Impact of Money Supply and Exchange Rate on Agricultural Prices in Pakistan

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CERTIFICATE

This is to certify that this thesis entitled **"Impact of Money Supply and Exchange Rate on Agricultural Prices in Pakistan."** submitted by **Mr. Muhammad Sajid Iqbal** is accepted in its present form by the Department of Economics and Finance, Pakistan Institute of Development Economics (PIDE) Islamabad as satisfying the requirements for partial fulfillment of the Degree of Master of Philosophy in Economics and Finance.

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Declaration

I, Muhammad Sajid Iqbal s/o Muhammad Din, hereby declare that this thesis represents my own work which has been done after registration for the degree of MPhil Economics and Finance at PIDE, and has not been previously included in a thesis or dissertation submitted to this or any other institution for a degree, diploma or other qualifications.

Muhammad Sajid Iqbal

Dedicated to

MY BELOVED PARENTS

AND

MY GRAND MOTHER (late)

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Muhammad Sajid Iqbal

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ABSTRACT

This study analyzed the long-run neutrality of money supply and exchange rate on the agricultural prices of Pakistan by using the Least Square Estimator (LSE) and Johansen & Jusileius from 1975 to 2016. The result shows that the neutrality of exchange rate does not hold in the long-run while the coefficient of money supply is insignificant in the long run emphasized the neutrality of money. There are some unobservable factors such as demand and supply empirically includes in the model shows those prices of agricultural influenced by other factors in the short and long run. Therefore, result suggests that the monetary authorities can control the exchange rate through proper policies to overcome the overshoot problem of agricultural prices in Pakistan.

CHAPTER 1

INTRODUCTION

Agriculture, since independence, has been one of the major productive sectors in Pakistan. Even though there have been decades of efforts to reforms and shift towards a more high value industry and service-centric production, agriculture still holds a huge impact on our economy. One cannot shy away from the significance of the agriculture sector because it contributes a sizeable 20 percent to our Gross Domestic Product (GDP) and employs 43.7 percent of the total labor force. Major chunk of that labor force, about 90 percent, hails from the low -income and fixed income households of the rural areas of Pakistan whereas 62 percent of the whole population is dependent upon this sector for their livelihood. [Government of Pakistan, 2014]

Standard theory dictates that prices are the lubricant that keeps the economic wheel moving. For the purpose of this study, we are focused exclusively on the agricultural sector and are primarily interested in agricultural prices and their dynamics. To put the problem in perspective we argue that since a significant portion of the population attached to this sector is middle to low income households [GoP, 2014], any change (instability) in prices whether direct or indirect can have significant impacts of their standard of living as well as the rest of the population. Therefore, it is of reasonable interest to find what are the major macroeconomic factors that impact agriculture prices and develop reasonable predictability for future periods.

There is a good amount of literature investigating into the instability of agricultural prices due to changing exchange rate and monetary policy. Pakistan also trades agricultural products internationally so it is reasonable to believe that domestic agricultural prices are affected by any changes in its exchange rate, especially for an

economy operating under the floating ER system because at times it is possible for the nominal exchange rate to overshoot out of bounds and cause severe distress on prices and subsequently the domestic purchasing power of the households. The relationship between relative long-term agricultural prices and exchange rate has been empirically examined for other countries.

The overshooting model argues that monetary policy changes carry short run effects that are real on agricultural prices also that money in the short run is non-neutral because it can change relative prices. In the absence of government intervention, the prices of agricultural commodities are flexible as they are determined in competitive circumstances. While the prices of manufacturing goods are mostly sticky as there is presence of some sort of monopoly power [Barnet, *et al*. (1983)]. Since monetary policy does carry effects for agricultural sectors in the short as well as long run, it becomes very important from a perspective of analysis because the income of farmers is susceptible to changes in market prices. Even if the money supply is neutral in the long run having no long-term effects on income of farmers still in the short run it has tremendous impact on the farmer's income. Any change in the prices of agricultural commodities is a concern to the public and policy makers because fluctuations in prices affects productivity of agricultural sector. Fluctuations in prices increase uncertainty related to farmers and effects the business of agriculture. Before 2007, agricultural prices were comparatively low but after 2007, there was a pickup in prices of crops in Pakistan. Several internal and external factors are responsible for this factor. In Pakistan, the agricultural policy mainly focuses on increasing farmer's income along with providing cheap food items for urban consumers, and availability of raw materials on low prices for industrial sector. Saghian, *et al.* (2002) and Siftain, *et al*. (2016) suggested that expansionary monetary policy can boost up the agriculture

prices which leads to an increase in income, uplifting the farmer's living standard and increasing their investment capacity.

To support the urban population and to decrease domestic inflation, a rather tight monetary policy can be drafted to keep agricultural prices in check. Support price is used for controlling the prices of major commodities. Thus, the agriculture pricing policy plays a pivotal role in boosting crop production and farmer's income. It is also important to understand the supply response price mechanism [Nerlove & Bachman (1960)].

1.1 Motivation of the Study

The factors that influence the prices of agriculture are important to study for a developing country like Pakistan. In the historical context, relative prices are mostly determined by real demand and supply factors. Nominal money factors have lesser role to play in determining relative prices as it affects only the general price level. The money supply and demand only determine the general price level and have less concern about relative prices. Schuh (1974) was the first who suggested that the exchange rate significantly affects the agricultural prices. Later, the interest is developed to find out implication of several other nominal variables e.g. money supply and discount rate with agricultural prices. Studies of different areas show that there is ambiguity about the relationship among agricultural prices and monetary variables. Lapp (1990) shows that money supply does not significantly affect food prices. However, the later studies such as [Saghain, *et al.* (2002); Asfaha & Jooste (2007), and Ejaz, *et al*. (2007)] investigated that monetary policy has significant impact and strong implications for agriculture sector. Agricultural and food prices are significantly impacted by several macroeconomic variables and money. Policies and

changes in relative prices have impact on investment decision of the farmer, farm's productivity and farmer's income. Now the need is to understand which factors affects agricultural prices because it is important to sustain productivity in this sector as well as the whole economy also.

1.2 Significance of the Study

The primary objective of the study is to test whether the supply of money is neutral in determination of agricultural prices in Pakistan. Secondly, we will establish a relationship between agricultural prices and the exchange rate. Based on sound theoretical framework this study hopes to fit a model to the available data that can be used to predict future changes in agricultural prices. We will estimate the impact of monetary variables on the agricultural prices in short run and long run. We will investigate the neutrality of exchange rate in the long run and neutrality of money supply on the relative agricultural prices. Canonical Cointegration Regression (CCR) by Park's (1992) which is used instead of Johansen (1988) and Least Square Estimator (LSE) by Engle & Granger (|1987) is used to examine the hypothesis.

