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DOES INFLATION MATTER FOR SECTORAL GROWTH IN PAKISTAN? An Empirical Analysis

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Abstract. The present study makes vigorous attempt to analyze empirically the impact of inflation on sectoral growth of Pakistan. Three major sectors (*i.e.* agriculture, manufacturing and services) have been selected for analysis and study employed annual time series data started from year 1972 to 2010. It is found that impact of inflation on sectoral output differs substantially according to the nature of the sector. Prevailing inflation is harmful to the manufacturing sector growth; whereas, the effect of inflation on services sector growth is in sharp contrast with the manufacturing sector growth results. The statistically significant positive impact of inflation was found to encourage the services sector growth. It is observed that inflation and agriculture sector growth is positively and significantly related. It is suggested to restrict the inflation in a single-digit zone; so that it may put forth its positive impact on sectoral growth. Moreover, it is also concluded that the very low level of inflation in the economy may not be beneficial to the growth of agriculture and services sectors in Pakistan.

Keywords: Agriculture sector, Inflation, Manufacturing sector, Pakistan, Sectoral growth, Services sector

JEL classification: E31, E58

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I. INTRODUCTION

The issue of inflation has been remained on the top among other economic problems in Pakistan in the recent years. It is argued that less productivity in agriculture sector and "so called" shortage of goods and services used in the production of agriculture sector are considered liable for causing inflation. Rise in prices in economy are resulted from supply shocks of specific food items and to oil market in the world. In adding together, intermittent oil prices are the compact mirror image of rigid wages as well as price structure is a new source to mount in general price level of roughly all other goods and services in Pakistan (Ayyoub *et al.*, 2011).

Current account deficit and government fiscal policy have string inter-linkage. Fiscal policy pushes up domestic demand for goods and services that increases load on the current account deficit. From a different angle, it causes to enlarge the gap between investment and saving. If this gap is backed up from creation of money in spite of financing from external sources, inflation will be amplified (Khan *et al.*, 2007).

Increase in general price level is also a consequence of government borrowing from State Bank of Pakistan (SBP) to finance its expenditures. The expansionary monetary policy is supposed to give addition in high inflation rate in the economy. Increase in the demand of the imports also contributing towards inflation to rise. In this situation, exchange rate depreciation in the economy of Pakistan is also exerting pressure on inflation upward. A small number of economists hold the view that indirect taxes are responsible for inflation in Pakistan (Khan *et al.*, 2007). Wheat price sustaining polices are also a vital determinant of increasing inflationary pressure in Pakistan (Hasan *et al.*, 1995; Khan and Qasim, 1996).

Low income group in Pakistan is going to spoil because more than half of total budget is utilized in purchasing of food stuff. High inflationary situation also creates disparity in the distribution of income disturbing fixed income group more as compare to owners of assets and earners of large and variable income (Hasan *et al.*, 1995; Khan and Qasim, 1996). Long-run effect of inflation is a pure source of expansionary monetary policy and other structural problems influence the prices to boost up (Khan and Schimmelpfennig, 2006).

Above debate signify that inflation and sectoral output of Pakistan are inter-dependant with one another. Inflation could increase the sectoral output to some extent at the cost of hurting all sectoral growth of Pakistan economy.

The question of interest is to analyze the impact of inflation on different sectors of the economy. Does it encourage or hurt the sectoral growth in a uniform way or it behaves differently among major regions of the economy, depending upon the state and structure of the sector? Technically speaking, this study is based to explore the answer of the question; whether inflation in Pakistan is encouraging the growth of manufacturing, agriculture and services sectors or something else is happening due to inflation in Pakistan? The specific objectives of the study are:

1. To evaluate the growth performance of different sectors of the economy of Pakistan and to analyze the magnitude of impact of inflation on different sectors and the difference in this magnitude according to the nature of each sector.
2. To establish and inspect the realistic benchmark level of inflation for growth of different sector of Pakistan economy. To give the policy suggestions, after taking care of estimated results about their statistical significance to find out relationship between inflation and output of different sectors of the economy.

The rest of the paper has been arranged as follows; section II analyzes the structure and trends of inflation and sectoral growth in Pakistan. Section III consists of the theoretical framework, whereas a brief review of very limited existing literature on the topic has been presented in section IV. Data, methodology and model specification have been explained in section V. The empirical estimations of the models of sectoral growth are brought into analysis in the section VI. Conclusions and policy recommendations are provided in the last section.

II. STRUCTURE AND TRENDS OF INFLATION AND SECTORAL GROWTH IN PAKISTAN

The historical trend analysis indicates that inflation in Pakistan has explicitly negative impact on the growth of GDP and manufacturing sector growth. Whereas, it is found positively correlated with the growth of services sector, but it remains inconclusive in the case of agriculture sector. The growth rates and shares of these sectors in the GDP in various years have been presented in Table 1, which has been explained in respective sub-sections of the selected sectors.

Manufacturing Sector Growth and Inflation

Manufacturing sector, comprises of small scale and large-scale manufacturing sub-sectors, is considered as an engine of the economy. The

share of this sector in GDP, though gradually growing, has not remained up to the expectations of the policy makers. After 1972, it had to face different type of policies resulting in various different outcomes. This sector faced the nationalization policy of industries and, after that, experiencing the privatization policy of successive governments.

