

The Evaluation of the Equilibrium Exchange Rate based on the Purchase Power, for Romania's Case

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Abstract. *The current paper aims to analyse one of the many models of evaluation for the equilibrium rate in an economy. It also briefly presents the main models and methods used in the specialized literature for the evaluation of the equilibrium exchange rate. The utilization of as many methods allows the deciders of monetary and economic policy to accurately ground the moment of one country's adherence to the euro zone. Also, an analysis can be made, whether the respective country is ready and how fast the process of convergence to the Euro zone can evolve. In general, it is recommendable a country not to force its adherence to the euro zone because the negative effects may occur for a long period of time, leading to a development for the respective economy under its potential. The estimated model in Romania based on data will be afterwards used for estimating the equilibrium rate and for issuing scenarios concerning its future evolution. Usually, the parity at which the national currency should be converted for an unlimited period of time, will also be around the level of the equilibrium rate. From that moment on, after attending the Exchange Rate Mechanism II (ERM II), the respective country's economy loses an equilibrium buffer – the exchange rate. Starting from that moment, the country's economy is supposed to be so performant that it absorbs the internal and external negative shocks, only relying on the fiscal and budget policies. Hence, the particular importance of a correct evaluation for the equilibrium rate by using several models and methods, so that to be as close as possible to the equilibrium level on mid term.*

Keywords: equilibrium exchange rate, Purchasing Power Parity, Desirable Equilibrium Exchange Rate, Natural Equilibrium Exchange Rate, Law of One Price – LOOP

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1. Models and Methods for Estimating the Equilibrium Exchange Rate

The used models can be grouped in three main categories, considering the hypothesis they start from:

- models that assume the lack of arbitrage opportunities on the consumer goods market or on the financial market - Purchasing Power Parity – PPP, respectively Uncovered Interest Rate Parity – UIP;
- models that assume both the internal equilibrium and the lack of arbitrage opportunities – out of which the model for determining Behavioural Equilibrium Exchange Rate – BEER offers a flexible frame for also including other interfacing

models such as Balassa Samuelson, the monetary model and Permanent Equilibrium Exchange Rate – PEER;

- models that assume both the internal and external equilibrium – out of which the model for determining Fundamental Equilibrium Exchange Rate – FEER also offers a flexible frame for incorporating other models with similar specifications such as Desirable Equilibrium Exchange Rate - DEER, Natural Real Exchange Rates - NATREX, Sustainable Real Exchange Rate - SRER.

According to the considered time horizon in which the equilibrium is accomplished, the models can be grouped in three categories:

- models that aim the exchange rate equilibrium on short term – for example, UIP;
- models that aim the exchange rate equilibrium on mid term – BEER, PEER;
- models that aim the exchange rate equilibrium on long term – the monetary model, PPP, FEER, DEER, NATREX, SRER.

The fundamental equilibrium exchange rate – FEER – Williamson (1994) is defined as the level of the exchange rate at which an economy is at internal and external equilibrium.

The Internal Equilibrium is defined as the certain economy status in which there is no demand deficit or surplus, so the GDP is at its potential, and the inflation rate is constant (or equal with the targeted inflation for that economy).

In what the **external equilibrium** concerns, its definition is subject to intensive discussions. In large, the external equilibrium is achieved when the weight of the current account balance in GDP reaches a targeted value having certain desired features.

While some authors consider this targeted value to be the level of the current account compatible with the stabilisation of the weight of the external debt balance or of the external net assets in GDP, other consider it to be the certain level of the current account deficit that is achieved during some sustainable economic policies on a long term (in principle the fiscal policy, as the monetary policy cannot influence the economy on a long term). This version of the FEER model is called DEER (Desired Equilibrium Exchange Rate), namely the exchange rate compatible with the accomplishment of a certain desired value, of a target for the current account. In the light of the same approach, models as NATREX (Natural Equilibrium Exchange Rate and Macroeconomic Balance (Isard et al. (2001), Isard (2007), Lee et al. (2008)) developed.

From the practical point of view, the FEER methodology consists of estimating the equilibrium, by following three steps:

- ✓ determining **the underlying current account** – that certain value of the current account that would be registered in the absence of some cyclical factors, i.e. when the internal and external economy is at its potential;

- ✓ determining **the equilibrium or sustainable current account**, namely that value of the current account based on the savings/investments of the internal economy;

- ✓ estimating the **equilibrium currency (FEER)** – that level of the currency rate that equals the underlying current account with its equilibrium value.

