Purchasing Power Parity: Implication with respect to Pakistan and USA

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Abstract
The basic aim of this paper is theoretical explanation of Purchasing Power Parity and its practical implication in the real world. The researchers tried to explain whether it holds in the real world or not, if not then what are major factors deviating its practical implication from that what the theory says about it. This paper specifically draws the findings how actually exchange rate moves with the domestic and foreign price index. This study is based on the historical prices indexes of two countries Pakistan and USA pertaining the period from 1980 to 2011. So our sample size is two with the number of observations equal to 31. The results of this research expressed the findings that the Exchange rate (Pakistani rupees per dollar) increases with the increase in the domestic price index, means home currency will depreciate against the foreign currency. These findings are drawn on the basis of beta coefficients obtained from the regression analysis. The research results expressed that PPP holds to some extent which shows that inflation differential has a considerable impact on exchange rate movement but it is not the only factor.
Keywords: Relative PPP, Absolute PPP, IRP, Exchange rates, Inflation rate differential.

1. Introduction

Purchasing power parity (PPP) is a theory states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the two countries. In other words, the exchange rate between two countries should equal the ratio of the price level of these two countries for a fixed basket of goods and services in the economies. When a country's domestic price level is increasing (i.e., a country experiences inflation), that country's exchange rate must depreciated in order to return to PPP. Actually, when one country's inflation rate rises relative to that of another country, decreased exports and increased imports depress the country's currency. And here PPP theory plays its role and tries to quantify this inflation-exchange rate relationship.

Purchasing power parity has two forms, absolute form of PPP and relative form of PPP. Absolute form of PPP or "law of one price" says that similar products in different countries should be equally priced when measured in the same currency. While relative form of PPP considers market imperfections like tariffs, transportation costs imposed on few countries. This form actually meant that rate of price changes should be similar in both countries.

For example, if the inflation rate in US is 10% and in UK it is 12%. US people will stop buying the goods from their home country and demand of UK goods will increase by US people. Due to high inflation UK will decrease their demand for US products. In the result of this difference in inflation rate between these two countries, Foreign currency that British pound in this case will be appreciated by two percent (in other words we can say that home currency will be depressed by 2%). The shift in consumption of goods from U.S to U.K and appreciation of pound will continue until price of U.K goods, in the U.S ≥ Price of U.S goods, and in the U.K, price of U.S goods≤ price of U.K goods.

Formula for calculating new foreign exchange rate is given as follows:

F= S*(1+ef)

Where, "F" is new foreign exchange rate, "S" is current spot rate and "ef" is premium or discount by which foreign exchange rate will be adjusted.

And,

$$\mathbf{e}f \ = \ \frac{(1 + I_h)}{(1 + I_f)} \ - \ 1$$

$\Rightarrow$ If $I_h > I_f$, $e_f > 0$ (foreign currency appreciates)

If $I_h < I_f$, $e_f < 0$ (foreign currency depreciates)

If $I_h = 5\%$ & $I_f = 3\%$, $e_f = 1.05/1.03 - 1 = 1.94\%$

$\Rightarrow$ From the home country perspective, both price indexes rise by 5%.

$\Rightarrow$ In theory we use this simple formula to find the specific results, but in research we use different statistics models for finding changes in exchange rate

PPP theory can be tested in three ways: First one is Conceptual test, in which we actually plot the inflation differential between two countries, and percentage change in exchange rate on the graph. If the points significantly deviate from the PPP line then PPP does not hold in that country.

Second method to test PPP is Statistical method in which we apply regression analysis on the inflation and exchange rate differentials. And Finally, Empirical studies focus the fact that the use of inflation differentials to forecast long-run movements in exchange rates is supported. These Empirical studies also indicate that the relationship between inflation differentials and exchange rates is not perfect even in the long run.

Now here the Question arises that the PPP determines exchange rates. Most of the economists believe that the exchange rates movements in short term are news-driven Different Announcements about interest rate changes; changes in perception of the growth of economies and the like are all factors that drive exchange rates in the short run. On other hand, PPP describes the long run behavior of exchange rates. The economic forces behind PPP will ultimately equate the purchasing power of currencies. This can take many years, however. A time horizon of 4-10 years would be typical. PPP may also not occur because of lack of substitute availability of the traded goods.