TABLE 1

Sectoral Growth Rates and Shares in GDP of Pakistan in Various Years

Years	GDP Growth Rate	Agricul-ture growth rate	Agricul-ture share in GDP	Manufa-cturing Growth Rate	Manufa-cturing Share in GDP	Services Growth Rate	Services Share in GDP
1950s	3.3	1.7	50.0	8.2	9.7	5.5	30.1
1960s	6.7	5.1	41.2	9.9	14.1	6.0	35.5
1970s	4.8	2.4	35.7	5.5	15.2	6.3	39.6
1980s	6.4	5.4	27.2	8.2	19.0	6.7	44.9
1990s	4.5	4.4	25.0	4.8	18.0	4.6	49.2
1999-00	3.9	6.1	26.2	1.5	14.8	4.2	51.2
2000-01	1.8	–2.2	24.4	9.3	15.7	3.1	52.5
2001-02	3.1	0.1	23.6	4.5	15.7	4.8	53.4
2002-03	4.8	4.1	23.6	6.9	16.2	5.2	53.4
2003-04	6.4	2.2	22.3	14.1	17.6	6.0	52.7
2004-05	8.4	7.5	21.6	12.5	18.2	7.9	53.3
2005-06	5.8	6.3	22.5	8.7	18.8	6.5	51.7
2006-07	6.8	4.1	21.9	8.3	19.0	7.0	51.8
2007-08	3.7	1.0	21.3	4.8	19.2	6.0	52.9
2008-09	1.2	4.0	21.9	–3.7	18.3	1.6	53.1
2009-10	4.1	2.0	21.0	5.2	18.5	4.6	53.5

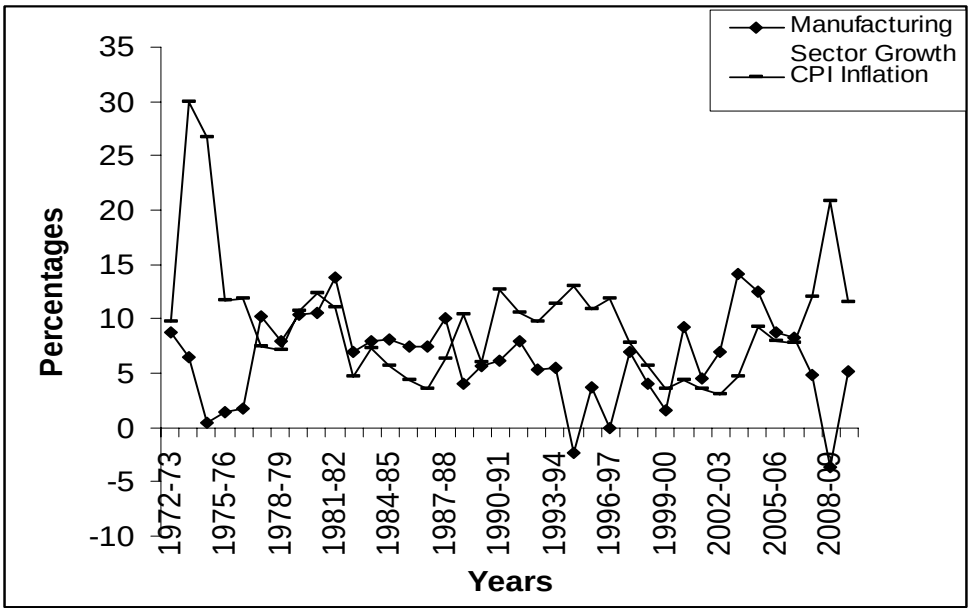
Source: *Pakistan Economic Survey* (Various issues), Ministry of Finance, Islamabad.

Table 1 shows that the manufacturing sector's share in GDP remained around average of 17 percent during the study period, while it remained highest during FY 2006-07. Figure 1 shows the trends of manufacturing sector growth and CPI inflation in Pakistan. Negative growth rate of this

sector was observed during the FYs 1994-95, 1996-97 and 2008-09, while it crossed double digit figure during six fiscal years in the study period. The CPI inflationary trend shows that whenever inflation in the country entered into the double-digit zone, the manufacturing sector growth rate tended to decrease. The two presented trends demonstrate negative association between inflation and this sector's growth.

FIGURE 1

Manufacturing Sector Growth and CPI Inflation in Pakistan



Moreover, Figure 1 indicates that double-digit inflation seriously hurts the growth of this sector. Whenever, inflation remained restricted in single-digit zone, the manufacturing sector's growth resulted in a rising trend. Thus, we may conclude that the rising inflation is very harmful to manufacturing sector growth in the economy.

