The validity of the purchasing power parity in intermediate and flexible exchange rate regimes: Empirical evidence from Turkey

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The aim of this paper is to analyze empirically the validity of the purchasing power parity (PPP) hypothesis for Turkey under intermediate and flexible exchange rate regimes. In this framework, the periods where intermediate (January 1994-February 2001) and flexible (March 2001-September 2012) exchange rate regimes implemented in Turkey were taken as a base. The estimation results show that foreign exchange rate regimes are significant factors in validity of the purchasing power parity in Turkey. While the purchasing power parity is not valid in the intermediate exchange rate regimes, it is valid in the flexible exchange rate regime. This empirical result is also consistent with the theory.

Key words: Purchasing power parity, intermediate exchange rate regime, flexible exchange rate regime.

INTRODUCTION

This paper analyzes the validity of the purchasing power parity (PPP) hypothesis for Turkey in intermediate and flexible exchange rate regimes. In the flexible exchange rate regime, it is assumed that exchange rates quickly adjust to changes in relative price levels. If it is so, the PPP should hold in the flexible exchange rate regime. On the contrary, since in the intermediate exchange rate regimes exchange rates do not quickly adjust to changes in relative price levels, the PPP hypothesis should not hold.

The empirical results of the previous studies about the validity of PPP for Turkey give mixed results. While Gözgör (2011), Özdemir (2008), Yazgan (2003) and Sarno (2000) show that the PPP hold for Turkey, Telatar and Kazdağlı (1998) show that the PPP does not hold.

On the other hand, Kalyoncu (2009), Alba and Park (2005) find mixed empirical support for the validity of PPP for Turkey. There are also some papers that investigate the validity of PPP hypothesis for emerging market economies. Karabulut et al. (2013) show the validity of PPP hypothesis for Czech Republic and Poland, and find mixed empirical evidence for Hungary. Boršic et al. (2012) find support for the validity of PPP for 7 out of 12 Central and Eastern European economies.

This study uses different time periods from the previous empirical studies (except Özdemir (2008)) about Turkey and compares the effects of intermediate and flexible exchange rate regimes on the validity of PPP hypothesis.

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The Central Bank of Turkey intervened in the exchange rate volatility has been tried to be minimized. Markets' stability, using the exchange rate policy the objective of monetary policy was to maintain financial the monetary policy. In this period, since the primary regulated the foreign exchange rate policy with respect to expected increases in the currency basket.

Between 1996 and 1999, the Central Bank of Turkey often intervened the exchange rate volatility. For that reason, the exchange rate regime was called "managed floating". At the beginning of 1995, the value of the Turkish lira was pegged to the currency basket consists of 1 US dollar and 1.5 Deutsche mark. It was also decided that the monthly value of the currency basket would be increased with respect to expected monthly inflation rates. The Central Bank of Turkey intervened in the foreign exchange market to maintain foreseen increase in the currency basket.

Between 1996 and 1999, the Central Bank of Turkey regulated the foreign exchange rate policy with respect to the monetary policy. In this period, since the primary objective of monetary policy was to maintain financial markets' stability, using the exchange rate policy the exchange rate volatility has been tried to be minimized. The Central Bank of Turkey intervened in the exchange markets in order to minimize exchange rate volatility. The devaluations were made with respect to expected inflation rates. So, the exchange rate regime implemented in this period can be described as "managed floating with no predetermined path for the exchange rate".

In December 1999, a stand-by arrangement was signed with the International Monetary Fund (IMF) and within the framework of the disinflation program "forward looking crawling pegs" started to be implemented. The exchange rate increases were determined in accordance with the targeted inflation rate. The value of the exchange rate basket consisted of 1 US dollar and 0.77 euro was announced for one year. But, after the financial crisis on 21 February 2001, this regime was abandoned and flexible exchange rate regime was adopted. Currently, the Central Bank of Turkey intervenes in the foreign exchange market to minimize excessive exchange rate volatility, and in the case of excess foreign exchange supply in the market buy them to increase its foreign exchange reserves.

THEORETICAL FRAMEWORK

The purchasing power parity (PPP) hypothesis explains the relationship between exchange rates and price levels. It represents an equilibrium relationship between the exchange rate and national price levels. The origins of the PPP hypothesis extend to the Salamanca School in Spain in the sixteenth century and to the works of Gerrard de Malynes in England at the Tudor period in 1601 (Taylor, 2006). In the nineteenth century some classical economists, including Wheatley, Ricardo and Mill developed the PPP hypothesis by their writings. However, the Swedish economist Gustav Cassel is the first author who reviewed the PPP during the 1920s (Balassa, 1964; Holmes, 1967). He recognized that the PPP can be regarded as an extension of the quantity theory of money to an open economy. In the 1970s, the interest in the theory revived when the flexible exchange rate regime started. The history of the PPP in that period has been reviewed by Frenkel (1978) and Officer (1982).

