



CEPEA

**CENTRO DE ESTUDOS AVANÇADOS
EM ECONOMIA APLICADA
CEPEA / ESALQ / USP**

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

Heloisa Lee Burnquist

***Farm Foundation and ERS Workshop
Global Biofuel Developments: Modeling the Effects on Agriculture***

February 28th 2007

02/28/2007

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?

02/28/2007

Ethanol in Brazil: A Success Case

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

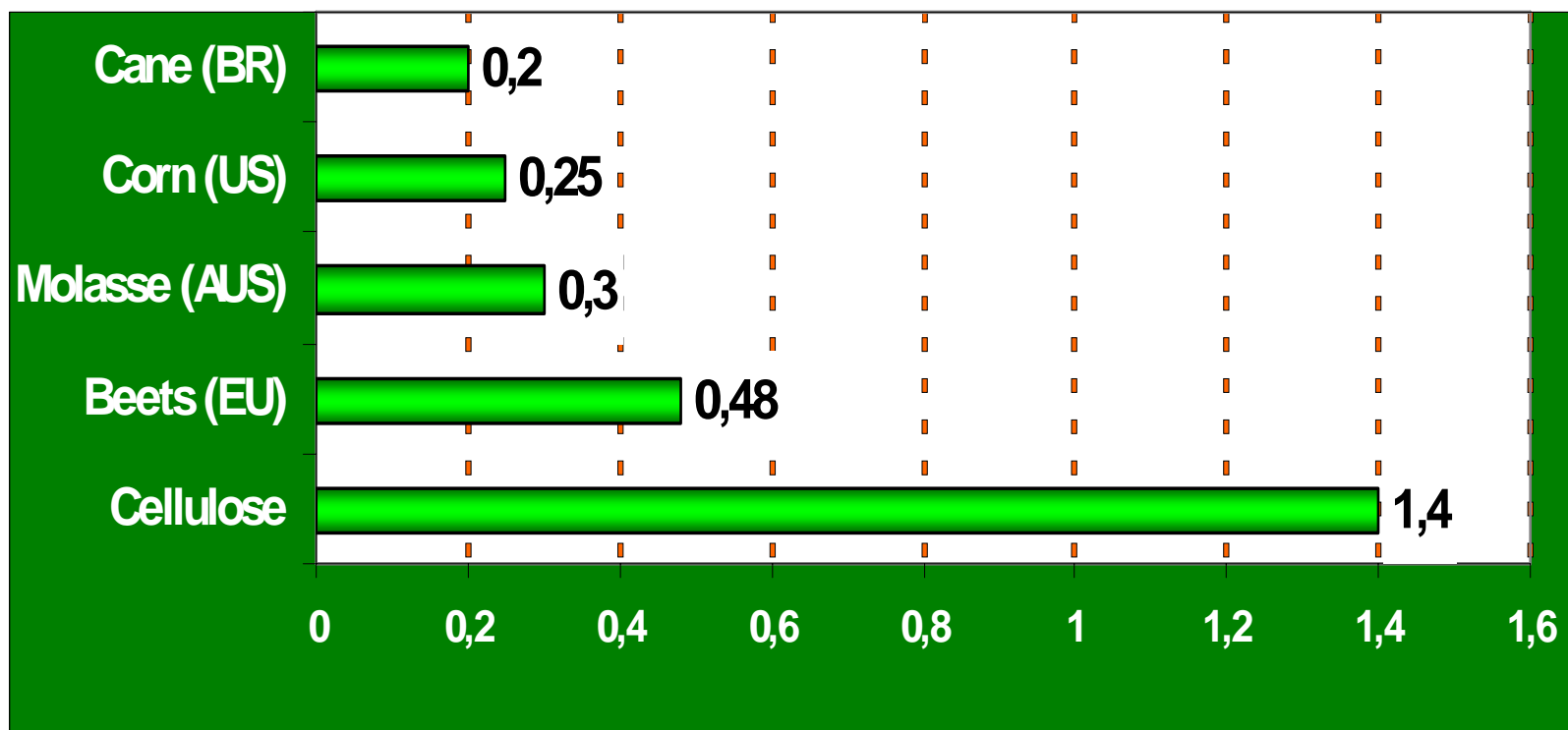
**What is *(will be)* working and
what is *(will be)* not in the next decades?**

