

Parity Pricing as an Approach to Price Support Programme in Agriculture Sector of Pakistan: Policy Analysis

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Abstract

Parity pricing is an important approach that helps the government and policy makers to determine the support prices of the different commodities. In this study we will discuss how the parity price ratios will prove effective and efficient role in determining the price support programs in agricultural sector of the Pakistan. There are two approaches described in this study: First is the cost of production; Second is the parity pricing. The cost of production approach is used to make sure the farmers to get the suitable prices for their products. Parity price approach is used to remove the imbalance between the agricultural sector and non-agriculture sectors. We use the secondary data from time period 2005-2015. The data were collected from Pakistan Development Review and from Pakistan Economic Survey. The data on different crops like wheat, maize, rice, cotton and sugarcane are collected to calculate the parity price ratios. The price indexes are used to calculate the parity ratio. As the parity ratio is the ratio between prices received by the farm owners and prices paid by the farm owners, so these received and paid prices are calculated. Parity ratios are also calculated for different Cultivation models in Pakistan. At the end it is told that support prices can be determined in Pakistan by combining these two approaches of cost of production approach and parity pricing approach so that the farmers of Pakistan become able to get reasonable returns for their commodities and could improve their living standard.

Keywords: Agriculture Sector, Parity Pricing, Wheat, Cotton, Pakistan

Introduction

Pakistan is a developing country where unfair capitalism is working. Here unnecessary restrictions are being made on each sector of the economy in connection with the agri sector and there is an effective role of demand and supply. Although every year Government of Pakistan proclaims procurement prices of many agricultural crops like wheat, cotton, sugarcane and rice. But still the prices of agricultural products are more unstable. Instability creates the following problems:

- 1- unprofitability rises in agriculture sector and agriculture sector becomes fewer striking sector and mostly parts of the lands remain uncultivated.
- 2- There rises uncertainty in allotment and division of resources in the country.
- 3- High fluctuations create in the incomes and outputs of the farmers.
- 4-the terms of trade become unbalance and go against the agriculture sector.
- 5-the financial problems occur in the agriculture sector for the small formers and mostly advantages and profit go in the favor of big farmers.

All the above reasons show that because of instability in the prices of agricultural products the small farmers badly effect and the mostly incomes in rural areas go in favor of big farmers. In the presence of all the problems of instability in the prices of agriculture goods and the effective

demand and the supply forces, there is a big need of some policy packages announced by government. Parity pricing is one of these policies for supporting prices of agriculture products.

A price support program was also introduced by John Kenneth Galbraith for five years to Pakistan Planning Commission in 1950s. The objective of this Programme was to lower the prices of food products. This policy is still in operation. It was thought that under this policy the industry owners will get high profits and will buy cheaper raw materials and cheaper labor from agri- sector. Then these profits will prove helpful to strong then the development process in the country.

The basic aims of pricing policies like parity pricing and other policies are;

1- To meet the increasing demand of agriculture products from domestic resources and to increase the agricultural output.

2- To increase the incentives given to farmers which will result in an increase in incomes and output of the farmers and this will bring a change in social and economic conditions of rural areas of an economy.

3- To give an insurance to farmers regarding minimum price to protect the incomes of the farmers.

4- To maintain a balance between demand and supply so that prices of agri goods will not high above the support prices when there occurs shortage of a product and when products are bumper there price will not be low than the support price.

5- An economy would be self-sufficient and production would be increase in the country.

Changes in agricultural prices respond by owners of farm are established also in the traditional agro setups. Some research works on agriculture sector of Pakistan revealed that the resources were devoted with the impacts of prices and other related parameters of economics to yield and cattle actions other than management of utter traditions. The goals of progress in the agriculture that are required can be analyzed by sensible treatment of prices of agriculture inputs and products.

To get the required changes in agriculture prices, the policy makers have suggested some methods. These methods include setting up of price, restricting in international trade and many others like these. The desired goals are determined by the usage and type of price policy adopted in agriculture. These goals may be different in every country with respect to time. These goals depend generally on international economic condition and particularly on the performance of agriculture sector. The main stress in agriculture sector of developed countries is to protect farmers from the price establishment risks.

As in Pakistan and some other developing countries, the adopted price policy should be production oriented because here the traditional agriculture changes its shape. The farm entrepreneurs can increase their production by adopting modern technologies and it is possible when there is a favorable relationship between prices of the products and agriculture inputs. So the national targets of production for many agricultural crops can be obtained by adjusting prices of competitive agriculture commodities. In 1960s a series of support prices were presented in Pakistan. In the beginning the Programme was the intervention of the government in market just when the price of wheat decreased from Rs.13.50 per mound. After this the other agriculture commodities were also taken under this system like sugarcane, rice and cotton etc. later on, Pakistan's government also included onions, maize and potatoes to this price support Programme.

However desired level of this Programme of supporting prices was not achieved despite having many agreements on the advantages of price supports.

There are two methods which can be adopted in determination of support prices:

1- The cost of production method.

2- Parity pricing approach.

