



SOCIAL EXTERNALITIES OF DIFFERENT FUELS IN BRAZIL

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Objective

Comparing social indicators in the following activities

- I. Ethanol production (sugarcane and ethanol)
- II. Extraction and production of petroleum by-products

Methodology

- I. Survey of socio-economic indicators
- II. Penetration assessment: location quotient calculation
- III. Analysis of the impacts of variations in the demand for ethanol and gasoline on the economy (jobs and remuneration): Input Output Model

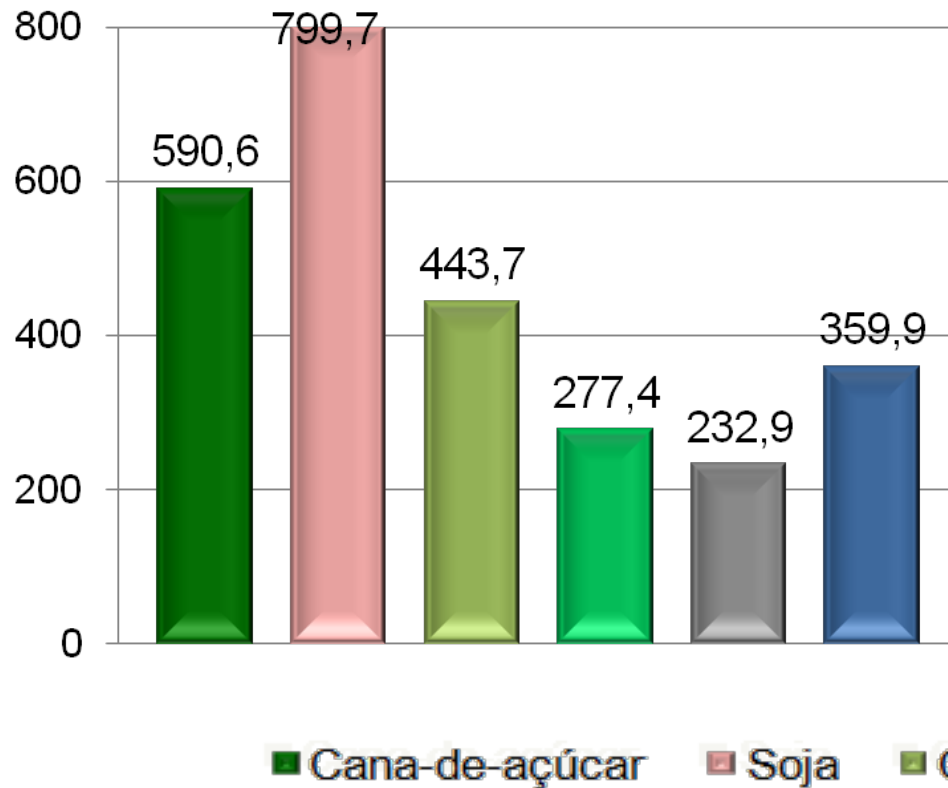
RESULTS

SUMMARY OF INDICATORS FOR THE ANALYZED INDUSTRIES (2007)

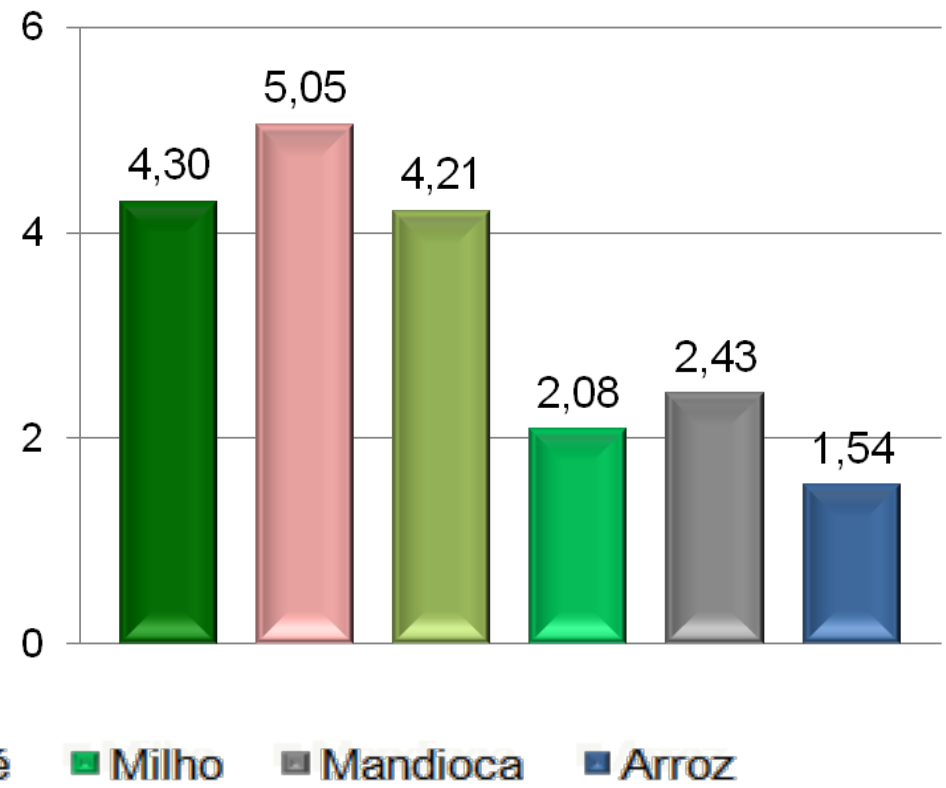
Industry	UF*	Municipalities	Jobs	Establishments	Average age	Average schooling
Sugarcane	23	990	274,342	16,262	33.9	4.2
Ethanol	24	229	190,894	567	35.8	7.7
TOTAL Sugarcane & Ethanol	25	1,042	465,236	16,829		
Petroleum Extraction	21	113	54,847	894	37.7	11.7
Oil By-products	23	100	18,228	345	36.5	11.3
TOTAL Petroleum extraction & By-products	24	176	73,075	1,239		

