

An Empirical Analysis of Dual Sector Inflation in Pakistan

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ABSTRACT

Dual sector inflation is very important for any country and so it is for Pakistan. In this study we are estimating the long-run and short-run relationship among the variables using the data of 1974 to 2014. The technique of ARDL is used for this purpose. Data has been collected by the World Development Indicator and by Handbook of statistics. Data consists of time series data. Among the variable inflation is a dependent variable and independent variables are bank, budget deficit, foreign direct investment, money supply, gross domestic product (GDP), exchange rate and trade open. All the variables which have been used are in stationarity by using the approach of Auto Regressive Distributed Lag Model. In this estimation, bank rate and gross domestic product have a negative impact on inflation in the long run coefficient. While on the other hand, budget deficit, foreign direct investment, money supply, exchange rate and trade open have positive effects on inflation. The topic which we have chosen is very important from an economic point of view. When price level of goods and services increases, people will chase few goods and commodities. This will have a great impact on the economy. As a result, economic growth will greatly be affected to either move in upward or may be in downward direction. There are many types of inflation which are demand pull inflation, cost push inflation and built in inflation. From an economics point of view, inflation is a regular increase or rise in the general price level of goods and services in an economy. When the general price level increases, every unit of paper money buys fewer goods and services. Inflation reflects a reduction in the purchasing power of the consumer per unit of money currency, which is the loss of real value. Inflation is increasing day by day and is having a worst effect on the economy. It is controlled by Fiscal Policy as well as monetary policy.

Keywords

Inflation, Money Supply, ARDL, Gross Domestic Product, Budget Deficit

I. Introduction

In economics, inflation is a continuous increase in the general price level of goods and services in an economy over a period. When the general price level increases, every unit of paper money buys fewer goods and services. Frequently, inflation reflects a reduction in the purchasing power per unit of money; it is the loss of real value, as a single dollar can purchase fewer goods. Inflation is a phenomenon which means that our money is not able to purchase as much quantity of a commodity as it could have purchased before. Inflation depends on supply and demand, which are the reasons of inflation. General price level of the goods and services increase, due to changes in demand and supply of the commodity. From the Keynesian, there are three types of inflation, demand pull inflation, cost push inflation and built in inflation. Before the independence of Pakistan in Asia, many people lived together including Muslims, Hindus, Sikhs and many

other's minorities. When subcontinent was divided into two parts, Pakistan and India, many Muslims moved from the land of India to Pakistan to protect their religion, Islam. At the time, the economic situation was at its worst due to the limited allocation of resources whereas a few consumers made up the large cabinet. Less resources were available in Pakistan. Few industries were present. At that time less economic growth meant high inflation. Pakistan's population growth was fast from 30 million in 1947 to over 130 million in 1996. Annual growth rate was nearly 3% in 1960. Average economic growth rate of Pakistan at the time of independence was higher than the average growth rate of the world economy at that time.

Average annual real GDP growth rates were 6.8% in the 1960s, 4.8% in the 1970s, and 6.5% in the 1980s. Average annual growth fell to 4.6% in the 1990s with significantly lower growth in the second half of that decade. During the 1960s, Pakistan was a role model of economic

development in the world, and there was much praise for its economic progress in the globe. Karachi was the capital and was seen as an economic role model around the whole world. Many countries decided to opt for Pakistan's economic planning strategy and one of them, South Korea, copied the "Five-Year Plan". Economic growth was averaged at 5.82% from 27 October 1958 to 25 March 1969 under Ayub Khan who was the President of Pakistan. Manufacturing growth rate was 8.51% higher in Pakistan at that time as compared to the previous years. Pakistan first got an automobile industry, a cement industry and some other heavy manufacturing industries at that time. Tax collection was less than 10% of GDP. The export bonus vouchers companies (1959) and tax incentives activated new entrepreneurs, industrialists and exporters. Bonus vouchers proved to be an opportunity to earn foreign exchange for imports of industrial machinery and raw materials. Due to economic mishandling and particularly fiscally irresponsible economic policies, resulted in a large increase in the country's public debt and resulted in slower growth rate in the 1990s. Two wars were fought with India. First was in 1965 on Kashmir issue. Then in 1971 a war resulted in separation of East Pakistan. As a result, Bangladesh and Pakistan separated and economic growth was affected on a large scale. Separation of East Pakistan brought the economic condition close to recession. Due to the policy of deregulation in the period of 1980, the condition of the Pakistan economy improved a little resulting in inflow of foreign investment and remittances. Abraar Zahoor divided the nationalization of the industries into two eras. First era started when PPP came into power. Z.A. Bhutto tried to bring the financial matters of the country under the state's own control and struggled to give the control of the physical capital to the corporate elite. First phase was totally different from the second era due to its motives and impacts. Second era started in 1974. The first phase was a high point which included strategies motivated by ideological forces. When Bhutto came into power in the period of 1974 to 1976, he promised to reduce role of planning commission and political decision makers.