The cost of production method explains that farmers should be ensured the suitable price for a crop and there should be a creation of balance between different crops which are competing with another. But it is difficult the determination of cost production for a crop because:

- 1- Production is effected by the technologies used in production process.
- 2- The cost of the farmers having more lands will decrease and they will get the economies of scale. So the supporting of prices will only advantageous to the big land owners and not to the small land owners.
- 3- There are not organized markets in our country and for many inputs in agriculture sector for which it is not possible to trade in the markets. For example rent of land, the agriculture labor price specially domestic- female labor and the costs of management.
- 4- Due to prices becoming high or low and inflation, the cost in agriculture sector may change.

Parity Price Approach: If there occur imbalance in terms of trade of agriculture sector and non-agriculture sectors in an economy, the parity price approach is used to eliminate this imbalance. The parity price approach describes equilibrium between the sold agriculture products and productive price that produces income which will prove helpful to buy such a quantity of another product. So this approach proves helpful to create a balance between the product bought by the cultivators and product sold by the cultivators.

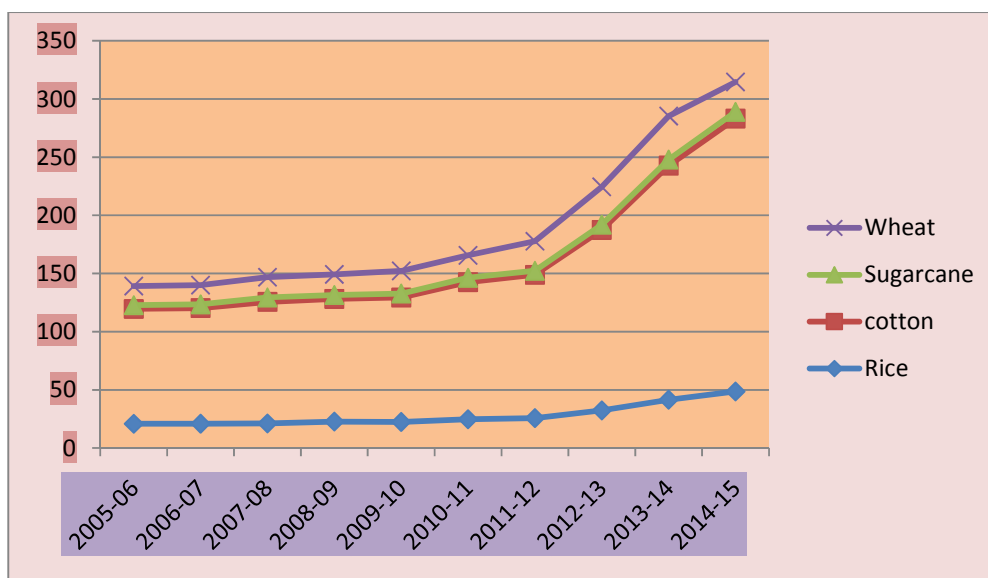


Figure 1: Trend of Major Crops

Literature Review

Afzal, Muhammad (1977) worked on parity price as an approach to price support programmer: A policy analysis. In this study the secondary data was used from time period 1966-1976. The data on the four crops was collected (rice, wheat, sugarcane and cotton). In this research two approaches were used 1: the cost of production approaches, 2: parity price approaches. To determine the required level of supporting prices, the parity price method is used in this research. In this study to make an estimation of monthly price that farmers receive and price that farmer pay for agri inputs and family consumption. It was suggested that there should be conducted a survey at a large scale.

Chaudhry, M. Ghaffar (1995) analyzed recent input-output price policy in Pakistan agriculture: Effects on producer and consumer. In this study he used the data on prices of agricultural inputs and outputs from time period 1984-1993. The data was collected from Pakistan Development Review. In this study it was analyzed that what are the effects of agricultural pricing policies on producers and consumers. The approach of parity price ratio was used. The study concluded that the policy of the government for recent year was against the agriculture. When the government interfered into the prices, the general agricultural commodity prices remained below as compare to the world prices. So a need was felt to make government intervention powerful enough to make the prices of agricultural commodities stable.

J. Verteramo Chiu, Leslie, and Calum G, Turvey (2014) analyzed cross market price support and agricultural development: Quant options valuations for cash grains in Mexico. In this study the price data of three commodities: yellow corn, white corn and sorghum. The data was collected from a consulting company specialized in agriculture markets in Mexico during 2002-2007. The data was estimated by the law of one price by adding transportation and handling costs from US port to desired local market. Dependent variable was $P_{i,t}$ (local price of a given commodity), F_t (nearby features settlement price), E_t (exchange rate) and $B_{i,t}$ (local basis in mpx for i market).

Wibowo, Alan Dwi, et al. (2015) analyzed the Policy model of production and price of rice in Kalimantan Selatan. System dynamics model was used and mental data and secondary data was used in this study. The methodology contained three stages. The first stage was problem identification. The second stage was the use of system dynamics model. The third stage was the testing of scenario by stimulation approach. The variables used were cultivation area, production, market demand and population. The study concluded that the three strategic policies of government that were applied did not give significant results of establishing the price of rice in the market.