I. Low production costs cane, sugar and ethanol

Cane = f [soil, climate, labor, technology (cane varieties, biological control of pests, cane remote sensing (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)

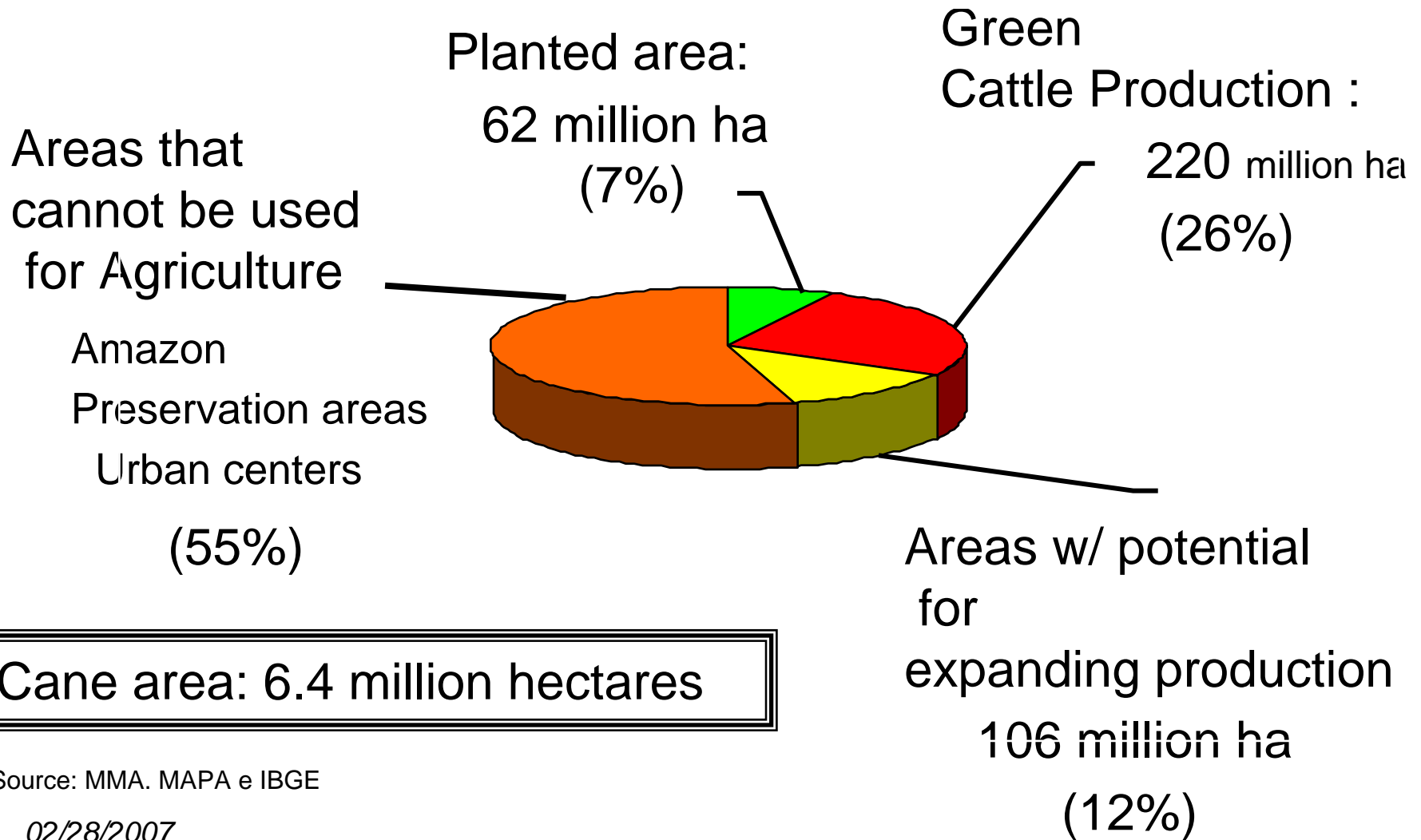


Various sources: FO Licht; Unica; Abare

II. Relative abundance of land

Brazil can expand production for ethanol without necessarily reducing the area allocated for other crops.