The corruption rate increased, and the politicians used the public wealth in order to increase the economic wealth power. In the era of Zia ul Haq economic welfare boosted, both at domestic and international level. Tarbela dam was completed in his period. Agricultural growth, fertilizer industries and cement industries were given importance by Bhutto, financially. Wages of the workers increased which helped in the growth of the economy. Remittances from foreign countries contributed of 10% to the GDP. In Zia Ul Haq's era United States helped the Afghan Mujahidins through Pakistan which raise growth rate of the economy. Zia highly concentrated on the market economic policies.

In 1990's election Nawaz Sharif came into power for the first time in the history of Pakistan. With the help of economic liberalization and decentralization the chain of inflation broke because of the struggle of the government of Nawaz Sharif. At that time the economy rose above from recession but only temporarily. The growth of the economy was not permanent as many plans were turned down by the PPP government. They said that Nawaz Sharif's government did not consider other matters of the country and only paid attention on fixing prices of the markets. At that time, Sartaj Aziz came on front and took notice of that statements.

When PPP came into government then Asif Zardari who was the president of Pakistan and Youssef Raza Gilani was the Prime minister of Pakistan. At that time level of social evils was high like increase in suicide, dishonesty, rise in unemployment rate, lack of national security and poor economic policies. In that result the economy of Pakistan again came in the phase of stagflation that condition was seen in the era of 1990. In the history of Pakistan economic circumstances was decline from 8.96% to 4.09%.

In this table rate of inflation are showed of different years, in 1999 inflation rate was 6% while 5.2% in 2000 and then decline 4% in 2001. On the other hand, again inflation rate was high in 2005 due to inefficient economic policies. And same would happen in years of 2008, 2010, 2011. In 2013 Nawaz Sharif again came authority and got many previous government problems like large budget deficit, high level of debt, less economic growth, lacks energy and hyperinflation. Frequently, they got loan of \$6.6 billion from international monetary fund (IMF). For the sack of to recover the balance of payments (BOP) condition. Then direction of growth was to move in good manner due to high remittances, increase in consumer expenditures and decline in oil prices. The condition of gross domestic product was decline in 2012 and 2013 to 3.59%. In business sector many changes were occur rise in foreign reserves \$10 billion but it to be expected that it will be cross the \$15 billion in the mid of 2014 which is best for Pakistan. In 2008 inflation rate was 25% which was decline in 2014 by 13%. The situation of budget deficit reduced to 3% of GDP while foreign assets are in best position in the year of 2014. In the fiscal year of 2013 to 2014 GDP rate is 4.14% while rate of inflation is 8.5%. In 2015 4.14% is gross domestic product and inflation is 4.8%. 2016 fiscal year GDP is 4.5% which is projected, and inflation rate is 5.1%.

II. Review of Literature

Inflation is present everywhere in the world. Rates of inflation are different in various countries of the world. In the developed countries of the world inflation rate is less as compared to the developing countries of the world. This

variation in inflation rates is because of various reasons and factors. The factors include price level, money supply, GDP, exchange rate, domestic credit, rate of interest, consumer price index etc.

Afridi et al. (1982) studied dual sector inflation in Pakistan. The study was associated with the time series data. Statistical Descriptive technique was used to analyze the data. It showed the significance of standard deviation in the economic analysis not only as a confidence level on a prediction, but also as a basic analytical tool. According to economic index the economy has been disaggregated into two sectors. In the first sector, they had listed 16 commodities which could be considered as “basic foods” which were produced in agriculture sector. While in the second sector they had listed 28 commodities which consisted of industrial products, industrial raw materials and cash crop from the agricultural sector. They had used two sources of data for the purpose of analysis. The CSO price indices of wholesale prices base year (1969-70) for the determination of inflation rate of individual commodities were listed for the two sectors. The “input-output” tables were also compiled at the PIDE with the purpose of showing the weights of commodities as against the total weight of their respective sectors. Inflation was indicated by a shortage in supply and an excess in demand, in every economic period.