2. Estimating the Equilibrium Rate by Using the Purchasing Power Parity

A reference theory in the specialized literature for determining the equilibrium exchange rate is the **Purchasing Power Parity – PPP**, according to which, on different markets, the level of the prices expressed in the same currency should be the same. The Purchasing Power Parity is one of the economic theories with the

longest history, its present name being asserted in 1918 by the Swedish economist Gustav Cassel.

Although the most empiric proofs do not sustain the validity of this theory on a short term, this offers precious information concerning the level of the equilibrium exchange rate on a long term. On a short term, the deviations from the level implied by the theory of the purchasing power parity can be interpreted as being episodes of over or under evaluation of the national currency.

The theory is known in two versions: relative and absolute. In its „absolute” version, starting from the **Law of One Price – LOOP**, the prices in different markets will be equivalent when they are expressed in the same currency.

The respecting the law of one price should be provided by a mechanism of eliminating the arbitration oportunities, as the price differences existing on the market would generate the possibility to purchase cheaply on one market and sell expensively on another, and the impact of this type of commerce would generate an equality between the exchange rate on the market and the equilibrium rate.

The equilibrium exchange rate involved in this theory (E^{PPP})

$$E^{PPP} = \frac{P}{P^*}$$

where P represents the level of prices in the internal economy and P^* is the level of prices in the commercial partner’s economy.

In the relative version, the modification in percentages of the exchange rate ($\Delta(\%)E^{PPP}$) is given by the inflation differential, as follows:

$$\Delta(\%)E^{PPP} = \pi - \pi^*$$

where π represents the inflation rate in the internal economy and π^* is the inflation rate in the commercial partner’s economy. We notice the fact that a positive diferential of the inflation rate towards the partner economy determines an increase of the nominal exchange rate according to the purchasing power parity.

The most empirical studies start from the relative version of this theory, considering the stability of the series of data. An alternative for testing the theory validity is the analysis of the real rate stability; if the theory of the purchasing power parity is respected, an increase of the prices on the internal market would have to be accompanied by an increase of the nominal exchange rate, and the real exchange rate would have to remain constant. Starting from the bilateral real exchange rate definition,

$Q = \frac{E \times P^*}{P}$ (where E is the nominal exchange rate), an over unitary level of this

indicates a higher exchange rate that the one determined by using the purchasing power parity theory and an **under evaluation** in real terms of the national currency. Similarly, when the nominal exchange rate is lower than the one determined by using the purchasing power parity theory, respectively Q is less than one unit, we may say that the national currency is **under evaluated** in terms of purchasing power.

In practice, there exists a series of factors that can determine deviations from the currency exchange rate implied by this theory, among which we can mention:

- the structure of the goods basket based on which the prices are calculated in the two economies subject to comperison is not identical;

- the exchange rate is a volatile economic variable, while the consumer prices are rather rigid, fact that makes their evolutions on a short term impossible to be proportional, as it can be found by studying Rogoff, (1996);
- the existence of the *home bias* phenomenon, a *puzzle* of the international finance, as it is called by Obstfeld and Rogoff (2000), according to which the consumers prefer the native products although substitutes that have the price advantage exist;
- the existence of the shipment costs, of the tariff and non-tariff barriers, limits the capacity of the arbitration phenomenon to determine the equalization the exchange rate on the market with the equilibrium exchange rate.

Regarding this last argument, there is a certain category of goods for which the shipment costs would be excessively high towards their value, goods that are called nontradable. As there are not any arbitration possibilities for these goods, the purchase power parity is not applicable in their case.

For Romania's case, the purchasing power parity, in its absolute version, indicates a significant under evaluation of the national currency (please, see the Table 1).

Table 1. The real exchange rate according to purchasing power parity, the absolute version, in Romania towards the Euro zone

	Total Consumption	Consumption Tickets	Non-lasting Goods	Semi-lasting Goods	Long lasting Goods	Capital Goods	Services
2000	0,35	0,50	0,46	0,47	0,80	0,47	0,24
2001	0,34	0,50	0,46	0,48	0,72	0,50	0,24
2002	0,34	0,51	0,47	0,57	0,68	0,52	0,24
2003	0,35	0,53	0,48	0,56	0,74	0,52	0,24
2004	0,36	0,53	0,48	0,56	0,73	0,53	0,25
2005	0,45	0,67	0,62	0,74	0,84	0,60	0,31
2006	0,48	0,69	0,65	0,81	0,75	0,62	0,35
2007	0,53	0,75	0,70	0,90	0,84	0,68	0,39
2008	0,53	0,72	0,66	0,93	0,83	0,67	0,41
2009	0,48	0,67	0,62	0,85	0,81	0,60	0,35
2010	0,48	0,68	0,64	0,85	0,81	0,61	0,35
2011	0,50	0,69	0,64	0,84	0,83	0,59	0,36
<i>Increase of the Relative Prices 2000 – 2011 (percentage)</i>							
	43,8	37,1	39,7	80,0	4,3	24,2	51,7

