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Price convergence, reversal speed and purchasing power parity: Stylized facts for Brazilian cities

Elano Ferreira Arruda [a,*], Ivan Castelar [b], Daniel Barboza Guimarães [c], Rafael Barros Barbosa [d]

[a] *Applied Economics Department (CAEN/MAER/UFC), Federal University of Ceará, Brazil*
[b] *Finance Department (CAEN/UFC), Federal University of Ceará, Brazil*
[c] *Business Department (DA/UFC), Federal University of Ceará, Brazil*
[d] *Applied Economics Department (DEA/UFC), Federal University of Ceará, Brazil*

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Abstract

This paper analyzes the price dynamics of Brazilian cities between 1995 and 2012 to identify stylized facts about price convergence, the reversal speed of deviations between relative prices and purchasing power parity (PPP). There is evidence of a strong reduction in the absolute dispersion of prices of Brazilian cities and in the variability of relative prices. The estimated half-life of deviations from PPP reversal proved to be lower than those found for cross country data and American cities. The results also indicate that the stationarity of the real exchange rate among the cities is rejected for all the series that presented a reversal speed to deviations from the PPP smaller than the average for each numerarie considered. It is argued that the evidence of price convergence associated with a process of slow reversal speed of deviations from the PPP have influence on the non-rejection of a unit root in the real exchange rate series for some cities, however, this fact does not constitute in itself evidence against the validity of the PPP.

JEL classifications: F31; R10; E31

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1. Introduction

In recent years, several researchers have observed flaws in the relationship called purchasing power parity, heretofore PPP, for international data. Such observations motivated several studies[1] to investigate the behavior of the real exchange rate using within country data.

* Corresponding author.
E-mail address: elano@ufc.br (E.F. Arruda).

[1] See for example Engel and Rogers (1996), Culver and Papell (1999), Cecchetti et al. (2002) and Chen and Devereux (2003).

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These flaws, represented by an incomplete adjustment of the level of international relative prices, can be explained by factors such as: (i) commercial barriers, as tariffs and quotas; (ii) barriers of bureaucratic origin in the establishment or creation of a distribution system of goods; (iii) failure in the adjustment of the real exchange rate to shocks in the relative prices; (iv) market failures, such as the presence of firms with monopoly power, with differentiated prices in segmented markets; (v) transport costs, associated with transferring goods from one region to another, and (vi) possible differences in the composition of the price indexes between countries.[2]

The empirical papers which analyze the validity of the PPP test if the series of deviations of the PPP, called relative prices, or the real exchange rate between countries are stationary. Authors such as Breuer (1994) and Froot and Rogoff (1995) present a survey of the literature which corroborates that the series in question have unit roots. Such evidence implies that the inflation differentials between countries, measured in the same currency, can persist indefinitely, or deviations from the PPP converge to a common average at a very low speed. Furthermore, the literature points to a consensus about the speed of convergence, or the reversal of PPP deviations, with a half-life[3] between three to five years (Abuaf and Jorion, 1990; Frankel and Rose, 1996; Wu, 1996; Papell, 1997; Lothian, 1997).

The need to comprehend the persistence in PPP deviations for international data and the existence of great economic regions with a single currency, such as the European Union, encouraged specialists to analyze if countries with continental dimensions, with great diversity and regional disparities, satisfy the PPP regularity conditions and if the reversal speed is shown to be lower using intranational data. Furthermore, this approach is relevant because it shows that excessive variations in relative prices and, hence, on inflation differentials lead to the inefficient allocation of resources among economic sectors, and determine the differences in real wages and real interest rates that, in turn, influence the flows of labor and capital. Therefore, the shifting of relative prices involves substantial losses of welfare to society, besides being useful in the investigation of the degree of integration and regional growth (Nath and Vargas-Silva, 2012; Hegwood and Nath, 2013). Also, with the use of intra data, it is possible to come to a better understanding of sources of persistent deviations from the PPPs found in papers using cross-country information (Cecchetti et al., 2002).

The first effort in that direction was made by Engel and Rogers (1996), which compared the variability in relative prices with disaggregated data of price indexes for the United States, Canada and between the two countries. The authors showed that the distance between cities located in the same country substantially explains the variation in prices of similar goods. Also, oscillations in prices at cities located in different countries were shown to be greater than those in equidistant cities within the same country.

Yet Culver and Papell (1999), investigated PPP regularity in the post-Bretton Woods period, using international and within country data for the United States, Canada and European countries. The authors found poor evidence of the validity of PPP with international data, when compared to what was found for European countries. Only Canada presented a clear evidence when compared to that of European countries. The price convergence speed was shown to be slower in the United States than those found for Canada and the European countries. In other words, even without problems arising from trade barriers, exchange rate volatility, monetary policy differences and other factors[4] which restrict arbitrage in the goods market, the authors found a slow price convergence process in the United States.

Using information for the 19 more populated American cities[5] between 1918 and 1995, Cecchetti et al. (2002) analyzed if the price indexes of those cities followed a common trend, and estimated the reversal speed of possible shocks to local prices. The authors found evidence of a temporary divergence in the price indexes of American cities, with a slow reversal process representing an estimated half-life of approximately nine years. The authors argue that the main reason for those findings are the presence of transportation costs and market failures.

In another important paper, Chen and Devereux (2003) analyzed the dispersion of absolute prices in American cities between 1918 and 2000, measured by the coefficient of variation of the price level, and found strong evidence

[2] For a review of these aspects, see Rogoff (1996) and Taylor and Taylor (2004).

[3] Half-life is a measure of the velocity of adjustment in some variable. It indicates how fast the variable reverts its trajectory to the mean.

[4] These factors refer to problems to construct the consumer price indexes, as consumer's preferences, weights of each item, the existence of non-tradable goods, etc.

[5] Atlanta, Baltimore, Boston, Chicago, Cincinnati, Cleveland, Detroit, Houston, Kansas City, Los Angeles, Minneapolis, New York City, Philadelphia, Pittsburgh, Portland, San Francisco, Seattle, St. Louis and Washington D. C.

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