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***EQUILIBRIUM EXCHANGE RATE AND ITS ECONOMIC AND FINANCIAL  
IMPLICATIONS***

DOCTORAL DISSERTATION ABSTRACT

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## **INTRODUCTION**

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Exchange rate is one of the most important prices in open economies. Excessive volatility of the exchange rate can influence both internal and external stability of the country, by determining the current account imbalances, raising inflation and negatively affecting the economic growth and external debt. Also, exchange rate variations of a currency can influence the foreign investors' decisions regarding their investments in a country, determining the structure and directions of the foreign capital flows globally.

Considering the importance of the exchange rate variations on the country's performance, securing the exchange rate stability is vital in elaboration and implementation of the macroeconomic policy decisions by policy-makers.

In order to appreciate the sustainability of the exchange rate became essential to determine a reference which would allow to determine the level of overvaluation or undervaluation of the currency, to analyze the tendency of the exchange rate in the medium and long-run, to identify the fundamental economic factors which determined the evolution of the exchange rate and its deviations from the equilibrium level and to investigate the economic and financial implications of the overvaluation or undervaluation of the exchange rate on the country's economy.

Since the equilibrium exchange rate concept is relatively unexplored research subject, in doctoral thesis we aimed to contribute to existing literature by defining the equilibrium exchange rate concept, investigation of the approaches on which is based the equilibrium exchange rate and practical implementation of this concept. Also, we examined the potential economic and financial implications of equilibrium exchange rate on the country's economy.

## **CHAPTER 1 CONCEPT OF THE EQUILIBRIUM EXCHANGE RATE AND ITS FEATURES**

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Exchange rate is one of the most important prices in open economies, capable to influence internal and external stability of a country. Therefore, in order to avoid an arbitrary adjustment of the exchange rate by policy-makers, was indispensable to identify a reference, which by comparison would permit to determine the level of overvaluation or undervaluation of the currency and investigate the potential influence of the depreciation or appreciation of the exchange rate on macroeconomic stability of the country.

There are different opinions in international literature about the concept of equilibrium exchange rate. Most of the time the equilibrium exchange rate concept was defined resorting to the theoretical support and hypothesis of the exchange rate determination models.

In our work we outlined four types of equilibrium exchange rates which differ according to the time horizon in which can be realized the economic and monetary equilibrium.

**Short-run equilibrium exchange rate** is determined on a foreign exchange market by supply and demand forces, excluding central bank interventions. The short-run equilibrium exchange rate considers a time horizon up to one year and implies equilibrium on the foreign exchange market.

**Medium-run equilibrium exchange rate** – is the exchange rate which is compatible with the economy being at its internal and external balance.

External balance implies a sustainable level of current account balance and is determined by the fundamental factors at their current settings. Medium-run exchange rate implies a time horizon between one and five years.

**Long-run equilibrium exchange rate** is compatible with a long-run macroeconomic balance and is given by long-run values of economic fundamentals or their trends.<sup>1</sup>

**Equilibrium exchange rate in a very long-run** – is defined as an exchange rate which would prevail when is achieved a full price convergence home and abroad and can be estimated by applying the model of purchasing power parities.

Comparing the concepts of the nominal exchange rate, real exchange rate and equilibrium exchange rate, we highlighted that the equilibrium exchange rate is an estimable variable which implies some level of uncertainty due to laborious calculations.

In performed research we emphasized the importance and distinctive features of the equilibrium exchange rate. I showed that the equilibrium exchange rate can be used not only as a reference to appreciate the level of undervaluation or overvaluation of the exchange rate, but also helps to identify the fundamental factors which influence the exchange rate on different time horizons, to understand the tendency of the exchange rate in time, to investigate causes and consequences of the excessive variations of the currency's price and to analyze the potential costs of the sustainable exchange rate for the country's economy.

## **CHAPTER 2**

### **FUNDAMENTAL DETERMINANTS OF THE EXCHANGE IN THE MEDIUM AND LONG-RUN**

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This thesis proposes a classification of the fundamental determinants of the exchange rate in the medium and long-run. We argued that in the medium-run the exchange rate is determined by interest rate differential, current account balance, medium-term capital flows, money supply,

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<sup>1</sup> Voinea, Gh., ș.a., *Economia financiar-monetară internațională și unele probleme ale lumii contemporane*, Editura Tehnopress, Iași, 2013, p.101-102.

government spending, relative economic growth and market anticipations regarding the exchange rate evolution.

