

EQUILIBRIUM EXCHANGE RATE FOR ARGENTINA THROUGH THE PURCHASING POWER PARITY AND THE MONETARY APPROACH MODELS

TAXA DE CÂMBIO DE EQUILÍBRIO PARA A ARGENTINA POR MEIO DO MODELO DE PARIDADE DO PODER DE COMPRA E DO MODELO DE ABORDAGEM MONETÁRIA

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Abstract

In the present paper, the long-term estimation of the equilibrium exchange rate for Argentina is studied using two methods: the Purchasing Power Parity (PPP) and the Monetary Approach (MA). Using a vector error correction model (VECM), the conclusion is reached of a persistent imbalance whose correction usually occurs through currency crisis shocks. Likewise, the VECM model estimates an adjustment coefficient through which, in the face of a short-term shock, approximately two years are required to correct 50% of the misalignment generated. Finally, using an ARIMA model with theoretical values of the exchange rate, projected values are estimated for 18 months in the future.

Keywords: Argentina, real exchange rate, equilibrium, PPP, Monetary Approach

Resumo

No presente trabalho, a estimativa de longo prazo da taxa de câmbio de equilíbrio da Argentina é estudada usando dois métodos: paridade do poder de compra (PPP) e abordagem monetária (MA). Usando um modelo de correção de erro vetorial (VECM), chega-se à conclusão de um desequilíbrio persistente cuja correção geralmente ocorre por meio de choques de crise cambial. Da mesma forma, o modelo VECM estima um coeficiente de ajuste por meio do qual, diante de um choque de curto prazo, são necessários aproximadamente dois anos para corrigir 50% do desalinhamento gerado. Por fim, os valores teóricos da taxa de câmbio oficial são aplicados por meio de um modelo ARIMA e projetados para estimar a taxa de câmbio de equilíbrio.

Palavras-chave: Argentina. Taxa de câmbio real. Equilíbrio, PPP. Abordagem monetária

1 INTRODUCTION

One of the most studied topics in economics is referred to the equivalence of currencies to establish international relations between countries and economic regions. In particular, the exchange rate is the tool that is usually investigated to determine, on the one hand, its current level, and on the other, the imbalances observed in order to anticipate possible macroeconomic conflicts.

This article presents the main results of an investigation carried out for Argentina, determining the theoretical equilibrium exchange rate according to two long-term models: the Purchasing Power Parity (PPP) and the Monetary Approach (MA).

Both proposals have in common that they determine a theoretical value considered to be equilibrium as a long-term trend to keep both internal and external economic activity of a country level. This is how, the PPP that begins its proposal in the single price theory, is then extrapolated to macroeconomic indices in order to apply the bilateral

relationship of currencies, peso-dollar, adjusted for inflation in Argentina and the United States. Next, the MA continues with this proposal for long-term balances, but incorporating elements of the monetary market, particularly monetary aggregates, interest rates and GDP levels, both domestic and foreign.

2 LITERATURE

Cassel (1918) postulates in his absolute version of PPP that the relative prices, in different currencies and places, of a common basket of goods tend to equalize when they are expressed in the same currency. However, Rogoff (1996) warns that since PPP is a long-term equilibrium approach, it is to be expected, for example, that the speed of convergence to the equilibrium value is slow and that in the short term the deviations are very large and volatile. This happens mainly in economies where they apply price policies or interventions in exchange rates. Since these policies are incorrect, from time to time the adjustments are not only unforeseen but also very large.

Frenkel (1976) uses this model for the case of hyperinflation in Germany after the First World War. Being one of the first works developed on the MA, the author's idea is that price flexibility allows rapid adjustment in the money market. Regarding the validation of the model, there are works such as those by McNown and Wallace (1994) who apply this model to the currencies of Argentina, Chile and Israel, detecting strong evidence of compliance for Argentina and Chile, but not for Israel.

Miyakoshi (2000) also applies the monetary approach model and documents its validation in the long run between the Korean won and the German mark, and between the Korean won and the Japanese yen. Tawadros (2001) analyzes the exchange rate between the Australian and the US dollar, finding a single long-term relationship between the exchange rate, money supplies, industrial output, and short-term interest rates.

Dunaway et al. (2006) evaluate the robustness of the different approaches and alternative models used to calculate the equilibrium exchange rates, studying the case of the Chinese currency, and conclude that the results are sensitive to small changes in the specifications of the models, to the definition of the explanatory variables and the period of time used in the estimates. Therefore, the final numerical results must be analyzed taking into account the recommendations of Dunaway et al. (2006).

3 DATA AND ECONOMETRICS

The econometric method used for both approaches is the Vector Error Correction Model (VECM), since it takes time iteration of the series and estimates not only the stability of the series in terms of zero-order integrity, but also estimates the adjustment coefficient to correct the observed imbalance.

The availability of the series involved for each approach implies differences in the length of the time series and their periodicity. In the case of the model applied to PPP, a period of 77 years (1943-2019) is studied with monthly data, while for the MA model the period analyzed is 41 years (1980-2020) with quarterly data.

