Solutions

RAMSS Review of Applied Management
and Social Sciences

Journal homepage: <http://ramss.spcrd.org>

ISSN (Print): 2708-2024

ISSN (Online): 2708-3640

Inflation and Growth Nexus in Pakistan: A Time Series Analysis

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ARTICLE DETAILS	ABSTRACT
History: Accepted: 26 May 2020 Available Online: 30 June 2020	<p><i>This study is related to recognize the effect of inflation on economic growth in the case of Pakistan. Inflation is a state when the general price level moves to increase. A large number of people say that if unnecessary money pursues meager goods this state is called inflation. This analysis is comprised of data from 1981 to 2014. Selected variables are Gross Domestic Product growth rate, Inflation, Child labor force, Unemployment, and Gross fixed capital formation. The inflation will work only if the rising price process prevails in the country and increases in wages, devaluation of the currency, an increase in oil prices, and an increase in indirect taxes. This finding fails to provide credibility in the direction of observation that developing countries are confronting a persistent decline in the gross domestic product due to the devaluation of the currency. ARDL technique and unit root test are used to find stationary. There is no single solution to the conflict. So, the Government should accept those measures such as monetary and non-monetary to fight it. These measures can be classified as under monetary measures, Fiscal measures and General measures. Credit rationing put to get a better gross domestic product. Policy commands that Pakistan should adopt an energetic plan for encouraging gross domestic product utilizing exceeding channels.</i></p>
Keywords: Gross Domestic Product, Inflation, Child Labor Force, Unemployment, Gross Fixed Capital Formation	
JEL Classification: P24, P44	
DOI: 10.47067/ramss.v3i1.29	

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1. Introduction

This study illustrates that low inflation and high economic growth is the primary intention of macroeconomic policymakers. So, the greater part of the research includes inflation which relates to macroeconomics. Many factors affect inflation, such as monetary measures, credit rationing, central bankers, and many others. Consumer price index, Sensitive price index (SPI), and GDP Deflator is a

measure of inflation. In the United States annual rate of inflation is 2.4% in the 1960s, 7.1% in 1970s, 5.5% in 1980s, 3.0% in 1990s and 2.3% in 2000s. Even when the U.S. inflation problem during the 1970s turns severe, however, it was no matter which compares to the situation of extraordinarily superior inflation which is called hyperinflation. The economic law concealed services to guide Inflation is not as strange. Inflation means a rise in the normal level of prices and at which the price also requires a large amount to pursue a very small number of commodities. To appreciate the increase in price for that reason, we must be aware of money. Supply and Demand factors of inflation have special effects over the country, thus inflation has severe effects on the economy.

The economic study of Pakistan 2009-2010, the inflation rate was 11.5 %. Out of this, the price of foodstuff inflation is 12% and the price of non-foodstuff inflation is 11%. From 2008 to 2009, the inflation rate was 22.3%. While it was 13% on the foundation of in 2010-11. In April 2012 the inflation rate was 10.8% based on consumer price index out of this, foodstuff inflation is 11.1% and non-foodstuff inflation is 10.7%. Within 2012 to 2013 inflation rate is 7.5% on the base of a consumer price index. Out of this, food inflation is 6.6% at the same time as foodstuff is 8.1%. Inflation value is caused by A devaluation of currency more than an 11 percent inflation rate per year record higher taxes, short of expansionary policies due to hindrance in production, and decrease economic growth. The international point of view into merchandise and petroleum prices also to force complexity lying on familial inflation. Causes of the rise in prices such as international inflation rise in wages decrease in production, disturbance in the money supply, population pressure, and imperfect social structure which resulted in rebel inflation. Therefore rising price level towards demand-side factors is called demand-pull inflation. Whereas price level increases toward supply-side change which is called cost-push inflation. It is observed that the cost shove and demand drag inflation during the year 2011 to 2012. Normally; CPI is used to measure inflation. However, it reduces at 9.7% through solitary numbers in December 2011. Here in April 2012 it rises highly and arrives at 11.3%. Foodstuff inflation happens from uppermost year to lowly year at 9.2% while nonfood stuff inflation occurs through the uppermost year to lowly year at 11.6%. Price rises are one of the obstacles on the way of development.