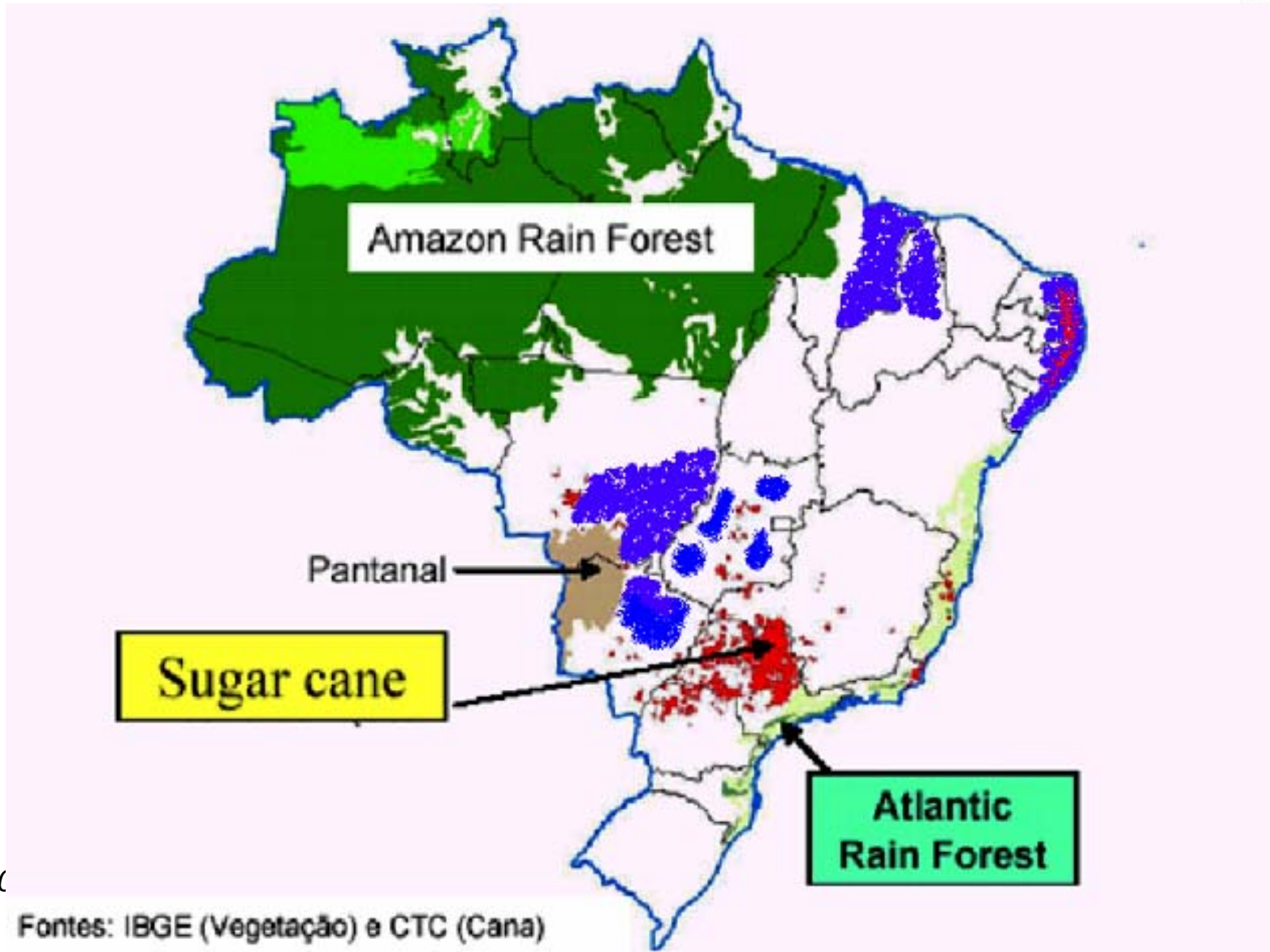
Brazil: New Agricultural Frontiers



Source: MMA, MAPA e IBGE

02/28/2007

Sugarcane areas in Brazil



CEPEA's primary research focus