Li, Ping, et al, (2015) examined Pricing of Basket Default Swaps based on factor copulas and NIG. In this study the empirical data was used during time period 2009-2011. The correlation test was used in this study to check whether there was correlation between the variables. The dependent variable was PL present value of the premium payment leg and the independent variables were F total face value of the portfolio, T default time of asset, L indicator function of a credit event using risk neutral measure. The main point of this study was the use of factor copula model to tell the correlation between the underlying assets in BPS.

Lund, Peter D., et al (2015) worked on Review of energy system flexibility measures to enable high levels of variable renewable electricity with variable Pricing, Demand Response and Thermal Energy Storage for residential Applications. In this study variables used were Renewable Energy Base cost, Renewable Gen. present of capacity and Multiplier wholesale retail. In this study metered data was used and control strategy was used. This research was organized in three steps. Firstly overall control strategy was introduced. Secondly the modeling approach was described. Finally future research plans are presented. This study focused on the day ahead time frame optimization of the grid based on traditional forecasting techniques of energy demand and methods to produce energy.

Kohler, Jillian Clare, et al. (2015) analyzed proofs for PLOS one paper: Doer pharmaceutical pricing transparency matter? Examining Brazil's public procurement system. A general report of BPS and STAGS data created for 25 drugs. These 25 drugs were selected because they constitute widely utilized therapeutics on Brazil. Data were described using means and standard deviations over all transactions for each drug and state separately. For each pairing of drug and state, a linear regression model was estimated using the log of unit price as the dependent variable and time as the primary linear predictor. The study resulted that there is no consistent decrease in price across all medicine groups.

Lee, Ji Hyung, and Peter CB Phillips (2015) examined asset pricing with financial bubble risk. In this study time series data was used during the period 1947-2009 from Wharton research data services (WRDS). The study extended the standard present value and consumption based-asset pricing models by incorporating the possibility of periodically collapsing price exuberance and investor uncertainty about the origination and termination dates of exuberance.

Khan, Tahir Mehmood, et al. (2015) analyzed pharmaceutical pricing policies and procedure in Saudi Arabia: A narrative review. To meet the goal of the study, a systematic search approach was adopted. The data was collected from scientific database and policy documents which were published by the Saudi food and drug authority (SFDA). In this study 10 articles were used that were related to the study and were used in final data extraction. The variables used in this study were factory price in country of origin, wholesale price in country of origin, public (retail) price in country of origin, proposed cost, insurance and freight (CIF) price to Saudi Arabia and price of product where it is marketed.

Mamitimin, Yusuyunjiang, Til Feike, and Reiner Doluschitz (2015) worked on Bayesian network modeling to improve water pricing practices in North West China. The primary data was collected from expert interviews, expert workshops, policy documents, scientific literature and official statistics during August-October 2015. Netica software was used for Bayesian modeling exercise. The variables were water pricing, water pricing practices, agricultural extension services, subsidy, operation and maintenance O and M investment, altering crop pattern, optimizing farm management practices, adopting advance irrigating technology, water use efficiency. The study concluded that an increase in price of water results a limited positive effect on regional WUE.

Lin, Tom CW (2015) analyzed reasonable investor. This study was consisted of three ways of methodology: 1-contacts were made prospective respondents by variety of industry sources. 2-interviews were conducted from thirty nine suppliers. 3- 9 interviews were conducted from three super market groups. The variables were promotional items, incentives, volume sales, retail price, frequency purchase, reference price, competitor pricing. This study informed power balance that comes from the relationship between suppliers and retailers.

Orlov, Anton (2015) examined an assessment of optimal gas pricing in Russia: A CGE approach. In this study data was collected through the global trade analysis (GTAP) database in 2007. For this study computable generation equilibrium (CGE) model was used. In this study dependent variable was QQ (total domestic consumption) and the independent variables were QINTDD (demand for intermediates by industries), QCD (household demand), QGD (government demand), and QINVD (investment demand). The study concluded that welfare gains with an increase in domestic price of gas and when domestic gas prices increase it results in higher government revenues.

Tveteraas, Sigbjorn L (2015) worked on price analysis of export behavior of Aquaculture producers in Honduras and Peru. This study is based on the time series data collected from NWFS during 1989-2013. Time series tests: unit root, granger causality and co integration were used to estimate variables. Price series was the main dependent variable. The study showed that the price changes for Atlantic salmon fresh wild products (whole and fillet) do not have any competition effect on farmed salmon product demand or prices.

Jiang, Yuanchun, et al. (2015) examined Redesigning promotion strategy for E-commerce competitiveness through pricing and recommendation. In this study the data of 50 products (electronics) from Amazon.com, including before promotion prices, the complementary, substitute and independent products and their prices. Two promotional activities were used: 1-PNR strategy (promotion with no recommendations), 2- MCR strategy (recommend products with the minimum cost

ratios). The variables were d (the discount rate of product) and X_s^s (the decision variable). In this study an analytical marketing strategy was proposed for e-tailors.

