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Energy prices and the real exchange rate of commodity-exporting countries

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ABSTRACT

This paper investigates the relationship between energy prices and the real effective exchange rate of commodity-exporting countries. We consider two sets of countries: 10 energy-exporting and 23 commodity-exporting countries over the period 1980–2011. Estimating a panel cointegrating relationship between the real exchange rate and its fundamentals, we provide evidence for the existence of "energy currencies". Relying on the estimation of panel smooth transition regression (PSTR) models, we show that there exists a certain threshold beyond which the real effective exchange rate of both energy and commodity exporters reacts to oil prices, through the terms-of-trade. More specifically, when oil price variations are low, the real effective exchange rates are not determined by terms-of-trade but by other usual fundamentals. Nevertheless, when the oil market is highly volatile, currencies follow an "oil currency" regime, terms-of-trade becoming an important driver of the real exchange rate.

1. Introduction

The real exchange rate is a key economic variable that allows to assess the price competitiveness of a country, and constitutes a crucial stake in economies wherein revenues are derived from exports'

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activity. While the real exchange rate is difficult to forecast because of its high volatility (Meese and Rogoff, 1983; Obstfeld and Rogoff, 2000), it does not fluctuate erratically. Indeed, variables such as the net foreign asset position, productivity differentials, trade openness, public expenditure, *etc.* have been found to be key determinants of its dynamics (Gagnon, 1996; Clark and MacDonald, 1998; Lane and Milesi-Ferretti, 2002, 2007). The literature also identified the terms-of-trade, defined as the ratio of the prices of a country's exports to the prices of its imports, as being a major determinant of real exchange rate movements (De Gregorio and Wolf, 1994; Dornbusch, 1980; Edwards, 1994). Terms-of-trade fluctuations are usually twice as large in developing countries as in developed countries (Baxter and Kouparitsas, 2006), accounting for roughly one-third to half of the output volatility of these economies (Mendoza, 1995; Broda and Tille, 2003). Analyzing terms-of-trade's impact on the real exchange rate is highly relevant for developing countries whose wealth largely depends on commodity exports.

In the early 2000s, fuel and non-fuel commodity prices experienced a surge which has sparked interest on the link between the real exchange rate and terms-of-trade of countries whose exports are mainly composed of commodities.[1] The literature evidenced a positive link between the two variables, leading to the denomination "commodity currencies" (Chen and Rogoff, 2003; Cashin et al., 2004a), that applies to both developed (Amano and van Norden, 1995; Chen and Rogoff, 2003) and developing countries (Cashin et al., 2004a; Coudert et al., 2011; Bodart et al., 2012). More recently, "oil currencies" were observed (Habib and Kalamova, 2007; Korhonen and Juurikkala, 2009; Coudert et al., 2011), defined as currencies that appreciate when the price of oil goes up. In this paper, we analyze the link between energy prices, terms-of-trade and the real exchange rate in two sets of economies: energy-exporting countries and commodity-exporting countries over the period 1980–2011.

Our contribution is twofold. First, we investigate whether the currency of the energy-exporting countries comprised in our panel can be referred to as "energy currencies". We focus on ten energy producers that export either crude oil, natural gas, or coal. To our best knowledge, the existing literature has made a clear distinction between oil and other commodities (Cashin et al., 2004a; Coudert et al., 2011), yet coal, natural gas and oil represent 27%, 21% and 33% of the demand for primary energy worldwide, respectively.[2] Furthermore, they share the same feature in that they are non-renewable fossil resources, thus subject to the same depletion issue. The two main potential implications being increasing energy prices in the future and in line with the recent financiarization of commodity markets, a disconnection between prices and their fundamentals (Creti et al., 2013). Also, demand for energy product is rather inelastic, and energy usually accounts for a great part of the countries' export structure, even though some export other commodities (*e.g.* iron ore in Australia). From a methodological viewpoint, we rely on panel techniques to increase the statistical power of our empirical analysis by combining information from both time and cross-section dimensions. A significant and positive terms-of-trade effect on the real exchange rate will mean that the energy-exporting countries considered have an "energy currency". Second, conversely to any type of commodity, oil is widely used in the production and transportation of (agricultural and mining) goods, but also in private consumption and energy production. As the engine of economic activities, and in conjunction with the development of nonlinear econometric techniques, there has been evidence of asymmetric effects of oil prices on economic activity (Huang et al., 2005). We study the impact of terms-of-trade on the real exchange rate of both energy-exporting countries and commodity-exporting countries with respect to the situation on the oil market. More precisely, we investigate whether there is evidence of a sign or a magnitude effect. Our perspective is justified by (i) the fact that oil price increases generally matter more than oil price decreases and (ii) the existence of a causal relationship linking extreme movements in oil prices and terms-of-trade as evidenced by Backus and Crucini (2000), the underlying transmission mechanism here, occurring *via* intermediate input costs (Nazlioglu, 2011), and volatility spillovers among the oil and commodity

[1] Although demand for energy products has decreased in developed regions (Europe and North America), due notably to government policies on fuel efficiency (IEA, 2013), the worldwide demand for fossil fuels has been steadily growing, mostly driven by emerging countries consumption that exerted an upward pressure on the prices. *Source*: Institut Français du Pétrole et des Energies Nouvelles (IFPEN). See Section 3.1 for greater details on energy prices' recent evolution.

[2] *Source:* IEA.