

## FOOD DRIVEN INFLATION

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### ABSTRACT

*This paper discusses the impact of the surge in food prices on the general price level. This paper explores the fact that how rises in food prices lead to inflation. A rise in food prices is a cost-push type of inflation, thereby creating a negative shock in an economy which lead to inflation and a decline in national output. Nowadays there are several factors for surges in food prices. This increase in food price act as cost-push inflation and as a consequence, there is an upward shift in Aggregate Supply and due to this shift, Aggregate Supply falls short off Aggregate Demand. The excess Aggregate Demand creates upward pressure on General Price Level and price start rising till Aggregate Demand decreases and become equal to Aggregate Supply. Thus, due to a rise in food prices, inflation and downfall in national output take place simultaneously. However, there is another process of the wage-price spiral which turn expected inflation into actual inflation. Rise in food prices is one of several factors of the wage-price spiral process. Workers in expectation of inflation start demanding higher wage rates to maintain their real consumption power. Due to an increase in workers' income, Aggregate Demand rises. Hence wage-price spiral lead to upward shift both in Aggregate Supply and Aggregate Demand which ultimately lead to inflation with no increase in national output. Government may try to bail out the economy from the problem of rising in food prices by giving food subsidy. Food Subsidy although inflationary by nature but creates positive shock in an economy thereby leading to an increase in national output. However, the impact of food subsidy is negated by wage-price spiral thereby hindering an economy to fully leverage the positive shock of Food Subsidy. Hence Government through its policies should try to create an environment of trust in the economy so the process of wage-spiral does not initiate in the economy and its policies achieve the desired outcomes.*

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**JEL Classification:** E30, E31, H25, O13, Q11

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### Introduction

There are many factors nowadays that are responsible for an increase in the price level of food. Primarily the increase in food prices is associated with population growth but there are other strong reasons also which have been verified empirically. The rise in oil prices, increasing urbanization, deepening of commodity exchanges, use of food as biofuels, etc. are also some of the reasons that are significantly associated with the increase in prices of food.

An increase in food prices significantly impacts the economy. One of the significant effects is food driven inflation. Food driven inflation is primarily cost-push inflation. Due to an increase in prices of food items the cost of living goes up thereby forcing the worker to bargain for higher wage rates. Higher wage rates increase the costs of production thus creating a negative supply shock in an economy. Due to a negative supply shock, aggregate supply falls short of aggregate demand thereby creating excess demand at the current price level and as a consequence, there is upward pressure on the price level.

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Thus, rising prices of food create inflationary pressures in the economy. Due to this, inflationary expectations are built in an economy. These expectations in the economy start a loop called the wage-price spiral. Due to the wage-price spiral, expected inflation eventually turns out to be a reality. Hence expected inflation works as self-fulfilling prophecy, which eventually turns out to be actual inflation and this loop goes infinitely through the wage-price spiral process. Therefore, an economy is always under the pressure of inflation due to rising food prices and the wage-price spiral process. When the food prices increase then the government uses food subsidies as a bail-out, especially to the people of lower incomes group. The food subsidy also creates inflation but it also has a positive effect on national income and employment. However, the process of the wage-price spiral can negate the positive impacts of food subsidy by increasing the price level and thereby draining out the positive impact of food subsidy on national income.

#### **Reasons for Increase in Prices of Food**

Food prices are increasing at a global level. Some of the reasons for the increase in food prices are as follows:

- **Growth of Population**

The population has been growing all over the world, especially in countries like China and India. Advancement in medical sciences has contributed to population growth. The growing population creates a greater demand for food since food is a basic necessity for humans to survive. The increasing demand for food automatically exerts upward pressure on the prices of food.

- **Increase in the Prices of Fuels**

Nowadays farming has become much more mechanized and modernized. Machinery is used in every aspect of farming, i.e., cultivation, irrigation, harvest, transportation, storage, etc. The machinery runs on fuels and therefore increase in the prices of fuels directly impacts food prices.