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

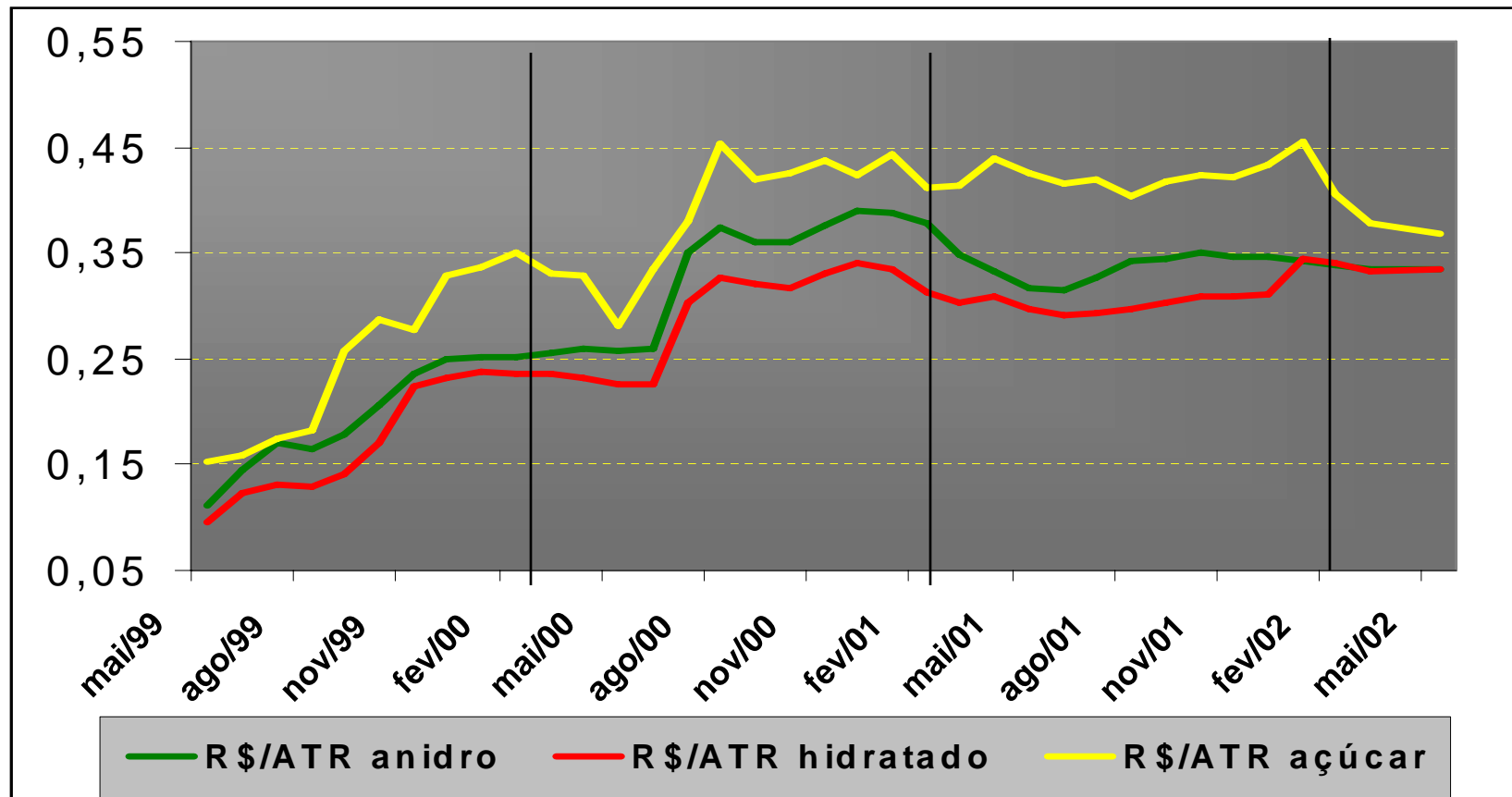
Market information - Price Indicators

Time series: 1995 – 2007