1.3 Objectives of the Study

i. To ascertain whether there is any short run impact of money supply and exchange rate on agricultural prices.

ii. To find out whether in the long-run money supply and exchange rate are neutral in determination of the relative agricultural prices.

iii. To find out the relationship of overall prices with the agricultural prices.

CHAPTER 2

REVIEW OF LITERATURE

The 70s was a particularly troubling time for a lot of currencies of world economies as for some there were huge movements in their exchange rates. Many economists at that time set out to find ways to analyze impacts of this new development. One such effort was to establish a connection between observed large fluctuations in exchange rate and formation of rational expectations by Dornbusch (1976). The formal model, which is often referred to as the 'overshooting' model, consisted of insights from the asset markets and movements in capital over time. The study proceeds to lay down a benchmark 'perfect foresight path' where exchange rate depreciation occurs because of expansionary monetary policy. When we get off the 'perfect foresight path' an overshooting of exchange rate can be simulated using different adjustment speeds of the markets and its persistence and magnitude controlled by the structural parameters of the model.

Chambers, G. & Just, E. (1981) analyzed quarterly, dynamic, econometric technique have been cast off for the US corn, wheat and soybean markets which are designed to check specification of exchange rate and effects of fluctuations of exchange rate on the foreign and domestic markets of these markets. This study found that there has had a real impact of exchange rate variations on the markets of agriculture by changing the size of relative split and the exports between exports and domestic use of these goods. The long-run and dynamic adjustment of exports prices and to variations in the rate exchange is specifically interesting. It seems that there is some empirical support for main hypothesis, on the other hand results showed do not have much consistency.

Barnett, *et al.* (1983) studied the effect of money supply on the prices of the agricultural sector and found that there is significant impact of monetary variables on the prices of agriculture. He argues that there is maybe some other variables also significantly affect these prices and only the money supply is significant. Classical dichotomy holds in this research between the real variables and money supply and has strong implication in the applied economics.

Chambers, R. (1984) examined the interdependence of agricultural markets and financial markets in the short-run. He showed that the tight monetary policy depresses the agriculture sector in the short run leading to lower relative prices and income of the farmers. Furthermore, he found that the short effects are not neutral because of prices of agricultural sector fall relative to the prices of nonagricultural sector.

Spriggs J. & Taylor S. (1989) analyzed the impact of the monetary macroeconomy on agriculture prices of Canada. They found that relative importance of macroeconomic monetary variables has been determined on the price instability in the agriculture sector. Main macro monetary variables affect with more speed to the agricultural prices than the prices manufacturing sector. Because the sector of agriculture has a stake in international and national monetary policy while the policymakers for agriculture started focusing the conditions of international monetary system rather domestic as a way of price instability of agricultural items. So long-run money neutrality is supported.

Orden, D. & Robertson C. (1990) investigated the impact of money on prices of New Zealand in the short and long run. Their study provides support for money neutrality by providing that series of money supply, manufactured goods prices and the series of agricultural prices are stationary and cointegrated, series are established to have long

term relationship at the level. Short-run analysis from “vector error correction model” showed that monetary shocks raise the agricultural prices and permanently increase the nominal prices.

Bowles & Biswas (1992) analyzed the impact of money on agricultural product prices and inventories with the perspective of modeling behavior of the government. To incorporate for the impact of government intervention they used the SVAR model. Moreover, they extensively work the empirical side of the phenomenon of the impact on commodity prices through money shocks from domestic and foreign sources to see whether there is any significant relationship between change in prices of commodities and stock of money within a floating exchange rate system. They make use of mainly four variables: first, difference in nominal grain price index (P); second, log difference in international reserves (R); third, log difference in US M2 money supply (M); and fourth, log difference in CCc inventories (g). The results show that there is no significant relationship between monetary factors and agriculture commodity price in the long run. And also found that variables were not to contain a unit root.

Schuh (1992) investigated the exchange rate impact in the United States (US) agriculture prices and found that exchange rate proved to be a vital element while affecting production technology as well as benefits of technical change. Because of realignment of the currency, it has been likely to redistribute income the short run. Moreover, the terms of trade turned into the favor of agriculture, indirectly indicating the high prices of food items. Such types of inflationary injections due devaluation in less developed areas are the major reasons and these nations are less willing to devalue their currencies until everything else fails. Because of all this, it is likely to be

large part transfer of income to the proprietors for consumers with ambiguous magnitude and intensity.

Choe & Koo (1993) examined the impact of monetary policy on prices of the United States in the short and long run. This study examined the money neutrality in the long run and its dynamics in the short-run, using "Johansen's approach". They found that monetary variables are not neutral while the agricultural prices adjust faster than the non-agricultural prices. In their study, impulse response function shows that the monetary shock is responsible for the overshooting of agricultural prices.

Perrin K. & Fulginiti E. (1993) analyzed the prices and productivity in the agriculture sector. They have found that the prices of previous periods affect significantly positively on the present productivity of agriculture while if we flip the side of the coin we came to know that high taxation of less developed nations on agricultural sector have reduced their productivity. Moreover, conceptual approach delineates other than past prices, the variables which are technology changing also determine the productivity conventional inputs such as labor, land, and capital.

Ball & Mankiv (1995) examined the effects of overall shocks of supply on the relative prices. The primary motive of this paper is to test and propose a novel theory of supply shocks. Primarily changes in relative prices are understood the cause of supply shock but as a theoretical matter it's not obvious that it will be an inflationary phenomenon rather it will be affected by real determinants. This paper covers the hypothetical framework to describe what sources the short-term aggregate supply curve to shift. This study shows that, when costs of menu create a choice of delay in answer to shocks, the distribution of relative price varies, impacts the general price level. When the distribution is skewed to the right, the economy observes a contrary

shift in aggregate supply, the price level increases for assumed aggregate demand. Equally, when the circulation of shockwaves is skewed to the left, the economy observes a beneficial supply shock. This model shows that the paradigm of menu cost can offer a combined explanation of short-term variations, in which frictions in the adjustment of price elaborates the effects of supply and demand shocks.

Kaabia, B. & Gil M. (2000) investigated the effect of macroeconomic variables on prices of the agricultural sector in Spain. They used the cointegration approach for making distinction between possible long and short-run effects. In their study both money income neutrality and agriculture price homogeneity. They used "vector error correction model" for analyzing the short-run dynamics. They suggested that farmers will benefit from increase in money supply in the short run but will worse affect the terms of trade in the long term.