The basic concept of the PPP is the law of one price that implies the price of identical goods is equalized between countries by perfect arbitrage assuming there are no transportation costs and no barriers to trade such as tariffs, custom duties, quotas etc. An alternative interpretation of the law of one price is mentioned in the Cassel's theory (Balassa, 1964; Holmes, 1967). Absolute PPP assumes that if different goods are produced and the law of one price holds for each of the goods, then the cost of a basket of goods and services should be the same in all countries when measured in terms of a common currency. Let "P" and "P*" represent the domestic and foreign index and "e nominal" the nominal exchange rate, i.e., the price of foreign currency in terms of domestic currency. The cost of the foreign basket of goods and services in terms of domestic currency is 

\[ e_{\text{nominal}} \times P^* \]

so absolute PPP can be written as,

\[ e_{\text{nominal}} \times P^* \text{ or Nominal exchange rate } (e_{\text{nominal}}) = \frac{P}{P^*} \]

Absolute PPP assumes that the real exchange rates continuously equal to 1. The real exchange rate is the nominal exchange rate adjusted to the foreign and domestic price levels.

Real exchange rate (ereal) = \( e_{\text{nominal}} \times P^*/P \)

Relative PPP states that the exchange rate changes should be equal to the differences between the domestic and foreign inflation. So, the foreign exchange value of a currency tends to rise or fall at a rate equal to the difference between domestic and foreign inflation. Let "\( \Delta \)" the percentage change, the relative PPP can be written as follows:

\[ \Delta e_{\text{nominal}} = \Delta P - \Delta P^* \]

DATA AND EMPIRICAL RESULTS

In the empirical part of this study, the validity of PPP hypothesis is tested for Turkey using different time
periods where intermediate and flexible exchange rate regimes were implemented. The validity of PPP is determined by testing whether real exchange rate contains unit root. If the unit root hypothesis can be rejected, the real exchange rate is stationary and the PPP holds. If real exchange rate is stationary, this implies that any changes in the price level of two countries would be offset by an equal depreciation or appreciation of the nominal exchange rate. If real exchange rate has unit root this means that shocks to real exchange rates are permanent and the PPP does not hold. The common method for testing unit roots is the Augmented-Dickey-Fuller (ADF) test. The real exchange rate is calculated using the following formula:

\[ \log(REER) = \log(NER) + \log(TRCPI) - \log(USCPI) \]

where \( REER \) is real exchange rate, \( NER \) is nominal exchange rate, \( TRCPI \) is the amount of Turkish lira per unit of US dollar, \( TRCPI \) is the Turkey’s Consumer Price Index and \( USCPI \) is the United States of America’s Consumer Price Index. All the variables are in the logarithmic forms. The data are monthly and are taken from the International Monetary Fund’s (IMF) International Financial Statistics (IFS).

The ADF test statistics for real exchange rate in the periods intermediate (January 1994-February 2001) and flexible exchange rate regimes (March 2001-September 2012) are presented in Table 1. The ADF test results show that while the real exchange rate is not stationary during the period between January 1994 and February 2001, it is stationary during the period between March 2001 and September 2012. These test results can be interpreted that while the PPP hypothesis does not hold in the intermediate exchange rate regimes, it holds in the flexible exchange rate regime in Turkey.

Telatar and Kazdağlı (1998) for the period from 1980:10 to 1993:10 and Kalyoncu (2009) for the period from 1980:01 to 2005:04 showed that the PPP does not hold for Turkey using conventional unit root tests. This study, taking into consideration the implemented foreign exchange rate regime and using conventional unit root tests showed that the PPP holds in Turkey under flexible exchange rate regime. Papell (1997) found the evidence of the validity of PPP for industrial countries. Sarno and Lavente (2006) also showed that the PPP deviations are reversed more quickly under the flexible exchange rate regime using over a century of data for G5 countries.

CONCLUSION

This paper examined the validity of the PPP hypothesis in intermediate and flexible exchange rate regimes for Turkey. The empirical results showed that while the PPP does not hold in the intermediate exchange rate regimes in Turkey, it holds in flexible exchange rate regime. These empirical results support the theoretical view that since exchange rates quickly adjust to changes in relative price levels in the flexible exchange rate regime, the PPP should hold.

Conflict of Interests

The authors have not declared any conflict of interests.

REFERENCES


<table>
<thead>
<tr>
<th>Period</th>
<th>t-statistic</th>
<th>Test (1 %)</th>
<th>Critical values (5 %)</th>
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<tr>
<td>1994:01-2001:02</td>
<td>-1.645</td>
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(**) denotes rejection of null hypothesis at 1% significance level.

Table 1. Empirical results for unit root test of the real exchange rate.