Inside the economy, price rises are a constant raise into the universal cost intensity of economic consumption in specific time duration. Inflation is a composite economic event that has still greatly notice by macroeconomists, policymakers of underdeveloped country and advanced countries. Inflation is also a foremost topic in macroeconomics along with the primary affair of the policymaker and the general people. There are two main types of inflation (demand-pull inflation) it occurs in the economy when aggregate demand is larger than aggregate supply (cost-push inflation) it mentioned that it becomes a cause of high in the price of basic input of the production process. The countries macroeconomic situation had an important effect on the link between economic growth and inflation. In a Asia Pakistani can be concentrated toward the increasing nation, Gross domestic product growth rate of Pakistan in the 1970s can be examined which is lesser than 5% as on another hand at the same time, price rises are demonstrated superior to 10%. Inflation has many positive as well as negative impacts on the economy of a country. If we consider the negative impacts of inflation, it consists of a rise in the alternative cost of keeping money, there is also a consequent fall in foreign and domestic investments. Also, the rate of savings began to fall when there is inflation in a country the producers start to store goods to further increase in the prices by creating a deficiency in coming up. Positive influence may involve that a very small rate of interest remains greater than zero. It decreases the actual stress of private and national liability so that the economy can stay steady by the central bank and a decrease in unemployment due to a fixed wage rate. They work out a deal among inflation as well as growth occurs in this case with the intention of inflation to create into economic strategy because it is a leading example. Inflation behavior is a more concentration aspect for the macroeconomist and central bank together into their hypothetical

contest and in practical studies. Inflation is a conflict situation for economic growth. Inflation is a situation of persistent rise in common cost level inside the country, the prices of fluctuations at the start price falls but then rise to higher than the initial point. For example, International Inflation, No limit to growth, a Persistent increase in Inflation, private inequality, population pressure, and Increase in money supply, an increase in wages, and many more. The purpose of this learning is as follows: To examine the effect of price rises on GDP, to study the result of Population on GDP, to analyze the impact of Gross fixed capital formation (GCFC) on GDP, to investigate the effect of Money Supply on Gross Domestic Product and to analyze the existence of price rises on GDP. Their force provides evidence on the linkages among price rises and gross domestic product changes from 1981 to 2014 in this study.

Figure 1: *Trend & Size: Impact of inflation on economic growth: A case study of Pakistan*

Source: Data has been collected from state bank of Pakistan (SBP)

This figure shows the trend of color lines. Firstly the green line represents the gross fixed capital formation. Secondly, the brown line specifies the child labor force. Thirdly skyline indicates hat inflation. The green line shows that gross fixed capital formation is in the starting decreasing then will be increasing due to some market forces after that it will go on decreasing after the year 2008. While the brown line shows the child labor force working in the country it is in the starting decreasing trend after that it indicates the same trend in 2004 then till 2011 while after that it will remain a stable trend in the year 20012 to 2014. Green line shows the same trend in 2001 till in a little way but brown line indicates child labor force it is in the starting show decreasing trend and then increasing. Skyline indicates the inflation rate it shows an increasing trend till 2014. So we can say that the level of inflation will remain at least the same it has also a negative impact on economic growth.

2. Literature Review

Borensztein, E., et al (2007) the data composed from the period 1960-2005. Objectives of inflation and gross domestic product: In this study of Sri Lanka. To be tested using a co-integration analysis (ADF), Granger causality test (GCT) be used to verify even but the way of causality runs from inflation to economic growth and generalized impulse response analysis (GIRA). In which to examine time-series data. These were variables such as GDP, INFL, INV, and economic growth so the relationship was not significant among financial expansion and price rises. It resulted in the specialist of the financial strategy thought that inflation is adverse to economic growth. Whereas formalism accepts that limited inflation can lead to economic growth and then it will be more supportive of the monetary authority to control inflation in the economy.

Falki, N., (2009) observes the effect of foreign direct investment on financial expansion inside Pakistan. The time-series data was used over the period of 1980 to 2006. It examines the association among Foreign Direct Investment and financial enlargement through means of the manufacturing function. FDI made easing the ability to new technologies and it identified the development attractive factor in rising countries. The variables were used in this study such as FDI of real GDP, labor, physical capital. The cointegration regression, Durbin-Watson test technique was applied to test the cointegration of variables. It mentioned that FDI had not statistically significant because of the negative sign. We concluded that Foreign Direct Investment had helped to increase the financial expansion and get international development aims of increasing standard income level and decreased whole poverty. This study was discovered a physically powerful connection among capital accumulation, foreign direct investment, and production growth.

Zakaria, M. (2010) analyzed the association among inflation plus trade openness inside Pakistan. The annual time series data was used between 1947 to 2007. The variables were used such as inflation, Openness, Money supply, Fiscal deficit, Exchange rate, terms of trade, overseas debt, per capita income, CPI. In this study macroeconomic variables like financial shortage and money, supply had a statistically predictable major effect on the inflationary domestic process. We concluded to it had a pessimistic association among openness and inflation. So, inflation is a solitary hindrance in the way of economic development.

