DUAL SECTOR INFLATION DYNAMICS IN PAKISTAN: AN EMPIRICAL ANALYSIS USING COINTEGRATION ANALYSIS

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Abstract

Dual sector inflation is essential for any country, and so it is for Pakistan. In this study, we estimate the long-run and short-run relationship among the variables using 1974 to 2020. The ARDL technique is used for this purpose. Data has been collected by the World Development Indicator and also by Hand Book of statistics. Data consists of time series data. When the price level of goods and services increases, people will chase few goods and commodities. This will have a significant impact on the economy. As a result, economic growth will significantly be affected to either move upward or maybe in a 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 consumer's purchasing power per unit of money currency, which is the loss of real value. Inflation is increasing day by day and is having the 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.

1. Introduction

In economics, inflation is a continuous increase in the general price level of goods and services in an economy over a period of time. 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 that means that our money cannot purchase as much quantity of a commodity as it could have purchased before. Inflation depends on supply and demand, which are the reasons for inflation. The general price level of goods and services increases due to changes in the demand and supply of the commodity. There are three types of inflation from the Keynesian: demand-pull inflation, cost-push inflation, and built-in inflation.

Average annual accurate 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 seen as a role model of economic development globally, and there was much praise for its economic progress around the globe. Economic growth was averaged at 5.82% from 27 October 1958 to 25 March 1969. The manufacturing growth rate was 8.51% higher in Pakistan than in the previous years.

Due to the policy of deregulation in 1980, the condition of Pakistan's improved a little, resulting in an inflow of foreign investment and remittances.

Table 1: Rate of inflation in Pakistan

Yeas	1999	2000	2001	2002	2003	2005	2006
Inflation	6	5.2	4	3.9	4.8	9.1	7.9
Yeas	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Inflation	7.6	20.3	13.6	13.4	11.9	9.7	7.7

Source: Pakistan economic survey (Various Issues).

This table shows the inflation rate for different years, in 1999 the inflation rate was 6% while 5.2% in 2000 and then declined 4% in 2001. On the other hand, again inflation rate was high in 2005 due to inefficient economic policies. Moreover, the same would happen in the years 2008, 2010, 2011. In 2013 Pakistan got a loan of $6.6 billion from the international monetary fund (IMF) to recover the balance of payments (BOP) condition. Then the direction of growth was to move in an exemplary manner due to high remittances, increased consumer expenditures, and declined oil prices. As a result, the gross domestic product condition declined in 2012 and 2013 to 3.59%. In the business sector, many changes occurred 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 a decline in 2014 by 13%. As a result, the budget deficit situation reduced to 3% of GDP while foreign assets were in the best position in 2014.

Table 2: Rate of GDP & inflation

GDP Growth Rate	Inflation Rate
4.14%	8.5%
4.14%	4.8%
4.5% Projected	5.1%

Source: Pakistan economic survey (various issues).In the fiscal year of 2013 to 2014 GDP rate is 4.14%, while the rate of inflation is 8.5%. In 2015 4.14% was the gross domestic product, and inflation was 4.8%. 2016 fiscal year GDP is 4.5% which is projected, and the inflation rate is 5.1%.

2.   Review of Literature

Afridi et al. (1982) studied dual-sector inflation in Pakistan. The study was associated with the time-series data. According to the economic index, the economy has been disaggregated into two sectors. In the first sector, they listed 16 commodities that could be considered "basic foods" produced in the agriculture sector. While in the second sector, they had listed 28 commodities, consisting of industrial products, industrial raw materials, and cash crops from the agricultural sector. They had used two sources of data for 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. A shortage indicated inflation in supply and excess in demand in every economic period.

Afridi et al. (1983) investigated the Dual Sector Inflation in Pakistan. Variables 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 1959-60 to 1978-79 for the Pakistan economy. The model suggested that inflation in Pakistan mainly had 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.

Ahmed et al. (1999) examined used the quarterly data for the period of 1982 to 1996. The study concluded that (PPP) purchasing power parity held for the marginal changes in the price level and exchange rate. It was concluded that the inflation rate was equalized with the rate at which the exchange rate depreciated for the given world prices. Purchasing Power Parity (PPP) proposition did not have an effect in the short run. Temporary shocks by dynamic responses allowed the system to adjust gradually to regain the relative parity.