- **Decreasing Agricultural Lands**

Due to increasing urbanization land for agricultural use is rapidly declining. Agricultural land is now extensively used for real estate purposes. Due to a decrease in land available for agriculture, the supply of agricultural produce is declining. Reduced supply of agricultural products automatically puts upward pressure on the prices of food.

- **Use of Food as Biofuels**

With an increase in the prices of fossil fuels, the search for alternative fuels around the globe has increased. Many food items have appeared as an effective alternative for fuels in many places. However, when food is used as an alternative to fuel, the prices of food shall automatically rise (Elliott, 2008).

- **Role of Commodity Exchange**

Commodity exchanges have deepened all over the globe. Commodity exchanges are very useful in discovering the fair price of the commodity including food items. Although commodity exchanges help in the price determination of the commodities sometimes due to various factors operating on commodity exchanges, they mismanage the prices and actual prices may deviate significantly from fair prices (OECD, 2008). These limitations of commodity exchanges have now been recognized globally and for this reason, people have started criticizing the commodity exchanges for the increase in food prices.

- **Alternative Uses of Agricultural Land**

Today there are many profitable uses of agricultural land. Due to this, people, especially in developing countries, have started using agricultural land for alternative uses such as brick-kilns, real-estate, warehouses, satellite-antennas, etc. All these ventures are more profitable than agricultural land. Therefore, farmers use their agricultural land for other activities. Due to this, there is a reduction in land available for agriculture thereby reducing the supply of agricultural products and putting pressure on the prices of food.

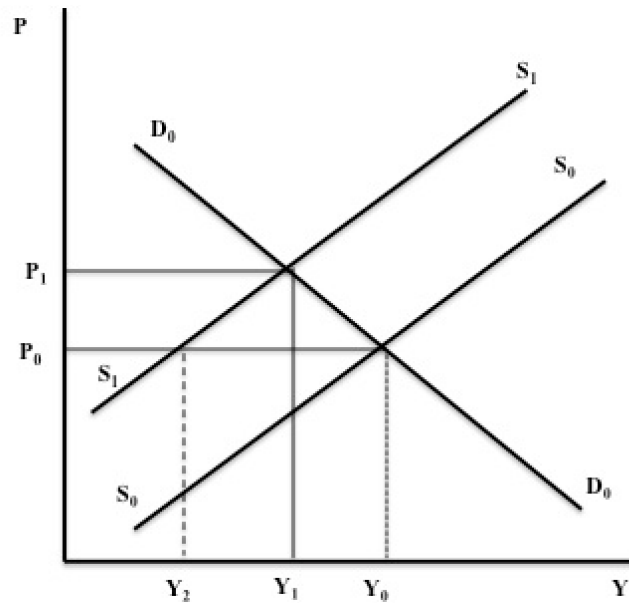
These are some of the main reasons for the increase in food prices. Whatever may be reasons but the increase in the price of food creates a serious effect on an economy. It creates a negative supply shock in the country, which results in never-ending inflation.

#### **Effect of Increase in Prices of Food**

Rising food prices may seem good up to a certain level but after certain sustainable limits, these surging prices create serious repercussions in an economy. Rising prices of food create a negative supply shock in an economy, which has a negative effect on national income and the overall price level.