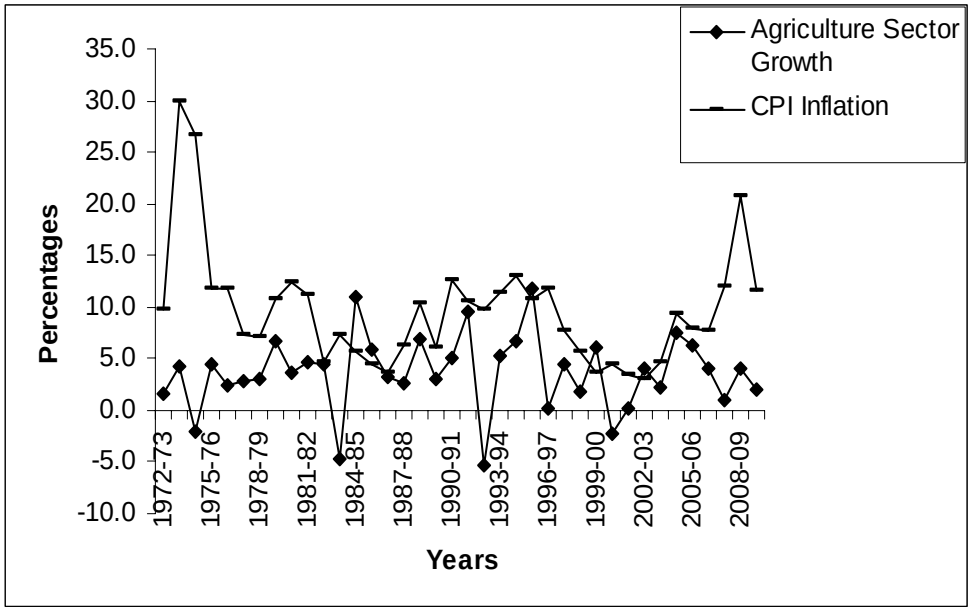
Agriculture Sector Growth and Inflation

Agriculture sector of Pakistan is considered the backbone of the economy but its importance, in recent years, has declined due to many reasons. This sector provided employment to more than 65 percent of the labor force in 1950s and still engaging about 45 percent labor force in it. Contribution of this sector in GDP remained more than 50 percent in 1950s but now, accounts for only about 21 percent of GDP in the economy (*Pakistan Economic Survey*

2010-11) Gradual decrease in share to GDP and employment in this sector pose critical implications.

FIGURE 2

Agriculture Sector Growth and CPI Inflation in Pakistan



During the study period, it has been observed that the growth of this sector had not been up to the desired level. From 1972 to 2009, it crossed double figure for growth just during the FYs 1984-85 and 1995-96, whereas, negative growth rates was observed four times in the study period. Serious fluctuations have also been observed in its growth rate. Its share in total GDP and employment rate are gradually declining with each passing year (Table 1).

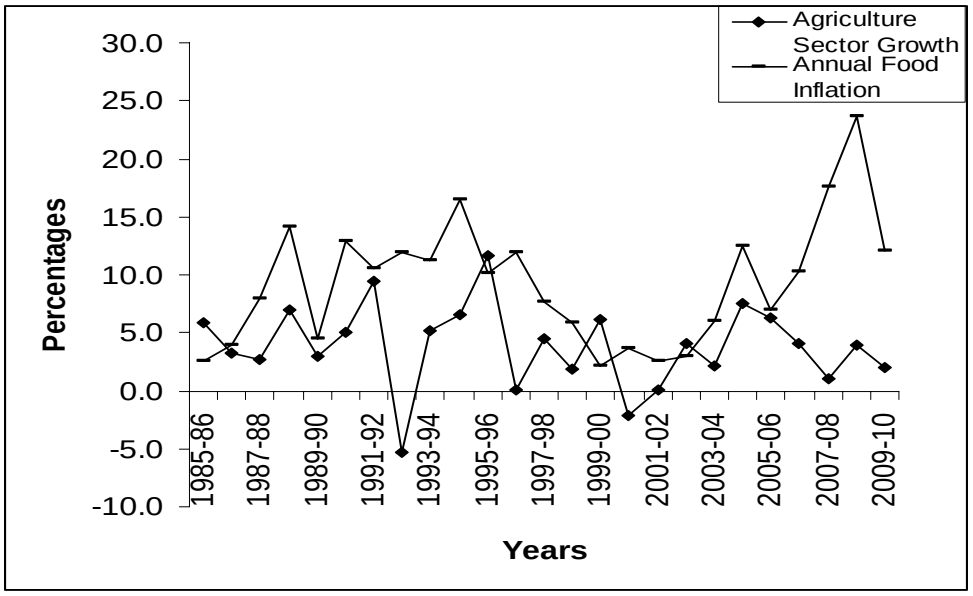
During the FY 1973-74, the CPI inflation in the economy remained 30 percent but the growth rate of this sector remained 4.2 percent, whereas during the FY 1995-96 CPI inflation was observed at 10.8 percent level and agriculture sector growth rate remained 11.7 percent annually. The trends presented in Figure 2, show a somewhat weak positive association between inflation and agriculture sector growth.

Figure 3 shows the interdependence between food inflation and agriculture growth during the last twenty five years. The trends explained through Figure 3 clearly indicate a mix of two way associations between

inflation and agriculture growth. For example, during 1987 to 1992, it has been observed positive relation between these two variables. Negative relation in many years can also be observed.