2. Literature Review

Neely & Rapach (2011) describes how inflation rates in different countries are potentially linked with variety of channels. Many different macroeconomic shocks as well as economic and political pressures for central banks to respond the shocks similarly, are capable of producing co-movements in the inflation rates across the countries. Such factors can cause a given country's inflation rate to behave in highly idiosyncratic way if its central bank follows monetary policies that are different from the monetary policies of the rest of the world. Moreover, political, cultural, demographic, and technological factors also affect a country's openness and the degree to which trade channels link its inflation rate to foreign rates.

Researchers elaborated in this paper that the international inflation rates has been described by using a dynamic latent factor model which decomposes the national inflations rates from 1951 to 2009 of 64 countries into the world, regional and idiosyncratic components. The world component account for 35% and regional component account for 16% on average of the annual inflation rate variability across the countries. So, more than half of the inflation variability is explained by international influences.

Results show that the significance of world factor in accounting for inflation variability varies across the countries. Seven variables which include openness to trade, institutional quality, financial development, average real GDP per capita, average inflation, inflation volatility, and central bank independence, strongly explain the cross-sectional variation in the proportion of inflation variance accounted for by the world factor. These results show that idiosyncratic factors less strongly affect the wealthier countries and countries with more advanced institutions and developed financial markets. Finally, stability of variance decomposition was checked by estimating the dynamic latent factor model for the 1951-1979 and 1980-2009 subsamples. Regional factor is more important for North American and European countries and world factor is more important for some Latin American and Asian countries.

McKinnon (2011) described about the impact of Fed on worldwide inflation. The United States is sovereign country which has right to pursue its own monetary policy. It is also the center of the world dollar standard since 1945. So the monetary policy chooses by U.S. Federal Reserve can strongly affect its neighboring countries for better or for worse. In each case, 1971, 2003, and 2010, an easy monetary policy was accompanied by weakening dollar by forcing other countries to appreciate against the dollar. In all these three cases, low U.S. interest rates and the expectation of further depreciation of dollar led to massive hot money outflows from the United States. As most of the goods in foreign trade are invoiced in dollars so foreign central banks are intervened to buy dollars to prevent further appreciation. When central bank issues more money to buy dollars

then domestic interest rates are forced down and domestic inflation rises.

Few lessons are drawn from these episodes of U.S. easy money cum weak dollar for the stability of America's own economy. First, sharply increasing the general prices in auction-market goods like prices of primary commodities or foreign exchange are useful early warning to the Fed that it is being too easy but Fed is again ignoring this warning. Second, due to U.S. monetary shock, hot money flows into the countries which cause a loss of monetary control and increase in inflation rate. After Nixon shock of 1971, there was a significant increase in inflation in Japan. In 2010, CPIs of major emerging markets such as China, Brazil, and Indonesia shot up over 5%. Emerging markets or developing countries on the dollar standard's periphery are very sensitive to sudden increase in price of food because food has a major portion in their consumption market and their per capita incomes are low. Fed has made both the world and American economies much less stable by ignoring inflationary early warning signals on the dollar standard's periphery and eventual lagged feedback.

McKinnon (2011) talks about stagflation in the United States of America. Non-zero U.S. short term interest rates cause a massive hot money outflows into the emerging markets. Central bank of each emerging market buys dollar to prevent its currency from more appreciating but due to this it loses monetary control. In spite of some appreciation, average inflation in the emerging markets is much higher now as compared to the inflation in old industrial economies and prices of the world commodity are increased sharply. 1970s stagflation was brought because of easy U.S. monetary policy that depreciated dollar and led massive outflow of hot money that destabilized the monetary system of trading partners of America and increased the worldwide inflation. Today's shock is because of setting the short term federal funds rate close to zero by Fed. It has a very straightforward solution that Fed should introduce a program to increase the Fed fund rate gradually to some modest target, say 2 percent. The big four central banks which include the Fed, the European Central Bank, the Bank of England and the Bank of Japan, should move jointly and smoothly to maintain the stability of exchange rates in better way by setting a minimum target for their basic short term interbank rates, say 2 percent. Hot money flows will be decreased by reducing the spread in interest rates between the center and periphery. Central banks can monitor their own commercial banks to help central banks on the periphery enforce their controls.