Hussain, et al. (2011) the period from 1978-2010. Analyzed the association among financial enlargement and price rises in Bangladesh. It indicated the occasion cycle. This study was using the cointegration technique, Phillip Perron test, and better dickey fuller test. It forces main focus was on inflation, economic growth, co-integration, Granger causality. Too much money caused increasing the production cost and decreased in exchange rates. In this study, the variables were used such as INF, CPI, GDP, and Openness. The Co-integration test was too connected to the error correction model EMC and there applied granger causality experiment to settle the way of causality in the middle of two changeable effects. It resulted was with the intention of association among economic development and price rises either it would be negative or positive. Hence with the study of high inflation had never been favorable to economic growth

Aurangzeb & Ul Haq, A. (2011) period from 1960-2006 Examined the inflation and economic growth: Evidence from Pakistan. This study was on time series data in this article these variables were used such as GDP growth rate, inflation, investment, CPI. Some famous techniques have taken the improved dickey fuller test and Phillip perron test would be sent on the way to make sure the existence of element basis of the time series variables. Our experimental effort also shows an important association among two items such as price rises and economic improvement. For the period of the long way so, it slows the economic growth and the aim of the Pakistan government had on the way to received single-digit inflation of custody on close to the digit.

Chaudhry, Qamber and Farooq (2012) observed the economic strategy, the price raises and cost-effective with the reference Pakistan: and investigate the relationship, co-integration, and causality. We study the relationship of variables, co-integration, and causality in which period from 1972-2010. In this study time series data was used. The study used variables such as RGDP, Credit, CPI, REXR, CMR, INF. The two main goals of the policy were to obtained cost constancy and economic enlargement inside the country. We analyzed the most popular technique better dickey fuller test could be there use on the way to verify the motionless sequence a jerquer bear test granger causality test was used. The result that actual substitute price became the reason toward financial plan scarcity also economic deepness inside

Pakistan this was agreed using hypothesis

Pradhan et al. (2013) examined the effect of supply market growth lying on price rise surplus financial enlargement of Asian countries during the period of 1988 to 1998. In this study, we lead to panel granger test relatively effortless mono variety sequence of investigation. Examined the fundamental connection among stock price market place of growth, financial enlargement in addition to price rises inside a great section of Asian countries. Those variables were such as GDP, INFL, MAC, TRA, TUR, CPI was showed stock market development. We concluded that stockpile market growth also price rises might faster the economic performance of countries.

Farid and Khan (2012) here we use the data of time series from 1972-2007. Which examined the relationship between inequality in income, inflation, and economic expansion in Pakistan. We applied the technique of co-integration analysis. In this article discussed inequality, development, manufacturing due to inflation and income equality. The inflation rate had been the effect on poor people. Employment provided opportunities were not enough to reduce income equality and poverty. In this study time series data had been used in this article variables were used such as income, inflation, employment, GDP, GINI. MLR test corrected 3 co-integrating vectors and the granger causality test technique used in this article. Concluded that government economic policies should give more attention to redistribution of income through advocating progress taxation. So it the necessary government would take the economic policy to mobilize

Yabu and Kessy (2015) examined appropriate threshold level of inflation for economic growth in three founding EAC countries. The key objective of this research is to examine the relationships among economic growth and inflation. EAC must know the suitable threshold level of inflation at the farther side which may be causing harm for capable economic growth variables such as inflation logy, INFL, PG, INV, FD, OPEN, FDI. This study estimated random effect vs. pooled effect model. If the threshold level below which had positive or non-significant effect on economic growth. EAC members stated had a significant and positive effect on growth. The EAC members determined to help economic growth.

3. Theoretical Framework

Monetarists oppose that if the rate of growth of national income is lower than money supply then at that time inflation occurs. If money supply increases inline using price rises then according to Friedman who said that there will be no inflation. "Inflation vary and happen in anywhere regarding monetary fact"

Accordance with (Fischer Version) who elaborated Quantity theory of Money

$$MV=PT$$

Where V= Velocity of exchange, M = Money Supply, P= Level of Prices, and T = no of Transactions.
T is difficult Local calculate that's why it replaces for Y denoted as National Income

$$\text{As a result } MV = PY$$

Whereas Y =national output

This equation should keep the value of the expense on services and goods which equivalent to the value of national production. On the other hand, the argument that the reason for inflation is unnecessary increases in the money supply. Monetarists believe that in the short term velocity (V) is permanent. This is because the rate at which money circulates is determined by institutional factors e.g. how often workers

are paid does not change very much. Friedman admitted that it may vary a little but not very much so it can be treated as permanent. Monetarists also hope that Output Y is fixed. In this situation, it may vary in the short run but not in the long run. Therefore, an increase in the Money Supply will take to an increase in inflation

For example, if Money Supply is primarily £1000 and the circulation Velocity is as 5. The output Level is taken as 5000 units. Then quantity equation become as $1000 \times 5 = 1 \times 5000$

If the supply of money gets binary then equation = $2000 \times 5 = 2 \times 5000$ (the level of must be double). According to Friedman who calculates that an increase in the supply of money would take about 9 to 12 months, it increases the level of output. The production will come back toward its original stability following another year causing a rise in the money supply that holds an increase in prices.