FIGURE 3

Agriculture Sector Growth and Food Inflation in Pakistan



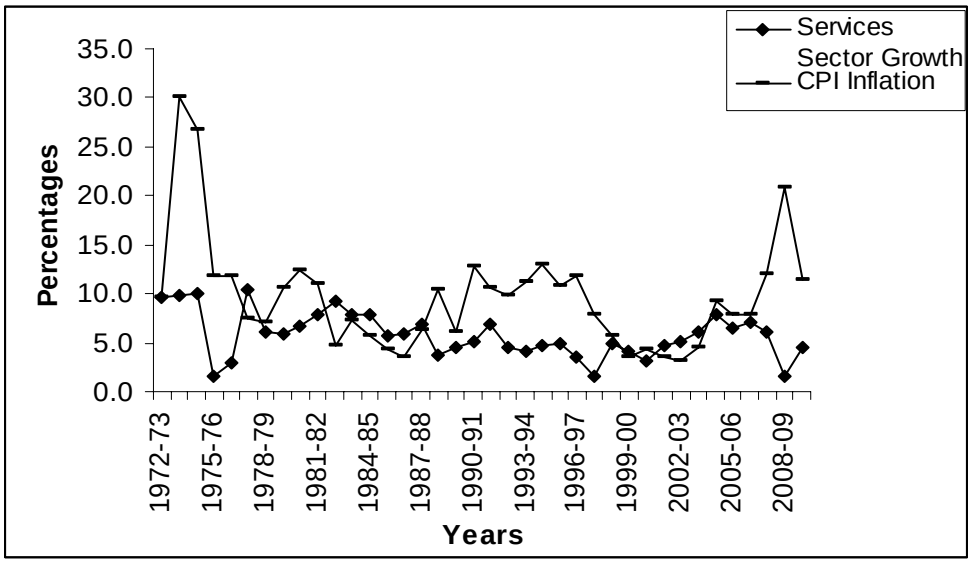
Services Sector Growth and Inflation

The services sector is consisted of transport, storage and communications, wholesale and retail trade, finance and insurance, ownership of dwellings, public administration and defense, and services sub-sectors. The services sector growth and inflation in Pakistan trends are explained with the help of Figure 4. Excluding the three fiscal years 1975-76, 1997-98 and 2008-09, this sector's growth remained encouraging. During whole of the study period, steady and stable growth rate has been observed except these three years. Following the increasing trend in its share in GDP (Table 1: column 8), it contributes more than half of the GDP. The trend analysis describes that the growth of services sector in Pakistan is positively correlated with annual CPI inflation. Excluding the highest inflationary values of 30 percent, 26.7 percent and 20.8 percent form the data; the remaining data shows a positive trend between these two variables. Moreover, it can be observed that

whenever inflation remained below a certain level (9 percent),[1] the performance of services sector had been observed up to the mark, but higher rates of inflation found damaging to this sector's growth rate.

FIGURE 4

Services Sector Growth and CPI Inflation in Pakistan



III. THEORETICAL FRAMEWORK

Inflation and GDP Growth Relationship

Economists reach at a number of findings in making theories about sectoral output response to inflation. Theories are beneficial in explaining relationship because these are based upon empirical evidences. Traditionally, cyclical annotations are noted in old growth and inflation theories based upon postulate of what named as "absence of persistent inflation". It settles at a specific level until the time there is a interruption. Subsequently, it shifts to a different level, at which it stays. As a result, they winded up discussion that inflation and growth are positively related to one another.

The (AS-AD) framework also advocate relationship between inflation and growth that is positive, where, as output amplified, so did the inflation rate. In the period of 1970s, on the other hand, the idea of stagflation

[1]Feasible threshold level of inflation in Pakistan estimated by Mubarik (2005).

achieved fame, and positive inflation-growth relationship become a question mark .Even, broadly accepted Phillips Curve relationship started to lose its fame. The reason behind this upsetting behavior of inflation and growth was because of existence the periods in which very high rates of inflation yield very low or negative output. Consequently, at the cost of very low output world economies have to experience very high rise in prices and besides this a remarkable increase in unemployment. Classical economics call to mind supply-side theories to center their attention on the requirement for stimulation to save and invest for the national output to boost up. Keynesian as well as Neo-Keynesian theories gave the initiative of a more inclusive model that link inflation to output growth under the Aggregate demand and aggregate supply framework. Monetarists investigative the function of expansionary monetary policy in judging inflation rate, whereas Endogenous theories of growth and Neo-classical school of thoughts materialize the effects of inflation on economic growth through the channel of investment and capital formation.

Dynamics of Sectoral Growth

The structure of an economy is constituted on different sectoral outputs and their shares which are summed up to give total country's output. With the rise in national income, Industrial sector gets dominance over agriculture sector giving way first to a climb up in the industrial sector, then to a mount in the service sector. These stages are essential for all developing countries to pass through, which are elucidated by structural adjustment in the demand of consumer and in the comparative labor yield of major sectors of economy.

People demand for food gets its optimal limit when their income rises and they convert their demand towards manufactured products comparatively. Meanwhile, the agriculture products are available to consumers at very moderate rate because of commercialized manufacturing technique, labor output increases faster in agriculture than in manufacturing that diminishing agriculture share in GDP of the country.