Afridi et al. (1983) investigated the Dual Sector Inflation in Pakistan. The data was associated with time series data. On that data Statistical Descriptive technique and Correlational technique were used. Variables used included wheat, maize, bajra, meat, fish, machinery, transport, chemicals, fertilizers, sugarcane, cotton and leather. At that time, 103 variables were included in an econometric model for the period of 1959-60 to 1978-79 for Pakistan economy. The model suggested that inflation in Pakistan had mostly been a domestic phenomenon and was also affected by external factors.

Afridi et al. (1984) examined the effects of dual sector inflation across various income levels in Pakistan. That data was associated with time series data. They surveyed the different income levels and also investigated the preferences. They said that the people facing negative inflation see it as encouragement to save more.

Ahmed et al. (1999) examined the data on the topic of exchange rate and inflation dynamics. That data was associated with the time series data. They used the quarterly data for the period of 1982 to 1996. They used price level of domestically produced goods, money supply and domestic output (real GDP) denoted by P, M and Y respectively. At the end of the work they concluded that (PPP) purchasing power parity did hold for the marginal changes in the price level and exchange rate. It was concluded that for the given world prices the inflation rate

was equalized with the rate at which the exchange rate depreciated. Purchasing Power Parity (PPP) proposition did not take effect in short run. Temporary shocks by dynamic responses allowed the system to adjust gradually to regain the parity in relative sense. Madhavi Bokil et.al studied the data of three attempts at inflation forecasting in Pakistan (2006). That data was related with the time series data. They used the annual data from the period of 1975-2000. Variables such as consumer price index (CPI), velocity (V), (M) broad money and (Y) for real GDP (Gross Domestic Product) were used. Monetary development was described by the Phillips-curve through the technique of the Vector autoregressive model (VAR). They used the recent observations by restricting their sample on the account of fundamental changes in the Pakistan economy.

Khan et al. (2006) investigated inflation in Pakistan. That data was based on the time series data. They used the data from the phase of January 1998 to June 2005 on monthly basis for purpose of estimation of the data. Vector Error Correction model (VEC) and Co-integration techniques were used. Model was specified and included usual monetary variables (money supply, credit), exchange term and the price for sustenance of the adjacent factors of the wheat supply. Inflation rate started to accelerate in the late 2003. During the crisis in the year of 1998 to 1999 inflation dropped below 5% by 2000 and remained stable in 2003. They found that in the short run wheat support price effected the inflation while monetary factors were the main reasons of inflation. Their investigation showed that monetary factors played a dominant role in inflation and affected inflation by a lag of about a year. In short run, changes in wheat support prices had an impact on inflation but not in the long run.

Khan et al. (2007) studied the elements of inflation in Pakistan. That data was associated with the time series data. OLS technique was used for that purpose. They took data from the period of 1971-72 to 2005-06. They used the four indicators for the determination of inflation such as: CPI, WPI, SPI, and GDP which were the dependent variables, while on the other hand economical deficit, interchange rate, wheat support prices, yearly interest rate, charge of annual imports, annual prices of sugarcane, rice, wheat, cotton and money stock were explanatory variables. These were used to explain variations in CPI, WPI, SPI and GDP respectively.

Khan et al. (2009) discussed the Political Instability and inflation in Pakistan. Data was associated with the time series data. At that time, they applied generalized method of movement and used the data from 1951 to 2007. Variables such as inflation and money supply were used. Different techniques had been applied including the Ordinary Least Square (OLS). They had included more

recently Aisen and Veiga (2006) argued that the economy with weak institutions and political unsteadiness did not have efficient tax system that increased their support on seignior age. To come across the demand for community expenses they therefore ended printing unnecessary money that eventually lead to inflation. But according to Khan et al., they argued that above lines of reasoning might be true for extraordinary inflation countries, but not for low and moderately high inflation countries. Rate of inflation was present from top to bottom in the period of 1951-2007, which was 6.99%. They concluded that mixture of predictions of strong form of FTPL and theories of PEMP were more appropriate in justifying a link between political instability and inflation in a low or moderately inflation struck country like Pakistan.

Asmat et al. (2011) studied the monetary variability, output and inflation in Pakistan. Their work was concerned with time series data. They used the M2 and GDP and inflation in their work with simple statistical approach. That data related to time series data. They said that when there are unexpected changes in money supply then it would be strongly linked to output and inflation in Pakistan. They were not sure that the changes would be long run or short run.