Herwartz & Roestel (2011) elaborated capital market integration in terms of the RIP (real interest rate parity). It investigates the convergence of long-term ex ante real interest rates obtained from Canadian, French, UK, and U.S. inflation indexed government bonds for the period of 2000-2010. Because capital market integration improves the allocation of investment, lower the consumption volatility and increase the growth, so it is a core issue of international economics. In capital market integration, free flow of capital and technology transmission tends to equalize the cost of long-term capital and the marginal return from national production possibilities. As a result, the real interest rate parity shows the efficiency of capital allocation and the exploitation of comparative advantages. Capital market integration is analyzed according to the law of one price in this study. Two capital markets are integrated if the expected real cost of capital and the expected marginal yields on investment are tend to be equal in the long run. Prevalence of co-integration for all markets is evident from bi variant co-integration testing points. Furthermore, to reflect pair wise integration of CA and U.S., UK and FR, FR and U.S., and UK and U.S. capital markets, observed co-integration patterns cannot be rejected. Co-integration analyses show that all real interest rates are individually linked to the U.S. counterpart. Tests of over identifying parameter confirm that CA, FR, UK, and U.S. capital markets are integration. It is evident from related studies on IRP that real money market rates or weakly approximated long-term Real Interest Rates barely converge for the same time period.

Li (2010) examined the currencies of five inflation targeting countries to draw the results. This study delivered the three interesting results. First, correlations among the exchange rates are dynamic and vary from time to time. This is not unique to some IT laden countries, can be applied to all currencies exchange rates. Second novel result found is that the asymmetric in dynamic exchange rate correlation is of positive type. It has been found that the correlation between the currencies of IT laden country is greater with the currency of an influential country in period of joint appreciation than in joint depreciation. The most important among these influential currencies are US Dollar, Euro, and Japanese Yen. This phenomenon is attributed to the particular monetary policy regime "Inflation Targeting" Which gives privilege to five central banks to maintain price stability as their important policy goal. Third result proved by strong evidence is that being other things constant both widening and narrowing the interest rate differential cause a decrease in exchange rate correlation. This observation is aligned with UIP Theory.

These findings have contributed to the portfolio management. For example, it will help investors to optimize their currency portfolio by bundling the currencies of five IT counties and can accurately estimate the diversification benefits by considering the positive type asymmetry in exchange rates correlation. Moreover, Investors may also predict the changing direction of exchange rate movements based on the past IRDs. IT Policymakers can also be benefited regarding the effectiveness of their policies for the purpose of achieving price stability as necessary for IT regime and also in terms of managing exchange tare by an appropriate use of interest rates.

According to Edward (2011) the main conclusion can be described in on word that is, "Pragmatism". The important point is that "one size does not fit all" and that the different exchange rates are appropriate for different countries. Another important conclusion is that it's very dangerous to use rigid approaches for defending a specific currency value. Third important point is that greater the flexibility, better the performance, countries with more flexible rates have grown faster over the average and has greater capacity to absorb the exogenous shocks.

Fourth conclusion is related to the inflation, the fear that flexible exchange rate will lead to high inflation is misplaced, because of sustainable fiscal stance and the central bank are independent and focused on achieving targets. The fifth conclusion is that even under the floating exchange rate, it is possible for real exchange rate to be overvalued. It is proved that the overvaluation is very costly. Fifth conclusion is that there is asymmetry between the undervaluation and overvaluation. In the sixth place, "Dollarization" is not the appropriate system for most of the countries. However it goes well for the countries of long term imbalances and stability. It has also justified that the central bank intervened to avoid the overvaluation of exchange rate that is the market exchange rate is out of line with respect to long term equilibrium value.

Finally, it has been concluded that there has been an important change in the relationship between real exchange rate of commodity trading from Latin American countries and RER in the USA. In history, there was no correlation among the variables but now strong negative correlation has found. In short, it is suggested that the recent appreciation in currencies is found as USD Dollar has weaken in the global market.

