ON THE CURRENT ACCOUNT - BIOFUELS LINK IN EMERGING AND DEVELOPING COUNTRIES: DO OIL PRICE FLUCTUATIONS MATTER?

Anthony Paris, IFP Energies nouvelles, and EconomiX-CNRS, University of Paris Nanterre, and LED, University of Paris 8, +331 47 52 70 59, anthony.paris@ifpen.fr
Gabriel Gomes, EconomiX-CNRS, University of Paris Nanterre, and OECD, +331 85 55 68 60, gabriel.gomes@oecd.org
Emmanuel Hache, IFP Energies nouvelles, +331 47 52 67 49, emmanuel.hache@ifpen.fr
Valérie Mignon, EconomiX-CNRS, University of Paris Nanterre, and CEPII, +331 40 97 58 60, valerie.mignon@parisnanterre.fr

Overview

For the past two decades, a strong interest has emerged in favor of the integration of renewable energies in the electricity mix and in the transportation sector. This constitutes a major concern for developed economies as well as for developing and emerging countries in order to ensure energy transition policies, to fight against climate change and reduce Greenhouse Gas Emissions (GHG). Along these lines, the use of biofuels is encouraged in developed countries and in emerging economies such as Brazil, China and India for environmental concerns, as well as for promoting energy security, agricultural opportunities and economic growth. For instance, the European Union introduced a blending target of biofuels in petroleum products in 2003 and the Renewable Fuel Standard program (2005) combined with the Energy Independence and Security act of 2007 (36 billion gallons of biofuels by 2020) allowed the establishment of mandatory target of biofuels utilization in the United States' transportation sector. However, such environmental policies may cause externalities or adverse effects on the economy of emerging and developing countries whose activity is highly dependent on agricultural commodities used in biofuel production. Aiming at investigating those issues, this article analyzes the price impact of biofuels on the economy of such countries, focusing on the current account consequences. By concentrating on the current account, we fall into the spirit of the oil-macroeconomy literature. Indeed, it is well known that oil-exporting countries experiment large current account improvements following a sharp rise in oil prices (see Allegret, Couharde, Coulibaly, and Mignon (2014) and the references therein). In other words, for such countries, oil windfalls constitute a key source of foreign exchange and income. The price of oil is also a key element behind agricultural commodity prices (see Paris (2018) and the references therein). Shocks in the price of oil spill over agricultural production costs which comprise fertilizer and fuel, thus decreasing supply. On the consumer side, the impact can be either negative or positive. On the one hand, positive shocks in the price of oil have a negative impact on demand if in their food purchasing decisions, households account for price changes in other goods among those oil products. In this case, oil and agricultural commodity prices would have a negative relationship. On the other hand, a positive link between agricultural commodity demand and oil prices is likely to occur through the development of biofuels: due to the substitution effect between fuel and biofuel, a rise in the price of oil could lead to an increase in the demand for biofuel. In this context, oil and agricultural commodity prices would be positively related.The preceding arguments show that important links exist between the price of agricultural raw materials used in biofuel production, the price of oil and the current account of emerging and developing countries exporting or importing agricultural commodities. While the impacts caused by biofuel production development are likely to be highly significant on the economy of such countries, the literature on this topic is very scarce.

Methods

For our estimations, we rely on annual data over the 2000-2014 period. The choice of the starting date, 2000, is guided by data availability considerations. Indeed, we calculate a biofuel feedstock price index (hereafter biofuel price) based on information provided by the reports of the US Department of Agriculture (USDA), which date back only from 2000. The dependent variable is the current account to GDP ratio, extracted from WDI (World Development Indicators, World Bank). Turning to the explanatory and control variables, we consider usual current-account determinants in addition to the biofuel price. As stressed above, we acknowledge that this current account - biofuel price relationship may vary depending on the price of oil. The latter is defined as the simple average (in logarithm) of Dated Brent, West Texas Intermediate and the Dubai Fateh spot prices, and is extracted from IMF (International Financial Statistics, IFS). Acknowledging this major role played by the price of oil, we account for nonlinearities by estimating a panel smooth-transition regression (PSTR) model, proposed by Gonzalez, Terasvirta, and van Dijk (2005), for a panel of 16 countries – 9 developing and 7 emerging economies – which are either exporters, producers or importers of agricultural commodities used in biofuel production. In this type of modeling, the price impact of biofuels on the current account varies, depending on the value of another observable variable,

i.e., the price of oil. Specifically, the observations in the panel are divided into two homogeneous groups or "regimes" – high oil price and low oil price regimes –, with different coefficients depending on the regimes.