- Rising Prices of Food and Negative Supply Shock**

Food is essential for human survival. Due to continuous rises in prices of food, there is a decrease in real purchasing power in terms of food for people. Due to this, they demand an increase in real wages to maintain their real income and real purchasing power. Hence as a result of an increase in wage rates, the cost of production rises, thereby creating a negative supply shock in an economy. This is diagrammatically explained below:

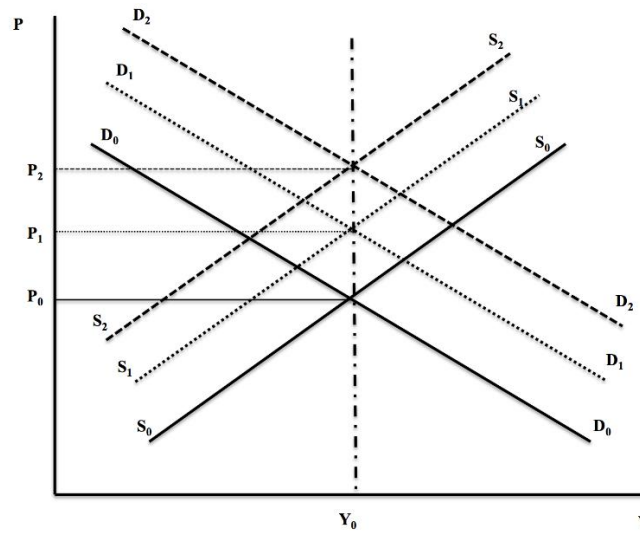


In the above diagram, price-sensitive Aggregate Demand and Aggregate Supply are given. Aggregate Supply is price sensitive due to sticky-wage assumption. Initially, Aggregate Demand is shown by  $D_0D_0$  curve and Aggregate Supply is shown by  $S_0S_0$  curve. The equilibrium is at  $Y_0$  level of output with price level  $P_0$  that is at the intersection of the Aggregate Demand curve ( $D_0D_0$ ) and Aggregate Supply curve ( $S_0S_0$ ).

However, over time there is an increase in the prices of food, which creates a negative supply shock in an economy. Due to an increase in food prices workers start demanding higher wage rates. Due to increased wage rates, the cost of production goes up thereby shifting the Aggregate Supply curve to the left. In the above diagram the Aggregate Supply curve shifts from  $S_0S_0$  to  $S_1S_1$ . At the current price level  $P_0$ , the aggregate supply along with the new supply curve  $S_1S_1$  shall be restricted to  $Y_2$  level of output. However Aggregate Demand at price level  $P_0$  would be  $Y_0$ . This would create excess demand in an economy. Due to excess demand, there would be upward pressure on the prices. As a consequence, the price would start rising and would reach to a new level that is  $P_1$  which is higher than price level  $P_0$  and at this higher price level excess demand would be wiped out and aggregate demand would equal to aggregate supply. Thus, new equilibrium is established at  $Y_1$  level of output with price level  $P_1$ . Hence it could be seen that how an increase in the prices of food cause inflation but with a negative effect on national income since equilibrium output has decreased from  $Y_0$  to  $Y_1$ .

- Rising Prices of Food and Wage-Price Spiral**

Wage-price spiral is a process through which expected inflation turns out to be actual inflation and inflation becomes a never-ending process. Rising food prices and resulting inflation forms expectation of inflation for future periods. As inflation is built in current expectations, therefore, the cost of production increases (Blanchard, 1986). Cost of production consists of incomes of different factors of production such as labour, capital, etc. Due to an increase in the cost of production, incomes of different factors of production also increase. As a result of increasing income, Aggregate Demand also increases. Thus, there are two types of shifts. One type of shift is due to an increase in the cost of production which shifts the Aggregate Supply curve to the left and another type of shift is due to an increase in incomes, which shifts Aggregate Demand curve to the right. This process is shown through a diagram as follows:



Initially, Aggregate Demand and Aggregate Supply are shown by curve  $D_0D_0$  and  $S_0S_0$  respectively. Initial equilibrium is at  $Y_0$  level of output with the  $P_0$  price level. Now there is an expectation of inflation in an economy. Due to this expectation, there is an increase in the cost of production and as a consequence, there is a shift in the supply curve from  $S_0S_0$  to  $S_1S_1$ . Now with an increase in the cost of production, there is also an increase in factors incomes. As factors incomes increase there is also a rise in Aggregate Demand. Due to the rise in Aggregate Demand, Aggregate Demand curve shifts from  $D_0D_0$  to  $D_1D_1$ . With these shifts, a new equilibrium is established at the intersection of  $D_1D_1$  and  $S_1S_1$  with a higher price level that is  $P_1$  but at the same level of output that is  $Y_0$ . So, a loop is created that turns expected inflation into actual inflation but without any effect on national income.