Rizvi et al. (2012) studied the factors of inflation in Pakistan economy by an Empirical investigation. That data was related with the time series data and used the time period of the data from 1980-81 to 2007-08. Simple least square method (SLS) and SPSS were used for the analysis of the data in that dependent variable was inflation and independent variables were gross domestic product, import prices, government direct taxes, export prices, government landing. When there was increased in import prices then it meant that increased in the cost of final product. Then prices would raise as a result inflation rate would be high. Export cause inflation in the economy due to the increased demand and increased in prices. But in the matter of Pakistan it was quite opposite. They concluded that GDP, IMP, taxes and government landing were a strong infusion. Inflation could be control by the continuous growth in GDP. Furthermore, government might be cut down expenditures. When above mentioned factors would be controlled in best manor then we would be able to put inflation under effective control

Yasmin et al. (2013) examined the money source, régime borrowing and inflation relationship in Pakistan. That data was the time series data. They used the techniques of vector auto regressive model (VAR) and causality analysis by using monthly data from January 2008 to February 2013. Their experimental grades were based on the fully modified ordinary least square (FMOLS). They suggested that government lending and currency supply was a strong impact on price rises in the

case of long run for Pakistan. They concluded that bidirectional causality occurs between inflation and money supply. However, unidirectional causal connection founded among government borrowing and inflation also in the case of government borrowing and money supply.

Ijaz et al. (2014) was studied the sound effects of terms of trade and explosive nature of inflation in Pakistan. That data was associated with time series. They practiced annual data for the era of 1972 to 2012. They applied GMM technique. Any volatility on the terms of trade (TOT) opposed outcome on the economic growth due to increase in unpredictability raise risk, which disappointed the investment by made investment unsuccessful. While instability of TOT rise in developing states like Pakistan where transfers of goods consisted on the primary goods with altered prices. Favorable effect on inflation under a detached exchange rate when raise in TOT led to nominal and real exchange rate gratefulness. The data in the year of 1970's showed more volatility in TOT as compared to the inflation. Due to an increase in the value of exports TOT was improved in the year (FY) 1974. But in the (FY) 1975, the condition was opposite, and TOT decreased. But in the year of 1980 mixed trend was done with the TOT increased and decreased.

Saleem et al. (2015) investigated the crude oil price and inflation in Pakistan in recent year. That data associated with the time series data they determined the presence and strength of relationship in the middle of the crude oil prices and inflation. They also analyzed the effects of crude oil price on GDP deflator. They used time series data from period of 1979 to 2012. For the purpose of estimation, they used the technique of Johansen Co-integration for short run and long run results. They used variables such as: prices of oil, foreign exchange rate, interest, indirect taxes and unemployment. They were concluded increase in money supply, crude oil prices, exchange rate, interest rate and indirect taxes accelerated inflation while on the other hand increased in real gross domestic product led to decreased in general price level in the short run and long run. They described the results that supply of money, prices of crude oil, rate of exchange, and term of interest and taxes of indirect was positive effect, while real gross domestic product kept negative impact on inflation.

III. Data and Methodology

Data is collected from different websites and we allocate data on the base of variables which are required. It is the main point of research work when we gather useful and accurate data then our results are very accurate. Data provide information about past trend of any country and this convert from one format to another. There is a benefit, data is accumulated from various sources and recorded in computer for processing to producing information.

Methodology is a process in which we solve the research problems in a systematic manner. It consists of theoretical and logical points. Researchers have adopted a series of logical steps. Methodology is the key which support size of sample, data collection, sampling methods, designing instrument for collecting of data, recording analysis and interpretation of data.

Model Specification:

We explain our equation as follows;

$$\Delta \text{Inf} = f(\text{bank}, \text{BD}, \text{FDI}, \text{M}_2, \text{GDP}, \text{EXR}, \text{TO})$$

$$(-) \quad (+) \quad (+) \quad (+) \quad (-) \quad (-) \quad (+)$$

In this equation, Inf represent the inflation rate, which is equal to the bank rate, bd shows the budget deficit, fdi is used for foreign direct investment, m₂ for money supply, gdp present the gross domestic product, exr for exchange rate and open trade. Inflation is the dependent variable which depend on variables such as bank, budget deficit, foreign direct investment, money supply, gross domestic product, exchange rate and open trade. Whereas on one hand bank, gdp and exr have negative relationship with inflation on the other hand bd, fdi, m₂ are positively related.