Galenson, David W., and Simone Lenzu (2015) analyzed pricing genius: the market evaluation of innovation. In this study the quantitative data was used during time period 1965-2015. The variables were Age, Age 2, Age 3, Age size, paper support, other supports, size and sale year. The regression analysis technique was used to estimate the results. The analysis of the careers of the artists revealed that art is most important because it is most innovative.

Puspita, Fitri Maya, Bahok M. Taib, and Ismail Abdullah (2015) examined optimization of wireless pricing scheme. This study revealed that when the provider set the increment of price change due to Q_{os} change and the decrement of amount of Q_{os} value, then the aim to maximum price is obtained. In this study the model of nonlinear programming was used. The data was collected by international conference on information technology and variables, model class, state, objective, infeasibility, iterations, GMU, ER.

Raza, Syed Asif (2015) worked on an integrated approach to price differentiation and inventory decision with demand leakage. In this paper the suggested mathematical model was a nonlinear constrained optimization problem and to solve it two approaches were proposed: 1-Hierarchical optimization, 2-joint optimization. The variables were P_i (price for market segment), V (differentiation price) and Q (quantity inventory allocation for market segment).

Adjagbodjou, Paulin (2015) analyzed aligning sales promotion strategies with buying attitudes in a Recession. In this study primary data was used during time period 1999-2005. The techniques used in this study were structural equation modeling (SEM) chi-square test and analysis of variance (ANOVA). The conclusions of the study proposed that emphasis in cost pricing had a positive and significant relation between price determinants and performance of organizations.

Arenoe, Bjorn, Jean-Pierre I. van der Rest, and Paul Kattuman (2015) examined game theoretic pricing models in hotel revenue management: an equilibrium choice based conjoint analysis approach. In this study the dependent variable was R_i (revenue for hotel i) and independent variables were D (total market demand), P_i (room price charged by I hotel), P_j (room price charged by j hotel), $X_i X_j$ (vectors of non-Price attributes offered by I and j hotel) and $M_i (P_i | P_j, X_i X_j)$ (market share for hotel i). There was specified competition between hotels in term of market share function which was estimated using multinomial log it models of consumers' choice. The study showed an equilibrium framework to determine the hotel room prices, building on the foundations of an oligopoly game.

Chin, Anchor, Andy Lai, and Joseph Y J Chow (2016) analyzed non-additive public transit fare pricing under congestion with policy lessons from Toronto case study. In this study a method of successive averages was adopted to find the SUE. The decision variables were t_s (travel time on links), c_r (travel cost of path r), g_z (demand between OD pair Z), v_s (transmit passenger flow on links), h_{rz} (transmit passenger flow on path r), s_z (expect minimum travel cost between an OD pair) and q_z (the zonal path r). The OD demand data was collected from TTC (transportation tomorrow surveys). The study resulted that researchers should design more sophisticated zone-based or even temporal-based policies which cater greatly.

Mclarty, Dustin, Jack Brouwer, and Chris Ainscough (2016) worked on economic analysis of fuel cell installations at commercial energy dispatch were performed to get an entire year of high resolution building energy data. The variables were t_{on} (begin of on peak electricity rate), t_{off} (end of on peak electricity rates), r_{on} (duration of ramp from of peak output to one peak output), demand (demand of time interval t) and DG_t (output at time interval t). This study evaluated seven tests by using national analysis feature of DG-BEAT. This paper presented seven scenarios for stationary fuel cell integration into the US commercial building stock.

Roy, Rajat, Fazlul K. Rabbane, and Piyush Sharma (2016) analyzed antecedent's outcomes and mediating role of internal reference prices in pay- what- you want pricing. The data was collected through a structured survey and analyzed through a structural equation modeling technique using AMOS. In this study the structured survey data was used. This study offer useful insight into its underlying socio psychological mechanism. The research of this study showed that social motivation and price consciousness can influence prices offered and PWYW. The variables were amount of money, price consciousness, reference price, social availability, altruism, gender, age, monthly income and attitude.

Theoretical Framework

Since the procurement prices which are fixed by the government have the nature of floor prices and farmers are not restricted to sell their products to some specific person or market, so the farmer is free and he could sell his production output in the open market. The government sets some specific amount of agriculture output up to which the government district officers have to support agriculture output for example rice and wheat and many others. Government buys the agriculture products through its programs of procurement prices but it purchases only at the fixed prices and does not pay the higher prices. Government does not pay above the fixed procurement prices even these fixed prices are lower than the prices in the declaration open market. In spite of these difficulties, the policies settled by the government about supporting the prices of agricultural commodities play an important role to protect the farmers from difficulties which they face in production process.