Fortune (2011) studied the topic, "Expected Purchasing Power Parity". He used the distributed lag model to find the prices in domestic and foreign country to study both relative and absolute PPP. Recent analyses have demonstrated that exchange rates have not reflected the Purchasing power parity during 1970s. The differences in the expected future inflation among countries may be the reason for the failure of concept of purchasing power parity in this era. This paper tries to find the relationship between the interest rates and the exchange rates of foreign currency and home currency. Expected future inflation affects the exchange rate through anticipated real wealth impacts. Expected real wealth includes the expected real balances which can be maintained in the domestic currency and can be converted to the foreign currency. Expected real balances are equal to nominal money balances deflated by expected future prices. An increase in the expected future inflation will result in anticipated loss of real wealth in terms of real balances. If future inflation level is expected to be higher in domestic country, domestic wealth holders may find it worthwhile to convert their real wealth to the foreign currency. In this manner, anticipate level of real balances is restored in to desired level. This conversion is of course appreciation of the foreign currency.

The central theme of this paper is to find whether the purchasing power parity can be treated as "Forward Looking Concept" with the current exchange rates being influenced by what market participants believe the purchasing power parity be in future. This paper draws the conclusion on the analysis of both relative and absolute PPP. The conclusion drawn was that the movements in the exchange rates are primarily determined by expected purchasing power parity. Expected future wholesale and consumer prices both were significantly related to the exchange rates.

Manzur & Chan (2010) studied, "Volatility and Purchasing Power Parity". They used Principle Component Analysis (CPA) that was employed to construct a pooled measure of inflation for 12 Euro countries. This measure then use to test the PPP of Euro countries against 3 major currencies namely, Japan, UK and USA. As inflation of 12 Euro countries is not observable, it was maintained that PCA on inflation of 12 Euro countries provides a consistent measure of pooled inflation for the Euro zone. It has been found that high inflation countries receive the larger weight in pool. This measure of inflation has been used to test the PPP. The PPP found weak in case of some countries. However this weak support for PPP has been encouraging for two reasons. First, data are in monthly frequency which does not favor PPP. Secondly, the data sample may be contaminated by the intervening factors.

Next the test results were used to measure the adjustment of deviation from PPP using rolling and recursive regression procedures. Further the results suggest that 1) relative PPP does not hold for the introductory period of Euro for three currencies under study, 2) Over time there was tendency towards the relative PPP. Results found by this PPP model were similar to that of others simple forecasting rules such as: No-exchange Extrapolation and Synthetic Euro Series provided by Central bank. So this encourages the PPP Model.

According to Mohammad (2009) the purpose of this study is to find that whether the real effective exchange rates are sustaining or not in Pakistan case. In the sense, Purchasing power Parity test pointed out that real effective exchange rates are stable over long period. Variables of this study are: Consumer Price index (CPI), whole sales Price Index (WPI) and nominal exchange rates. The probability of the existence of this theory is in a weaker position by inquiring the stability of a proportional relationship between nominal exchange rates and relative prices. The findings are in favor of PPP theory that holds in case of Pakistan. In addition to that, our expectations that PPP does not work at aggregate basket (which also includes many non-traded goods), i.e. with

respect to the general price level, although it might work for the highly traded individual goods such as wheat or steel of specific kind. Moreover, PPP works over the shorter period for any level of aggregation of the basket. In the monetary side and asset market, PPP theory has an important position to the balance of payment and exchange rate determination. Exchange rate policy helps in finding both real as well as nominal exchange rate. This is useful to calculate the competitiveness, which is found by relative price movements.

Additionally, due to depreciation in home currency, economy has to pay some cost in short run, such as increased in the international debt (loan), and a decrease in the living standard. If there is a budget deficit or a widespread increase of the real exchange rate, it may be harmful for short period of time. It is essential to consider these difficulties which are facing the common people after considering these harms. Exports declines because of depreciation of the home currency. It creates high inflation because of higher cost of production, so it becomes necessary to control this threatening situation by different measures to improve current account balance. This looks an easy solution to establish competitiveness in the long run to set the economy on the way of export led growth.

