On the impact of volatility on the real exchange rate – terms of trade nexus: Revisiting commodity currencies ☆

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ABSTRACT

The aim of this paper is to study the relationship between terms of trade and real exchange rates in commodity-producing countries on both the short and the long run. We investigate potential non-linearity in the real exchange rate – terms of trade nexus according to the level of volatility in commodity and financial markets. To this end, we consider a panel of 68 commodity exporters, split in sub-samples of advanced, intermediate and low-income countries. We first show that there is a long-run relationship between real exchange rates and terms of trade, taking also into account productivity and net foreign assets. Then, we run panel smooth transition regressions to estimate the adjustment process of the real effective exchange rate to its equilibrium value depending on different proxies of volatility. Our results show that only advanced oil-exporters' currencies are sensitive to changes in terms of trade in the short run especially when volatility is high on commodity markets.

1. Introduction

Commodity-producing countries are reliant on world commodity prices regarding their exports, income and inflation rates. Their currencies are known to be affected by commodity prices, in such a way that they are dubbed "commodity currencies" on the forex market, a denomination that gathers

together the Australian dollar, the New Zealand dollar, the Canadian dollar among others. Indeed, their real exchange rates tend to respond to the commodity terms of trade, defined as the ratio of the country's commodity export price to the import price. Two types of theoretical effects are at stake depending on the horizon. First, in the long run, a rise (fall) in terms of trade brings about more (lower) income and wealth in the exporting countries, which causes the real exchange rate to appreciate (depreciate). This long-run effect has been extensively documented in the economic literature dealing with the influence of fundamentals on equilibrium real exchange rates (Edwards, 1994; Isard, 2007; Ricci et al., 2008). Second, even if the real effect is felt only in the long term, market participants anticipate this movement and bid up the currency, as soon as commodity prices begin to rise. Consequently, commodity currencies have been shown to closely follow the fluctuations of commodity prices (Chen and Rogoff, 2003; Clements and Fry, 2007).

In this paper, we aim at better capturing the relation between terms of trade and the real exchange rates of commodity-producing countries on both the short and the long run by paying particular attention to non-linearities. Indeed, the forex markets are subject to non-linear responses to fundamentals, as they are often disrupted in times of financial strains. In those periods, as risk aversion rises, long positions taken on risky currencies through carry trades are abruptly unwound, and exchange rates' movements are disrupted (Clarida et al., 2009). Consequently, it is very likely that the real exchanges rates of commodity producers also respond in a non-linear way to terms of trade, depending on risk aversion and uncertainty on the global economy. More precisely, we argue that commodity prices spill over into the forex markets to a larger extent in periods of uncertainty, i.e., when volatility is high.

We therefore state the hypothesis that the real exchange rates of commodity-producing countries are more tightly linked to their terms of trade in times of high volatility on commodity and financial markets. If so, the "commodity currency property" that characterizes the tendency of a currency to co-move with commodity prices would be exacerbated by financial volatility. In this case, the relationship between real exchange rates and commodity terms of trade should be reformulated to account for these non-linearities. By testing for this hypothesis in the framework of a non-linear model this study can be viewed as an extension of the literature on commodity currencies (see e.g., Cashin et al., 2004) which analyzes the link between exchanges rates and commodity prices only in the long run and without accounting for non-linearities caused in the short run by market volatility.

Volatility spillovers within commodity markets may indeed have amplifying effects on the reaction of commodity currencies to prices. Commodity markets strongly interact with one another for a number of reasons; among them the exchange-traded funds buying huge amounts of futures on indexes of commodities contribute to enhance the co-movements. In this respect, their prices as well as their volatility tend to move in line with one another. While research has been extensive on the interdependencies between commodity prices and exchange rates, no study has been devoted to possible non-linearities in times of financial stress. This is however a key issue: volatility spikes in commodity prices can also spillover to currency markets. Thus, commodity currencies may turn more sensitive to commodity prices during episodes of high volatility. To the best of our knowledge, our contribution is the first to tackle this issue and to investigate the impact of commodity terms of trade on currencies within a non-linear framework.

To this end, we consider a panel made of 68 commodity exporters over the 1980–2012 period. Our empirical approach involves two steps. First, we estimate a long-run, cointegrating relationship between the real effective exchange rate and economic fundamentals, including the commodity terms of trade. This estimation amounts to finding an equilibrium value of the real effective exchange rate, in line with the behavioral equilibrium exchange rate (BEER) approach introduced by Clark and MacDonald (1998, 2000). Second, we estimate the short-run adjustment process through a panel smooth transition regression (PSTR) which is able to account for non-linearities depending on the situation – calm or volatile – on commodity and financial markets. Specifically, we retain three proxies for volatility as a gauge of strains on commodity and financial markets that may entail non-linearities in the exchange rates' responses to terms of trade. To deal with potential heterogeneity, we split the commodity producers between advanced, intermediate and low-income countries in order to compare the behavior of their exchange rates.