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



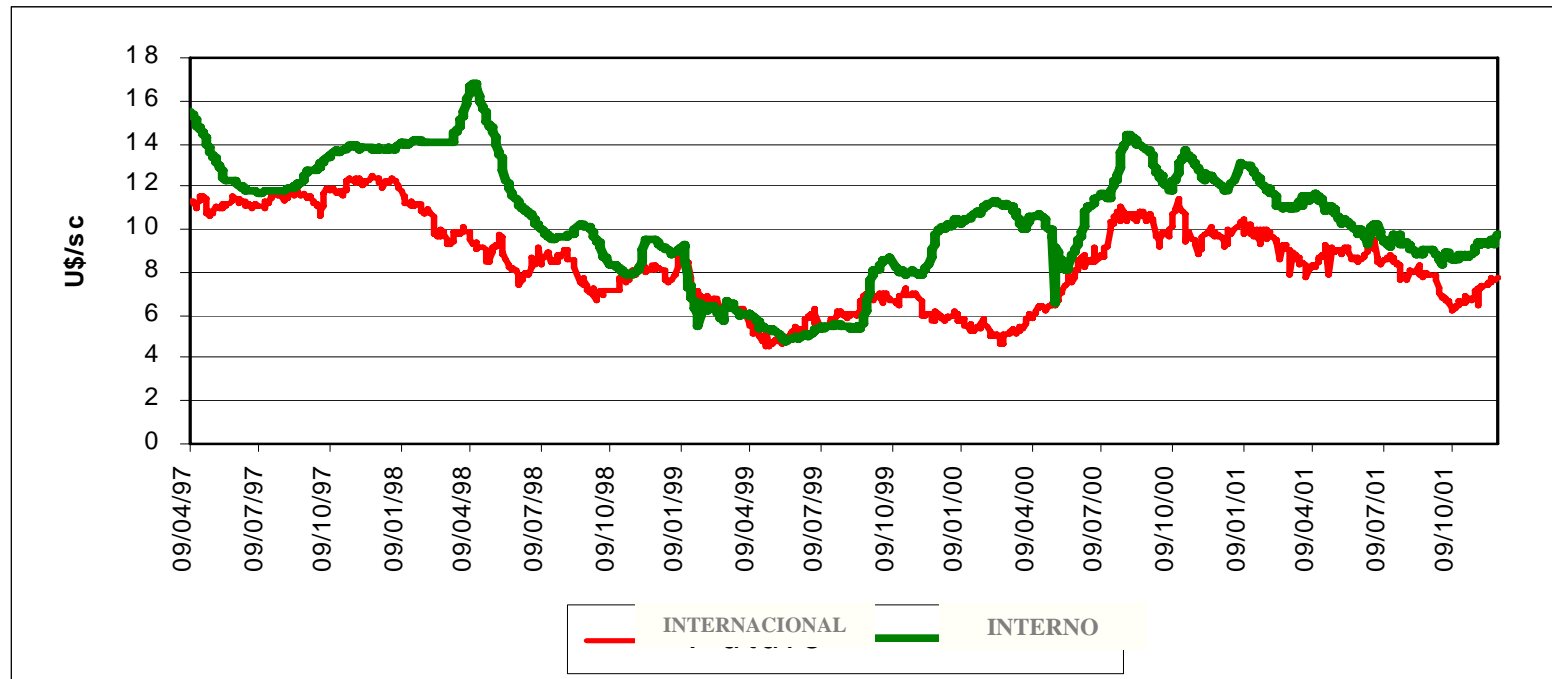
Source: CEPEA/ESALQ/USP

02/28/2007

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