As expected, inflation turns out to be actual inflation in the next period there would be again expectation of inflation. Once again loop of wage-price spiral shall work. Expected Inflation will again increase the cost of production thereby again shifting the Aggregate Supply curve from  $S_1S_1$  to  $S_2S_2$ . Once again there shall be a rise in factors incomes thereby shifting Aggregate Demand curve from  $D_1D_1$  to  $D_2D_2$ . Due to this process once again, equilibrium shall be established at a higher level of price that is  $P_2$  but at the same level of output that is  $Y_0$ . Once again expected inflation turns into actual inflation. Thus, expected inflation works out as a self-fulfilling prophecy and finally converts into actual inflation.

• **Data Analysis of Inflation and Food Price Index**

The data is collected from the wholesale price index of India from the website of the Office of Economic Adviser, Government of India, Ministry of Commerce and Industry from the year 2005 to 2016 of General Price Index and Food Price Index (Base 2004 – 2005). The data is as follows:

Year	General Price Index	Food Price Index
2005	103.37	103.33
2006	109.59	112.25
2007	114.94	122.65
2008	124.92	131.56
2009	127.86	148.31
2010	140.08	174.56
2011	153.35	190.42
2012	164.92	206.52
2013	175.35	234.13
2014	182.01	249.08
2015	177.03	259.03
2016	180.57	274.02

Correlation Coefficient between the General Price Index and Food Price Index = 0.983346

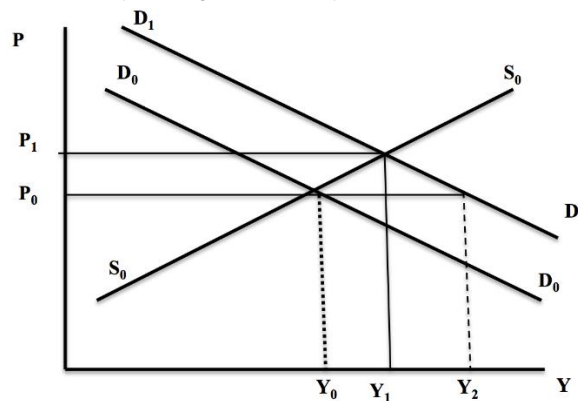
The correlation coefficient between the General Price Index and Food Price Index is significantly high and it can be said that an increase in food prices results in inflation through wage – spiral process.

### Food Subsidy

In a time of rising food prices and inflation, people of lower-income groups are the worst affected. In such a situation, the government uses food subsidies to bail out people in the lower-income group. Food subsidies can help the poor. However, there are other effects of food subsidies as well. These effects have been discussed below:

- **Effect of Food Subsidy on Prices and Output**

Food subsidy increases the Aggregate Demand of the economy thereby shifting the Aggregate Demand curve to the right. Food subsidies also demand-pull inflation, which is good for the economy. There is inflation but it is combined with an increase in national income, which is beneficial for an economy. The effect of food subsidy is diagrammatically shown below:



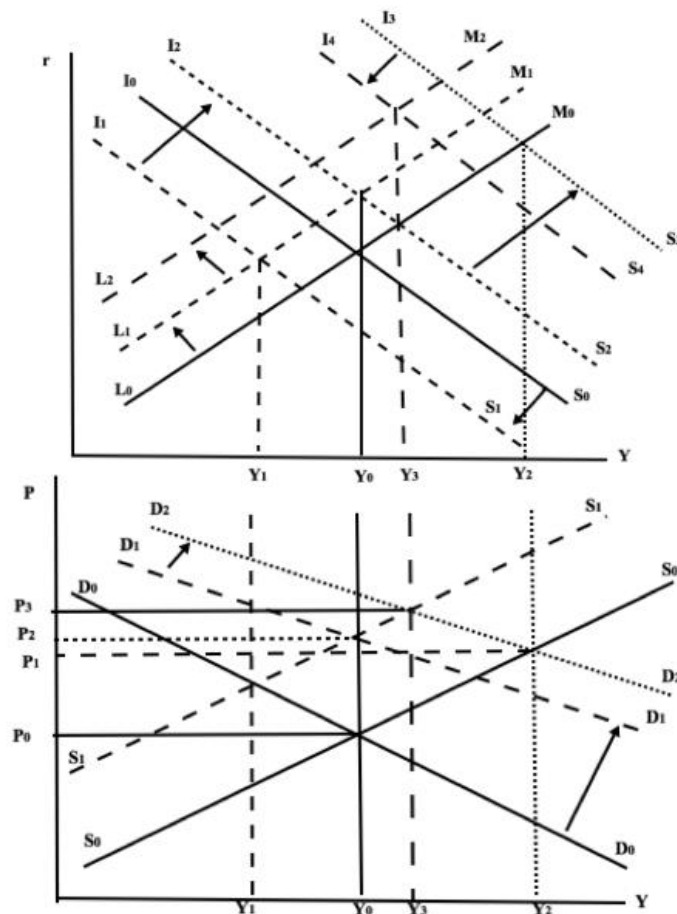
Before the food subsidy, the Aggregate Demand curve is shown by  $D_0D_0$ . The Aggregate Supply curve is given by  $S_0S_0$ . The equilibrium point is at the  $Y_0$  level of output with price level  $P_0$ . Thereafter the government introduces food subsidies in the economy, which creates a positive demand shock. Due to this positive shock on the demand side, there is an increase in Aggregate Demand thereby shifting the Aggregate Demand curve from  $D_0D_0$  to  $D_1D_1$ .

Due to a shift in the Aggregate Demand curve, Aggregate Demand increases from  $Y_0$  to  $Y_2$  at the current price level along with Aggregate Demand curve  $D_1D_1$ . However Aggregate Supply remains at the same level that is  $Y_0$  at a current price level that is along with Aggregate Supply curve  $S_0S_0$  so there is a mismatch between Aggregate Demand and Aggregate Supply. There is excess demand at the current price level  $P_0$ . There is an excess demand i.e.  $Y_0Y_2$ . This excess demand creates upward pressure on prices and as a result, the price level starts rising. Rise in the price level will eliminate any mismatch between Aggregate Demand and Aggregate Supply and ultimately price level shall be settled at a higher price level that is  $P_1$  where Aggregate Demand is equal to Aggregate Supply.

Hence food subsidy creates inflation in an economy but on the other hand, it also increases national income. So, it is beneficial for the economy as a whole since an increase in income or output can only be achieved by employing additional labour. Hence it also creates employment in an economy.

- **Effect of Rising Food Prices, Wage–Price spiral and Food Subsidy in an Economy**

It often happens that food subsidy is not the sole factor in deciding the price level, national income and employment. There are other factors too. Food subsidy often comes at the time of surging food prices to bail out, especially the people of the lower-income group. Surging food prices creates an expectation of inflation, which starts an infinite loop of a wage-price spiral. As a result of this loop, inflation turns out to be unstoppable thereby having a negative impact on national income. Thus positive impacts of food subsidies are lessened by the wage-price spiral effect. Food subsidy raises price level but due to the wage-price spiral, price level increases fourfold. Due to so much increase in the price level, there is a negative impact on national income. Hence, on the one hand, food subsidy raises national income but on the other hand, the wage-price spiral negates this increase in national income. As a consequence, there is an insignificant impact of food subsidies on national income. This process is shown diagrammatically below:



Initially in the above diagram, equilibrium is at  $Y_0$  level of national income (output) with price level  $P_0$ . This equilibrium is shown by the intersection of IS curve ( $I_0S_0$ ) and LM curve ( $L_0M_0$ ) in the upper panel of the diagram. This equilibrium is also shown in the lower panel of the diagram at the intersection of the Aggregate Demand curve ( $D_0D_0$ ) and the Aggregate Supply curve ( $S_0S_0$ ).