Kargbo (2000) studied the impact of macroeconomic variables on prices of food in Eastern and South African countries. These countries faced high growth in prices since early 1980. In this study, "technique of cointegration" and "error correction modeling" are used to test the long-run relation between the real food prices and the variables influence the behavior in these countries.

Freebairn & Ardeni (2002) studied the relationship of agriculture with the rest of economy. They concluded that there exist long-run and short-run relations between the agriculture with monetary and other variables of the macroeconomy. They studied both backward and forwards channels which comprises from the agriculture to the rest of economy and from other economic variables to the prices of agricultural sector. For the developing countries they proposed that the backward linkage is very important.

Saghaian *et al*. (2002) investigated the impacts of monetary policy and increase of agriculture prices in an open economy. They found that money neutrality does not hold and it has some real effects on prices. Moreover, they found that whenever monetary shock is occurring then the prices of flexible sector increase compared with their long-run equilibrium. Their results also showed that prices of agriculture adjust faster than prices of industrial sector after changes in monetary policy.

Mushtaq *et. al.* (2003) studied the response of production in the agricultural sector of Pakistan. Their results showed that the production of wheat is significantly dependent on prices of wheat and fertilizers. While the cotton supply is influenced by the real cotton price, real fertilizer prices, and the irrigated area. Supply of wheat is inelastic both in long and short-run while that of cotton is found elastic in long run.

Cho, *et al.* (2004) studied the long term variation of agriculture prices as compared to overall prices in the United States. Their study shows a link between agricultural prices and money supply, the further exchange rate has real impact on the longer-term variations in relative agriculture prices. They analyzed that there are other factors are also present which affect these prices. Different demand and supply of commodities determined the relative prices and add an additional relationship of overall prices with the agricultural prices. The neutrality of money supply holds as it is insignificant in the long run.

Bakucs & Ferto (2005) investigated the monetary impact and raise at agricultural prices in a transitional economy. Their study focused on real effective exchange rate's path of adjustment over time and prices to changes in unanticipated shocks in money by using the model of Saghaian *et al.* (2002). In this study we use two familiar approaches to checking long-run relationship among variables i.e., Johansen

cointegration and vector error correction approach which indicate that prices of agriculture adjust faster than the prices of agriculture sector by new modes of money supply, affecting relative prices in the short run, but strict long-run money neutrality does not hold.

Ibrahim (2005) investigated the sectoral shocks of monetary variables in the Malaysian economy. The positive shocks of monetary variables cause more decline than the overall production. Contrary to this, insensitivity of innovation in interest rate present for the agriculture sector. Their results have strong implications in real sectoral activities.

Kargbo (2005) investigated the impacts of macroeconomic variables on food prices in Western African countries by the "Vector Error Correction Model (VECM)". Results indicated that monetary factors and trade policies have effects on the food prices, real income and per head food production. Aftershocks in the system, there is a strong adjustment among the variables towards the long-run equilibrium. Thus macroeconomic policies affect poverty alleviation, food security and food consumption patterns in West Africa.

Asfaha & Jooste (2007) estimated the effects of monetary changes on agriculture prices in "South Africa" to see long-run and short-run impacts of money changes on the relative agriculture prices by using "Johansen Co-Integration Approach" for long run and by "Vector Error Correction Model (VECM)" for short run. This study shows that in the longer run, a link is present between the agriculture and industrial prices, money supply and real effective exchange rate. Results of this study negate the hypothesis of money neutrality in the long run. Moreover, the dynamic relationship showed that agriculture prices might adjust faster.

Hossain Akhand, A. (2008) attempted to examine the link among money supply, manufactured goods prices and prices of agriculture sector in the longer run. The author proposed that in the short run monetary shocks affects the agricultural prices effectively rather than industrial prices. This study has used "co-integration and error correction". The results of these tests explain that co-integral relationship exists between monetary policy, industrial prices and prices of agriculture sector. The Wald test approach confirms that there is a long-run positive influence on the agricultural terms of trade if money supply is increased. In the meantime, monetary policy also has a short-run positive impact on the terms of trade of agricultural sector in the short run.

Hye & Ali (2009) investigated the causal link among money supply, food prices and industrial prices in Pakistan. They found that bidirectional causality exists between food prices and prices of manufactured products while unidirectional causality is present from money supply to manufactured product prices. Another important finding of their study is that the response of food prices is faster than the prices of manufactured product derived from impulse response analysis.

Mushtaq, *et al.* (2011) investigated the impacts of macroeconomic indicators on the prices of wheat in Pakistan. They found a relationship between the variables in long run. Money supply, openness of the economy and Real Effective Exchange Rate (REER) had significant impact on the real wheat prices. The impulse response function for the trade openness showed that it has same impact on the prices of wheat.

Azeem, *et al.* (2012) analyzed the factors affecting the inflation in their study and found per capita income and crude oil prices have a positive impact but crude oil is insignificant statistically while in the short run wheat support prices and money

supply affect negatively and lag values of food prices have positive impact. These findings imply that inflation of food is not a phenomenon of money supply and the support prices of wheat should be used as a policy variable to change the inflation of food price in Pakistan.

Jamil & Akbar (2012) examined the monetary and fiscal policies' effect on agricultural growth. Their results showed that agricultural wage rate, agricultural subsidy, capital stock, and agriculture credit have positive and significant impact on the output of agricultural products while it has been shown that energy price index, prices of fertilizers, population growth have negative impact on their production. Moreover, the inputs which are physical such as energy, labor, and fertilizers affect adversely from their own prices and energy is being shown as a substitute by labor with the rise in the price level. Further added, that high level of capital stock affects vitally to all inputs' demand and higher the stock of capital higher the farming activity.

Salman, *et al.* (2014) investigated the macroeconomic variables and rising food prices in Pakistan. It was postulated in the case of Pakistan that there is a significant positive impact on the prices of food items, due to the increment in the energy prices, CPI inflation, money supply, exchange rate in the long run as well as short run. On the other hand, qualitatively economic growth globally and other variables are also the main sources of the upward direction food prices but the magnitude and intensity of certain variables are different.