With the increase in income, people's wants for goods turn to be less matter of object and they embark on to claim further services especially in education, entertainment, health and in many other areas. In the meantime, the growth rate of services sector slow down as compare to agriculture sector and manufacturing sector because of the reason that in services or job sector most of the jobs are not done with the use of machines. Therefore, it causes to decrease labor productivity in the services sector. Ultimately, services sector increase its share in GDP and becomes more expensive sector as compare to agriculture and manufacturing sector. Less use of machines in

services give evidence that why employment in the services sector is growing and, technological progress increasing the marginal productivity of labour in the agriculture sector while decreasing employment in that sector. Employment in the services sector is increasing because of technological progresses that enhance employment but reduce marginal productivity. Finally the service sector substitutes the manufacturing sector as the foremost sector of Pakistan economy. High income countries and developing countries are controversial in that point that high-income countries are flattering less dependence on manufacturing sector while low income or developing countries are going to industrialize, becoming more dependent of industry.

The service sector creates more human capital as compare to natural capital. Consequently, demand has driven towards education and health for building more human capital diverting the investment priorities from agriculture and manufacturing sector to services sector. One more advantage of the rising service sector is that it is environment friendly in a way that with less or nominal use of natural resources as compared to manufacturing and agriculture sector more productivity is achieved. Environmentally sustainable economy is also a vital benefit gained form human capital formation.

IV. LITREATURE REVIEW

Inflation Growth Relationship and Harmful Level of Inflation Growth

The research work related to 'inflation growth issue' has been reviewed as follows: Barro (1995) uncovers the adverse relationship between growth and inflation rate significantly with the help of other helping variables, *i.e.* education, fertility rate, etc. Results of the study point out that 10 percent increase in inflation annually decrease the real GDP by 0.2 to 0.3 percent.

Bruno and Easterly (1998) claims that there is no string proof of any reliable relationship between growth and inflation rate for a specific level of inflation rate. Inflation above 40 percentage influence growth bitterly but recovers after inflation comes down below 40 percent. A temporal negative association is observed between these two variables ahead of 40 percent threshold level of inflation rate.

Mubarik (2005) uses time series data started from the period 1993-2000 to estimate the threshold level of inflation in Pakistan. The results of the study reveal that 9 percent inflation rate is a threshold level of inflation for Pakistan economy beyond this limit inflation harm growth. His results also go behind the exertion of Khan and Ssnhadji (2001) in which they estimate

threshold level of inflation for developed economies and developing like Pakistan. Panel data of 140 developed and developing economies was employed form the period 1960 to 1998 and 7-11 percent and 1-3 percent, threshold level for both groups of economies respectively.

Related study has been made by Hussain (2005) using primary time series data from the year 1973 to 2005. He does not investigate any particular threshold level for inflation rate. It finds no specific threshold level of inflation for Pakistan recommending that Pakistan can bar inflation only up to level of 4-6 percent. Where, he contradicts with Mubarik (2005) as 9 percent threshold level of inflation for Pakistan come out to be on the very high side.

Ayyoub *et al.* (2011) retrace the holding of relationship between inflation and growth of Pakistan economy. They examine whether different levels of CPI inflation rate give confidence or harms the Pakistan economy in consistent way. Inflation and growth rate are negatively related to one another significantly, the study investigates. On the basis of estimated results, study exploded that existing inflation rate is dangerous for economic growth exceeding from a specific level. So, policy proposition includes that authorities should attempt to keep inflation rate below 7 percent. If it is so, inflation may put positive impact on economic growth.

Most of the research work revolves around the issue of inflation and overall economic growth (GDP) of an economy. The focus of the researchers is on the issue that whether inflation impacts GDP growth in a positive way or it affects negatively to the growth rate. Moreover, it is mainly to identify the breakpoints after which inflation is harmful to economic growth or not. However, there is no consensus over the point after which the inflation is harmful to economic growth of the economy because the research work differs substantially across the countries according to the overall situation of the economies.

Inflation and Sectoral Growth: A Review

Determinants of sectoral growth have been addressed by the researchers, which are briefly reviewed as follows: Mundlak *et al.* (2002) examine the growth consequences for agriculture sector in economies of Indonesia, Thailand and the Philippines. They observe that despite geographic proximity, similar climate and characteristics, gains in productivity and income differ significantly among these countries. The results from the large sample data from three economies and using OLS technique show that the new technology changes the returns to fertilizers, irrigated land and capital.

Complimenting technology related changes in factor use are investments, driven in part by policy.

Kopeva *et al.* (2010) examine determinants of industrial growth in the economy of Bulgaria. The analysis reveals the level of impact of different factors on Bulgarian industrial growth before and after accession to the European Union. They analyze different determinants of industrial growth such as innovation behavior, deregulation and investments, education, competitiveness, fiscal policy, inflation, international trade and financial system. They conclude that investment growth leads to increased market potential in several industrial sectors and investments in technology result in value added growth.

The topic of inflation and sectoral growth is a fresh and least researched area. This subject requires the attention of researchers to contribute towards the relationship of inflation and sectoral growth and its impact on different sectors of the economy. Therefore, this study could be considered as the first attempt to this issue.

V. DATA, METHODOLOGY AND MODEL SPECIFICATION

Data Sources

The data for this study are taken from *Pakistan Economic Survey* (various issues), *Ministry of Finance* and *Fifty Year Economy of Pakistan* (SBP). Data are ranging from 1972-73 to 2009-10 and consist of wide range of different important variables which explain their relationship with CPI inflation to affect the growth of sectoral growth of economy.