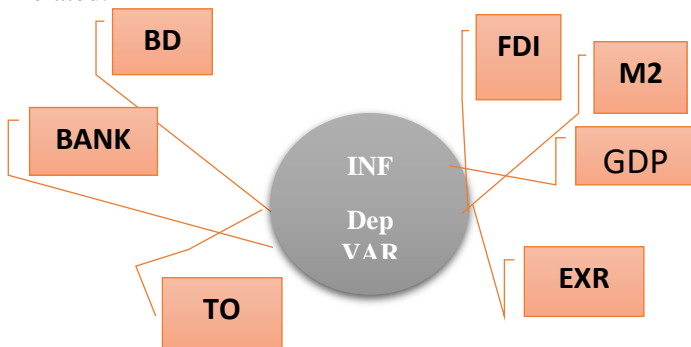


Figure 3: Model Specification

3.1. Description of Variables

In this figure, central point is the dependent variable, which is showing in grey shade while bank, budget deficit, foreign direct investment, money supply, gross domestic product, exchange rate and trade open these are independent variables. Suppose, all above variables changes then there would be one percent change in inflation variable. All points of variables are briefly explained as follow:

3.1.1. Inflation (INF)

It is the proportion alteration in the value of Wholesale Price Index (WPI) of a year over the base year. It efficiently calculates the change in prices of a basket of goods and services in a year. Generally, inflation is measure by considering WPI as a base. When difference in demand and supply of money then it causes inflation, disparities in production and distribution cost which increase the taxes on products. The value of currency falls when prices of goods and services increase. Then every

unit of money purchase small portion of goods and services. Its impacts on consumer and customer because it is difficult for them to buy essential goods due to high price. The solution for this is to increase income level. Inflation should be control by government.

3.1.2. Bank

An institution officially by the government which pay interest rate, loans, accept deposits, clear checks, react as a middle financial transaction and offer monetary services to own customers. Commercial banks borrow from bank and fix the interest rate.

3.1.3. Budget Deficit (BD)

It is the change in the middle of all receipts and expenses in both revenue and capital account of the government. When Government expenditures beyond its total revenues then budget deficit will occur. Budgetary deficit is the addition of capital account deficit and revenue account deficit. When expenditures of the government exceed its total revenue, it results in revenue account deficit. If the capital disbursements of the government expenditures exceed its capital receipts, it moves to capital account deficit. Budgetary deficit is normally expressed as a percentage of GDP.

3.1.4. Foreign Direct Investment (FDI)

Foreign direct investment is an important thing in financial account for any country. In this foreign investment sources bring into domestic scale. In stock market foreign investment is not consider. It is more useful component for any country.

3.1.5. Money supply (M₂)

Money supply is the total stock of money flowing in an economy. In the term of other liquid assets, the socializing money include deposit account printed notes and currency. It is use for analysis and help the policy maker and economists for increasing and decreasing the money supply factor. This estimation is very significant impacts on business cycle and on the economy.

3.1.6. Gross Domestic Product (GDP)

Goods and services produced within a country during identified time the final value of output is known as gross domestic product it usually includes a year. It is an important growth rate for an economic welfare. Inflation is negatively related to GDP. When gross domestic product increases then inflation rate will be decline and with decrease in gross domestic product inflation will be rise.

3.1.7. Exchange rate (EXR)

When two or more countries exchange their goods and commodities and currency interchange between them. Exchange rate either fixed or floating. Due to market demand and supply, exchange rate is calculated by central bank.

3.1.8. Trade Openness (TO)

When trading starts then market opens financial security at some price which is different from previous price. Trade open has a positive relationship with inflation. When trade open increase then inflation level also rises.

3.2. Sources of data

Mostly data is collected from World Development Indicator. Some part of the data is collected from Handbook of Statistics.

Table 1: Data Sources

Variables	Source
Inflation	WDI
Bank	WDI
Budget Deficit	WDI
FDI	WDI
M2	WDI
GDP	WDI
Exchange Rate	WDI
Trade openness	WDI

Procedure of Estimation: Procedure of estimation has following steps.

3.3. Stationarity of Data

We check stationarity of all variables; some variables are stationary at first difference and some at zero difference. Which is showing the stationarity of data?

3.3.1. Augmented Dickey Fuller Test (ADFT)

To examine the stationarity of the data, Dickey and Fuller (1981) proposed a test based on the presence of unit root generally which is known as the Augmented Dickey Fuller (ADF) test. For this test, we conclude that our all selected variables such as inflation rate, bank, budget deficit, foreign direct investment, money supply, gross domestic product, exchange rate and trade open are stationary at level and 1st difference. Discussing about our first variable which is dependent variable inflation, is significant at Level's Intercept, Trend & Intercept but not at none which is also not necessary because if the variable satisfy at least two of these conditions then we can say that our variable is significant. At 1% level of significance, 5% level of significance and 10% level of significance, the result we can be expressed as I (0) which shows the significance at Level. Our next independent variables such as bank and BD (budget deficit) are also significant at the level which can also be judged by simply noticing the values of Intercept, Trend & Intercept and None. The result is as I (1) which means that the variables are significant at level. However, the other independent variables such as FDI (foreign direct investment) and M₂ (money supply) are significant at 1st difference. The result is as I (1) which means that the variables are significant at the 1st difference. Further variables are GDP (gross domestic product), Exr (Exchange rate) and TO are showing the stationarity at Trend, Trend & Intercept. Which concluded that I (1).