Burakov, D. (2016) studied the impact of money on the elasticity of agricultural prices. This study investigates the long and short-run both indirect and direct effects of variations in the prices of oil, bank lending policy on the prices certain groups of

major agricultural products in Russia. The approach of Granger causality is applied to check the long-term relations with monthly time series data from January 1999 to October 2015. In order to test the reply of agricultural prices to abrupt shocks on oil prices, interest rates and exchange rates for agricultural loans in the short-term, they used impulse response techniques. The results of display that agricultural prices are not mainly delicate to changes in oil prices, interest rates of banks and exchange rate of Russian currency, except for not subsidized and imported commodities. In the long-term, Granger causal test displays same results.

Muroyiwa, *et al.* (2014) analyzed the effects of monetary changes on the outcomes of the agricultural economy. This study delineates the examination of the linkages between stock prices, monetary policy, agricultural sector, and the macroeconomy. Both the market of money and shocks of inflation have tremendous negative effects on the efficiency of agricultural GDP, as reported by results that a rise in the one of money market leads a decrease by 0.021 percent in the agricultural GDP. While the increase in the rate of interest for the long-term causes to fall CPI which also affects the GDP of Agriculture.

Siftain, *et al.* (2016) found the effect of monetary policy on the food prices in Pakistan. Their results showed that there is a relationship among the monetary variables and food prices but there is no significant impact of monetary variables on food prices in the short run. Moreover, they suggested that expansionary monetary policy can boost the agriculture prices which lead to increase income, standards of living and investment of farmers. A tight monetary policy can control agriculture prices to ease urban consumers and for decreasing inflation in the country.

Dorfman & Amatov (2017) analyzed the effects on commodity prices by extraordinary monetary policy. They found that the expansionary monetary policy such as lowering the interest rate raising the money supply leads to driving up the price of commodities, especially food items. The primary goal of these types of policies should be a stabilized commodity market rather economic growth and decreasing unemployment. Moreover, unconventional monetary policy is bringing down the dollar value and results the upward trend in the commodity price. Such policies could have long term and unclear effects and these could be drastic for other several vital economic variables.

Orden & Frackler (2017) also used the SVAR analysis to examine the impact of money on agricultural prices. They used a commonly used three-variable model i.e., money, industrial prices, and agricultural prices. This specific modeling has been used extensively in the literature to evaluate effects of money on price dynamics. Later on in the study they do introduce a slight rich model for behavior. The analysis shows that a simultaneous model proves to be more effective than a recursive model when impact of money on agricultural price is being examined. The relation between money and agricultural prices, however, was found to be insignificant.

2.1 Research Gap

Ejaz (2007) and Hye (2009) conducted the study in Pakistan about the monetary impacts of agricultural sector. In these studies, exchange rate is not incorporated. As Pakistan is a small open economy, therefore, it would be better to include exchange rate. Siftain, *et al.* (2016) incorporated the monetary variables with exchange rate to investigate the impacts of monetary policy on food prices in long and short run by using Saghaian, *et al.* (2002) model.

However, Siftain, *et al.* (2016) did not focus on the long-run neutrality of exchange rate on the movement of relative agricultural prices in Pakistan and showed the only long-run relationship. In this study, we have tried to find out the impact of monetary policy and exchange rate on the relative prices of agriculture sector in Pakistan and to find out the long-run neutrality of these on the movement of relative agricultural prices.

There is also an additional long-run relationship that would not be ignored and that is the relationship of agricultural prices or food prices with overall because the long-run relationships could be explained by unobservable relative movements of factors. First time Friedman (1975) notes that expansionary monetary policy affects the overall prices of the economy and demand and supply of the commodities determined the relative prices of the products. This shows that in the long run agricultural prices move differently than the overall price level even if the money supply does not change.

CHAPTER 3

DATA & METHODOLOGY

In this chapter, we will discuss the theoretical foundation of our proposed empirical model. The chapter also includes the econometric specification of the model and data sources and variables information.

3.1 Theoretical Framework

Since Schuh's (1974) seminal work on the issue related to the agricultural sector and its relationship between monetary and other macroeconomic variables. This issue is important because impact of monetary directly affects the prices of agriculture and that prices influence the living standard of every person. Our main problem is to check whether agricultural and nonagricultural prices respond to monetary changes in long run or not. Further, we want to check the hypotheses of money neutrality for the short run. Observational data suggest that agricultural prices are more competitive in nature than any other sector so the prices are less sticky. Consequently, expansionary monetary policy favors the agriculture sector while contractionary monetary policy has reverse effect. Ferto I. & Bakucs L. Z. (2005). Many studies conducted in this regard showed that prices of agriculture adjust faster than the non-agriculture sector to changes in monetary policy in short-run but money neutrality does not hold in the long run [Saghaian, *et al.* (2002); Jooste A. & Asfaha T. (2007)]. We will test whether this holds for Pakistan or not.

Referring to Dornbusch's (1976) model above mentioned studies explain the link between exchange rate, money supply, and commodity prices. According to the Saghaian, *et al.* (2002) model which is an extended version of Dornbusch's model with incorporation of international trade, a short-run deviation of nominal exchange

rate may be possible when prices are sticky. So, this overshooting may cause the short-run variation of real exchange rate even if it in the long run.

Prices of agriculture and exchange rate are assumed flexible as they have their own separate and different adjustment paths and adjust quickly to shocks in monetary policy. In contrast, prices of non-agriculture sector assumed to be sticky. They assumed the economy to be a small open economy, the study asserted that with monetary shocks the prices of agricultural and services sector are far from their long-run equilibrium. Study concludes that when the monetary shocks occur the burden of adjustment of the sector where prices are sticky is also shared by the flexible prices sector. The economy which has floating exchange rate system is less prone to agricultural price hike due to monetary shocks.

3.2 Model Specification

The goal is to test for money neutrality in the long run and for that, we follow in the footsteps of [Grennes & Lapp (1986); Robertson & Orden (1990); Zanias (1998) and Saghaian *et al.* (2002)]. We set up the equations for nominal prices of food and agriculture, money stock, real exchange rate, and aggregate price level as

$$\ln P_t^A = \alpha_0 + \alpha_1 lnM_t + \alpha_2 lnR_t + \varepsilon_t \quad (3.1)$$

$$lnP_t = \beta_0 + \beta_1 lnM_t + \beta_2 lnR_t + v_t \quad (3.2)$$

Where;

$\ln P_t^A$ denotes the log of agricultural food/product prices

lnM_t denotes the log of the money supply

lnR_t denotes the log of real exchange rate

lnP_t denotes the log of manufacturing products prices

If one percent increase in the money supply generates the same percentage increase in the general price level as well as agricultural prices this would be indicative of long-run neutrality of money. In older studies $\alpha_1 = \beta_1$ has been taken as a condition to test this hypothesis. However, if percentage increase in money supply translates into a higher average price level, also argued by Friedman (1975), then it becomes imperative that relative prices between commodities, in the long run, be determined by the changing in the existing supply-demand conditions. Through Friedman's argument it is, therefore, possible for agricultural prices do not always move in coherence with the general prices regardless how stock of money changes. Conversely, if stock of money changes, where agricultural and general prices are moving disproportionately, its impact on both will be quite different. As per our hypothesis, the impact of money supply on agricultural would be different as compared to the overall prices and in this case α_1 should be smaller than β_1. This empirical model is not proper to test the money neutrality.

