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Price variability and price convergence: Evidence from Indonesia

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ABSTRACT

This paper evaluates price variability and price convergence in Indonesia. Using price indices of 35 products in 45 cities from January 2002 to April 2008, this study shows that, during the observed period, prices in Indonesia converged to the 'relative' law of one price. The price variability of one product across cities is found to be smaller than the price variability of all products within a city. Transportation costs and the level of development matter to price variability. This study also reveals that the average speed of convergence, which is measured by the half-life, for perishable goods is about 9 months, non-perishable goods 32–36 months, and services 18–19 months, while the median of the half-life of all products is about 16–17 months. The speed of convergence depends on the initial price difference, but not the distance between cities.

1. Introduction

A study of price convergence is often linked with the study of the law of one price (LOOP) and market integration. The LOOP states that in an efficient market an identical good must have the same price when expressed in a common currency. The intuition for this law is that all sellers demand the highest prevailing price and all buyers demand to pay the lowest current market price. In perfectly integrated markets, prices of similar goods ought to be equalized, when those prices are denominated in a common currency. If the prices in one location rise substantially above those in another, market forces would tend to move the prices back toward equality.

In international macroeconomics, a puzzle is still unresolved since there is little evidence of the LOOP. The law might only be valid for tradable goods. An early example of the failure of the LOOP has been documented by Isard (1977). Froot, Kim, and Rogoff (1995) also conduct excellent surveys of many studies that find a "collapse of purchasing power parities (PPP)". In particular, these studies failed to reject the hypothesis that the real exchange rate follows a random walk, which implies that any deviation from the PPP is permanent. Another survey on the analysis of the LOOP in an international context is conducted by Sarno and Taylor (2002). Sarno and Taylor (2002) note that, in general, economic studies suggest rejection of the LOOP, although some studies provide evidence that departure from the LOOP may dissipate over time when they are modeled in a non-linear framework.

In a cross-country studies price differentials tend to remain persistent over time, fading away only relatively slowly. The reasons for incomplete relative-price adjustment are due to: (i) trade barriers, i.e. tariffs and quota; (ii) non-tariff barriers, i.e.

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bureaucratic matters; (iii) failure of the exchange rates to adjust to shocks; (iv) monopoly firms; (v) sticky prices; (vi) transportation costs; (vii) the presence of non-traded goods; (viii) labour market segmentation; (ix) productivity differentials; (x) pricing to market; and (xi) informational asymmetries (see, for example, Cecchetti, Mark, & Sonora, 2000; Lutz, 2003; Ratfai, 2003).

Studies of the empirical validity of the law of one price are numerous. Most of the seminal papers relating to price convergence focus on developed countries, such as the U.S., the U.K., Canada, Australia, New Zealand, Hungary, Russia, and other European countries. Only a few of them analyze developing countries. Moreover, they have primarily focused on cross-country analysis and aggregate price level differentials.

Engel and Rogers (1996) compare the convergence to the law of one price intra-country versus inter-country in both the U.S. and Canada. They find that the volatility of prices between U.S. city pairs is generally slightly higher than that between Canadian city pairs, but cross-border city pairs have much higher volatility. A similar result is found in a study conducted by Rogers and Smith (2001) who find that the border effect on U.S.-Mexican relative prices is larger than that on U.S.-Canadian prices.

In the European area, some studies on price convergence have been conducted. For example, using price indices of 168 goods and services in 26 cities in 18 countries, Rogers (2001) finds that there is an evidence of convergence for traded goods, but not for non-traded goods. The prices of certain products, such as cars, the Big Mac Index, and the Economist magazine are also found to converge (see Gil-Pareja & Sosvilla-Rivero, 2008; Goldberg & Verboven, 2005; Lutz, 2003). Using aggregated and disaggregated price indices, Imbs, Mumtaz, Ravn, and Rey (2005) find that the half-life for aggregated data is 39 months, whereas the half-life for disaggregated data is 27 months. The bias can be economically substantial due to differences in the dynamics of disaggregated price data compared to aggregated data. From this result, they suggest using microeconomic price data to study price differentials.

Price convergence is also found in Mercosur countries, i.e. Argentine, Brazil, Chile, Paraguay, and Uruguay (Cuestas & Ordonez, 2007). However, a study conducted by Coleman and Daglish (1998) shows that price behaviour in Australia and New Zealand is different, suggesting that integration of both countries is far from complete.

The literature has shifted the focus from examining uniquely international markets to both international and domestic markets, and from using time series data to using panel data. The availability of data for prices of products in each region allows researchers to test the law within domestic markets.

The difference between a national and a regional economy is that a regional economy is more open since in the regional economy there is a tariff-free trade, it uses a single currency, and it has more similar tastes and customs. When evaluating prices within a country, it is expected that there will be more rapid price convergence across regions than across countries, since in intra-country markets products, labour, and capital are presumably better integrated. Moreover, the tax system and trade policy are more similar within a country than between countries.

Parsley and Wei (1996) examine price convergence across 48 U.S. cities from the first quarter of 1975 to the fourth quarter of 1992. They use actual goods prices so that they examine deviations from the 'absolute' LOOP. The estimated half-life for non-perishable goods is found to be 5.3 quarters, for perishable goods 4.1 quarters, and for services 15.4 quarters. Cecchetti et al. (2000) also study price convergence in the U.S., but they use annual price indices across 19 major U.S. cities from 1918 to 1995. They find a surprisingly low speed of convergence with a half-life of about 9 years. Since they use low frequency data, their estimated speed of price convergence might be biased upwards.

Ratfai (2003) uses tradable prices to measure the speed of price convergence within Hungary and finds that the speed of price convergence is very fast, i.e., 4 months. Fast price convergence is also found in China, that is, 3–4 months (Fan & Wei, 2006), and in India (Morshed, Ahn, & Lee, 2006), 3 months.

Gluschenko (2004) tests the law of one price over the period of 1994–2000 within the Russian economy and finds that the degree of market integration is not high. Among 75 markets, only 50–60% of the Russian markets are integrated. Horvarth and Vidovic (2004) examine final goods and service prices in 38 Slovakian districts and find that the speed of convergence to the absolute law of one price is lower than that found in U.S. cities, i.e. for non-perishable goods it is 15.8 months, for perishable goods 12.2 months, and for services 46.2 months.

The purpose of this paper is to understand the price dynamics in a developing country, namely Indonesia, by answering the following questions: (1) Does the 'relative' LOOP hold in Indonesia? (2) Do transaction costs and the level of development matter to price variability? (3) Do prices in Indonesia tend to converge? If so, how fast is the speed of convergence? (4) Is there any non-linearity in price convergence? (5) Does price convergence depend on distance between cities?

Examining the price indices of 35 products from January 2002 to April 2008 in 45 major cities our results show that the 'relative' LOOP holds in Indonesia. We find that the price variability of one product across cities is smaller than the price variability of all products within a city. Transportation costs and the level of development do matter to price variability. This study also reveals that the average speed of convergence, which is measured by the half-life, for perishable goods is about 9 months, non-perishable goods 32–36 months, and services 18–19 months, while the median half-life is about 15–17 months. We also find that the speed of convergence depends on the initial price difference, but not the distance between cities.

The rest of the paper is organized as follows. The data are described in the next section. Section 3 tests whether the relative LOOP holds in Indonesia by analyzing price variability of products across cities. Section 4 analyzes whether transaction costs and the level of the development matter to price variability. Section 5 studies price convergence and measures a half-life. Section 6 analyzes whether there is non-linearity in price convergence. Section 7 analyzes whether the price convergence depends on the distance between cities. Finally, Section 8 concludes.