3.3.2. Auto Regressive Distributed Lagged Model (ARDL)

The equation can be expressed as follows. It is a technique for estimating the long run and short run relationship between variables.

3.3.2.1. Estimates of Long-run relationship between Variables

In ARDL approach, we consider the long run cointegration between the variables. And from this table, we show that the coefficient of Bank is negative, and its value is -0.038245 which is statistically significant. The coefficient of Bank implies that 1% increase in bank rate will reduce the inflation. It is significant as shown by its P-value i-e 0.0008. Negative sign shows that when bank rate decrease then inflation rate will be increase this shows the negative relationship between bank and inflation. In such situation, government should opt the fiscal policy and as well as monetary policy

In this table, the R-squared is 0.873719, which shows that our model is more favorable. This value predicted that 87% changes in dependent variable is being explained by the independent variables in our model. The value of Durbin-Watson Stat is 1.962657, which is close to the 2 indicating the absence of autocorrelation. Further, the value of Prob (F-statistics) is 0.00001, which shows that our all variables are more significant at 1 and 2 lags.

3.3.2.2. Estimates of Short-run Relationship between Variables

The short-run co-integration is used to describe the Coefficient, Std. Error, t-statistics and the Prob in the short-run. In this table, the last value is CointEq (-1) which also satisfied in our terms that is negative and the probability is less than 0.05 in our model it is 0.0000. This data is evaluated from short run cointegration. The table also shows the short-run relationship of inflation in Pakistan, which is based on the selected ARDL model (1, 0, 0, 2, 1, 2, 2, 0). The results show that FDI and M₂ has negative relationship with the Inf. But the other variables such as Bank, BD and FDI, EXR, GDP and TO has positive relationship with the Inf.

3.3.3. Estimates of Bound Test

Calculated value of F-statistics is 4.01 and is significant at 1%, 5% and 10%. From the given result we concluded the value of F-statistics is 10.21511 that is greater than all the critical values either they are Lower Critical Bound (LCB) or Upper Critical Bound (UCB) at the 10%, 5% and 1% respectively. The value of F-statistics shows that it lies on all the values of lower and upper bound. The further given values of R-squared shows that our model is 87% accurate with our selected model and Adjusted R-square is also close to the R-squared which is also represent the model correction. Also, there is a point to be noted in the Bound test, our null hypothesis is that: there is no long-run

relationship exist within the model and our value of Bound test satisfies the null hypothesis. In this table, the R-squared is 0.8774448, which shows that 88% variation in dependent variable is explained by the variations in the independent variables in our model. In this, the value of Durbin-Watson Stat is 2.382957, which is 2 and this show the absence of autocorrelation in our model.

3.3.4. Stability Test

To check the stability of the model for the policy implications, stability of the coefficient is to be tested. For this, Cumulative Sum of Recursive Residual (CUSUM) and Cumulative Sum of Recursive Residuals of squares (CUSUMS) is draw at 5%. This test is used to check the stability test, which is shows the power of the model to be tested.

Econometric issues: An Analysis

When data is collected then data is ready for analysis. Next is to apply statistical test and interpret results in a good manner.

Descriptive statistics: *It* consists on data of a complete population and uses only numbers for description of the data. It covers many qualities of data by using the numerical and graphs.

Time series Analysis: Dual sector inflation in Pakistan in this which data is collected, it is time series data.

Table 2: Unit Root Test (ADF Test)

At Level Variable	Intercept			1 st Difference			Result
	Intercept	Intercept & trend	None	Intercept	Intercept & Trend	None	
Inf	-4.473*	-4.416*	-1.110				I(0)
Bank				-5.501*	-5.691*	-5.587*	I(1)
BD				-7.170*	-7.329*	-7.184*	I(1)
FDI				-4.934*	-5.716*	-4.125*	I(1)
M2				-6.785*	-6.717*	-6.887*	I(1)
GDP				-4.855*	-5.363*	-3.760*	I(1)
EXR				-4.369*	-4.271*	-2.745*	I(1)
TO				-4.043*	-5.060*	-5.117*	I(1)

Where * shows the significance at 1% level, ** shows at 5% level, *** shows at 10% level.