Results

The null of linearity is rejected in favor of the alternative of logistic PSTR specification for all panels except importing countries. The latter result regarding importers may be related to the policies implemented in some of those importing economies (China, India, and Indonesia for example) in order to protect domestic market from inflation pressures. These measures could have limited the current-account deterioration with the reduction of international price pressures in the domestic market, thus explaining the absence of nonlinearities on the biofuel price impact on the current account in importing countries. For other panels, our findings show that a rise in the biofuel feedstock price index tends to improve the current-account position for agricultural commodity-producing and -exporting countries. However, this impact is nonlinear, depending on the level reached by the price of oil. Specifically, we find that for low values of the price of oil—i.e., below 60 US dollars per barrel for our whole panel of countries—, a 10% increase in the price of biofuels leads to a significant current-account improvement of about 2%. When the price of oil increases to exceed 56 US dollars per barrel for producers and 45 US dollars for exporters, the effect of fluctuations in the price of biofuels on the current account tends to decrease until becoming non significant. For commodity exporters which are also oil importers, these findings illustrate that, when the price of oil increases, the current account is pulled by two opposite forces, making its overall reaction moderate or even nil.

Conclusions

On the whole, our findings put forward the importance of accounting for the effect of the price of oil in designing policies to promote the use of biofuels. In particular, while an increase in the biofuel price is benefit for commodity-exporting countries in a low oil price regime, it is no more the case in high oil price states. With regard to the "food versus fuel" debate, sharp increase in the price of biofuels coupled with strong rise in the price of oil are likely to exert important detrimental effects on the economy of agricultural commodity-exporting countries.

References

Abbott, P., and A. Borot de Battisti (2011): "Recent Global Food Price Shocks: Causes, Consequences and Lessons for African Governments and Donors," *Journal of African Economies*, 20, i12-i62.

Allegret, J.-P., C. Couharde, D. Coulibaly, and V. Mignon (2014): "Current accounts and oil price fluctuations in oil-exporting countries: The role of financial development," *Journal of International Money and Finance*, 47(C), 185-201.

Calderon, C., A. Chong, and N. Loayza (2002): "Determinants of Current Account Deficits in Developing Countries," *The B.E. Journal of Macroeconomics*, 2(1), 1-33.

Chakravorty, U., M.-H. Hubert, and B. U. Marchand (2015): "Food for Fuel: The Effect of the U.S. Biofuel Mandate on Poverty in India," Discussion paper.

Ciaian, P., and D. Kancs (2011): "Interdependencies in the energy-bioenergy-food price systems: A cointegration analysis," *Resource and Energy Economics*, 33(1), 326-348.

Gonzalez, A., T. Terasvirta, and D. van Dijk (2005): "Panel Smooth Transition Regression Models," Research Paper Series 165, Quantitative Finance Research Centre, University of Technology, Sydney.

Jones, D., and A. Kwiecinski (2010): "Policy Responses in Emerging Economies to International Agricultural Commodity Price Surges," *OECD Food, Agriculture and Fisheries Papers*, 34, OECD Publishing.

Khanna, M., H. Onal, X. Chen, and H. Huang (2008): "Meeting Biofuels Targets: Implications for Land Use, Greenhouse Gas Emissions and Nitrogen Use in Illinois," Discussion paper.

OECD (2008): "Rising Food Prices: Causes and Consequences," *Policy brief*, Organisation for Economic Cooperation and Development.

Paris, A., (2018), "On the link between oil and agricultural commodity prices: Do biofuels matter?", *International Economics*, (Forthcoming).

Thompson, P. B. (2012): "The Agricultural Ethics of Biofuels: The Food vs. Fuel Debate," *Agriculture*, 2(4), 339-358.