According to the quantity theory of Cambridge Version $P = f(M)$

In the model of AS and AD described by

- i) With an increase in the Money Supply, people have extra money to purchase more and more goods; this will move the AD curve.
- ii) in case of Firms respond to rising production along SRAS, from A to B
- iii) Now production of country rise than the stability level of output. Thus there is age proof inflationary.
- iv) Firms want to hire more employee so salary increase lead stories in cost and hence level of prices. Because they observe an increase in nominal wages initially workers have the same opinion to work extra hours.
- v) Money can buy less as prices rise so there is an improvement to the shifting left of the new AD
- vi) Also employee identifies the rise in nominal wages is not a rise in the real wage. Therefore, the employee also demanding an increase in nominal wages in such extent which will benefit for their real wage and generate more productivity to compensate them for increasing prices, therefore Short-run AS move to the left
- vii) The economy has a struggling output at the level of equilibrium, but r prices should be at a higher level.

Hence the increase in the Supply of Money brings about an increase in Aggregate Demand, But because the Long Run AS is not elastic which leads to inflation named demand-pull inflation.

Inflation is an international phenomenon. A region in the entrepreneurial world is not linked by the force of rising prices. Inflation is a vast and rapid rise in the general price level. A small rise in the price level is not regarded as inflationary in the economic term. Furthermore, inflation is not dangerous always. A rise in the price levels is not be considered as inflation in the duration of depression, as it does not have any more dangerous results for the economy. Therefore, cautiously rising in prices the clause of disequilibrium in which an extension of purchasing power leads to the basis of rising in the price level. So there are two methods in the theory of inflation, named as,

- The Excess Demand Approach
- The Quantity Theory of Money Approach

The approach of the Quantity Theory of money describes the characteristics that arise in the quantity of money that bring about an inflationary increase in the level of price. On the other hand, the approach of Excess demand, propose that inflation is a requirement in which the overall demand for goods surpasses the supply of the total goods. In theories of inflation, the quantity of money which is growing faster than real national output is expanding so, the purchasing power is falling. "Inflation is a state of generally rising prices and the falling value of money".

4. Data, Variables, and Methodology

4.1 Nature and Source of Data

To make the model, in this paper I have chosen the data of time series for 34 years. I comprised the time duration of 1981 to 2014. In this research, the techniques of econometric such as Unit root test and ARDL are used. I have taken secondary data from various resources. The sources of the data assortment International Monetary Fund, Pakistan Bureau Statistic, Handbook of statistics of Pakistan, State Bank of Pakistan.

Table: 1 Explanatory Variable with Expected Sign of ECM Model

<i>Variables</i>	<i>Descriptive Variables</i>	<i>Unit of Measurement</i>	<i>Source</i>	<i>Sign</i>
<i>Dependent Variable</i>				
<i>GDP</i>	<i>Gross domestic product</i>	<i>percentage</i>	<i>SBP</i>	
<i>Independent Variable</i>				
<i>GCFC</i>	<i>Gross capital formation</i>	<i>Million Rupees</i>	<i>SBP</i>	<i>+ve</i>
<i>POP</i>	<i>Population</i>	<i>percentage</i>	<i>WDI</i>	<i>-ve</i>
<i>INF</i>	<i>Inflation</i>	<i>Million Rupees</i>	<i>SBP</i>	<i>-ve</i>
<i>UE</i>	<i>unemployment</i>	<i>percentage</i>	<i>WDI</i>	<i>+ve</i>
<i>CLF</i>	<i>capital-labor force</i>	<i>Million Rupees</i>	<i>SBP</i>	<i>+ve</i>

source:(Data has been collected from FBS and SBP)

4.2 Methodology

“Autoregressive distributed lag” (ARDL) is an econometric technique that represents the auto lag values and also has a distributed lag component. ARDL model was introduced by [Pesaran et al. \(2001\)](#) to incorporate I (0) and I(1) variables in the same estimation.

4.3 Model Specification

$$GDP = \beta_0 + \beta_1(GCFC) + \beta_2(INF) + \beta_3(POP) + \beta_4(UE) + \beta_5(CLF) + \varepsilon$$

Where sign represent

GDP=gross domestic product

POP= population

UE= unemployment

INF= inflation

GCFC= gross fix capital formation

CLF= capital labor force

There are some of the variables that effect (GDP) such as unemployment, POP, GCFC, inflation, CLF.

Figure: 2 *Dependent and Independent variables*

4.4 Description of variable

The description of the variables is as follows:

4.4.1 Gross domestic product (GDP):

Gross domestic product (GDP) is the basic sign used to judge the strength of a country's economy. It shows off all total dollar value of goods and services produced in the exact period. Generally, GDP is articulated as a contrast to the previous year. GDP is an important variable for measuring economic activity. GDP is standing for the sum of consumer spending, housing, business investment net exports, and government purchases. To measuring the GDP is difficult but the used computation which is very essential can be ended in two ways such as income approach and expenditure approach. So both procedures must appear. GDP shows the monetary value of all goods and services produced within a country at an exact period

4.4.2 Population (POP):

In this model POP is the gross population. The total population of Pakistan that was estimated by the economic survey that was around 189.9 million people in 2015 is the latest figure. If the population of an economy is increasing then it means poverty of Pakistan also increasing if the population is not comprised of the effective labor force. If the percentage of effective labor force increasing then poverty ratio will be down.