Another relationship of significant importance is among prices for food and agriculture and prices in general. Now, there is unobservable relative movement of factors to explain long-run relationships, as noted by Kliesen & Poole (2000) in favor of elasticity of demand and income, however, it is not possible to include all such structural variables in the analysis. We have incorporated the relationship between prices for agriculture and food and prices, in general, using the rational expectation approach. The approach suggests that in the long run, relative movements of demand and supply over time is realized in variation of relative prices.

Assuming following long-run relationship between agricultural prices and general prices, which is determined by the real factors.

$$lnP_t^A = \gamma_0 + \gamma_1 lnP_t + \eta_t \quad (3.3)$$

Multiply equation (3.2) by -γ_1 and add equation (3.1) & (3.2) for following long-run relationship:

$$lnP_t^A - \gamma_1 lnP_t = \alpha_0 - \gamma_1\beta_0 + (\alpha_1 - \gamma_1\beta_1)lnM_t + (\alpha_2 - \gamma_1\beta_2)lnR_t + (\varepsilon_t - \gamma_1 v_t) \quad (3.4)$$

Or, equivalently

$$lnP_t^A = \delta_0 + \gamma_1 lnP_t + \delta_1 lnM_t + \delta_2 lnR_t + \xi_t \quad (3.5)$$

If agricultural prices reacted more than overall prices in the reaction of change in money supply, $\delta_1 > 0$ and $\alpha_1 > \gamma_1\beta_1$; $\delta_1 < 0$ and $\alpha_1 < \gamma_1\beta_1, otherwise.$ If agricultural price respond more sensitively in response to real exchange rate $\delta_2 < 0$ and $\alpha_2 < \gamma_1\beta_2$; $\delta_2 > 0$ and $\alpha_2 > \gamma_1\beta_2$, otherwise. If we take money and exchange rate to be neutral i.e., δ_1 and δ_2 equal to zero then $\alpha_1 = \gamma_1\beta_1$ and $\alpha_2 = \gamma_1\beta_2$.

The model (3.5) contains three possible cases. Formally, expressed below;

Case-1: if the long-run relationships signified in equation (3.1), (3.2) and (3.5) holds and also if exchange rate and money are neutral in the long run, then the estimated coefficients δ_1 and δ_2 in model (3.5) should be zero. Under given innovations, ξ_t should be a stationary process implies that the coefficient γ_1 should be a cointegration vector.

Case-2: If true long-run relationships hold in (3.1), (3.2), and (3.3), but without holding long-run neutrality either in money or in the real exchange rate, the coefficients δ_1 and $\delta_2$should be zero. However, the coefficients in model (3.5) represent a long-run co-integration vector under assumption of given innovations.

Case-3: If residual ξ_t is a non-stationary process means that the coefficients of model (3.5) are not a co-integration vector, hence, either there should be no true long-run relationships existed in estimated equations (3.1), (3.2), and (3.3) Or, it might be that we are not able to identify the long-run relationship, with the variables we have, because there could be factors that are unobservable causing cyclical variations in long-run equilibrium path of prices for food and agriculture.

Note that the δ_2 coefficient indicates how much food and agricultural prices are sensitive to respond against movements in real exchange rates and aggregate prices relatively. Simply we can say that even when δ_2 is zero, it does not imply exclusion of any real effect of real exchange rate either on food and agricultural exports or on domestic food and agricultural prices. Instead, real exchange rate variability cause food and agricultural prices as well as aggregate price level in long-run.

We followed a proper econometric procedure to get our estimates. We started with a very basic model OLS, which definitely gives us an insight into the econometric problems like endogeneity, autocorrelation as expected. The further procedure incorporates the tests to cater these problems. Then we check that data is stationary or not. Augmented Dicky Fuller (ADF) test used for the purpose of unit root analysis. Secondly, we used co-integration on the basis of unit root analysis for long-run relationship. For checking the long-run relationship, we have used Least Square Estimator [Engle & Granger (1987)]. LSE is good for its consistency property in estimating long-run relationship. For comparison we have used another technique known Johanson and Juselious (JJ) (1990) cointegration technique.

3.3 Data and Variables

Variables used for this study are money supply, real exchange rate, agricultural prices, and overall prices. CPI of food is used as a proxy for agricultural prices and index of all commodities for overall prices. Money stock (M1) data is used for the Money supply variable and real effective exchange rate data. All variables are transformed into logarithm form. Annual Time series data is used from 1975 to 2016. Data of money supply is used from data source of SBP. IFS database is used to collect exchange rate data. Index of food and overall price are collected from the data source of Pakistan Bureau of Statistics.

3.4 Estimation Method

For the purpose of our analysis, of relationships among variables, in the long run, we use the most successful technique i.e., the "Engle & Granger Two-Step Estimation Method" as used by [Engle & Granger (1987)]. Error Correction Model is used to check the short-run dynamics of the variables. This method, however, is not asymptotically efficient because of non-existent dynamic short-run adjustments and is only consistent under a few regularity conditions for estimating long-run co-integrating vectors. JJ technique also allows us to test the hypothesis on the cointegrating relationship themselves, which "Engle and Granger" doesn't [Brooks (2008)]. "Engle and Granger" also cannot find the cointegrating vectors if there are more than one cointegrating vectors so JJ method is applied to find if there are more than one cointegrating vectors.

We start the discussion with the explanation on the least square method. Let Z_t be a $n \times 1$ vector of a variable that is both random and stationary at first difference (ΔZ_t denotes stationary). Under the condition, where there is a non-zero vector of real

number $\boldsymbol{a}$ such that $a'Z_t$ is stationary, then it is said to be associated with a co-integrating vector $\boldsymbol{a}$. normalizing one element with one is expedient most of the time. Assume that the first element of $\boldsymbol{a}$ is zero, then partition Z_t by $Z_t = (y_t, X_t')$ and normalize $\boldsymbol{a}$ by $\boldsymbol{a} = (\mathbf{1}, -\boldsymbol{c})$. Here, y_t is a difference stationary process, X_t is a vector difference stationary process, and $\boldsymbol{c}$ is a normalized associating vector.

