Brazilian Sugarcane, Sugar and Ethanol Markets: Modeling Issues and Perspectives

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Presentation

Brazil Ethanol:
- outline determinant factors of S&D

Cepea research focus:
- evolving according to changes in the Brazilian sugarcane scenario

- Current concerns and research issues
General Background

The world has been relying on fossil fuel for about a century.

• In the last three decades, countries started to search for fuel alternatives, stimulated by a set of factors:
  – **Economic**: Increases in petroleum prices - first because of supply restrictions by OPEC countries and now - demand increase;
  – **Environmental; and**
  – **Geo-political** issues.
General Background

Investment in alternative fuel:

- a relatively wide range of technologies that use renewable biomass resources have been developed.

However, ethanol is the only biofuel obtained and used in large scale.

Global production and consumption of ethanol is dominated by Brazil and the United States.
General background

As a result:

Agriculture accumulated new function:
- supplies part of the demand for energy, besides food and feed products.
General background

New questions for the sugarcane sector in the Brazilian economy:

- Will **production increase enough?**
  (to provide the required volume to expected demand for sugar and ethanol in domestic and external markets)

- Will **cane expansion impact important crops and livestock production** in Brazil?

- What is the **expected demand for ethanol in domestic and external markets**? How can it be determined?

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Ethanol in Brazil: A Success Case

What were the factors/strategies for Brazilian success in ethanol production?

What is (will be) working and what is (will be) not in the next decades?
I. Low production costs cane, sugar and ethanol

Cane = f [soil, climate, labor, technology (cane varieties, biological control of pests, cane remote sensoring (reduce price seasonality, waste management, vinasse, hydrolyses,...), others]

Sugar & Ethanol = f [combined production to maximum efficiency; technology; management (Consecana cane payment system, financing,..); others]
Production costs for Ethanol
(US$/liter equiv. gasoline)

Various sources: FO Licht; Unica; Abare

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II. Relative abundance of land

Brazil can expand production for ethanol without necessarily reducing the area allocated for other crops.
Brazil: New Agricultural Frontiers

- **Planted area:** 62 million ha (7%)
- **Green Cattle Production:** 220 million ha (26%)
- **Areas with potential for expanding production:** 106 million ha (12%)
- **Areas that cannot be used for Agriculture:**
  - Amazon Preservation areas
  - Urban centers
  (55%)

**Cane area:** 6.4 million hectares

Source: MMA. MAPA e IBGE

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Sugarcane areas in Brazil
CEPEA’s primary research focus

Sugarcane deregulation:
  Production (1990)
  Prices (1998/99)

Market information - Price Indicators


Daily prices for sugar
Weekly prices for ethanol
Export prices for sugar and ethanol
Sugar and ethanol (anhydrous and hydrated)
(R$/kilogram of Total Recoverable Sugar);
May/1999 a May/2002

Source: CEPEA/ESALQ/USP
Sugar Prices: Domestic and International Markets
Cepea & N.Y. (first future)
Period: April/1997 to December /2001

Correlation (04/1997 – 12/2001): 0.778
Correlation (2001): 0.82
CEPEA Sugar, Hydrated and Anhydrous Ethanol Price Indicators for Sao Paulo State; Brazil

Figure 3. Brazilian Ethanol and Sugar Prices

Source: CEPEA 2006

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Estimated Price Inter-relations: Brazilian Ethanol, Sugar and Gas Prices

Source: Fagnani & Bacchi (2005)
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Analysis Period:
Monthly data for July/2001 to February/2005
Current concerns: define market strategies for the next decades

Structural relations must be estimated to answer questions such as:

- How do (will) S&D interact in the sugar and ethanol markets (domestic and international)?
- What can producers expect?
- What can consumers expect?
Anhydrous Ethanol Consumption for Brazil
(Billion liters) Period: from 2004 until 2012

Forecast results on the annual consumption considering:
Scenario I (GDP growth of 1.22 percent);
Scenario II (GDP growth of 2.9 percent);
Scenario III (GDP growth of 4.6 percent),
Hydrated:
17.4 billion liters
[Current14;Expect:22 (7 exports)]

Source: Figueira, Burnquist and Bacchi (2005)
Cepea Model Planning

Theoretical Model

• To evaluate cane production increase by considering the impact of stochastic shocks of demand and supply.

Model impact shocks upon:

• Income
• Productivity
• Prices (sugar, ethanol)
• Harvested area

• One should be able to obtain growth rate for endogenous variables such as: cane area, production and exports.
COMMENTS AND SUGGESTIONS?

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