Methodology

For the purpose to examine the impact of inflation on sectoral growth, three models are specified. These models have been estimated by employing the method of Ordinary Least Squares (OLS). Autocorrelation among the regression errors are checked out with the help of Durban Watson (DW) test statistic. The model of agriculture sector growth has been estimated by iterative two-steps least square method for autoregressive of order one specification. Durban '*h'* statistic has been calculated to examine the agriculture sector model estimations, where lagged dependent variable of AGRG is used.

Manufacturing Sector Growth Model Specification

A model of two econometric equations (Equation (1) and Equation (2)) has been specified in order to study the effects of CPI inflation on manufacturing

sector growth, with other important macroeconomic explanatory variables which affect the MNFG.

$$MNFG_t = \alpha_0 + \alpha_1(FINF_t) + \alpha_2(OPNS_t) + \alpha_3(INVG_t) + \alpha_4(BNKR_t) + \alpha_5(LWRMT_t) + \alpha_6(WPRW_t) + \alpha_7(LPOPM_t) + \alpha_8(LITR_t) + \varepsilon_t \quad (1)$$

$$MNFG_t = \gamma_0 + \gamma_1(CINF_t) + \gamma_2(OPNS_t) + \gamma_3(BNKR_t) + \gamma_4(WPRW_t) + \gamma_5(LPOPM_t) + \gamma_6(LITR_t) + \gamma_7(INF9_t) + \varepsilon_t \quad (2)$$

Where

MNFG = Manufacturing Sector Growth Rate

CINF = CPI Inflation

OPNS = Trade Openness

INVG = Investment Growth Rate

BNKR = Bank Rate

LWRMT = Log of Foreign Remittances

WPRW = Women Participation Rate in Workforce

LPOPM = Log of Population in Millions

LITR = Literacy Rate

*INF*9 = Inflation Level ≤ 9 Percent as Dummy Variable
(1 = Inflation Level ≤ 9 Percent, 0 = Otherwise)

ε = Error Term

Agriculture Sector Growth Model Specification

The specified form of the model of Agriculture Sector Growth is as follows:

$$AGRG_t = \lambda_0 + \lambda_1(CINF_t) + \lambda_2(LASXP_t) + \lambda_3(INVG_t) + \lambda_4(LASIA_t) + \lambda_5(LLRIE_t) + \lambda_6(LPOPM_t) + \lambda_7(M2G_t) + \lambda_8(AGRG_{t-1}) + \varepsilon_t \quad (3)$$

Where

AGRG = Agriculture Sector Growth Rate

LASXP = Log of Agriculture sector Exports

LASIA = Log of Irrigated Area in Million Hectors

LLRIE = Log of Total Length of Roads in the Economy

M2G = Annual Money Supply (M2) Growth Rate

AGRG(–1) = One Year Lag in Agriculture Growth Rate

Services Sector Growth Model Specification

The specified form of the Service Sector Growth model is as follows:

$$SRVG_t = \varphi_0 + \varphi_1(CINF_t) + \varphi_2(OPNS_t) + \varphi_3(INVG_t) + \varphi_4(WPRW_t) + \varphi_5(UGBG_t) + \varphi_6(LITR_t) + \varphi_7(DEMO_t) + \varepsilon \quad (4)$$

Where

SRVG = Services Sector Growth Rate

WPRW = Women Participation Rate in Workforce

UGBG = Urban Population Growth Rate

DEMO = Democracy as Dummy Variable
[1 = Democracy, 0 = Otherwise]

VI. RESULTS AND DISCUSSION

Descriptive Statistics

We have drawn a comparison of sectoral growth when annual inflation level is divided into two parts (*i.e.* below 9% level and above 9% level).[2] The purpose of this descriptive data analysis is to show a feasible threshold level of inflation for different sectors of the economy.

TABLE 2

Inflation and Sectoral Growth when Inflation Remained below 9% during the Study Period

	CINF	GDPG	MNFG	AGRG	SRVG
Mean	5.61	5.34	7.57	3.24	6.00
Maximum	7.90	8.70	14.10	10.90	10.50
Minimum	3.10	1.80	1.50	-4.80	1.60
St. Dev.	1.67	1.75	2.70	3.39	2.11

[2]Feasible threshold level of inflation estimated by Mubarik (2005).

Table 2 demonstrates that the average *CPI* inflation is 5.61 percent and *GDP*, *AGRG*, *MNFG* and *SRVG* are 5.34 percent 7.57 percent, 3.24 percent and 6 percent respectively, whereas, the standard deviations are 1.75, 2.7, 3.39 and 2.11 for these variables. These deviations from average show stability in the growth rates of *GDP* and other sectors of the economy. When these results are compared with Table 9, it is found that the average higher level of 13.41 percent of inflation hurts the average growths of manufacturing, GDP and services sectors but the agriculture sector performed well after 9 percent level of inflation.

TABLE 3

Inflation and Sectoral Growth when Inflation Remained above 9% during the Study Period

	CINF	GDPG	MNFG	AGRG	SRVG
Mean	13.41	5.02	5.13	4.00	5.62
Maximum	30.00	8.40	13.80	11.70	10.00
Minimum	9.30	1.20	–3.70	–5.30	1.50
St. Dev.	5.65	2.18	4.71	3.88	2.49

Source: *Pakistan Economic Survey* (various issues)

Calculations based on E-views.