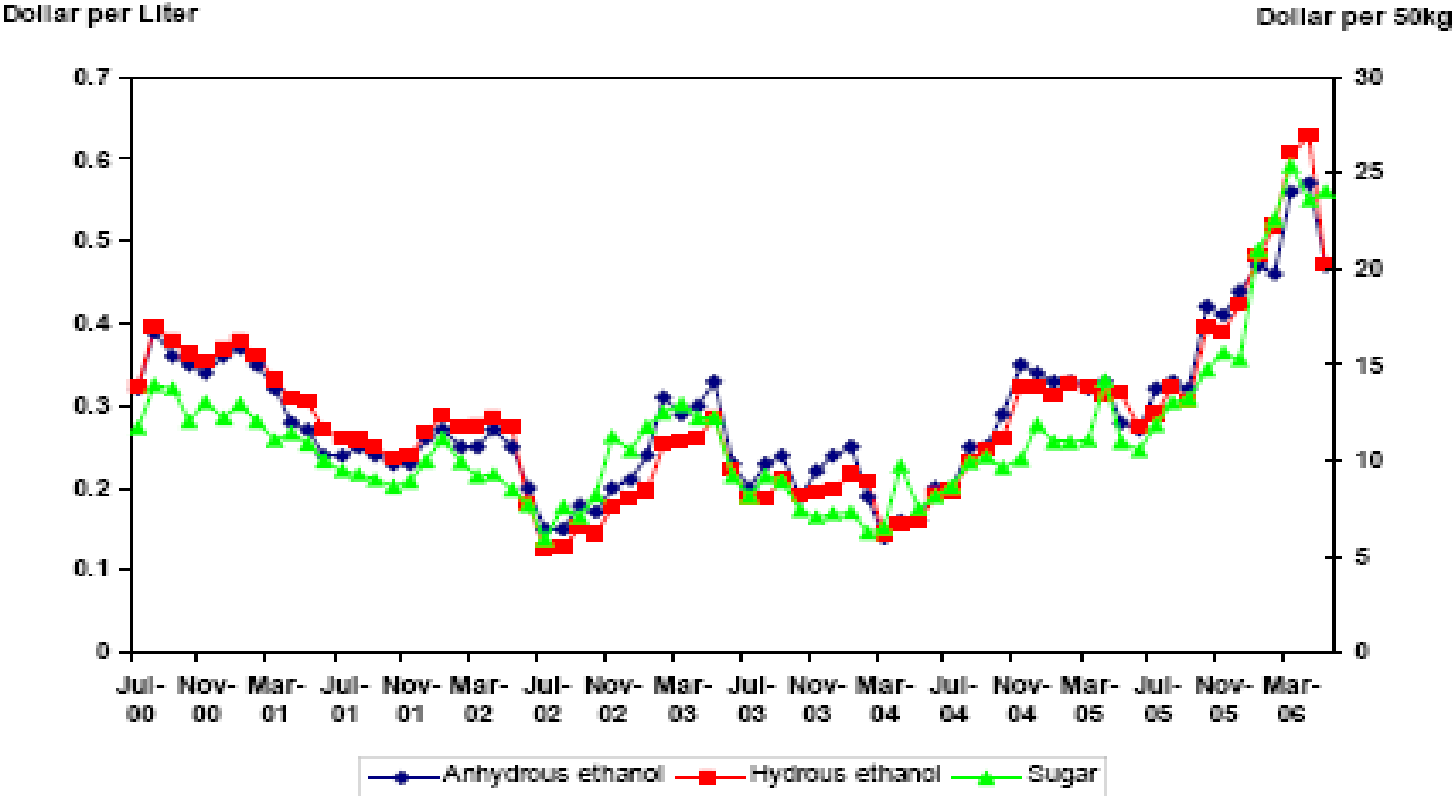
02/28/2007

CEPEA Sugar, Hydrated and Anhydrous Ethanol Price Indicators for Sao Paulo State; Brazil