In the long-run we showed that the exchange rate is influenced by relative prices home and abroad, stock of the net foreign assets, balance between savings and investments, productivity and terms of trade.

We considered that in the long-run exchange rate variations are determined by structural factors, which affect the economic development, such as: productivity, terms of trade, the gap between savings and investments.

Additionally, we showed that relative prices, also can influence the exchange rate, but in a very long-run time horizons, such as decades or centuries. We assumed that prices are flexible only in the long-term, in the short-term they are fixed due to contractual clauses.

In the medium-run we considered that the exchange rate can be easier influenced by the policy-makers through monetary and fiscal policy. Raising interest rates, increasing capital flows from abroad or current account surpluses can affect the exchange rate evolution in the direction desired by policy-makers.

In order to investigate the influence of the money supply on the exchange rate we resort to the following models: Mundell-Fleming model, monetarist model and portfolio balance model. The balance of payments approach and uncovered interest rate parity were used to highlight the implications of the current account balance and relative interest rates home and abroad on the exchange rate.

The long-run determinants of the exchange rate were analyzed following the theoretical background of the purchasing power parity theory (PPP), Balassa-Samuelson model (HBS) and macroeconomic balance approach.

### **CHAPTER 3**

#### **EQUILIBRIUM EXCHANGE RATE MODELS**

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In chapter three were investigated the equilibrium exchange rate models. We aimed to emphasize the distinctive features, advantages and disadvantages of each model by analyzing their analytical framework and hypothesis.

We showed that each model has its disadvantages. An ideal approach, which would be appropriate to estimate an equilibrium exchange rate for all countries, was not developed yet. Each model can be used only in a specific context.

We aimed to emphasize that for developed countries' currencies is more appropriate the Behavioural Equilibrium Exchange Rate Model (BEER), because in this countries exchange rate is determined by a limited number of fundamental variables, such as: productivity, net foreign assets,

aggregate demand and interest rate. The macroeconomic balance approaches would provide misleading results, because implies complex calculations and high quality of data.

In developed countries economic processes and linkages with abroad are more complex. The exchange rate behavior cannot be explained only by a limited group of factors. As a consequence, the partial equilibrium models are not appropriate for estimation of equilibrium exchange rate of the developed countries' currencies.

Regarding the classification of the equilibrium exchange rate models based on the considered time horizon, we highlighted that the Purchasing Power Parity Model (PPP) and the Natural Equilibrium Exchange Rate Model (NATREX) can be used to determine the equilibrium exchange rate in the long-run. The Behavioural Equilibrium Exchange Rate Model (BEER), Fundamental Equilibrium Exchange Rate Model (FEER) and Desired Equilibrium Exchange Rate Model (DEER) provide relevant results for the estimation of the medium-run equilibrium exchange rate.

#### **CHAPTER 4**

#### **DETERMINATION OF THE EQUILIBRIUM EXCHANGE RATE FOR ROMANIAN LEU**

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In chapter four we aimed to determine the equilibrium exchange rate for Romanian leu.

To identify the appropriate equilibrium exchange rate model and estimate relevant equilibrium exchange rate for leu, first were investigated the fundamental factors which influenced the real exchange rate of leu against the euro in the period 2000-2012.

We showed that during the analyzed period of time the real exchange rate of leu was influenced by capital inflows from abroad, aggregate demand, deterioration of the current account and improved labor productivity.

After the liberalization of the capital account from the balance of payments, foreign capital inflows grew rapidly. They have a great impact on the real exchange rate of leu through direct and indirect channels. On the one side, foreign capital inflows increased the supply of foreign currencies on the foreign exchange market, pulling down the nominal exchange rate of leu. On the other side, they also, affected the real exchange rate of leu through the real sector of the economy, bu improving the total factor productivity.

In order to analyze the implications of growing labor productivity on the real exchange rate we used the Balassa-Samuelson model (HBS).