The data sources are official and correspond to the Institute of Statistics and Censuses (INDEC), the Central Bank of the Argentine Republic (BCRA), the Department of

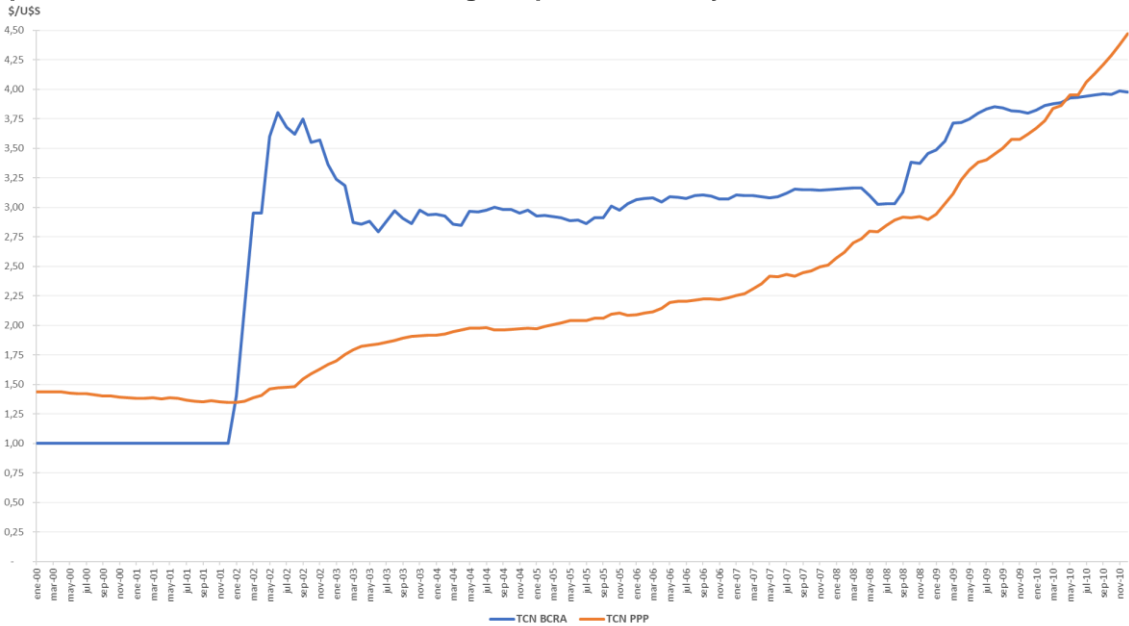
Statistics and Censuses of the Province of San Luis (Argentina), the Federal Reserve (FED) and the United States Bureau of Labor Statistics (BLS).

It is important to highlight that these models establish the value of the exchange rate necessary to correct the imbalances, however, in the short term the dynamics can respond to other variables, mainly policies, and therefore the gap between both values can grow considerably. In these cases, the adjustments come as a shock after a currency crisis.

4 RESULTS

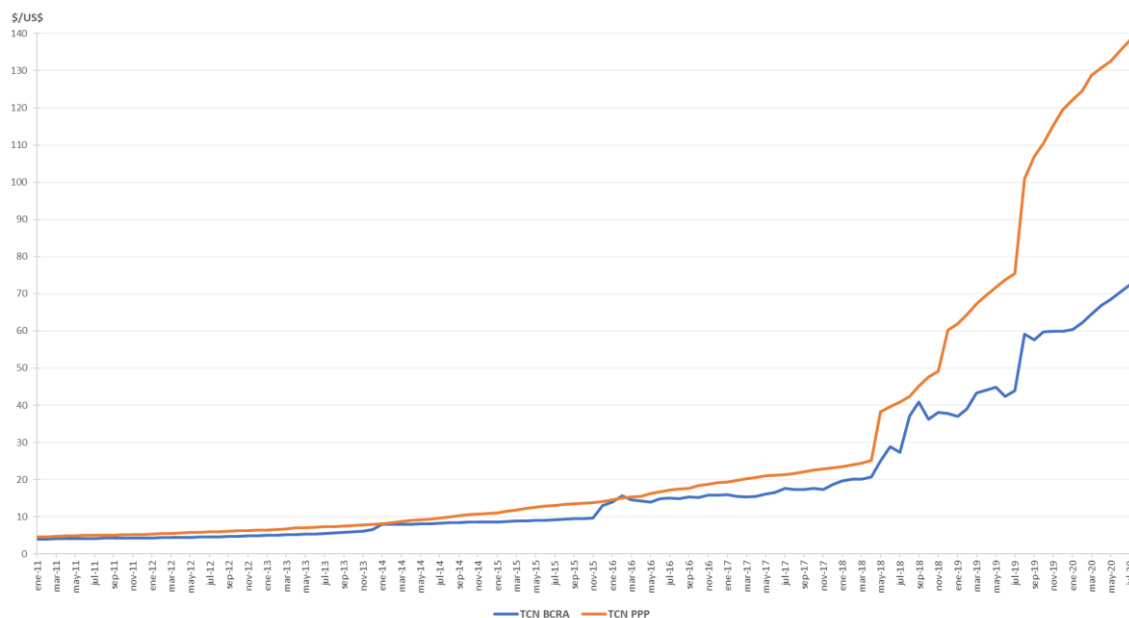
The PPP model estimated an adjustment coefficient of 3.13%, that is, in the face of a shock to the NER at a given moment, almost one year and four months are required to correct 50% of the imbalance generated. In the case of the MA model, the adjustment coefficient has a similar meaning, estimating approximately two years to adjust for 50% of a shock in the nominal exchange rate series. Another interesting finding is how the theoretical value of the exchange rate estimated by the MA is very close to that estimated by the PPP, this is due, in part, to the effect of the monetary issue and its consequent effect on inflation. In other words, there is not only a direct impact of the monetary issue on inflation, but also a secondary effect of the latter on the exchange rate. However, there is no scientific evidence of a direct pass-through, only a partial one.