Now as there is an expectation of inflation in the economy, the wage-price spiral begins to work. Since inflation is expected therefore it creates a negative supply shock and due to which the Aggregate Supply curve in the lower panel diagram shifts to the left that is from  $S_0S_0$  to  $S_1S_1$ . Along with this new Aggregate Supply curve, Aggregate Supply falls short of Aggregate Demand at the current price level which is  $P_0$ . Due to excess demand, the price level starts increasing. An increase in price level also affects IS and LM curves. Due to an increase in the price level, IS curve shifts downward that is from  $I_0S_0$  to  $I_1S_1$  and LM curve shifts to the left that is from  $L_0M_0$  to  $L_1M_1$ . Due to these shifts, a new equilibrium is established at  $Y_1$  level of national income as shown by the intersection of  $I_1S_1$  and  $L_1M_1$  in the upper panel of the diagram and by the intersection of  $S_1S_1$  and  $D_0D_0$  in the lower panel of the diagram. However, this would not be the final equilibrium since due to the rise in the cost of production, factors incomes have increased thereby shifting the Aggregate Demand curve and IS curve upward. As a consequence, the Aggregate Demand curve shifts from  $D_0D_0$  to  $D_1D_1$  and IS curve shifts from  $I_1S_1$  to  $I_2S_2$ . With these shifts both in the upper and lower panel of the diagram simultaneously equilibrium is established at an initial level of national income that is  $Y_0$  but at a higher price level that is  $P_1$ .

As a policy measure, the government introduces food subsidies into the economy. With this food subsidy, the Aggregate Demand curve would shift upward since due to food subsidies, Aggregate Demand would rise. The shifting of Aggregate Demand curve  $D_1D_1$  to the new Aggregate Demand curve  $D_2D_2$  shows this shift in the lower panel of the diagram. In the upper panel of the diagram, IS curve would also shift upward from food subsidy. Therefore, IS curve shifts from  $I_2S_2$  to  $I_3S_3$ . If food subsidy has

worked independently then equilibrium would have been established at  $Y_2$  level of national income that is at the intersection of  $I_3S_3$  and  $L_0M_0$  in the upper panel of the diagram and at the intersection of  $D_2D_2$  and  $S_0S_0$  in the lower panel of the diagram. The price level would be at a higher level that is  $P_2$  but that could be sustainable since it is also accompanied by a higher increase in the level of national income that is from  $Y_0$  to  $Y_2$ .

However as already stated that food subsidy does not work independently. Other factors also work along with food subsidy. One such factor is the wage-price spiral. As price would increase there would be a shift in IS and LM curves. The shifting of curves in the upper panel of the diagram from  $I_3S_3$  to  $I_4S_4$  and LM curve from  $L_1M_1$  to  $L_2M_2$  show these shifts. As a consequence, the final equilibrium would be established at the intersection of  $I_4S_4$  and  $L_2M_2$  (in the upper panel of the diagram) but at a lower level of national income that is  $Y_3$  and this equilibrium would be established at a very high price level i.e.  $P_3$  as depicted in the lower panel of the diagram by the intersection of  $D_2D_2$  and  $S_1S_1$ . Therefore, the process of the wage-price spiral has not only increased the price level but has also drained out the food subsidy potential to boost national income.