ADF test with level and 1st difference: In discussed in our analysis that there is no need for applying unit root test on data in ARDL approach, but on the other hand we want to confirm that the data we selected and the variables in it are not lie in 2nd Difference i.e. I(2).

In this above table all we concluded the stationarity of our selected variables which are as follow: inflation rate, bank rate, budget deficit, and foreign direct investment, supply of money (M2), gross domestic product, exchange rate and trade open. To fulfill our task, we used the Unit Root Test in which we selected augmented dickey fuller test (ADF). From our above result we can clearly see that stationarity of our selected variables on Level and on First Difference.

Discussing about our first variable which also dependent variable is Inflation rate, is significant at Level's Intercept, Trend & Intercept but not at none which is also not necessary because if the variable satisfy at least two of these conditions then we can say that our variable is

significant. At 1% level of significance respectively 5%, 10% level and the result can be expressed as I (0) which shows the significance of variable at Level. Which shows that our selected variable is significant at all the levels of stationarity which gives us best estimation of our selected variable. Our next variable that is the independent variable (Bank) is significant at the First Difference which can be judged by simply noticing the values of Intercept, Trend & Intercept and at none. The result is as I (1) which means that the variable is significant at 1st difference. Likewise, BD, FDI, M₂, Exr, GDP and To, are significant at 1st difference.

Table 3: Bound Test

Critical Value	LCB	UCB
10%	1.92	2.89
5%	2.17	3.21
1%	2.73	3.9

R-Squared = 0.8774

Adjusted R-squared = 0.7888

Akaike info criterion = -1.0211

Hannan-Quinn criterion = -0.7758

F-Statistic = 10.2151

The next step is co-integration test to check out the connection between our selected variables, such as Inf, Bank, BD, FDI, M₂, GDP, EXR, and TO by implying Bound Test technique on it.

From the given result we concluded the value of F-statistics is 4.01 that is greater than all the critical values either they are lower critical bound (LCB) or upper critical bound (UCB). The critical values are 10%, 5% and 1% respectively. Value of F-statistics shows that it lies on all the values of lower and upper bound. The further given values of R-squared shows that our model is 87% accurate with our selected model and Adjusted R-square is also close to the R-squared which also represent the model correction is good. The value of 10.215 and its probability is less than 0.000001 which shows that our model is correct that the value lies within 0.00% level. The value of Akaike is also the smallest value from all other the included observations that are obtained by ARDL approach. Likewise, the value of Schwarz criterion is also the smallest value of all included 40 observations. Also, there is a point to be noted that in this observation of Bound test our null hypothesis is that: there is no long-run relationship exist within the model and our value of Bound test satisfies the null hypothesis.

Table 4: Long run Co-integration

Variables	Coeff	S.E	t-stat	P-value
Bank	-0.0382	0.0099	-3.8748	0.0008
BD	0.0271	0.0129	2.0943	0.0480
FDI	0.174	0.0583	2.9991	0.0066
M2	1.187	1.0289	1.1543	0.2608
GDP	-0.001	0.0003	-5.0548	0.0000
EXP	0.250	0.1349	1.8572	0.0767
TO	1.241	1.0181	1.2193	0.2356
C	-0.787	1.5921	-0.4948	0.6257

Table 5: R-Squared values

R-Squared	0.8738
Adjusted R-Squared	0.7876
Prob (F-statistics)	0.000001
Durbin-Watson Stat	1.9626

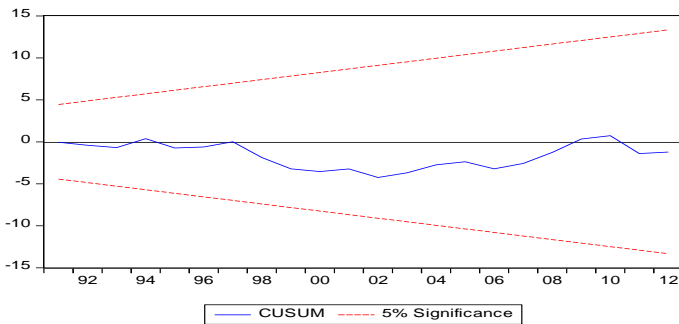
Here is the long-run co-integration of our described independent variables that are used in our model respectively. Our most of the variables have the probability which is less 0.05%, which shows that our most of the variables have high effect on our dependent variable. Except two that are M2 and To, which are not less than 0.05%.