4.4.3 Gross fixed capital formation (GCFC):

Gross fixed capital formation comprise land development, plant machinery, and equipment purchases and the construction of roads, railways and that is similar to counting schools, offices, hospitals, private residential dwellings. Fixed capital formation refers to the method of a firm raising its stock of fixed capital. GCFC is the net amount of fixed capital accumulation

4.4.4 Unemployment (UE):

UE stands for unemployment. The physically active people do work but they do not have any job or means of earning they are referred to as unemployed. At this stage Pakistan is facing a high level of unemployment this is the basic reason of poverty in Pakistan because a big part of the population has no opportunity any way of earning they can not fulfill their basic needs even food

4.4.5 Inflation (INF):

Inflation means an increase in the general price level. When money supply rises it will also cause a rise in the general price level that is called inflation. There is the effect of inflation on those people

whose income is less than the poverty line increase in price level leave a great impact on poor people they become unable to purchase even basic needing zakat will help them in this situation.

4.4.6 Child labor force (CLF):

Child labor means the employment of children in any work that they do not go to school and to take away from their childhood. These children mostly worked in agriculture, home-based assembly operations, factories, mining, and services. Child labor having aged 5-14 years proportionally. Their working hours are longer and there is no link between work and income. As a result, producers frequently exploit child labor. They work under physical, social, and mental pressure. Good governance should be brought in a country where market imperfection could come to an end and the common man's life could be better.

4.5 Process of Estimation

The theory of estimation describes the characteristics of an organization that accumulates the technique to resolve the issue simply, illumination from realism for the value of abomination has chosen from this illumination compared to consideration passing through observations. We don't have any idea about consequences exactly but it has a connection to observe many characteristics. If the observations are authentic than the possibility of any error will not exist and then consequences will resolve without any errors. So the all trial at whatever time repeated the values must be similar. That's why the theory estimation relates to these observations, and these observations make it easier to attain the possible level on the right basis.

4.5.1 Data Stationery

Stationarity of data means of forecasting of variables. It is applied to ensure the integration of data in various orders. Stationary present when variance and mean are continuous mean and variance is not steady means stationary is not present. If the collected data is not stationary then the prediction is not feasible.

4.5.2 ADF Unit Root Test

Sampler evolution which is used to operate to abolish the parameters is the technique of Augmented Dickey-Fuller (ADF). For this study, the Time Series Data apply, and when there is an unexplained deterministic tendency exist then we suggest using the ADF test to clear the determinants complication for the enhancement corrosion analysis. From the restrictions of these tests, we achieve statistics methods. Accordance with Time Series Data the innovation in these tests illustrates the relationship of the ADF t-test with ADF. These tests apply to verify the non-stationary and also used to formative the implication whether it is deterministic stochastic or. The t-test is also known ADF tests and these tests recognized as Z_t tests and Phillips Z_α . The ADF test also applies to modify economic models. The restrictions of stable valuation are simple transformation and it is helpful to verify the parameters offered by the ADF tests for all obscure problems.

4.5.3 Bound Test

Some economists of various region s assume several models to manage the exchange rate from the previous fifty years. So these tests identify the confirmation of long-run relations between prices of various goods, exchange rate, and interest rate, etc. So that from it we can obtain comprehensible information or durable authentication about theories of non-equality and equality. The international level would become the main issue that explains how to deal with the exchange rate, how it can determine. There is no contented point of view about the rising prices that how to illustrate the level of significance of the exchange rate. But with time reports are misplaced to illustrate the exchange rate correctly so

economists in U.S.A assume Bound-Tests to settle on the exchange rate. By using the of Bound- Tests the models reassure and the problems of exchange rate resolve.

4.5.4 ARDL Method

An econometric investigation about the long run and short-run relationships concentrates on theoretical and experimental investigation. When variables illustrate the various analysis of stationary, it becomes more difficult to comprehend. Stationary relate to the long-run coefficient of variables. But long-established ARDL approach is not useful for this research. There are a few small samples for presentation of ARDL-Sc, ARDL, AIC. There are two criteria for the estimation of parameters;

- (1) at. the first distinction level
- (2) (o) at. the best level.

The ARDL methodology used to estimate the inaccuracy of parameters in the long run.

4.5.5 Analysis of Co-integration

The term co-integration establish by the presence of a long-run relationship between the variables where at level one non stationary co-integration is applied to examine the relationship of variables for the long run term. If the long-run relationship does not present then we need to find out the short-run relationship between variables.