Abbas (2009) studied about power of exchange rate models in emerging Asian nations. The question addressed in his research paper is that whether the economic models perform better than naive exchange rate models, or not. In this paper, author has compared forecasting performance of three economic and two autoregressive models of exchange rate in five Asian countries; namely Pakistan, India, Indonesia, Korea and Sri Lanka. Five Models are: purchasing power parity (PPP), interest rate parity (IRP), Adhoc model, random walk model (RWM) and autoregressive integrated moving average (ARIMA) model. To compare the results of these models, four statistical measures are applied. Names of these statistical techniques are: Root Mean Square Error (RMSE), Mean Absolute Error (MAE), Median of Absolute Deviation (MAD) and Success Ratio (SR).

Results prove that models based on economic fundamentals do not perform better than random walk and ARIMA in all the of these five sample countries. If the effect of outliers is controlled, then adhoc model beat single variable based parities i.e interest rate parity and purchasing power parity models. Economic models have better predictive capacity except in case of Indonesian Rupiah, where random walk model beats economic models even after controlling the effect of outliers. RMSE, MAE and MAD favor economic models too. However, statistical results reports different results in different economies. In Pakistan, India and Korea, it gives in favor of IRP while in Indonesia and Sri Lanka, it favors RWM.

Their performance varies from state to state. In Pakistan, India, Korea and Sri Lanka, the Root Mean Square Error, Mean Absolute Error and Median of Absolute Deviation support fundamentals based models, while same statistical measures favor random walk model in case of Indonesia.

Nagar (2011) did empirical estimations in his research. These estimations were performed using three different techniques: OLS, Non- Linear OLS (NLS) and instrumental variables (IV) with the GMM technique. This paper answers the question that whether the continual undershooting of the inflation target during the disinflation process in Israel was because of Inflation Avoidance Preferences (IAP) or to a hidden inflation target that was adopted by the Central bank. According to author's knowledge, this difference has not yet been examined in the literature.

The CB's behavior under Inflation Avoidance Preferences (IAP) is forced by the ambiguity regarding inflation and the existing economic conditions, collectively with an avoidance to inflation; it nevertheless aims to achieve the target which results in an asymmetric policy with respect to inflation. On the other hand, a hidden target policy may be aiming to undershoot the announced target and is perhaps motivated by other reasons, such as the exploitation of the expectations of inflation, even under caution. The paper is also motivated by the claim made by Sussman (2007) that during the disinflation process in Israel in the 1990s the CB was having hidden target inflation as zero.

Another question which is examined in this paper that whether both policies – asymmetry and a hidden target – are different techniques for the same purpose, i.e. IAP policy to achieve the announced target, or whether they employ different motives aimed at achieving different goals. The model applied here is based on a New Keynesian economy, in the case of discretion and a CB objective function. After developing the model, it was tested for Israel for the period 1994-2007 using monthly data. This period was also further divided into two other small-periods: the first to capture the 90s - a period under the tenure of Bank of Israel Governor Jacob Frankel - which was characterized by a disinflation process and the second starting from 2000 which mainly coincides with the tenure of another Governor named David Klein (which was ended in 2004).

The researcher concluded following main results: (a) during the main period of the disinflation process (which was of the 90s) the CB adopted a hidden target that was roughly 4 percent, on average, in comparison to an average announced target of 8 percent. (b) During the whole period and the 1st sub-period, the CB conducted both a hidden target policy and as well as asymmetric policy was also applied, which suggests that they were directed at achieving different goals. (c) During the 2nd sub-period, on the other hand, it cannot be determined whether a hidden target or an IAP policy was conducted, thus suggesting that one or the other was used to implement the goal of IAP.

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The finding of both a hidden target and an asymmetric policy during the 90's suggests that the hidden target had motives other than IAP, such as perhaps the manipulation of the public's expectations of inflation. When CB policy involves a repeated game and an extended learning process on the part of the public, a hidden target that is lower than the announced one may be a practical way of manipulating expectations, even under discretion.

Chang (2011) studied "Long run Purchasing Power Parity and Asymmetric Adjustment in BRICs".Basic Aim of the study was to check if purchasing power parity holds in the countries known as BRICs i.e. Brazil, Russia, India and China. Sample period of this study was from July 1992 to December 2006. Researchers used threshold co-integration technique (Enders and Siklos, 2001) to test for long-run PPP with asymmetric adjustment in BRICs. The results of this study reveal that Engle–Granger test (with only symmetric adjustment) fails to prove any co-integration relationship for all four of the BRIC economies while threshold co-integration test provides clear evidence of long-run PPP with asymmetric adjustment for most of the BRIC economies, with the only exception of China. Hence thay concluded that it is necessary to incorporate asymmetric adjustment to nominal exchange rates in order to eradicate deviations from long-run PPP.