Table 6: Short Run Estimates of Model

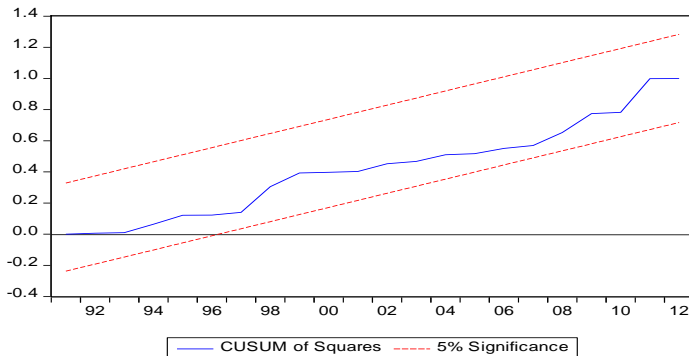
Variables	Coeff	S.E	t-stat	P-value
D(Bank)	-0.4858	0.0115	-3.9688	0.0007
D(BD)	0.0223	0.0134	1.6629	0.1105
D(FDI)	-0.0753	0.0443	-1.7013	0.1030
D(FDI(-1))	-0.2440	0.0597	-4.0851	0.0005
D(M2)	-1.1147	0.7966	-1.3993	0.1757
D(GDP)	0.0045	0.0004	10.1802	0.0000
D(GDP(-1))	0.0029	0.0007	3.7424	0.0011
D(EXP)	2.6249	0.7521	3.4899	0.0021
D(EXP(-1))	3.2515	0.9108	3.5699	0.0017
D(TO)	0.7343	0.8252	0.8898	0.3832
CintEq(-1)	-0.9979	0.1186	-8.4134	0.0000

The short-run co-integration is used to exhibit the coefficient, Std. Error, t-statistics and the prob. Of the independent variables. The last value is for CointEq(-1) which also satisfied our terms that is this value of coefficient must be negative and the probability must be less than 0.05. this data is evaluated for short-run and can be expressed as given above.

Stability Test: Stability test are two type which is following.

**Figure 4: CUSUM Stability Test**

In stability, CUSUM test is best, in this diagram results show that our estimation is stable.

**Figure 5: CUSUM SRRT (Square Recursive Residuals Test)**

In CUSUM Square Test, this shows that our estimation of variables is stable. In blue line of deviation show different trends and increasing falling under the red line cross the boundary of red line and not touched.

IV. Conclusion

Our results have some points of conclusion which are useful for research work. It is the final opinion of any researcher who involved in work deeply. We also recommended policy implication which is also good for controlling inflation rate in any country.

Inflation is present in every country of the world. By using the technique of ARDL which shows the significant result of the variables and check the stationarity. In this we use the annual data of 1974 to 2014. In this, when bank rate increase then the inflation rate also moving in downward position and also when government expenditures exceeds its total revenues mean budget deficit increase or decrease then it is positively related to the inflation and result in rise or fall in inflation respectively. Similarly, in the case of money supply which may be positive or negative but in our study it is positive when money supply increases then inflation rate also rise, when money supply go to downward position then inflation rate also fall, gross domestic product is negatively related to the inflation when GDP grow up then inflation rate will be decline and when GDP in downward position then inflation rate will be rise, foreign direct investment is a positive relationship with inflation when FDI increases then inflation rate increases. When exchange rate change then there will be a great change in inflation. Trade open has a positive relationship with inflation.

When spending increase then in the economy inflation develops. If this condition exists, price level increase and value of currency become less important as compared to yesterday. It means that current money is not able to buy enough goods and services as it would purchase earlier. Exchange rate deduct related to other currencies when our money value become less. There are various methods for the control of inflation, from this some procedures are helpful, and few are not able to give satisfied results. The more effective procedure is monetary policy. The objective of this policy is to increase interest rate and decline in the prices of bonds by sensible money supply in the economy. Due to this people spend less money and prefer to save as compared to spending. When rate of spending decrease then it is best in the period of inflation which help the economic growth.

Monetary policy should be move effectively by three leading ways. By Federal Reserve, rate of interest is increase which is the first term. In order to create money, banks borrow money from the government and lend it at greater rate. Banks are increase their rate due to rise in interest rate by federal reserves. When banks rates are

move in upward direction then minority of the people prefer to lend due to high interest rate. As a result, inflation go in downward position, prices drop due to less spending.

The second procedure is, in the volume of money banks are legally allowed to keep an eye to cover withdraws and to increase reserve requirements. Banks wants to hold more money, then they lend small quantity to consumer. Decline in spending is result that banks are less to lend then consumer borrow less.

The third way is to pass policies which induce to deduct the money supply by directly and indirectly decrease the money supply.

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