We pointed out that a raise in the relative productivity home and abroad was associated with an appreciation of the real exchange rate deflated with consumer prices. The empirical results provided the evidence that the relative productivity from non-tradable and tradable sectors, home and abroad influenced positively the real exchange rate of leu, deflated with consumer prices,

contrary to the Balassa-Samuelson model hypothesis. We explained this phenomenon by the influence of the administered prices and variations of the net foreign assets stock. Also, we highlighted the fact that the productivity grew considerably in the non-tradable sector of the economy and absorbed a substantial part of the influence coming from the productivity raise in the tradable sector.

To obtain a more comprehensive picture of the exchange rate determinants of the real exchange rate of leu we resort to the panel data analysis, too. In our study we considered three additional countries, namely Hungary, Czech Republic and Poland, which had the same macroeconomic transformations in the period 2000-2012.

The empirical results revealed that the real exchange rate variations of these countries' currencies were determined by the evolution of the relative productivity, money supply and official foreign currency reserves stock.

Following the results regarding the exchange rate determinants of the real exchange rate of leu, we argued that the most appropriate approaches to estimate the equilibrium exchange rate for Romanian currency are: the Purchasing Power Parity Model (PPP), Uncovered Interest Rate Parity Model (UIP) and the Behavioural Equilibrium Exchange Rate Model (BEER).

Because, under the conditions of high inflation, the Purchasing Power Parity model has the highest performance, first we investigated the validity of the hypothesis of this model.

We tested the weak and strong form of the Purchasing Power Parity theory. The results of the performed analysis invalidated the both form of the theory for the exchange rate of leu against the euro.

In order to take account for the influence of the interest rate differential from home and abroad on the exchange rate of leu against the euro was used the Uncovered Interest Rate Model (UIP). We showed that the relative interest rate has an insignificant influence on the expected nominal exchange rate of leu relative to euro in the period of 2000-2013.

Because both models were invalidated, we considered that the most appropriate approach to estimate the equilibrium exchange rate of leu against the euro is the Behavioural Equilibrium Exchange Rate Model (BEER). We take account for the influence of the following variables: relative price of the non-tradable goods to tradable goods home and abroad, money supply and official foreign currency reserves stock.

We argued that after the capital account liberalization followed a period of the leu overvaluation against the euro, which reached the highest level of about 13% in 2007.

An adjustment of the real exchange rate of leu relative to euro, took place during the period of the financial crises. The exchange rate undervaluation did not exceed the level of 5% in the period of 2008-2011.

## CHAPTER 5

### ECONOMIC AND FINANCIAL IMPLICATIONS OF THE EQUILIBRIUM EXCHANGE RATE

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In the last chapter were analyzed the economic and financial implications of the equilibrium exchange rate.

Within the external stability framework we analyzed the exchange rate implications on the current account balance. We aimed to investigate if the current account imbalances in Romanian were determined by the real exchange rate appreciation of the real, which affected negatively the external competitiveness of the country or were caused by the influence of the structural factors. We showed that the current account deficits originated from the gap between savings and investments, which had to be covered by capital flows from abroad.

Regarding the implications of the equilibrium exchange rate on internal stability of the country, we investigated the influence of the exchange rate of leu on inflation and economic growth.

Within the transmission channels of the exchange rate on internal stability we examined the Exchange Rate Pass-Through Effect and analyzed the connection between the exchange rate variations of leu and internal inflation level. We emphasized that the exchange rate policy had a significant influence on the disinflation process of the Romanian economy, especially after capital account liberalization.

With respect to the implications of the exchange rate on economic growth, we investigated the following transmission channels: net exports channel, capital accumulation channel and total factor productivity channel.

We argued that although, after capital account liberalization in Romania followed a period of a substantial national currency overvaluation, a significant appreciation of leu did not affect negatively the economic growth of the country. In the period 2005-2007 Romania had an important economic growth and made substantial progresses in development and reorganization of the real sector of economy. The Romanian economy recorded a significant growth of total factor productivity and gross valued added mainly in all productive sectors. We showed that these progresses can be accounted to the liberalization of the capital account which stimulated the foreign capital inflows.

In doctoral thesis we aimed to highlight the complex nature of the equilibrium exchange rate concept. We emphasized that modeling process of the behavior of the exchange rate is complicated and the estimation results of the equilibrium exchange rate models poses a high degree for uncertainty mainly because all elaborated approaches have their drawbacks.

Although, in our opinion the equilibrium exchange rate is an interesting topic for research and in the future we intend to extend our research by developing a new model, which would be easier to adapt for specific features of all economies and considered time horizon.

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