4.5.6 Econometric Model

We distinguish the subséquent équation to examine the spécial effets of Unemployment, Inflation, and Population on the Gross domestique Product:

$$\ln(GDP_t) = \beta_0 + \beta_1 \ln(INF_t) + \beta_2 \ln(UE_t) + \beta_3 \ln(POP_t) + \beta_4 \ln(CLF_t) + \beta_5 \ln(GCFC_t) + U_t$$

Where GDP_t , INF_t , $GCFC_t$ and CLF_t , UE_t and POP_t gross domestic product, inflation, child labor force, gross fix capital formation, and population. Time series data has been taken in the natural logarithm denoted as (Ln). β_1 , β_2 , β_3 , β_4 and β_5 are the Parameters which showed the long-run elasticity of poverty regarding GDP, POP, CLF and inflation and GCFC respectively. Cointegration approach such autoregressive distributed lag (ARDL) used to avoid restrictions that data must be significant at I (1) or I (o). Pesaran, Shin et al. (1996) developed this advance whereas Pesaran et al. (2001) extend it further. Because of different econometric advantages over other techniques of examining cointegration this technique has acquired huge recognition. The main advantage of this technique that it does not make all the variables to remain integrated into a similar order as I (1). This technique is equally exceptional if variables in a model are I (1) or I (o).

Bearing in mind above recompense of technique to examine cointegration which is ARDL, we identify subsequent version to identify the long-run relationship in ARDL:

$$\begin{aligned}
& \beta_0 \sum_{i=1}^q \beta_1 \Delta \ln(GDP_{t-i}) + \sum_{i=0}^q \beta_2 \Delta \ln(INF_{t-i}) + \sum_{i=0}^q \beta_3 \Delta \ln(GCFC_{t-i}) \\
\Delta \ln(GDP_t) = & + \sum_{i=1}^q \beta_4 \Delta \ln(CLF_{t-i}) + \sum_{i=1}^q \beta_5 \Delta \ln(POP_{t-i}) + \sum_{i=1}^q \beta_6 \Delta \ln(UE_{t-i}) \\
& + \beta_7 \ln(GDP_{t-1}) + \beta_8 \ln(INF_{t-1}) + \beta_9 \ln(GCFC_{t-1}) + \beta_{10} \ln(CLF_{t-1}) + \beta_{11} \\
& \ln(POP_{t-1}) + \beta_{12} \ln(UE_{t-1}) + U_t
\end{aligned}$$

In the above equation Δ is the difference and as we know q is lag difference $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 shows the short-run parameters of the above model where $\beta_6, \beta_7, \beta_8, \beta_9$ and β_{10} shows the parameter of long-run elasticity in the model before applying the ARDL model we should test our variables are significant on $I(1)$ and $I(0)$ if any one of the variables is significant on $I(2)$ then ARDL is not valid so first we should apply unit root test. Then we should apply bound test the F -statistic value should be higher than the lower bound value if this is then we select the best possible lag length of variables. The (ECV) is given below:

$$\begin{aligned}
\Delta \ln(GDP_t) = & \beta_0 \sum_{i=0}^{q_1} \beta_1 \Delta \ln(INF_{t-i}) + \sum_{i=0}^{q_2} \beta_2 \Delta \ln(GCFC_{t-i}) \\
& + \sum_{i=0}^{q_3} \beta_3 \Delta \ln(CLF_{t-i}) + \sum_{i=0}^{q_4} \beta_4 \Delta \ln(POP_{t-i}) + \sum_{i=0}^{q_5} \beta_5 \Delta \ln(UE_{t-i}) + \lambda EC_{t-1} + \varepsilon_t
\end{aligned}$$

5. Results and Discussions

“Unit root test” is the econometric technique used to check the variables of time series are stationary or non-stationary by applying an “Auto-Regressive technique. “Augmented Dickey-Fuller test” is normally used when samples or data of variables are very large. “Denis Sargan” and “Alok” introduced “optimal finite-sample tests” to check unit root in autoregressive models. If variables from time-series data so there is a need to check whether the data of time series is stationary or non-stationary in figures usually apply unit-root-test. There is a limited sample test of unit-root-test but we applied ADF, PP, and DF-GL

Table:2 Unit Root Test

Variables	DF-GLS	TEST	PP	TEST	ADF	TEST	RESULTS
	Level	1st DIFF	Level	1st Diff	Level	1st Diff	
GDP							I(1)
Intercept	-3.8501	-7.0829	-4.2910	-10.781	-4.1798	-6.9625	
T&I	-4.1537	-7.1364	-4.2405	-10.674	-4.1085	-6.8933	
None			0.1727	-10.945	0.2909	-7.0647	
INF							I(0)
Intercept	-1.0717	-0.5460	-4.5860	-9.3550	-4.4591	-7.2015	
T&I	-4.2435	-7.9629	-4.6617	-8.6704	-4.4946	-7.0732	