The types of price support policy issues are perhaps the well-known to the people specially farmers because these are the problems that get the most interest of the farmers. The need for price support policies mostly come from the achievement of many other progressive policies. The prices support policies are the policies which are made to increase the prices of agricultural commodities above the stage that can be taken when the policy is not present. In 1933, Agricultural Adjustment Act (AAA) was represented by Congress. The main goal of this legislation was to make an extension and improvement in the incomes of the farmers. Mainly there are two ways by which the incomes of the farmers could be increased: firstly making direct payment (cash) to the farmers, secondly indirectly supporting farmers by making improvement in the prices received by the farmers for their agricultural product. So both these methods are being used to make sure a favorable price for the cultivators of the certain crops and making cash payments to the farmers even if prices are not so high.

Cost of production method is the mostly used method in Pakistan. This method provides an appropriate return to the farmers for their products. Support prices are announced on the basis of the analysis and estimation of cost of production of many agriculture products and then there become a chance for the farmers to get a most reasonable return for their products and also a balance occurs between the gains on competitive agriculture products. So the cost of production is a useful way for the farmers because through this method they will be able to get the appropriate returns. Agricultural productivity uses many means for which there is no pricing in market. It is difficult to get an error-free estimate of cost in the presence of many difficulties like valuation problem especially for management inputs and labor and many other problems like variability in wages of workers in different areas. So it is problem creating situation for the policy makers to choose an adequate method of cost of production.

At the same time, a more costly part in production process is the land rent. They take almost 30-40 percent cost of whole cost of production. The cost of land rent depends upon the method adopted for estimation. Another serious problem is the valuation of land inputs especially in the

condition when there is no market for land and the rents of lands are taken as the opportunity cost of lands or sometimes even there is no existence of land rent. Type of technology utilized in production is another determinant of cost of production. Some features are using high cost conventional technology with undesirable justice effects. In this case, if the prices are settled low on the basis of modern technology, it will differentiate beside the farmers, when a bulk of farmers will not have the enough resources to adopt that modern technology and especially when the new inputs are subsidized. So to determine the level of support prices, a sensible and cautious analysis is compulsory regularly about the area, size of the farm and the kind of technology.

Parity price method is an important method of setting support price for the farmers. This method provides a yard stick for the farmers so that they could be able to get a fair price for the products in contact with the price products bought by the farmers. Considerably a parity price is the price of production which will create income for the farmers and they would be able to purchase same amount of other commodities which was for the period of another particular base period. It is necessary to narrate that parity price approach provides only a minimum level of income for the farmers which is not enough for families of the farmers so that they could get a better standard of living. Development is not lined out. There are many ways for the farm owners to get the higher incomes like quick transmission of new agricultural innovations and appropriate market environments. These ways become useful for the farmers in the sense that they would be able to get a better improvement in their standards of living. But the main objective of parity pricing is not just an improvement in the living standard of families of farmers. Its main goal is that purchasing power of the farmers should be strong so that they would be able to purchase the other commodities and inputs.

The government fixes some procurement prices of food crops and since the farmers are free from taxation of incomes, they indirectly become a part of taxation by the programs of government procurement prices. The programs of procurement prices of agricultural commodities are regressive because these programs effect the both the big farm owners and small farm owners who have only a limited surplus (marketable). In the absence of procurement prices the small farm owners will be free to trade their output in an open market. In this way farmers would be able to increase their incomes by getting favorable prices for their products and their savings will also increase and they will be able to get the better wages of agriculture inputs.

Methodology

The methodology contains the many steps of calculating parity pricing. The first step is to calculate the received prices of the farm owners and paid prices of farm owners.

Received Prices

If we multiply the price by total amount of product sold by farmers, it would result in the total prices received by the farm owners for that product. Prices which farmers receive are calculated to show that how much quantity of all the kinds of specific commodity have been sold. Moreover to evaluate a commodity, compulsory modification can be done when many different kinds and varieties of a commodity are produced and sold. The estimates about the prices received by farmers are made by procurement price center or by the domestic market to find the average of prices received by the farmers for their crops yearly in the first sale point of view. We have computed prices received by the farm owners from many commodities. These commodities and their index numbers are mentioned in the appendix given below.

Index of Prices Received

The measurement of average annual change in prices of agricultural commodities is provided by the index of prices received by the farmers. We have used Lapsers index formula to calculate the index of prices received by the farm owners.

The Lapsers formula is:

$$I = \sum \left(\frac{P_{i1}}{P_{i0}} W_{i0} \right) \quad (100) \quad i = 1, \dots, n.$$

Where;

I = index for a specific group.

P_{i1} = current price for i product.

P_{i0} = base period price for i product.

W_{00} = base period weight for commodity i.

Prices Paid

The prices paid by the farm owners can be calculated by the average of production input prices along with the consumed products bought by the farmers. We have chosen the following items to calculate the prices paid by the farmers which are mentioned in the appendices given below. Paid prices show the yearly average prices of commodities bought by the farmers. The prices paid by the farm owners also give the estimates of sales of all the kinds and varieties of crop sold by the farmers. The main object to calculate the prices paid by the farmers is to compute all the products bought by the farmers to get the estimate of goods and services that farmers buy for family consumption and for production inputs.

