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Trends in international commodity prices: Panel unit root analysis



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ABSTRACT

The purpose of this paper is to examine the behavior of international commodity prices within the context of the Prebisch–Singer hypothesis. To this end, I utilize a panel unit root approach which is able to account for multiple structural breaks and cross-section dependency. The unit root analysis for 24 international commodity prices during the period 1900–2003 shows evidence in favor of the trend stationary process in the commodity prices. The results thereby imply that shocks to commodity prices are temporary in nature and tend to be corrected over time. The estimation of the trend stationary models indicates that the Prebisch–Singer hypothesis is not a universal phenomenon.

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1. Introduction

The question of whether there is a trend in commodity prices has undergone a long debate. The early view of David Ricardo and John Stuart Mill argues for a positive trend in the prices of primary commodity relative to the prices of manufactured goods (i.e., relative commodity prices or terms of trade). This old hypothesis implies that primary commodity prices increase more than the manufacturing prices (Bleaney & Greenaway, 1993; Sarkar, 1986). On the other hand, the argument by Prebisch (1950) and by Singer (1950) asserts that there is a secular decline in relative commodity prices, which is referred as the Prebisch–Singer hypothesis (PSH). The PSH postulates that primary commodity prices

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increase less than manufacturing prices. Since the theoretical views do not provide a uniform conclusion of whether there is a secular decline in commodity prices, researchers have examined validity of the PSH by the use of statistical tools. The empirical results however do not have a still clear-cut proof of the validity of the PSH. While some studies support the PSH (Ardeni & Wright, 1992; Bleaney & Greenaway, 1990; Grilli & Yang, 1988; Sapsford, 1985; Spraos, 1980), some other studies provide evidence against the PSH (Bleaney & Greenaway, 1993; Cuddington & Urzua, 1989; Sapsford, Sarkar, & Singer, 1992).

Progress in time series econometrics – particularly in unit root tests – have led researches to focus on examining the unit root properties of commodity prices. More recent empirical studies have concentrated on examining the unit root properties of commodity prices in order to identify whether commodity prices are trend stationary or difference stationary. For example, by applying Dickey and Fuller (1979) and Vogelsang (1998) unit root tests, Kim, Pfaffenzeller, Rayner, and Newbold (2003) indicate that eighteen out of 24 commodity prices have a difference stationary process. They also find out that there is a downward trend in six out of those eighteen commodities prices, clearly proving that the PSH is not a universal phenomenon. In addition to taking into account the data generating process of commodity prices, one of the other developments in testing the PSH is to account for structural breaks. As Perron (1989) emphasized, ignoring structural shifts in a unit root test leads to decrease in the power of the test and may lead to misleading inferences. The literature on the PSH has recently focused on taking into account structural breaks in commodity prices (see, Ghoshray, 2011; Kellard & Wohar, 2006; Leon & Soto, 1997). Specifically, Leon and Soto (1997) employed one structural break unit root test of Zivot and Andrews (1992), Kellard and Wohar (2006) utilized two structural breaks unit root test of Lumsdaine and Papell (1997); and more recently Ghoshray (2011) carried out a two structural break unit root test of Lee and Strazicich (2003). The empirical evidence from these studies shows that the international commodity prices have different trend behaviors and thereby the PSH is not a “stylized fact”.

This paper aims at revisiting the trends in commodity prices within the context of the PSH from a panel data perspective. To this end, in the first step the unit root properties of 24 international commodity prices during the period 1900–2003 are examined by carrying out the panel unit root test developed by Carrion-i-Silvestre, Del Barrio-Castro, and Lopez-Bazo (2005). This test is able to take into account multiple structural breaks as well as cross-section dependency. The unit root analysis indicates that the null hypothesis of stationarity in the 24 international commodity prices cannot be rejected, implying that the commodity prices are characterized by a trend stationary process. In the second step, the trend stationary models are estimated by controlling for the structural breaks in order to determine whether the PSH is a universal phenomenon. The regression results show that there is a significant negative trend in eight commodity prices, but the PSH is not a universal fact.

This study contributes to the literature by looking at the validity of PSH from a panel unit root perspective. The time (single) series unit root tests provide less information relative to the panel unit root test since the panel-based tests combine information from the cross-section and time dimensions and hence mitigate the lack of power. Thus, the panel unit root tests are found to be more powerful, compared to their time series counterparts (Beckmann, Belke, & Dobnik, 2012; Dreger, 2010; Levin, Lin, & Chu, 2002; Maddala & Wu, 1999). The panel unit root approach utilized in this study is designed to test for the null hypothesis of stationarity against the alternative of a unit root by controlling for the structural breaks and cross-section dependency. This paper thereby switches the null hypothesis of a unit root with the alternative of stationary and it provides strong evidence on the trend stationary behavior of commodity prices if one cannot reject the null hypothesis. This study also extends the PSH literature by estimating trend stationary models in which the structural breaks in and cross-sectional dependency among the commodity prices are taken into account. A particular attention in that respect is paid to allow for interdependencies among the commodity prices since a shock and/or structural change in a commodity price may spill to other commodity prices. Because the time series unit root tests investigate the characteristic of a single series and they are not able to capture the contemporaneous correlations (cross-section dependency) among the series. It is well-known that commodity markets are highly integrated and thus a price shock to a commodity market may quickly get transmitted to other markets. Hence, an empirical analysis which does not account for the cross-sectional dependency among commodity prices may be misleading.

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