The comparison of growth rates of the dependent variables show that when the inflation remained above than 9 percent, its impact on the two sectors was negative except the agriculture sector. The *MNFG* had faced the severe negative effects of this rising inflation. The standard deviations of the four variables are less when inflation rate was below than 9 percent, which show that the steady pattern has been observed by Table 2. The negative growth rate of *MNFG* in the 4th column of Table 3 indicates that *MNFG* is most sensitive to rising inflation in the economy.

Moreover, Tables 2 and 3 indicate that it is the agriculture sector which is least sensitive to *CINF*. It can also be observed that the association between *AGRG* and *CINF* is very weak, which shows that there are some other factors which determine the pattern of *AGRG* in the economy. The results also unveil the fact that the *SRVG* is also less sensitive to the *CINF* as compared to *MNFG*. We can conclude that the inflation targeting to single

digit is the best option for steady and stable growth patterns for the different sectors of the economy.

Estimation and Results

The results of the estimated models are arranged in Table 4. Equation (1) and Equation (2) relate to manufacturing sector growth model (*MNFG*), Equation (3) is to explain agriculture sector growth model and Equation (4) addresses the services sector growth model. The results explain that our specified models performed very well in terms of F-statistic. On the basis of our hypothesis, all the variables are jointly significant. Though the value of R^2 and adjusted R^2 are low with reference to time series data, but it does not mean that factors in disturbance term are correlated with the independent variables (Wooldridge, p. 207). Moreover, low *R*-squared does not necessarily mean that an OLS regression equation is useless and using just R^2 as the main gauge of success for an econometric analysis can lead to trouble (Wooldridge, p. 44). The DW statistic values in four estimated models indicate that the element of autocorrelation is not present in our estimated model. Durbin (1970) 'h' statistic test has also been applied to test serial correlation in agriculture sector growth model. This estimated result confirms that there is no autocorrelation present in the estimated model.

Observing equation (1) and equation (2), the regression coefficient of CPI inflation is negative and statistically significant at 1 percent level of significance. The magnitude of coefficient states that *CPI* inflation has 0.44 percent negative impact on manufacturing growth, due to about 1 percent change in *CPI* inflation. *INF*9 is a dummy variable which states the condition '1' for inflation below or equal to 9 percent level and '0' for the condition when inflation exceeds the 9 percent level. It is considered as an optimal level of inflation at which sum of squared residuals has been found minimum. The results of the econometric equation (2), implies that its impact on *MNFG* has been found positive, but statistically insignificant. If we consider this level of inflation as a threshold for this sector's growth, our results reveal the fact that up-to a certain level (9 percent in this model), inflation causes manufacturing sector growth to increase in the economy.

Explaining the impact of regression coefficients in *AGRG* model (Equation 3), the coefficient of CPI inflation shows that there is a positive impact of CPI inflation on agriculture sector growth but this effect is not found statistically significant. This explains that increase in inflation causes agriculture sector to increases its growth and productivity. The estimated result indicates that about 1 percent increase in CPI inflation causes 0.046 percent increase in agriculture sector growth rate.

TABLE 4

Parameter Estimates of Estimated Models

Independent Variables	Dependent Variable MNGF	Dependent Variable MNGF	Dependent Variable AGRG	Dependent Variable SRVG
	Equation 1	Equation 2	Equation 3	Equation 4
Intercept	117.166 (2.678)*	98.074 (2.486)*	–68.975 (–1.780)***	5.32 (0.542)
CPI Inflation (*CINF*)	–0.442 (–3.174)*	–0.355 (–2.55)*	0.046 (0.328)	0.170 (1.922)***
Trade Openness (*OPNS*)	83.816 (3.184)*	83.590 (3.173)*	—	7.728 (–0.011)
Investment Growth (*INVG*)	0.052 (0.917)	—	0.125 (1.870)***	0.003 (0.090)
Bank Rate (*BNKR*)	–0.322 (–1.424)	–0.394 (–1.878)***	—	—
Log of Foreign Remittances (*LWRMT*)	1.293 (0.954)	—	—	—
Women Participation Rate in Workforce (*WPRW*)	0.770 (1.178)	1.105 (2.280)**	—	0.013 (0.054)
Log of Population in Millions (*LPOPM*)	–35.728 (–2.637)*	–29.032 (–2.497)*	–32.445 (–2.053)**	—
Literacy Rate (*LITR*)	0.450 (1.463)	0.259 (1.170)	—	–0.061 (–0.766)
Dummy Variable for Inflation ≤ 9 Percent (*INF*9)	—	1.456 (1.020)	—	—
Log of Agriculture Sector Exports (*LASXP*)	—	—	3.574 (1.911)***	—
Log of Area Irrigated in Agriculture Sector (*LASIA*)	—	—	32.058 (0.854)	—
Log of Total Length of Roads in the Economy (*LLRIE*)	—	—	9.057 (1.860)***	—
Money Supply Annual Growth Rate (*M2G*)	—	—	0.109 (0.941)	—