None			-0.3809	-8.9633	-0.1096	-7.3182	
GCFC							I(1)
Intercept	0.7003	-5.2452	-0.3307	-5.6323	-0.3298	-5.5714	
T&I	-2.7054	-5.5777	-2.6118	-5.5206	-2.6118	-5.4763	
None			10.162	-2.0514	9.1709	-0.8786	
POP							I(1)
Intercept	-0.1017	-5.6130	1.6446	-5.6474	0.6978	-5.6110	
T&I	-2.0029	-5.7294	-1.9433	-8.1773	-2.0590	-5.7107	
None			33.497	-1.4209	13.266	-0.5131	
CLF							I(1)
Intercept	-0.8075	-8.5578	-4.0850	-8.4719	-2.9981	-8.4195	
T&I	-1.1405	-5.4147	-1.5628	-22.407	0.5796	-6.0480	
None			1.4952	-7.8681	1.6736	-7.8952	
UE							I(1)
Intercept	-0.2628	-7.0445	0.6399	-6.9957	0.4437	-6.9957	
T&I	-2.4710	-7.0929	-	-7.1858	-2.4875	-7.0216	
None			21.023	-1.2395	16.381	-0.6184	

Source: Calculation based on software E. views 9.5

In the above table, we have used Augmented Dickey-Fuller (ADF), Dickey Fuller-GLC (ERS) 1979, and Philips Perron 1988 test to check the results about variables of my model. These tests examine the non-stationary and stationary of data. Accordance with outcomes all used variables are stationary at 1st difference. (o) show that variables are considered as stationary at a level while (1) illustrate that variables are considerable at 1st difference. These all variables like GDP (gross domestic product), UE (unemployment), and CLF (child labor force) are the variables that are considered as significant at 1st difference. Whereas INF inflation is considered as significant at level (o). The key variables such as POP and GCFC is also stationary at level (1).

Table:3 Testing of Long-Run Relationship by values of F-statistic as:

Lag order	F-Statistic
1	38.67331

The result shows that upper and lower bound values (2.68 and 3.05 at 95 percent) for F-statistic: And lag 1 is selected for our model as optimal lag length. So there exists a long-run relationship in our model. By using (AIC) Akaike info criterion and ret. the linear trend we have following results of the long-run coefficient of ARDLA

Table 4: Diagnostic Test

Test-Statistic	
Serial correlation	0.9640
Heteroscedasticity	0.6786

The above results show that our values are greater than 0.05 now we can say in these models heteroscedasticity and autocorrelation do not exist now we used the ARDL test in our analysis.

Table: 5 Long-Run Coefficients of ARDL where Dependent Variable is (Gross Domestic Product)

<i>Variables</i>	<i>Coefficient</i>	<i>Std.error</i>	<i>T-Statistic</i>
$Ln(INF_t)$	-0.21290	1.63396	0.130301
$Ln(POP_t)$	-18.6014	28.17435	-0.66022
$Ln(GCFC_t)$	0.40589	1.08608	0.373723
$Ln(CLF_t)$	-60.2450	118.8561	-0.506873
$LnUE_t)$	-4.71326	11.1637	-0.422193

(source: Calculation based on software 9.5 E. views)

The coefficient (-0.21290) of INF shows that there is a negative relationship between INF and GDP one percent increase in inflation leads to a 21% decrease in GDP so we can say by the economic theory that there is a negative relationship between inflation and GDP. So there is a negative correlation between GDP and INF. The coefficient (-18.601466) shows there is a negative relationship between population and gross domestic product. 1 percent increase in population leads to 18% decrease in GDP it means there is also a negative relationship between GDP and population and there is also a negative correlation between GDP and population. The coefficient (0.405896) shows that there is a positive relationship between GDP and GCF (gross domestic product) means a 1 percent increase in GCF leads to an increase in GDP about 40% so; there exists a positive correlation between GDP and GCF. The coefficient(-60.245029) shows there is a negative relationship between GDP and CLF child labor force means a 1 percent increase in child labor force leads to a decrease in GDP there is a negative correlation between GDP and CLF. The coefficient (-4.713265) of UE shows a negative relationship between GDP and unemployment.