Bokil et al. (2006) analyzed data time series data from 1975-200. The Phillips curve described economic development through the technique of the Vector autoregressive model (VAR). The study used the recent observations by restricting their sample on 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 every month to estimate the data. Vector Error Correction Model (VEC) and Co-integration techniques were used. The study found that wheat support prices affected inflation in the short run while monetary factors were the main reason. Their investigation showed that monetary factors played a dominant role in inflation and affected inflation by about a year lag. In the short run, changes in wheat support prices impacted inflation but not in the long run.

Khan et al. (2011) discussed the Political Instability and inflation in Pakistan. Data At that time, the study applied a 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).

The study argued that the economy with weak institutions and political unsteadiness did not have an efficient tax system that increased their support on seigniorage. Furthermore, the research argued that the above lines of reasoning might be accurate for great inflation countries, but not for low and moderately high inflation countriesQ3.

Ullah et al. (2013) studied the monetary variability, output, and inflation in Pakistan. Their work was concerned with time series data. The article used the M2 and GDP and inflation in their work with a simple statistical approach. That data is related to time series data. The study explored that unexpected changes in the money supply would be strongly linked to output and inflation in Pakistan.

Rizvi et al. (2012) studied inflation factors in the Pakistan economy by an Empirical investigation. That data was related to the time series data and used the period of the data from 1980-81 to 2007-08—simple least square method (SLS). The study concluded that GDP, IMP, taxes, and government landing were a strong infusion. Therefore, inflation could be controlled by the continuous growth in GDP. Furthermore, the government might be cut down expenditures. Therefore, when the factors mentioned above are controlled best, we can put inflation under effective control.

Yasmin et al. (2013) examined Pakistan's money source, régime borrowing, and inflation relationship. That data was the time series data. The research used the vector autoregressive model (VAR) and causality analysis techniques by using monthly data from January 2008 to February 2013. Their experimental grades were based on the fully modified ordinary least square (FMOLS). The study suggested that government lending and currency supply substantially impacted price rises in the long run for Pakistan. The paper concluded that bidirectional causality occurs between inflation and money supply. However, a unidirectional causal connection between government borrowing and inflation in government borrowing and money supply.

Ijaz et al. (2014) studied the sound effects of terms of trade and the explosive nature of inflation in Pakistan. That data was associated with time series. The study practiced annual data for the era of 1972 to 2012 and applied the 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.

Saleem et al. (2015) investigated the crude oil price and inflation in Pakistan in recent years. The study used time series data from the period of 1979 to 2012. For estimation, they used the technique of Johansen Co-integration for short-run and long-run results. The article concluded that increased money supply, crude oil prices, exchange rate, interest rate, and indirect taxes accelerated inflation. On the other hand, an increase in actual gross domestic product led to a decrease in the general price level in the short and long run. Furthermore, the research's results showed that supply of money, prices of crude oil, rate of exchange, and term of interest and indirect taxes had a positive effect. At the same time, actual gross domestic product kept a negative impact on inflation.

3. Data and Methodology

3.1 Sources of data

Data is collected from World Development Indicators and Hand-Book of Statistics of Pakistan.

Table 3: Data Sources

Variables	Sources of Data
Dependent Variables	
Inflation (INF)	WDI
Independent variables	
Bank	WDI
Budget Deficit (BD)	WDI
Foreign Direct Investment (FDI)	
Money Supply (M2)	WDI
Gross Domestic Product (GDP)	WDI
Exchange Rate (EXR)	WDI
Trade Openness	WDI

3.2 Model Specification
We explain our equation as follows;

Inf = f (bank, BD, FDI, M2, GDP, EXR, TO)

In this equation, Inf represents the inflation rate equal to the bank rate, bd shows the budget deficit, FDI is used for foreign direct investment, m2 for the money supply, GDP presents the gross domestic product, EXR or exchange rate, and open trade.

4. Empirical Estimations

4.1 Augmented Dicky Fuller Test (ADF)

To examine the stationarity of the data, Dickey and Fuller (1981) proposed a test based on the presence of unit root generally, known as the Augmented Dickey-Fuller (ADF) test.

Table 4: Unit Root Test (ADF Test)

Variables	Intercept	Intercept & Trend	None	
Inf (at level)	-4.4736 * **	-4.4161* **	-1.1107	I(0)
	-4.4736 * **	-4.4161* **	-1.1107	
Bank	-5.5019 * **	-5.6919* **	-5.5872 ***	I(1)
BD	-7.1706 * **	-7.3291 * **	-7.1849 * **	I(1)
FDI	-4.9346 * **	-5.7165 * **	-4.1251 * **	I(1)
M2	-6.7859 * **	-6.7170 * **	-6.8877 * **	I(1)
GDP	-4.8552 * **	-5.3632* **	- 3.7604* **	I(1)
EXR	-4.3697 * **	-4.2714 * **	-2.7451 * **	I(1)
TO	-4.0439 * **	-5.0605 * **	-5.1178 * **	I(1)

Source: Author's Calculations with E-views 9.5.
Note: Where * shows the significance at 1% level, ** shows at 5% level, *** shows at 10% level.