Chang (2011) studied "Long-run Purchasing Power Parity with Asymmetric Adjustment: Further Evidence from African Countries". Researchers took a sample of 22 African countries (Botswana, Burkina Faso, Burundi, the Central African Republic, the Coˆ te d'Ivoire, Ethiopia, Gabon, Ghana, Kenya, Madagascar, Mali, Mauritius, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Uganda, Zambia and Zimbabwe) for a period of January 1980 to December 2003. Study concluded that without asymmetric adjustments only 4 out of 22 countries proved to have long run purchasing power parity. On the contrary using threshold co-integration test, which assumes asymmetric adjustments, evidence of long run purchasing power parity is found in 17 out of 22 countries.

Chang (2010) applied non-linear panel unit root test to assess the non-stationary characteristics of real exchange rate. Procedure was applied to seven Central and Eastern European countries (CEEC namely Bulgaria, Czech Republic, Hungary, Poland, Romania, Russia and Slovakia). Authors discovered that nonlinear panel unit root test has higher power compared to linear method (Breuer et al., 2001) but with a condition that true data-generating process of exchange rate is a stationary nonlinear process. They also inspected Purchasing Power Parity (PPP) and found that five countries, namely, Hungary, Bulgaria, Poland, Romania and Russia provide evidence of validity of long run PPP. Values of exchange rates in the mentioned countries showed non-linear adjustments whose value is mean reversion towards PPP equilibrium.

Narayan (2008) examined evidence for purchasing power parity (PPP) in Asian countries, namely Malaysia, Thailand, India, Pakistan, Sri Lanka and Philippines. He used use annual data for the period 1967 to 2002. Researchers used panel Co-integration test by (Westerlund, 2006).

This test permits the possibility of modeling the presence of multiple structural breaks. As a result evidence for PPP in Sri Lanka, India, Malaysia, Thailand, Pakistan and Philippines was found to exist. With the surety that PPP exists we can use the predictive nature of theory to judge if exchange rates in said countries are over or undervalued. It also proved that, in Asian countries, shocks to exchange rates have a transitory effect.

3. Methodology
3.1 Sample Size
This study is based on the historical prices indexes of two countries Pakistan and USA pertaining the period from 1980 to 2011. So our sample size is two with the number of observations equal to 31.
3.1.1 Sample Period
31 years, from 1980 to 2011.
3.2 Equation of Model Employed
The model employed in this study is referred to two published research papers including "Expected Purchasing Power Parity" by J-Neill Fortune(1985) and "Long Run Purchasing Power Parity and Asymmetric Adjustments" by Hsu-Lin Chang and Chi-Wei Su (2010). In this study, we employ the equation for Purchasing Power Parity (for both relative and absolute PPP) which is given below:

$$InE_t = a + blnp_t^f + \beta lnP_t^f$$

Where,

E_t = the exchange rate i.e.: number of units of domestic currency per unit of foreign currency

P_t^f = Prices of goods in the home currency

P_t^f = prices of common basket of goods in foreign currency

a = y-intercept

b = beta coefficient between home domestic prices and exchange rate

β = beta cofficient between foreign prices and exchange rate

3.3 Variables

Independent Variable:

> ➢ Home Country Price Index
> ➢ Foreign Country Price Index

Dependent Variable:

> ➢ Exchange Rate i.e: Number of domestic currency units per unit of foreign currency

3.4 Procedure

Firstly, the procedure was followed by taking the natural logs of our both variable i.e: the home price index(Pakistan Inflation) and foreign prices index (USA Inflation). The natural log was taken to tacle the heteroscidity in oder to minmize the variation in data to draw the reasonable results.Then, the equation given above was employed through regression in order to find y-inteccept and beta cofficients to meaure the slope (change in y variable as a result of change in corrosponding x variable).

On the basis of these results, finding are drawn to check the theoratical explanation of Purchasing Power Parity. Resulta are shown in the form of regression table and PPP Graph which shows a line fit between Inflation Differential of both countries Prices(y-intercept) and % change in exchange rate.