Table: 6 Estimate Short Run Relationships

Variables	Coefficient	Std.error	t.Statistic
Constant	-3.9232	1.1058	0.0016
$\Delta \ln(CLF_t)$	0.05668	1.51985	0.03729
$\Delta \ln(INF_t)$	-0.00050	0.01215	-0.04126
$\Delta \ln(GCFC_t)$	-0.00240	0.00613	-0.39259
$\Delta \ln(UE_t)$	-0.90839	0.7837	-0.988
$\Delta \ln(POP_t)$	-0.06890	0.36009	-0.19134
ECM	- 0.01262	0.00088	-14.27984

(Source: Calculation based on software 9.5 E. views)

These are the result of a short-run of vector error correction model the value of ECM lies between 0 to -1 Δ shows the short-run elasticity in the model because we are examining the natural log model. The value of ECM is -0.01262 and it is significant (0.0016) it means GDP in equilibrium in the current period will 1% will be adjusted to the equilibrium to the very next period. In the short run, inflation is positively related to the GDP because in short-run inflation has no significant result as in the long run while in the short-run population is negatively related to the GDP the result is the same as in long run. Inflation also has the same result as in the long run due to a decrease in inflation the GDP will increase.

Table: 7: R-Square Model

R -Squared	Adjusted R-Square	Prob(F-static)	Durbin-Watson
0.998694	0.998368	0.000000	2.921827

This model explains that the value R^2 in the current table is 0.998694 which shows that 19 percent of the variation in gross fixed capital formation is due to variation in US-Real Gross Domestic Product, Gross Domestic Product, Gross fixed capital formation on depreciation. F - Test is of statistical significance. Durbin-Watson is significant 2.921827 so it shows that there is no multicollinearity between the dependent variable of the model. The standardized coefficient suggests that gross domestic product on depreciation is the most important variable which has more impact on inflation.

5.1 Stability Test

Now we check our model is stable at 5% or not for this purpose the CUSUM and CUSUMSQ test

is applied which is represented by Brown et. (1975)

Figure: 3 *Plot of Cumulative Sum of Recursive Residua*

The blue line is between these two red lines it shows that our model is significant at 5% and stable in the long run.

The plot of Cumulative Sum of Squares of Recursive Residuals

Figure: 4 *Plot of CUSUM of Square of Test*

The blue line between two red lines in short runs it is stable in the long run it shows that our model is stable'

6. Conclusion

The findings of this study show the impact of selected variables such as inflation, unemployment, population, GCFC on the growth rate of Pakistan. Our findings imply that the relationship between inflation and economic growth is positive in Pakistan. Monetarists argue that money is an important variable to affect the inflationary pressure by international agencies; this study is not consistent with policy implication. The examination has been completed on the source of annual data of time series used from 1981 to 2014. The ARDL technique is used to find the stationarity. It is also concluded that the result is statistically significant in showing a rising trend of price level hurts economic growth. Inflation below 7 percent encourages a positive impact on economic growth. Therefore, economic growth reduces unemployment and it hurts unemployment. The effect of the total population on unemployment is significant and remains negative. The Augmented Dickey-Fuller (ADF) and Phillips Peron (pp) to check the results of variables. The relation between gross domestic product and population is negative because the population rising in Pakistan's economy and decrease in FDI. This study revealed that CLF is negatively related to gross domestic product. It has a positive impact on the relationship between independent variable gross fixed capital formation (GCFC) and dependent variable gross domestic product. A unit root test is available to test the integration among variables. Error correction model (ECM) to examine the relationship between two variables in the short run or not. The government of Pakistan should aim at closing the inflation at a single digit in this way to growing up economic growth. So the government must take serious steps for controlling inflation by nonmonetary and non-fiscal measures such as rationing policy, better

financial system, and increase in production. Consequently to discover new channels through which inflation-growth relationship is positive and inflation is above 9 percent level which hurts the growth of the economy of Pakistan.

7. Policy Suggestions

- i. This study has been discovering that inflation is harmful to permanent economic growth.
- ii. The real output, interest rates, relative prices, and assets from taxes all are involved because of continuously rising prices.
- iii. The endorsement of social trouble like black-marketing, inducement, smuggling, and abduction are the results of inflation. So there is a need to handles these social problems.
- iv. Inflation leads to encouraging consumption and discourages saving.
- v. It is recommended to keep inflation below 7 percent in the economy.
- vi. The above-mentioned results obtain significant policy implications for domestic policymakers and other development partners.
- vii. Therefore controlling inflation is very essential for accelerating economic growth.
- viii. Thus, policymakers must give attention to adjust the inflation to the minimum rate.
- ix. The appropriate inflation rate is very supportive of lowering the fluctuation and unforeseen situation in the financial sector of the economy.
- x. The policymakers suggest other factors that affect economic growth such as human capital, technological progress, capital formation, and financial system.
- xi. Government policies like the good condition of the rule of law in this way to achieve and sustain high economic growth (GDP).
- xii. Inflation rates have great value in the macroeconomic variable to the change of GDP.
- xiii. The policymakers of monetary policy should make efforts in maintaining and achieving a single level of inflation to support economic growth.
- xiv. The policies should create by fiscal and monetary authorities in such a way that inflation would come down. So, unemployment decline for the reason that falls in inflation
- xv. Policymakers and state bank of Pakistan should struggle for the possible minimum rate of inflation. Hence achieving price stability which is the best policy recommendation of the economics.

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