Index of Prices Paid

The index of prices paid by the farmers is used to get an estimate of prices of goods and services which farmers buy. It is also used to tell whether prices of production inputs of agriculture have stayed as compare to the prices of products that farmers buy farm inputs and house hold products are the two main parts of the index of paid prices. To get the percentage weights (which are used to make the group indexes of commodities), data is collected from Household Income and Expenditure Surveys and Consumer Price Index Numbers. For different kinds of products and production inputs, a composite index was made with adequate weights of products. Then parity ratios and parity prices have been calculated from the indexes of prices paid by the cultivators and prices received by the cultivators.

Parity Ratios and Parity Prices

There are many ways to compute parity. These are: parity between agricultural and non-agricultural products; parity for individual product to determine the price; parity between the prices received by the farm owners for their crops and prices paid by the farm owners to buy production inputs; parity of many mix agri-products. These concepts of parity are discussed below in detail.

Parity between Agricultural and Non-Agricultural products

The parity ratios between agricultural sector and non-agricultural sector are most important because these ratios play an important role while making pricing policies by policy makers. The production process and exchanging surpluses of economics from one sector of country to the other sectors are greatly affected by the price relations of different sectors. The ratios of agricultural prices and non-agricultural prices were calculated from the following formula.

Parity Ratio = index of prices received by the farm owners/index of prices paid by the farm owners.

The separate product prices of different main agri-commodities like cotton, sugarcane and wheat are comparing with parity price indexes to find ratio of parity of these agricultural commodities. The table of parity ratio shows that the prices of all commodities change in every year except the prices of sugarcane prices. The parity ratio of sugarcane stayed inadequate in different years.

The parity ratios of mix crops play a very important role to give the information to policy makers about the prices of commodities and methods of cropping.

Parity Approach to Price Determination for every agri-product

The parity price method is a very useful method to make the price support programs to determine the price of commodities of agriculture. This method describes about the expenditure to farmers to buy the other agri-inputs and family consuming-products. This method also tells about the situation of demand in general in a country. The parity prices can be calculated by the two ways given below;

1-Fixed base: if we multiply the average received prices for a crop in a base year by the adequate index of paid prices by the form owners. We have taken 2008-2009 as a base year period for calculating parity prices. The formula to calculate the parity price is:

$$\text{Parity price} = A_{pe} \times P_{ip} \backslash 100$$

Where

A_{pe} = average of fixed price in base period.

P_{ip} = index of paid prices in parity prices calculating year.

These calculated values of parity price with the fixed base method are given in the following table.

2-Adjusted base: the adjusted base method to calculate parity prices is the enhancement over the fixed base method. This method is used due to following two situations: first the adjusted base method of parity prices taken into account the relationship between the prices of products in the recent 10 years. The relation that occurs in the real base period preserves in the previous formula. There is no need for the parity price to be adjusted for the recurring changes because these changes are averaged out. Second the ten year average is adjusted in a fix year by taking the average of received price index for all the products for the same period.

So the adjusted base method is used to compare the received prices and make a relation between the parity prices and changes in the other related prices in the previous 10 years. The method to calculate the parity prices by the adjusted base method is described as follows: first the average of received prices of commodities of previous 10 years is calculated. Second the average of 10 years and average of received price index are divided for the same period. At the end parity prices are calculated by multiplying the current parity index and prices of certain products are calculated which are given following:

Parity between received prices and paid prices of agricultural commodities:

The following table shows the parity ratios between paid prices index by farmers for a kind of fertilizer and received prices by the farmers. These calculations are given in the following table.

Parity ratio of different combined crops

Parity ratio of different combined crops is an important method that tells the relation between paid prices by cultivators for buying family consuming goods and agricultural inputs. The model of cultivation may be different in different areas with respect to time. We have chosen 5 very common cultivation patterns of different areas of country to calculate the parity ratios.

Results and Discussion

In our analysis different tables have been presented which show the parity price ratios of many agricultural commodities and various farm inputs. Parity ratios are calculated with adjusted base method and fixed base method. Then parity ratios of different cropping models prevailing in Pakistan have been presented. These tables are given below:

Table 1: Parity Ratio between Agricultural and non- Agricultural Prices as well as for Individual Crops

Year	Index of prices	Index of prices	Combined Parity Ratio	Parity Ratio Of			
	Received	Paid		rice	wheat	Sugarcane	Cotton
2005-06	129.2	124.3	103.9	93.6	98.1	79.1	135.3
2006-07	126.8	125.7	100.8	102.4	66.4	78.1	115.3
2007-08	127.6	131.9	96.7	97.1	63.2	85.3	98.1
2008-09	124.6	134.6	92.5	92.2	62.1	62.4	87.2
2009-10	155.3	156.4	99.2	100	63.2	90.5	53.4
2010-11	134.4	148.3	90.6	98.5	58.1	106.2	117.3
2011-12	156.3	155.4	100.5	96.5	67.2	103.5	88.4
2012-13	215.3	162.8	132.24	111.3	58.4	136.9	63.3
2013-14	284.1	253.6	112.02	117.4	49.3	94.2	115.4
2014-15	296.3	291.4	101.68	98.5	47.5	86.3	100.3

Source: Economic survey of Pakistan

The above table shows the parity ratios of agricultural and non-agricultural prices, then the parity ratios of individual crops like rice, wheat, sugarcane and cotton are calculated by using the Lapsers's formula. The parity prices are important for agricultural and non- agricultural sectors.