Period: July/2000 to March /2006



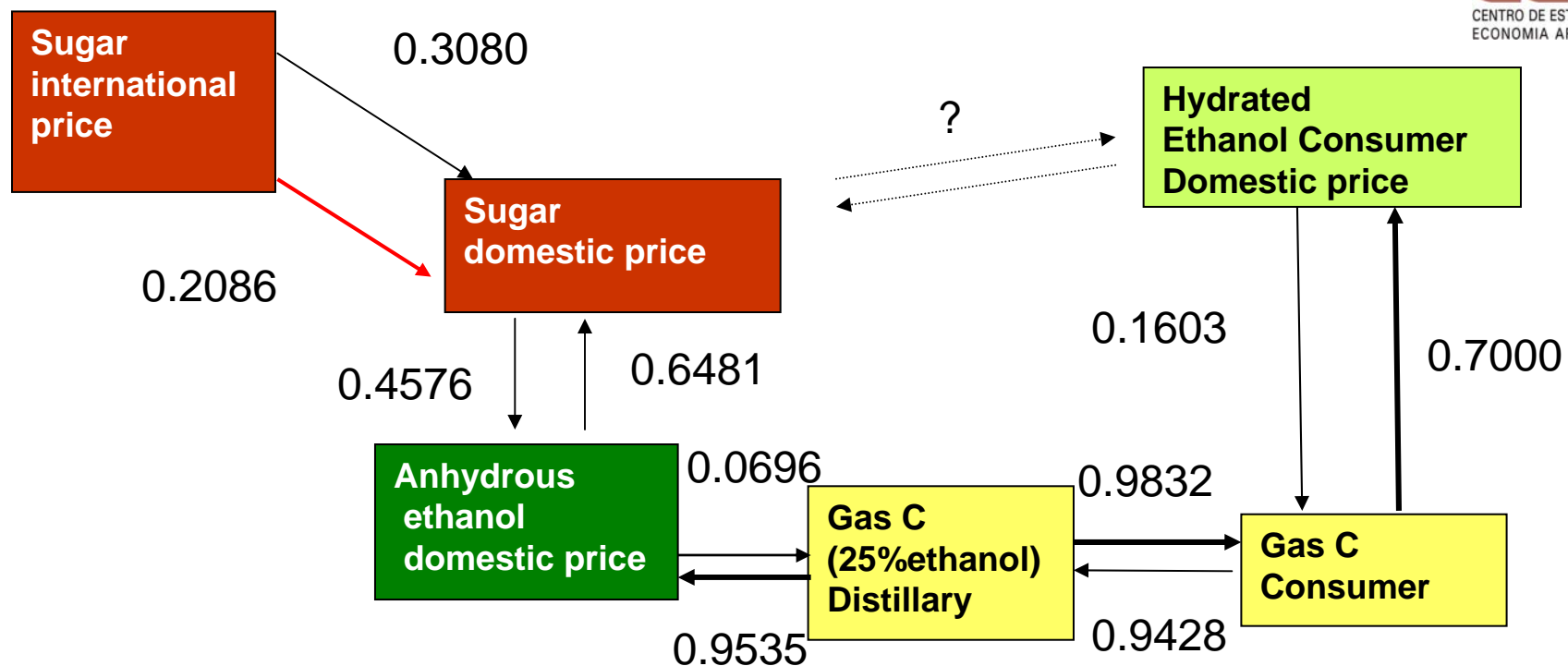
Figure 3. Brazilian Ethanol and Sugar Prices



Source: CEPEA 2006

02/28/2007

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



—→ Contemporary relation significant at 10%
 —→ One lag : significant at 10%

Source: Fagnani & Bacchi (2005)

02/28/2007

Analysis Period:

Monthly data for July/2001 to February/2005

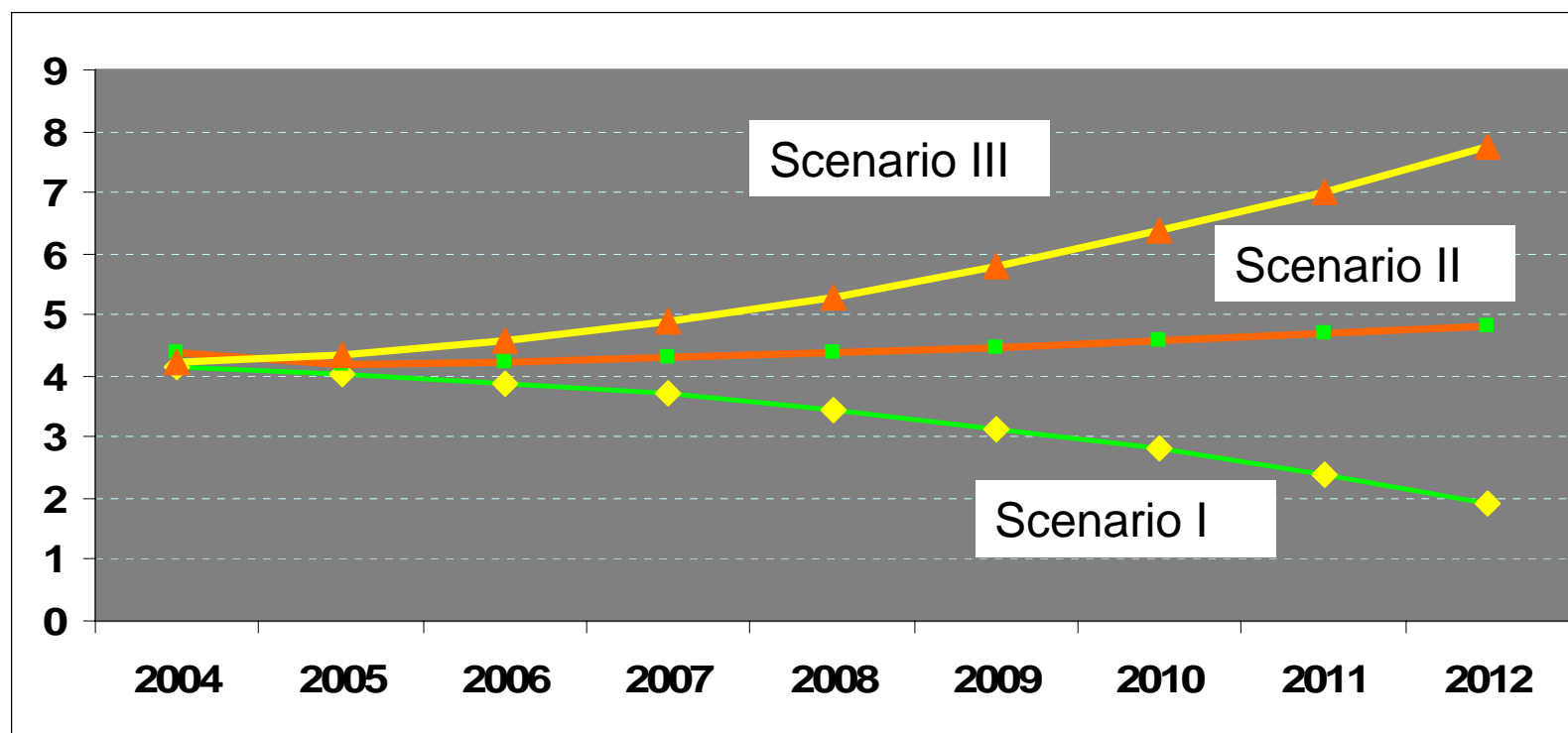
Current concerns: define market strategies for the next decades

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

[Current 14; 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

02/28/2007



**CENTRO DE ESTUDOS AVANÇADOS
EM ECONOMIA APLICADA
CEPEA / ESALQ / USP**

COMMENTS AND SUGESTIONS?

Heloisa Lee Burnquist

hlburnqu@esalq.usp.br

[http: www. cepea. Esalq.usp.br](http://www.cepea.Esalq.usp.br)

02/28/2007