ADF test with level and first Difference: In our analysis, there is no need for applying unit root test on data in the ARDL approach. However, on the other hand, we want to confirm that the data we selected and the variables in it are not lie in the 2nd Difference, i.e., 1(2). Discussing our first variable, which is also the dependent variable, the Inflation rate, is significant at level. Our following variable, the independent variable (Bank), is significant at the First Difference, which can be judged by simply noticing the values of Intercept, Trend & Intercept, and none. The result is as I (1), which means that the variable is significant at first. Likewise, BD, FDI, M2, Exr, GDP, and To are significant at first Difference.

Table 5: Bound Test
From the given result, we concluded that the value of F-statistics is 4.01, which is greater than all the critical values, either lower critical bound (LCB) or upper critical bound (UCB). The critical values are 10%, 5%, and 1% respectively. Therefore, the value of F-statistics shows that it lies on all the values of lower and upper bound.

Table 6: Long run Co-integration

Variables	Coefficient	P-Value
Bank	-0.0382	0.0008
BD	0.0271	0.0480
FDI	0.1749	0.0066
M2	1.1876	0.2608
GDP	-0.0013	0.0000
EXR	0.2504	0.0767
TO	1.2415	0.2356
C	-0.7877	0.6257

Source: Author's Calculations with E-views 9.5.

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

Table 8: Short Run Estimates of Model

| Variables	Coefficient	Prob
D(BANK)	0.0458	0.0007
D(BD)	0.0223	0.1105
D(FDI)	-0.0753	0.1030
D(FDI(-1))	-0.2440	0.0005
D(M2)	-1.1147	0.1757
D(GDP)	0.0045	0.0000
D(GDP(-1))	0.0029	0.0011
D(EXR)	2.6249	0.0021
D(EXR(-1))	3.2515	0.0017
D(TO)	0.7343	0.3832
CointEq(-1)	-0.9979	0.0000

Source: Author's Calculations with E-views 9.5.

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 harmful, and the probability must be less than 0.05. this data is evaluated for the short-run and can be expressed as given above.
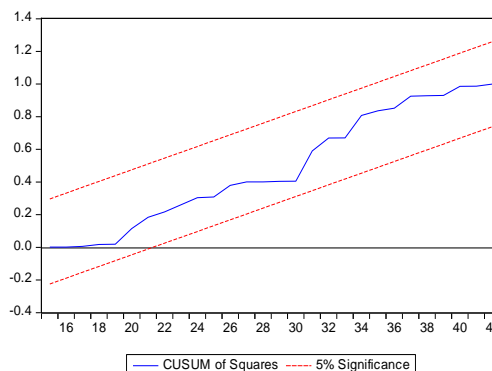
Stability Analysis
Instability, the CUSUM test is best; this diagram shows that our estimations are stable. In CUSUM Square Test shows that our estimation of variables is stable. The blue line of deviation shows different trends and increases falling under the red line crosses the boundary of the red line and is not touched.
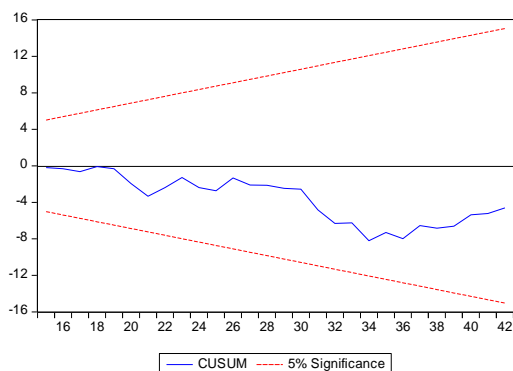
CUSUM   **CUSUM of SQUARE**

4.   Conclusion

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

In our study, it is positive that when the money supply increases, then the inflation rate also rises when the money supply goes to a downward position, then the inflation rate also falls, gross domestic product is negatively related to the inflation when GDP grows up. The inflation rate will be a decline, and when GDP in a downward position, then the inflation rate will be rise; foreign direct investment is a positive relationship with

inflation. When FDI increases, then the inflation rate increases. When the exchange rate changes, then there will be a significant change in inflation. Trade openness has a positive relationship with inflation.

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