Table 2 : Estimates Parity Prices with Fixed Base 2001-02 = 100

Year	Rice	cotton	Sugarcane	Wheat
2005-06	20.8	98.7	3.25	16.5
2006-07	20.9	99.4	3.16	16.6
2007-08	21.1	104.5	3.8	17.4
2008-09	22.7	105.4	3.4	17.8
2009-10	22.4	106.9	3.44	19.5
2010-11	24.7	117.9	3.68	19.3
2011-12	25.7	123.1	3.51	25.4
2012-13	32.3	155.1	4.53	32.5
2013-14	41.5	201.3	5.1	37.4
2014-15	48.6	234.5	5.9	25.6

Source: Economic survey of Pakistan

The above table shows the parity ratios using fixed base method. These parity ratios are calculated of different crops. In this method select the fixed base of year is 2001-02. The values show that the parity ratios of rice, cotton, sugarcane are continuously increases but wheat is firs increasing but in 2014-15 it is decrease.

Table 3: Estimated Parity prices Based on Adjusted Base Method

year	Rice	Cotton	sugarcane	Wheat
2001-02	22.8	108.7	3.52	17.9
2002-03	24.1	126.1	3.08	20.2

year	Rice	Cotton	sugarcane	Wheat
2003-04	25.2	134.3	4	21.5
2004-05	31.4	168.5	3.9	26.3
2005-06	40.2	214.7	4.2	35.7
2006-07	44.6	224.7	5.9	40.5

Source: Economic survey of Pakistan

This table shows the estimated parity ratios using adjusted base method. The parity ratios of this situation are that the parity ratios of all crops are increases continuously.

Table 4: Parity Between Prices Received and Paid of the Farm Products

Year	Index of prices Received	Index of prices Paid	Parity Ratio
2005-06	129.2	114.7	112.6
2006-07	126.8	114.7	110.5
2007-08	127.6	119.3	106.9
2008-09	124.6	130.6	95.4
2009-10	155.3	141.1	110.06
2010-11	134.4	130.6	103.9
2011-12	156.3	228.8	68.31
2012-13	215.3	341.6	63.02
2013-14	284.1	264.7	107.32
2014-15	296.3	332.5	89.11

Source: Economic survey of Pakistan

This table shows the parity ratios of farm inputs calculated by the index of received prices and paid prices by the farmers. Parity ratio is decreases from 2005-06 to 2008-09 after this increase by 103.9 and then decreases condition shows in table.

Table 5 : Parity Prices of Individual Agricultural Commodities

Years	Rice	Cotton	Sugarcane	wheat
2008-09	30.9	118.1	3.8	19
2009-10	37.8	131	3.9	18.1
2010-11	29.4	124.5	3.8	17.5
2011-12	52.3	211.5	5.4	34
2012-13	68.9	245.3	6	38.2
2013-14	84.3	308.1	6.2	50.6
2014-15	95.4	263.1	6.3	47.1

Source: Economic survey of Pakistan

In this table researcher exhibited the estimates for the parity prices of individual agricultural products. When we find individually parity prices then we see that rice, wheat and sugarcane prices are tending to increases while the cotton prices are showing both situations (positive & negative).

Table 6: Parity Ratio's for the Major Cropping Patterns in Pakistan

Year	Cultivation	Index of prices Received	Index of prices Paid	Parity Ratio
2005-06	sugarcane, wheat, maize	250.8	253.7	98.8
2006-07	sugarcane, wheat, maize	294.3	291.5	100.9
Year	Cultivation	Index of prices		
2007-08	wheat, maize	140.5	253.7	55.38
2008-09	wheat, maize	291.6	291.5	100.1
2009-10	rice, wheat	257.8	253.7	101.6
2010-11	rice, wheat	297.4	291.5	102.02
2011-12	cotton, sugarcane, wheat	240.1	253.7	94.6
2012-13	cotton, sugarcane, wheat	237.8	291.5	81.5
2013-14	cotton, rice, sugarcane, wheat	248.8	253.7	98.06
2014-15	cotton, rice, sugarcane, wheat	256.4	291.5	87.95

Source: Economic survey of Pakistan

The above table shows the pattern of major crops in Pakistan. We select the years 2005-2015 and in this decade parity ratio pattern is decreases. But prices received and paid both are increases in this duration.

Conclusion and Recommendations

The best and adequate method that assures eye-catching prices to farmers for their agricultural products is the cost of production method. This method also assures a required stability in comparative profitability of competition agricultural products and agri-products combinations. These goals can be obtained by introducing some modern appropriate estimates about the situations of the farms where there is an adequate division of labor and other inputs of lands.