The cointegration system (3.5) can be written as

$$y_t = X_t'c + \varepsilon_t \tag{3.6}$$

$$\Delta X_t' = v_t \tag{3.7}$$

Here $y_t = lnP_t^A, X_t' = [1,\ lnP_t, lnM_t, lnR_t], and\ c' = [\delta_0, \gamma_1, \delta_1, \delta_2]$ are in our case. The $y_t\ and\ X_t$ are stationary at first difference. While $\varepsilon_t\ and\ v_t$ are stationary and their mean is zero.

Now

$$Wt\ =\ (\varepsilon t, V\mathrm{t})' \tag{3.8}$$

Let $\Phi(i) = E(w_t w_{t-i}'), \sum =\ \Phi(0)\ ,\ \Gamma = \sum_{i=0}^{\infty}\Phi(i)$, and $\Omega = \sum_{0=-\infty}^{\infty}\Phi(i)$. In detail, the $\boldsymbol{\Omega}$ is the long-run variance matrix of $\boldsymbol{w_t}$. Further $\boldsymbol{\Omega}$ is explained in matrix form as

$$\Omega = \begin{bmatrix} \Omega_{11} & \Omega_{12} \\ \Omega_{1221} & \Omega_{22} \end{bmatrix} \tag{3.9}$$

Whereas Ω_{11} is a scalar, and where Ω_{22} is $(n-1)\times(n-1)$ matrix, and partition likewise.

Defining,

$$\Omega_{11.2} = \Omega_{11} -\ \Omega_{12}\Omega_{22}^{-1}\Omega_{21} \tag{3.10}$$

$$and\ \Gamma_2 =\ (\Gamma_{12}', \Gamma_{22}')'.$$

The LSE is used to correct the short-run movements and error term in the model, the example of this correction technique is maximum likelihood estimation presented by [Johnson (1988)]. As we are more interested in a long run association of variables in the model rather than short-run estimates, therefore, "Johanson and Juselious (1990)" cointegration technique is also used in this study. The "Johanson and Juselious (1990)" method follows the "Maximum Likelihood" (ML) method and finds the cointegrating equation in a non-stationary time series "Vector Autoregressive (VAR)" with restrictions imposed, known as a "Vector Error Correction Model" (VECM). This is measured as one of the efficient technique for estimation. For more brief understanding, take into account following equations:

$$y_t^* = y_t + \Pi_y' w_t \tag{3.11}$$

$$X_t^* = X_t + \Pi_x' w_t \tag{3.12}$$

As w_t is stationary, y_t^* and X_t^* are cointegrated of the same order. When y_t^* is regressed on X_t^*. The matrices for the purpose are

$$\Pi_y = \Sigma^{-1}\Gamma_2 c + (0, \Omega_{12}\Omega_{22}^{-1})' \tag{3.13}$$

$$\Pi_x = \Sigma^{-1}\Gamma_2 \tag{3.14}$$

Practically, through these equations, long-run covariance parameters can be estimated, and then these Π_y and Π_x transformed in to y_t and X_t.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter presents the estimation results and detailed discussion on these results. This chapter is further divided into different sections. Section 4.1 provides descriptive statistics and whereas section 4.2 gives unit root test results. The long-run analysis discussed in later sections of this chapter.

4.1 Descriptive Statistics

Descriptive statistics of the dependent variable and explanatory variables are given below in table 4.1 to define the essential characteristics of the data. The minimum value of General Price level is 8.39 and maximum value is 198.16, which shows an increasing trend of general prices further the average general price value is 60.72. Food prices values for minimum and maximum are 7.36 and 217.32 respectively while the mean value of food prices is 61.70 and the standard deviation is 59.85.

TABLE 4.1: Descriptive Statistics

Variables	**Mean**	**Minimum**	**Maximum**	**Standard Deviation**
General Price	60.72	8.39	198.16	53.27
Food Price	61.70	7.36	217.32	59.85
Real Effective Exchange Rate	132.26	93.53	221.68	44.34
M1	1396169	192186	8116888	2293937

The statistics of food prices are showing almost the same pattern as general prices that indicates the rising trend of both general and food prices. Whereas the real effective exchange rate has the maximum value is 132.26 and the minimum value is 93.53. In

year 1975 M1 has the minimum value which is 192186 on the other hand in year 2016 it has the maximum value 8116888 which indicates the increasing trend in money supply.

4.2 Unit Root Test

Augmented Dicky Fuller (ADF) and Dicky Fuller (DF) test have been widely used in order to check the presence of unit root in the data set. DF captures only AR (1) process whereas the ADF test captures higher-order process also. ADF is an improved version of DF and three different forms of DF test was used to amend the ADF test. The Null hypotheses $\delta = 0$ is used in ADF against the alternative hypotheses $\delta < 0$. If critical value is greater than the alternative value, alternative hypotheses are accepted $\delta < 0$ whereas the null hypotheses is rejected $\delta = 0$ so, the series is stationary and unit root does not occur.

We also applied the ADF test to check the stationarity of the series. The results of all unit root test are presented in below tables.

Table 4.2: Unit Root Test of Variables at Level

Variable	1%	5%	10%	t-Statistic	Prob.*
ln Food Prices	-3.606	-2.934	-2.607	-0.082	0.945
ln General Prices	-3.606	-2.937	-2.607	-0.210	0.929
ln M1	-3.600	-2.935	-2.606	0.343	0.978
ln Real Effective	-3.601	-2.935	-2.606	-1.946	0.309

The above table 4.2 shows the result of unit root at the level. According to the probability value of all variables, we cannot reject the null hypothesis and concluded

that all of the variables have unit root at level. Therefore, we are checking the unit root again after taking first difference and the results are reported in below table 4.3.

Table 4.3: Unit Root Test of Variables at 1st Difference

Variable	1%	5%	10%	t-Statistic	Prob.*
ln Food Prices	-4.212	-3.531	-3.196	-4.281	0.0084
ln General Prices	-3.610	-2.934	-2.608	-3.669	0.0080
ln M1	-3.610	-2.934	-2.608	-5.624	0.0000
ln Real Effective	-3.610	-2.934	-2.608	-4.741	0.0004

Graphical representation of the series suggests that the log of food prices has time trend so we apply the ADF test accordingly. From the above table, it can be seen that the ADF test rejects the null hypotheses that the Food price series has a unit root. Probability value clearly indicates that the series is stationary after taking first difference.