4. Results & Findings

Regression Statistics	
Multiple R	0.68
R Square	0.46
Adjusted R Square	0.42
Standard Error	0.50
Observations	31.00

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R Square	0.46
Adjusted R Square	0.42
Standard Error	0.50
Observations	31.00

Variable	*Coefficients*
Intercept	**1.25109661**
I_h	**0.11475461**
I_f	**-0.7170677**

Threshold co-integration techniques presents following relationship among exchange rates and inflation in domestic and foreign currencies.

$$e_t = \alpha_0 + \alpha_1 P_t^* + \alpha_2 P_t + \mu_t$$

Substituting the variables with values that we computed by processing historical data the equation comes out to be like this.

$$e_t = 1.25 + 0.114 I_h - 0.717 I_f$$

Where,

> ➢ e_t is the logarithm of foreign exchange in the domestic (Pakistani Rupee) currency.
> ➢ I_h represents the logarithm of price levels in Pakistan.
> ➢ I_f represents the logarithm of price levels in United States.

An intercept of 1.25 shows that the average value of exchange rate in terms of PKR/$ will remain 1.25 if both Ih and If are zero.

0.114Ih represents that holding all other variables constant one percent change in Inflation at home country i.e. Pakistan will cause a .114% increase in the foreign exchange rate of PKR/$. This relationship is positive and is also supported by the theoretical knowledge of finance. We know that when inflation in a country increases it exerts pressure on its currency which in turn gets depreciated. In this case when inflation in Pakistan increases we need more Pakistani Rupee to convert one US dollar into rupee. Hence US dollar now is worth more of Pakistani rupees than it was earlier, as Pakistani rupee lost its value due to inflation increases in Pakistan.

-0.717 If represents that holding all other variables constant one percent change in Inflation at foreign country i.e. United States of America will cause a .717% decrease in the foreign exchange rate of PKR/$. This relationship is negative and is also supported by the theoretical knowledge of finance. We know that increase in the foreign country's inflation causes the value of foreign currency to depreciate. In this case when inflation in United States increases we need less Pakistani Rupee to convert one US dollar into rupee. That is because US

Dollar has lost its value due to increase in US inflation. Hence US dollar now is worth less of Pakistani rupees than it was earlier.

Adjusted R square value of 0.42 shows that out of total variation in exchange rate of PKR/$ our model explains 42% of variation. i.e. 42% of changes in exchange rate of PKR/$ are explained by changes in Inflation at home currency and inflation in foreign currency. Rest of variation which is 58% is attributed to other factors which we didn't incorporate in our model. Moreover, the PPP Line drawn from the sample data is not the perfect line which shows that inflation differential between the counties is not perfectly equal to % change in the exchange rate, so it negates the theoretical explanation of Purchasing power parity. However there is a positive line PPP Line which shows a considerable relationship between inflation differential and the exchange rate movement.

PPP holds to some extent which shows that inflation differential has a considerable impact on exchange rate movement but it is not the only factor. According to finance theory, there are many other factors effecting exchange rates such as interest rates, national income, government restrictions and exogenous variables. If we incorporate these factors in our model then the remaining 58% of the exchange rate will also be explained.

5. Findings & Discussions

Purchasing power parity (PPP) is a theory states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the two countries. In other words, the exchange rate between two countries should equal the ratio of the price level of these two countries for a fixed basket of goods and services in the economies.

The literature review shows that PPP does not hold in reality as theory explains it. The model employed in this study is referred to two published research papers including "Expected Purchasing Power Parity" by J-Neill Fortune(1985) and "Long Run Purchasing Power Parity and

Asymmetric Adjustments" by Hsu-Lin Chang and Chi-Wei Su (2010). In this study, we employ the equation for Purchasing Power Parity (for both relative and absolute PPP) which is given below:

$$InE_t = a + blnp_t^f + \beta lnP_t^f$$

Inflation rates and Exchange rates of Pakistan and USA has been taken from 1980 to 2011 and tested for either Purchasing Power Parity holds or not. Two variables were used which includes X-Variables consisting Home Country Price Index and Foreign Country Price Index, and Y-Variable consisting Exchange Rate i.e: Number of domestic currency units per unit of foreign currency.