The cost of production approach provided the interesting estimates for devising price support programs during past in the country. So this approach became a source of attraction for progressive farm owners of relatively fine areas of the country. The cost of production approach gives better results from short run point of view when the main objective is to increase the productivity of the agricultural commodities.

On the other hand, as far as the parity ratios and parity prices are concerned, these approaches gave the reliably high parity price or consistently low parity price for all the agricultural products. These approaches of single agricultural products were depending upon the different other approaches. But these approaches give favorable estimates to trace the prices of agricultural commodities that manipulate the powers of supply and demand and to persuade the values of fairness. If we analyze the adjusted base parity prices we will come to an attractive result that these prices give significant verification to tell that parity price approaches are able to show the required amendment in prices that are desired to provide favorable incentives to the farm owners so that it will cause a higher production of agricultural crops to the farmers.

The parity pricing approach is useful and provides appropriate results when we analyze this approach from the long run point of view. So when in the long run the main objective is to examine the effects of supply and demand and to create the balance between agricultural and non-agricultural sector, the parity price approach should be adopted which provides a range of prices of agricultural commodities.

It is firmly recommended that there should be made estimates on monthly basis about the prices which farmers pay and the prices which farmers receive and also about the payments which farmers made for buying agri-inputs for production and for household consumption. Moreover there should also be made estimates regularly to get the indexes of prices which farm owners receive and which farm owners pay. Then the parity price approach and cost of production approach should be used combine to make the price support programs. These price support programs will provide the farm owners with required incentives as well as a balance will occur between agriculture sector and non-agriculture sector by the parity pricing ratios.

Combining these two methods of cost of production and parity pricing, the support prices are determined in the country for which a basis is also provided by international market prices existing prices in the open market. A Price distortion is an important problem creating reason in our country. Due to this problem, the prices existing in our country are not the true representative of the actual values of the agricultural products. On the other hand the prices on the international level are determined by the import prices and export prices.

So to determine the programs of support pricing in our country, there is a need to combine some methods like market price method or parity price method and cost of production method. It is also useful to mention that there are political situations and worth judgments that effect the fixed prices for single commodities. Analyzing all the above study sensibly, there is a hope that it will prove helpful for the policy makers to make the favorable policies of supporting price for the agricultural commodities to make the farmers stronger enough to get the appropriate returns for their crops and to increase their productivity. So the farm owners of Pakistan are hoped to get a better living standard.

Policy Implications

In Pakistan, agricultural price policies have been followed since 1947. In 1950, is the prices of many agricultural products were procured at significantly low prices than the prices prevailing in the world markets. Except cotton, all the main agricultural products were restricted to export and to move domestically. The amount of wheat and sugar which was imported or procured was subsidized for domestic consumers. To encourage the imports of industrial sector, the rupee was overvalued. But this policy affected the agricultural exports adversely. However this policy was relaxed in 1960 s. The ban on exports and movement of grains in country still continued with the over valuation of rupee. Then a policy was made which was the liberal subsidized policy of agricultural commodities like pesticides, tube wells, tractors, fertilizers and better seeds.

But in 1970,s as rupee continued to devalued, a reversal of the above mentioned policy started in 1972. While in 1980, is the agricultural pricing policies take a new turn. The government of Pakistan decided to bring the output and input prices nearer to prices prevailing in the world markets, by improving the role of private sector and by reducing public expenditures. It was done under the World Bank/IMF Structural Adjustment Programme. Further many policies were made to stable the prices of agricultural commodities, in different time periods.

If the agricultural products are underpriced it would result in lower agricultural production. This will cause the production process to slow and thus the capital formation process would also be slow. The low prices of agricultural commodities would result in poverty and unequal earnings of the farmers.

If the agricultural products are underpriced it would result in lower agricultural production. This will cause the production process to slow and thus the capital formation process would also be slow. The low prices of agricultural commodities would result in poverty and unequal earnings of farmers. The agri-price policies prevailing in Pakistan has adverse results for investment, produc-

tion, employment and income distribution in agriculture. As the economy of Pakistan has much dependence on agriculture, so the pricing policies of agricultural commodities should be improved and be made such effective to improve agricultural production, incomes of farmers and living standard of the farmers. So the pricing policies should be made to support the prices of agricultural commodities and should be modified and improved to get the better results. The prices of agricultural products should be fixed according to the import and export parity prices of various products. As the parity prices change directly with more volatile world prices, the prices of agricultural products can be made stable domestically if the prices are determined by the past values of parity pricing. So in the time period when world prices are low, the prices in the country will be more than the parity prices and if the world prices are high in some time period, the prices in the country would be lower than the parity prices.

The government should be careful to analyze the activities of private sector to control the tendencies of monopolists, excess profit earnings and unstable, unfavorable rising prices. The government of Pakistan should ensure the farmers to get favorable returns by making appropriate pricing policies which could prove helpful to poor farmers to raise their standard of living. The main objective of the policies made by government should be to maximize the returns to farmers but to minimize the cost of its programs. These policies should be aimed at improving the efficiency of resources used in agriculture and to remove the corruption and unnecessary intervention in agricultural sector.

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