Table 4.2 reports the result of the ADF test. In case of the General Prices and M1, ADF test rejects both of the null hypotheses that $\delta = 0$ which means both series are stationary at first difference.

The last Unit Root test was used to check the stationarity of the Real Effective Exchange Rate. The ADF test rejects the null hypothesis of unit root of the Real Exchange Rate series indicates that the series is stationary at first difference. Thus, ADF test concluded that all of the series are stationary at first difference.

4.3 Results of Engle-Granger

Two-step Engle-Granger Cointegration approach has been used to analyze the Long Run relationship among variables suggested by [Engle & Granger (1987)]. Results of Engle & Granger are given below in Table 4.4.

The value of the coefficient for the 'general price' comes out to be 0.870 which is also statistically significant which means that one percent increase in general prices will raise the food prices by 0.870 percent which is close but still lower than a one-to-one increase. The difference, however, is significant enough to prove the disproportionate movement in general prices and food prices. The reason why this happens is explained extensively in Kliesen & Poole (2000) on why food prices have a downward trend. The proposed reasons are comparatively lower-income elasticity (Engel's Law) and inelastic Demand & Supply Functions of food products. Engel's law points that due to increase in income, food and agricultural products consumption will increase but less proportionately than income. The lower-income elasticity and inelastic demand for consumption of food are the reasons for disproportionate increasing movement in food prices.

Table 4.4: Least Square Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.995	0.176	-5.657	0.000
Ln General Price	0.870	0.033	26.049	0.000
Ln M1	0.009	0.0136	0.674	0.504
Ln Real Effective Exchange Rate	0.103	0.038	2.694	0.010
R^2	0.993	**Adjusted R^2**	0.992	

The coefficient Ln M1 estimated value is 0.009 and it is statistically insignificant which explains the long-run money neutrality of the said variable. The money supply coefficient which indicates a one percent increase in money supply causes a 0.009 percent increase in food prices although it has no impact on our model. Money supply growth rate is positive during the sample period.

Real Effective Exchange Rate coefficient is 0.103 in our results and explains that a 1 percent appreciation of the currency leads to a 0.103 percent increase in the food prices. The variable is explaining that the real effective exchange rate movements are not neutral in terms of explaining the overshooting the food prices in the long run.

Adjusted R^2 has a value 0.992, shows the goodness of fit, through this value we can explain that 99 percent variation in explanatory variables is explained by this regression.

Table 4.5: Augmented Dicky Fuller Test of Co-integration

Variable	1% critical	5% critical	10% critical	t-Statistic	Prob.*
Residuals	-3.616	-2.941	-2.609	-3.013	0.0426

This study utilized the Augmented Dicky Fuller (ADF) test to check the co-integration. The above ADF results reject the null hypothesis of no co-integration at 5 percent level.

4.4 Error Correction Model (ECM)

We know that the benefit of using error correction approach to find the existence of long-run relationship is that it takes care of the spurious regression. Table 4.5 offers

sufficient evidence on the long-run relationship among the said variables. The probability value is 0.043 indicates the rejection of the null hypothesis. This condition has formed a foundation to regress ECM. ECM results are reported in below table 4.6.

Table 4.6: Error Correction Model Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLGP	1.451	0.074	19.702	0.000
DM1	0.004	0.013	0.330	0.744
DRER	0.089	0.037	2.356	0.024
U(-1)	-0.365	0.084	-4.351	0.000
C	-0.030	0.007	-4.617	0.000
R^2	0.929	**Durbin-Watson stat**		1.825

According to the Durbin Watson and R-squared values, the ECM regression is not a spurious regression. The co-efficient DLGP represents the short-run equilibrium coefficients and has a positive sign which indicates that there is a positive relationship between general price level and food prices. This coefficient is also statistically significant at 1% level. Both DM1 and DLRER are also the short-run coefficients and have positive relationship with food prices but money supply variable is statistically insignificant in our model whereas the real effective exchange rate has a significant impact in our study. The coefficients U (-1) is the error correction coefficient which is also known as long-run coefficients and it has negative sign as required. The value of U (-1) coefficient is -0.36 which explains that the shock in previous period will adjust in this period by 36%. This variable has the probability value is 0.0001 which confirms the significance and the long-run relationship.

4.5 Diagnostic Test

In order to diagnose the above regression, we further applied test for autocorrelation and normality test. The results of both tests are given below in tables.

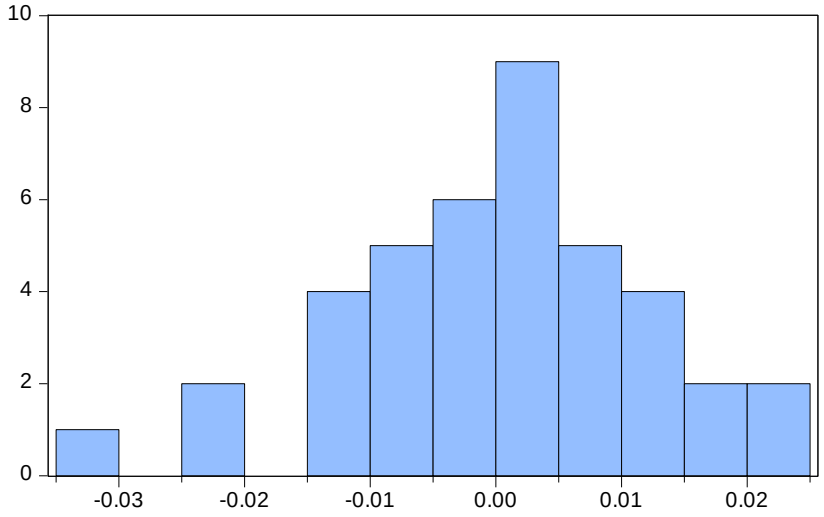
Table 4.7: Serial Correlation LM Test:

F-statistic	1.064	**Prob. F(2,33)**	0.357
Obs*R-squared	2.424	**Prob. Chi-Square(2)**	0.298

We applied the Breusch-Godfrey serial correlation LM test to detect the auto-correlation in our model. The results are reported in above table 4.7, which highlighted that there is no autocorrelation in our model. The probability value of Chi-Square is 0.298 that rejects the null hypothesis and confirms the no autocorrelation in our regressed model.

Further, we applied the Histogram Normality test to check the distribution of errors. The graph and the statistics of the normality test are provided below in figure 4.1.

Figure 4.1: Histogram Normality Test



The above graph shows a normal distribution of error terms further we can also check the statistics provided in the above graph. The probability value of Jarque-Bera is 0.466 so we do not reject the null hypothesis. The Null Hypothesis of the above test is that the errors are normally distributed.