Procedure was followed by taking the natural logs of our both variable i.e: the home price index (Pakistan Inflation) and foreign prices index (USA Inflation). The natural log was taken to tackle the heteroscidity in order to minimize the variation in data to draw the reasonable results. Then, the equation given above was employed through regression in order to find y-intercept and beta coefficients to measure the slope. Substituting the variables with values that we computed by processing historical data the equation comes out to be like this

et =1.25 + 0.114Ih- 0.717 If

By running the regression for the historical data we got adjusted R square value of 0.42 which shows that out of total variation in exchange rate of PKR/$ our model explains 42% of variation. i.e. 42% of changes in exchange rate of PKR/$ are explained by changes in Inflation at home currency and inflation in foreign currency. Rest of variation which is 58% is attributed to other factors which we didn't incorporate in our model.

However there is a positive line PPP Line which shows a considerable relationship between inflation differential and the exchange rate movement.

At last, it is concluded that direct exchange rate of a country's currency is is positively related to home inflation and negatively related to foreign country's inflation. PPP holds to some extent which shows that inflation differential has a considerable impact on exchange rate movement but it is not the only factor. There are many other factors effecting exchange rates such as interest rates, national income, government restrictions and exogenous variables.

References

McKinnon, R. (2011), 'Worldwide Inflation and International Monetary Reform: Exchange Rates or Interest Rates?', China &World Economy, Vol. 19, No. 5, pp. 1-16.

Herwartz, H. and Roestel, J. (2011), 'Convergence of Real Capital Market Interest Rates-Evidence from Inflation Indexed Bonds'.

McKinnon, R. (2011), 'The Fed as the Engine of Worldwide Inflation', Open Econ Rev DOI 10.1007/s11079-011-9218-0.

Christopher , J.N. and David, E.R., (2011), 'International co-movements in inflation rates and country Characteristics', Journal of International Money and Finance, Vol. 30, pp. 1471–1490.

Sulaiman, D.M., Umer, M. and Lal, I. (2009), 'Tests of Purchasing Power Parity; Extent of Pakistan', European Journal of Scientific Research, ISSN 1450-216X, Vol. 37, No. 4, pp. 608-615.

Abbas, Z. and Javed, T. (2009), 'Comparing Predictive Power of Exchange Rate Models in Emerging Asian Economies', http://ssrn.com/abstract=1867872.

Nagar, W. (2011), 'Persistent Undershooting of the Inflation Target During Disinflation in Israel: Inflation Avoidance Preferences or a Hidden Target?', Research department, Bank of Israel, Discussion Paper No. 2011.02.

Xiao-Ming, L. (2010), 'How do Exchange Rates can move? A study on the currencies of Inflation Targeting Countries', Journal of Banking and Finance, No.35, pp. 418-429.

Edwards, S. (2011), 'Exchange Rates in emerging countries: Eleven empirical regularizes from Latin America and East Asia', National Bureau of Economics Research.

Neill, F.J. (1985), 'Expected Purchasing Power Parity', Springer, Weltwristschaftliches archive, Bd. 121, H. 1, pp. 97-104.

Manzur, M. and Chan, F. (2010), 'Exchange Rate Volatility and Purchasing Power Parity. Does Euro make any difference?', International Journal of Banking and Finance, Vol. 7, Issue. 1.

The Economist Magazine, (2004), PACIFIC exchange rate service, University of British Columbia.

Ethier, W.J. (1995), ' Modern International Economics', W. W. Norton & Comp., New York/London, 3rd edition.

Medura, J. (2003), 'Relationship between exchange rate, Interest rate and Inflation', International Financial management, Chapter 8, pp. 237-255.

Hsu-Ling Chang,Chi-Wei Su, Meng-Nan Zhu and Pei Liu, (2011), ' Applied Economics Letters', No. 17, pp. 1083–1087.

Chang, T., Yang-Cheng Lu, D. P. Tang and Wen-Chi L. (2011), ' Applied Economics', No.43, pp. 231–242.

Hsu-Ling, C., Chi-Wei Su, Meng-Nan, Z. and Pei L. (2011), 'Applied Economics Letters', No. 18, pp. 411–415.

Paresh Kumar Narayan, Applied Economics, 2010, 42, 325–332.

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