Graph 1 - TCNBCRA and TCNPPP during the period January 2000 – December 2010



Source: Own elaboration based on VECM results and BCRA data. Note: "TCN" is Nominal Exchange Rate.

Graph 2. TCNBCRA and TCNPPA during the period January 2011 – July 2020



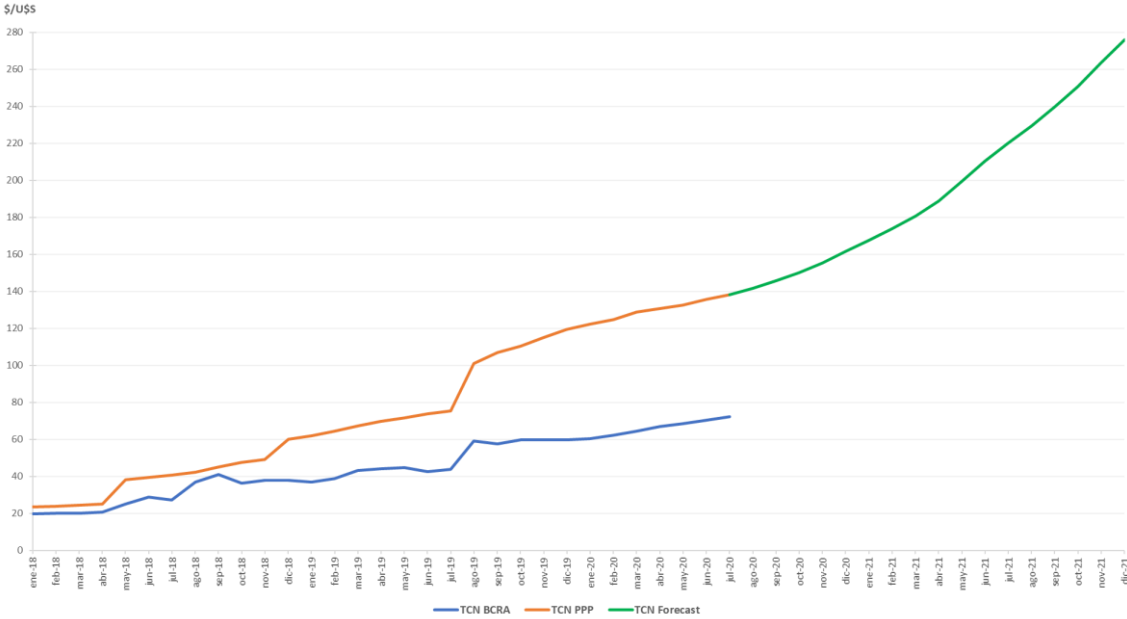
Source: Own elaboration based on VECM results and BCRA data.

Note: "TCN" is Nominal Exchange Rate.

Graphs 1 and 2 show the estimated series for the PPP model bounded to a time period beginning in the year 2000. The series estimated by the PPP is clearly higher than that reported officially by the BCRA, expanding the imbalance gap towards the end of the series. This situation deepens the global state of the economy in a negative sense, making a shock of great impact necessary to correct the value of the exchange rate.

In graph 3, what is included is an estimate of balance values throughout 2021 through an ARIMA analysis of the series proposed by the PPA. This projection could then be compared in a second stage with the observed values, being a fairly precise guide regarding the dynamics that the official value of the dollar had to adopt in Argentina, but not its specific value.

Graph 3. TCNBCRA and TCNPPP during the period January 2018 – December 2021



Source: Own elaboration based on VECM results and BCRA data.
Note: "TCN" is Nominal Exchange Rate.

In this way, Graph 4 continues, in which the EM model for the 2018-2021 period is presented, noting not only a similar behavior in both models, but also the estimated theoretical values.

In this sense, the similarity of the results observed by two classic models of economic theory, make a contribution with empirical evidence and applying a scientific method that is applicable to establish guidelines that help long-term decisions.

Graph 5. Forecast for Nominal Exchange Rate (NER) according to PPP and MA model.

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