4.6 Johanson and Juselious Co-Integration

There are some testing method to implement the Johansen's Cointegration technique like the time series data must be I(1). ADF test is utilized to check the stationarity of data and we found that all of our series are stationary at first difference. The results of ADF are given above in table 4.2 and 4.3.

The JJ method tells us the cointegrating equations by following the "Maximum Likelihood" method in a non-stationary time series "Vector Autoregressive" (VAR) with restrictions imposed, known as a "Vector Error Correction Model" (VECM).

To obtain the optimal lag length for JJ procedure, we prefer the "Akaike Information Criteria" (AIC) over the "Schwarz Bayesian Information Criteria" (SBIC) because the AIC gives the efficient results [Brooks (2008)]. The results of lag length criteria are given below in table 4.8.

Table 4.8: Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	38.472	NA	1.91e-06	-1.814	-1.642	-1.753
1	287.087	431.804*	9.29e-12*	-14.057*	-13.195*	-13.751*
2	299.352	18.721	1.17e-11	-13.861	-12.309	-13.309
3	316.763	22.909	1.17e-11	-13.935	-11.693	-13.138
4	329.057	13.588	1.66e-11	-13.740	-10.809	-12.697

Johansen (1991) proposed the tests to check the cointegration that are: the "Maximum Eigenvalue Test" and the "Trace Test". The trace test follows the alternative hypothesis that is no cointegration and the null hypothesis that is cointegration. The "Maximum Eigenvalue" test check the hypothesis that the number of cointegrating vectors are $r + 1$ or equals to r [Brooks (2008)].

After checking the unit root, we applied the JJ cointegration method to check the long-run relationship among variables. As per the trace result of trace test, we reject the null hypothesis that there is no cointegration equation because the probability value is less than 0.05. The next hypothesis is that there is at most one cointegrating equation and according to the probability value, we cannot reject the null hypothesis. Trace and maximum eigenvalue tests are giving the same results. We conclude that in VECM one cointegrated vector (long-run equilibria) will be added with one lag. The results are given below in table 4.9 and 4.10.

Table 4.9: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.692	74.038	47.856	0.000
At most 1	0.360	29.254	29.797	0.057
At most 2	0.221	12.266	15.495	0.144
At most 3	0.069	2.732	3.841	0.098

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Table 4.10: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	Prob.**
None *	0.692	44.784	27.584	0.000
At most 1	0.360	16.988	21.132	0.173
At most 2	0.221	9.534	14.264	0.244
At most 3	0.069	2.732	3.841	0.098

Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

4.7 VECM Results

After the detection of a number of cointegrating equation, we proceed for the "Vector Error Correction Model" (VECM). Table 4.11 shows the results of VECM. From table 4.11 given below, the long-run speed of adjustment back to its equilibrium is denoted by c(1) which is also recognized as the adjustment factor. The VECM coefficient is -0.464 and it is also statistically significant which implies that in the long run the system will come back to its equilibrium by 46%.

Table 4.11: Results of VECM

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	Prob.
C(1)	-0.464	0.216	-2.149	**0.038**
C(2)	0.441	0.605	0.728	**0.471**
C(3)	1.924	0.860	2.237	**0.031**
C(4)	0.086	0.057	1.491	**0.145**
C(5)	-0.272	0.228	-1.192	**0.241**
C(6)	-0.146	0.041	-3.498	**0.001**
Adjusted R-squared	0.4793	**F-statistic**	**2.636**	
Durbin Watson stat	1.973	**Prob (F-statistic)**	**0.040**	

The results are obtained after estimating the VECM, we also applied different test for diagnostics to figure out how fit is our mode. If our estimated model clears all of the diagnostics then we can conclude that the obtained results are efficient.

4.7.1 Wald Test

We conducted a wald test to check the joint influence of the variables and the results show that all of the variables are jointly influence our dependent variables. The null hypothesis of wald test is that the selected variables are equal to zero but we rejected the null hypothesis because the probability value is 0.0126 which is less than 0.05. Following table shows the result of WALD test.

Table 4.12:Wald Test:

Test Statistic	Value	df	Probability
F-statistic	3.187056	(4, 34)	0.0251
Chi-square	12.74823	4	0.0126

4.7.2. Serial Correlation LM Test

Lagrange-Multiplier test which is commonly known as the LM test is used to capture the autocorrelation in the model and the below tables 4.13 shows that there is no autocorrelation in the model.

Table 4.13: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.024	Prob. F(2,32)	0.976
Obs*R-squared	0.060	Prob. Chi-Square(2)	0.970

CHAPTER 5

CONCLUSION & POLICY IMPLICATION

5.1 Conclusion

Instability is a severe issue in the agriculture sector of the economy and long term volatile prices are the most vital variable in the contribution of this instability. Agriculture economists found severe instability issue after unexpected dollar variation while Bretton wood era, the long-run relationship between relative food, exchange rate, and agricultural prices has been ignored due to stringent influence of the monetary economic review of flexible exchange rate system.

In this study, long term neutrality of the local money and the exchange rate on the long run variations with relative prices of agriculture in Pakistan is tested. A simple derivation of new empirical model to test the long term neutrality of supply of money and exchange rate has been conducted. We have used the Johansen and Juselious method and we used Least Square Estimator (LSE) to check our results.

We examine the relationship between food prices and other independent variables that are described above by using the annual data from 1975-2016. In this study, we estimate the short-run coefficients and find the long-run equilibrium relation. We also find the evidence that increase in general price level cause increase in food prices. However, we find that the money neutrality holds in our study. The real effective exchange rate also causes an increase in food prices.

On the other side of results, it is being argued by certain economists that only stable monetary policy is not enough to prevent the problem of instability in the future as money supply plays a neutral role as it is insignificant in the long run. Since misalignment of the exchange rate is the reason up to some extent in the market of foreign exchange.

5.2 Policy Recommendations:

Instability in any sector of the economy is the major problem for any country. The money supply does not the main factor to create disturbance in the prices of the agricultural sector as we see it plays a neutral role in the long run because the coefficient of money supply found insignificant in the long run. However, the exchange rate overshoot causes changes in the prices of agricultural sector. Therefore, the monetary authorities can control the exchange rate through proper policies to overcome the overshoot problem. There are some other unobservable factors exists which cause the problem such as demand and supply problems. These problems can be overcome through crop support prices. Only the wheat support prices are given by the government to control the illegal export of the wheat. However, the support prices will provide the stability of prices of agricultural sector.

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