Food commodity prices: the effect of currency exchange rate volatility

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**Extended Abstract**

World food prices are more volatile than would be expected from normal market forces. Currency exchange rates are also volatile; Crucini, Shintani and Tsuruga (2008) found that the volatility of aggregate real exchange rates exceed what economists believe to be consistent with a plausible degree of price rigidity. Regarding food, Obstfeld and Rogoff (2000) identified trade frictions as the most important influence in preventing exchange rate fluctuations from having immediate consequences for food prices. Calculations of purchasing power parity (PPP) are based on baskets of goods that vary from country to country, and the arbitrage effect of commodity prices acts over periods of several years. From empirical examination of real exchange rates and commodity prices 1975-2005 Clements and Fry (2008) found that spillovers from commodities to currencies contributed less than 1% to the volatility of currencies, while spillovers from currencies to commodities contributed between 2 and 5.2% to commodity price volatility.

The jumble of currency exchange policies that arose after the demise of the gold standard in 1976 has exacerbated problems for international trade. Cooper, Dornbusch and Hall (1982) reviewed proposals made at that time for a commodity-based currency numeraire, and Cooper more recently (Cooper, 1999) foresaw that as international financial transactions continue to grow relative to growth in trade and services, financial factors would come to dominate exchange rate determination. Flexible rates, hitherto providing a useful mechanism for absorbing trade shocks and disturbances, have themselves become a source of economic shocks.

Agricultural commodities are by their nature entirely replaceable, and agricultural economists can predict the marginal cost of producing approximately sufficient of each commodity to satisfy the market in the short term. Among such commodities there are numerous close substitutes in each category so that commodities that remain persistently in short supply are gradually replaced in dietary habits. Deaton and Laroque (2003) used a statistical model of long-run behaviour of prices of primary commodities produced in poor countries, and concluded that commodity supply in the long run is infinitely elastic.

There is a long history of proposals for use of a commodity basket as numeraire for purchasing power. Vivo (2003) traced the path followed by Piero Sraffa in building the consistent wage-profit-price relations culminating in the publication of *Production of Commodities by Means of Commodities* , in which Sraffa explored the theory of a Standard Commodity produced by ‘itself and labour’. It is feasible, in the case of a weighted basket of commodities, to make the basket traceable to real goods defined within the *Système International* (SI) maintained by the *Bureau International des Poids et Measures* (BIPM). A key advantage of a numeraire defined with SI units is that derived variables are mutually consistent and non-volatile.

In this paper we give an illustration of a commodity-based numeraire that can be defined entirely in SI units. From weekly prices of traded food commodities from January 1999 to December 2009, we derive the cost of a basket of foods weighted by FAO data for actual consumption of cereals, pulses, tubers, animal protein and fruits, sufficient to provide the recommended food calorie intake. We interpret that cost as a useful proxy for the real resource cost of maintaining a lifestyle acceptable to the world population.

We show that real resource prices are stable in real terms, and likely to remain so. The duration of a boom in food price is limited because supply is elastic and response times are relatively short. Baffes and Haniotis (2010) examined the 2006-08 commodity price boom within the perspective of long-run decline in food commodity prices, and concluded that a strong link to energy prices is likely to have been a dominant influence on food commodity prices during the price boom of 2006-08. We show that a strong link from energy prices to food commodity prices remains, arising from energy inputs in agriculture, food processing and distribution. Market failure associated with the oligopoly of the OPEC cartel is at present preventing arbitrage from stabilising energy prices, but the marginal cost of energy supply is predictable and likely to remain stable.

Moshirian (2007) traced the evolution of financial institutions in the context of increasingly volatile exchange rates, and commented that reduced volatility would assist financial institutions’ international business growth. Calibration of currency value using a yardstick such as our SI numeraire offers a long-run unbiased measure of the consistently stable cost of subsistence in the face of volatile currency exchange rates.

References:

Baffes J., Haniotis T. (2010) Placing the 2006/08 Commodity Price Boom into Perspective. Policy Research Working Paper 5371, Development Prospects Group, World Bank

Bernanke B., Rogoff K. (eds) (2000) Macroeconomics Manual No15. NBER, Cambridge MA, USA

Cooper R.N., Dornbusch R., Hall R.E. (1982) The Gold Standard: Historical Facts and Future Prospects. Brookings Papers on Economic Activity, 1982(1), 1-56

Cooper R.N. (1999) A brief history of exchange rate policy. In Little and Olivei (1999)

Crucini M., Shintani M., Tsuruga T. (2008) Accounting for persistence and volatility of good-level real exchange rates: the role of sticky information. Working Paper 14381, NBER Cambridge MA, USA

Deaton A., Laroque G. (2002) A model of commodity prices after Sir Arthur Lewis. J Dev Econ 71, 289-310

Little J., Olivei G. (eds) (1999) Rethinking the International Monetary System. Univ Press of the Pacific. ISBN 978-0898755930

Moshirian F. (2006) Global financial services and a global single currency. J Banking and Finance 31, 3-9

Obstfeld M., Rogoff K. (2000) in Bernanke and Rogoff (2000)

Vivo G. de (2003) Sraffa’s path to Production of Commodities by means of Commodities. An interpretation. Contributions to Political Economy 22, 1-25