Independent Variables	Dependent Variable MNGF	Dependent Variable MNGF	Dependent Variable AGRG	Dependent Variable SRVG
	Equation 1	Equation 2	Equation 3	Equation 4
Lag in Agriculture Sector Growth [*AGRG*(–1)]	—	—	–0.437 (–2.680)*	—
Urban Population Growth Rate (*UGBG*)	—	—	—	–0016 (–0.011)
Democracy (*DEMO*)	—	—	—	–2.70 (–3.215)*
R-Squared	0.54	0.53	0.37	0.40
Adjusted R-Squared	0.41	0.42	0.19	0.26
DW Statistic	2.07		2.13	1.87
Durbin h Statistic	—	—	–1.76	—
Sample Size	38	38	37 After Adjusting Endpoints	38

NOTE: The *t*-statistic (in Parenthesis) significant at 1%, 5% and 10% level are indicated by *, ** and *** respectively. All the estimations are carried out by E-Views.

One year lagged agriculture growth has also been made the part of *AGRG* model. It is because the agriculture growth also depends on previous years' growth. The result indicates that previous year's agriculture sector growth has a negative and highly significant impact on current year's agriculture sector growth. Though the magnitude of impact is low but it is significant at 1 percent level. It explains that growth in the previous year hurts the growth in current year production of agriculture sector in economy of Pakistan. It is an unexpected result, which has serious and strong implications in it. It reflects the behavior of the farmers and rural population where literacy rate is very low. They become contented with their better production in the current year and reduce their further efforts to produce more in the next year. It is because of their low-standard living styles, low ambitious nature and many other social and cultural factors.

Observing the results of services sector growth model (Equation 4), the coefficient of CPI inflation unveils the evidence that it has a positive and

significant impact on services sector growth rate. The sensitivity of services sector growth with CPI inflation is significant at 10 percent level. It shows that about one percentage point increase in CPI inflation results in 0.17 percentage point increase in the growth rate of service sector. This result indicates that human capital formation in Pakistan needs little inflationary pressure to boost its productivity.

When we look at the coefficient of literacy rate (*LITR*) in Pakistan, its value is negative. Its negative impact on *SRVG* is due to the fact that most of the women, after completing their education, do not become the part of services sector in Pakistan. Another reason is that a large share of Pakistani people is literate but not up to the level that they may able to join the services sector. Any person who can read and write is called literate in Pakistan. According to this definition, a lot of people are literate but could not contribute towards the growth of services sector due to lack of basic educational and professional skills.

Presence of democratic government in Pakistan (*DEMO*) has been used as a dummy variable in equation (4). The results show that, in Pakistan, democratic governments did not contribute up to optimal level. The *DEMO* has negative and highly significant impact on *SRVG*. The magnitude of the coefficient of *DEMO* is also sufficient enough to lessen the growth rate of the services sector. This is due to the fact that not even a single democratic government could avail her full tenure. Their economic policies remained incomplete and left worse implications for the economy of Pakistan. However, this result bears policy implication for the democratic governments to put special focus on services sector and to frame policies for the progress of this sector.

VII. CONCLUSION AND POLICY RECOMMENDATIONS

The findings of the study conclude that there is trade-off between inflation and the manufacturing sector growth for the studied time-series data. Inflation in the economy of Pakistan is harmful for the growth of manufacturing sector. This statistically significant result indicates that the persistent increase in the general price level hurts the growth of manufacturing sector. The study also finds 9 percent as feasible threshold level of inflation which causes to grow this sector of the economy. The study, further, finds that inflation in the economy of Pakistan has positive impact on the growth of agriculture and services sectors. This result is found

statistically significant for the growth of services sector, whereas, it is found insignificant in the agriculture sector growth model.

It can be recommended on the basis of empirical evidence of the study to stay the inflation under a certain level[3] and, therefore, authorities and the SBP should focus on the policies which are helpful in keeping the inflation rate secure and under the level which may also be helpful for sustainable economic growth. Restrained and firm inflation is also helpful to minimize the irregularities and reservations in the financial sector of Pakistan economy which, in turn, mount the capital formation actions in the country. So that it may exert its positive effects on sectoral growth and it may not be dangerous to the manufacturing sector growth.

Moreover, it is also suggested that the very low level of inflation in the economy may not be beneficial to the growth of agriculture and services sectors of the economy. Hence, maintaining price stability will ultimately be the best policy recommendation to stable and sustained economic growth of all the sectors of the economy. It is because the trade-off between inflation and growth of two leading and prime sectors of the economy has not been found. On the basis of our analysis, we recommend the need for stable democratic governments in the country, which could, in turn, be the symbol of stable desired economic policies, especially for the steady growth rate of analyzed sectors of the economy.

This study can further be extended to consider some neglected issues in relation to sectoral growth and inflation. The impact of inflation on the remaining sectors of the economy of Pakistan (*i.e.* Mining and Quarrying, Construction, and Electricity and Gas Distribution)[4] can also be analyzed on the same pattern. The specific threshold levels or breakpoints for each sector can be estimated, to recommend a general inflation targeting level for the policy makers.

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[3]Single-digit zone without serious fluctuations.

[4]The share of these sectors in the total GDP is just about 6 percent.

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