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Brazilian Structural Adjustment to Rapid Growth in Fuel Ethanol Demand

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Abstract

In response to rising oil prices and carbon emission concerns, policies promoting increased ethanol usage in gasoline blends are debated and implemented by many countries, including major energy users such as the USA, the EU and Japan. As a result, Brazil, as the largest sugar ethanol producer and exporter in the world, can expect growing foreign demand for ethanol exports. Also, the introduction of flex-fuel vehicles in Brazil is causing domestic sales of ethanol to increase steadily. In this paper, we investigate the regional and industrial economic consequences of rapid growth in Brazilian ethanol domestic consumption and exports. For this, we use a disaggregated multi-regional computable general equilibrium (CGE) model with energy industry detail. Our modelling emphasises a number of features of ethanol production in Brazil which we expect to be important in determining the adjustment of its regional economies to a substantial expansion in ethanol production. These include regional differences in ethanol and sugar production technologies, sugarcane harvesting methods and the elasticity of land supply to sugarcane production. Some of the conclusions are as follows. (i) Debate on the prospects for the Brazilian ethanol industry often places a high weight on export growth. Our simulations suggest that growth in domestic ethanol demand will be the major influence on the Brazilian economy, at least to 2020. (ii) Pressure for further land clearance is often associated with a rapid ethanol growth scenario. But only a small (less than 2%) reduction in land use by other agriculture is necessary to accommodate the required expansion in ethanol production. Food production is equally affected by the appreciation of real exchange rate (Dutch disease effect) and growth of the light-duty vehicle fleet. (iii) Tight enforcement of a nation-wide ban on manual harvesting could reduce the ability of some (poor) regional economies to participate in the benefits of growth in ethanol production.

JEL Classification: D58, Q13, Q42, R11, R49
Keywords: CGE Models, Energy, Ethanol, Brazil

1. Introduction

In response to oil price increases since 2000 and concerns about global warming, policies promoting biofuels are being investigated and implemented by many countries, including major energy users such as the USA, EU and Japan. In developed countries, such initiatives result mainly from concerns about the balance of trade, energy security and greenhouse gas emissions. Developing countries view biofuels in economic growth terms, seeing them as a

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