Source: Eurostat, Anghel et al, calculations made by the authors

We can observe that the level of prices in Romania is, at the end of 2011, half compared to the prices in the Euro zone, fact that indicates a significant **under evaluation** of the national currency, from the purchase power parity perspective. If the validity of the purchase power parity theory is admitted in its absolute version, on a long term, the exchange rate of the national currency towards euro should **appreciate itself** or the internal prices of the transactionable goods should significantly increase. The explicit quantification of the necessary appreciation for aligning the exchange rate to the theoretical value implied by the purchase power parity is yet, problematic. The arbitration scheme that stays at the base of the unique price law is applicable just to the transactionable goods, while in the total consumption basket non-transactionable goods also exist.

By analysing the consumption basket subcomponents, we observe that the closest to the reference value of 1, are the semi-lasting and the long-lasting goods thus being best aligned with the euro zone prices. On the other hand, the services are the less aligned category from the euro zone prices point of view. Yet, we must observe that, during the period 2000-2011, a process of aligning prices with the euro zone took place in Romania - a relative fast process until 2007. As we can notice in the last line of the table no. 3.1., the total prices increased with approx. 44%, and the category that registered the most powerful alignment is the one of the semi-lasting consumer goods - prices whose, increased with 80%. The second most significant increase of prices was registered in the services area (51.7%), category of consumption that registered in 2000 – and continues to register – the lowest alignment degree with the prices in the euro zone. The long – lasting goods, whose price was aligned in proportion of 80% with the euro zone starting even since 2000, have only registered an increase of 4,3%.

From the above made analysis, it results the fact that, in the Romanian economy, there exist different alignment degrees for the consumer goods prices with the euro zone. Considering that, the law of the unique price would verify itself just for the case of the transactionable goods, the degree of under or over estimation of the exchange rate according to the purchase power parity theory can be decided just by analysing the prices alignment degree for the transactionable goods towards the ones in the euro zone.

Explicitly, there does not exist any data referring exclusively to the transactionable goods prices but we can assume that, from the consumption basket, only the services are not transactionable, so, for the purchase power parity, relevant in the consumption basket would be the part that refers to the consumer goods. In these conditions, as we can observe in the Table 1., the currency rate would be under evaluated with approximately 30%

3. Conclusions

Analysing a period of 12 years, using the purchase power parity method, we can consider that Romania is still far from the optimum moment for adhering to the Euro zone. The local currency registers a consistent under evaluation towards Euro. More important is to underline the fact that the convergence process to the prices in the Euro zone is developed very slowly, for certain groups of products and services. In 12 years time, Romania succeeded in reducing the price gaps in the total consumption gaining from 0,35 to 0,5 for the real currency, according to the purchase power parity. This was achieved despite the fact that, in the analysed period we remarked a dramatic increase of 44% for the relative prices. In the authors' opinion, for reaching an optimum moment for the adhesion to the euro zone, Romania should, at least, reach a level of approximately two thirds from the price level in the Euro zone (0,67). Thus, we could consider that we do not push the adhesion to euro moment to a too early time. A linear extent would lead to an approach towards this interval, to around 2023 year. The long lasting services group is the one that has to recover most, according to the used analysis method, registering a convergence with the prices at the Euro level zone in a proportion of just a third. In addition, the services recover the existing gap towards the Euro zone difficultly, considering the fact that the beginning of 2000 they were at a level of approximately a quarter from the level registered within the Euro zone. Also, a very worrying aspect is that, in relative terms, the price increase for services, in the analysed period, raised with more than half. All these, lead us to an image of how tough the convergence process is and shows how much Romania has to recover in this respect. Reaching the nominal criteria for adhering to the euro zone is more easily

to accomplish comparing with fulfilling the real convergence criteria. The purchase power parity method evidences this major gap, registered, for example, for services, compared with the similar level registered in the Euro zone. It should be normal that the monetary and fiscal policy deciders have serious reserves in accepting such a country that did not accelerate its convergence process for the services prices, to join the select club of the Euro zone. A premature acceptance could determine, together with the continuation of the convergence process for the services prices, a significant increase of the consumer goods price index, thus putting pressure upon the inflation, at European level. In other words, we still have to accomplish major structural reforms in services area, prior to Romania's adhesion to the euro zone.

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