The Government should be careful in introducing food subsidies. Government should create an environment of trust among the citizens of the country. If citizens have trust in the Government, then they would expect that Government will be able to control inflation therefore they will rationally expect low inflation for the future period. If the expectation of inflation is low in an economy, then the wage-price spiral shall not start. If wage-spiral process shall not start, then food subsidies can put the economy on the path to development.

In contrast, if the government does not create an environment of trust among the citizens of the nation then this would dampen the positive effect of food subsidy. There would be a negligible increase in national income and inflation shall be fuelling. A high rate of inflation and a low rate of growth of national income create havoc in a country. There is overall instability and uncertainty. There is uncertainty about the future prospect of a country since the high level of inflation combined with inequality form the basis for many social evils and unrest in a country. Economic development of a country is not possible when there are high inflation and glaring inequalities. Without economic development, financial stability is not possible. For this reason, the security market crashes on a recurring basis in a country whose economic prospect is in doubt. A country with a high inflation level loses its competitive edge with other countries due to which a country's trade surplus declines or trade deficit increases. This would depreciate the country's currency thereby building an atmosphere of uncertainty in a country. An unsustainable rate of inflation, increasing social unrest, decreasing trade surplus or increasing trade deficit, depreciating currency, financial market crisis, etc. contributes to the political instability of a country. Hence Government's inability to create an environment of trust brings all types of uncertainties and instabilities such as financial instability, economic instability, political instability, social unrest, hue and cry, etc. Hence the role of the Government is very important for the effective implementation of food subsidy policy and counter inflation (Sargent, 2013).

- **Data Analysis of Demand and Supply Side Factors**

Data is collected for demand and supply-side factors to determine which factors are prominent. For the Demand-side factor, data is collected for Gross Domestic Product per capita at Purchasing Power Parity in Dollar from the website of the World Bank. The data is as follows:

Year	Gross Domestic Product per capita at Purchasing Power Parity (\$)
2005	2,861
2006	3,173
2007	3,485
2008	3,638
2009	3,920
2010	4,315
2011	4,635
2012	4,922
2013	5,267
2014	5,680
2015	6,101

The semi-log growth rate in Gross Domestic Product per capita at Purchasing Power Parity is 7.39%.

Food Prices are one of the main supply-side factors and the semi-log growth rate in the Food Price Index from 2005 – 2015 is 9.89%. Hence Food Prices have grown at a rate larger than Gross Domestic Product per capita at Purchasing Power Parity which vindicates the fact that supply-side factors are more powerful than demand-side factors and rise in food prices are more responsible for inflation.

### Conclusion

The rise in the prices of food adversely affects the economy. Rising food prices create negative supply shocks in an economy, which not only leads to inflation but also reduces national income. Therefore, rising food is one of the significant factors for inflation in an economy. It not only brings inflation but also creates the expectation of inflation for the future period. The expectation of inflation starts the vicious cycle of a wage-price spiral. Wage-price spiral is a process through which expected inflation turns into actual inflation and this process goes on continuously thereby putting the economy into a never-ending process of inflation.

The government often as a countermeasure to control food-driven inflation introduces food subsidies so as to benefit the people of lower-income groups. Food subsidy also adds to inflation but it on the other hand has a positive effect on the national income. As food subsidy brings inflation it is also accompanied by an increase in national income so it acts as a good policy. However, there are other factors also which work along with subsidy. One such factor is the wage-price spiral. The wage-price spiral dampens the effect of food subsidy by not only fuelling inflation to an irresistible level but also hampering the increase in national income.

The role of the Government is very crucial. If Government through its policies and its effective implementation can create an environment of trust among the citizens of the country, then food subsidies can achieve desired outcomes. There would be no expectation of inflation in a country hence wage-price spiral shall not work and in such a situation food subsidy will have a positive effect on an economy. However, if Government is not able to create an environment of trust then a vicious cycle of wage-price spiral shall start which shall fuel up inflation level and deteriorate the country's prospects.

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