REMUNERATION EVOLUTION

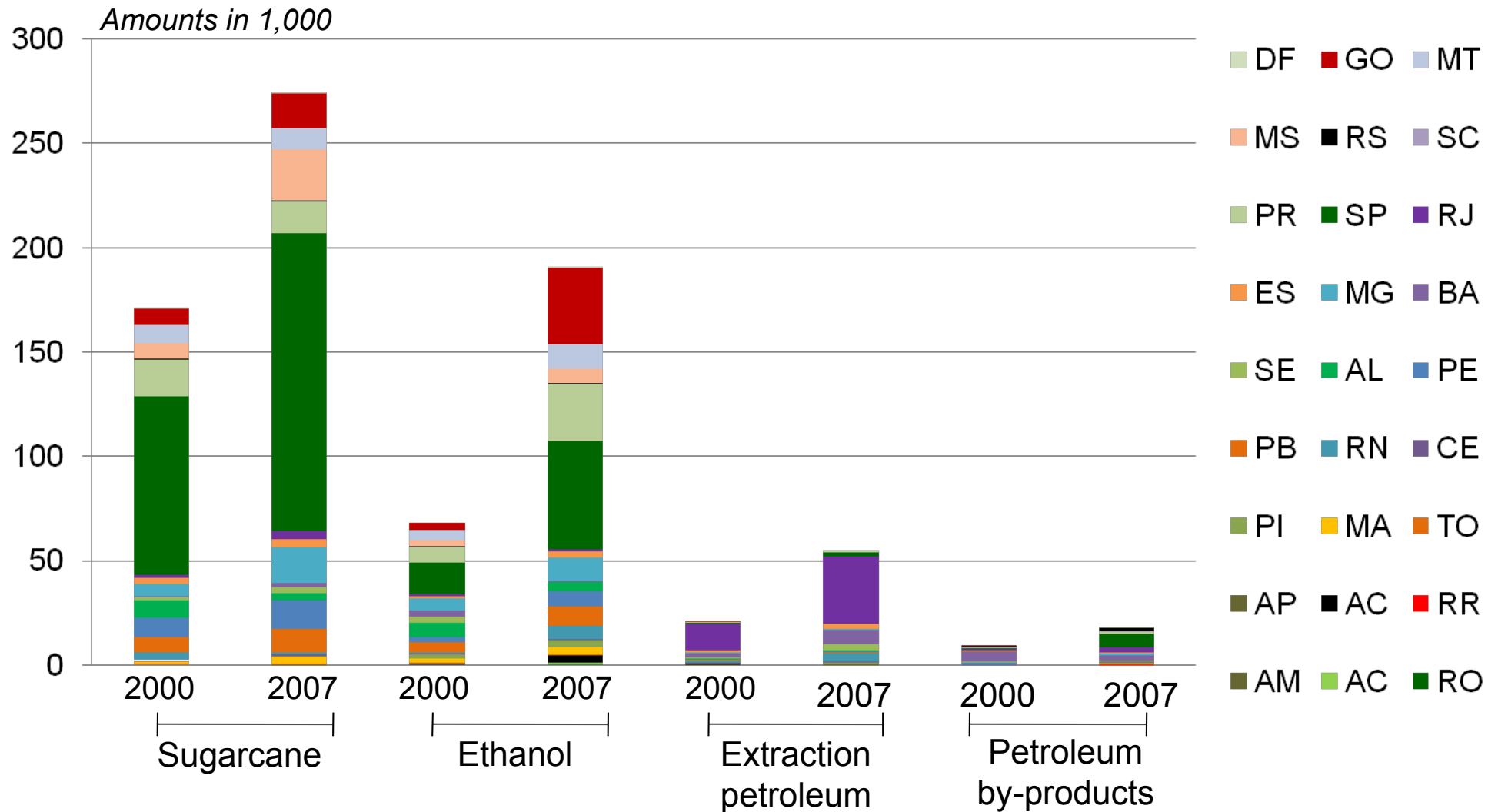
How much a worker earns in rural areas
(per month, R\$, 2007)



And who had the highest wage raises
(between 1999 and 2007, %)

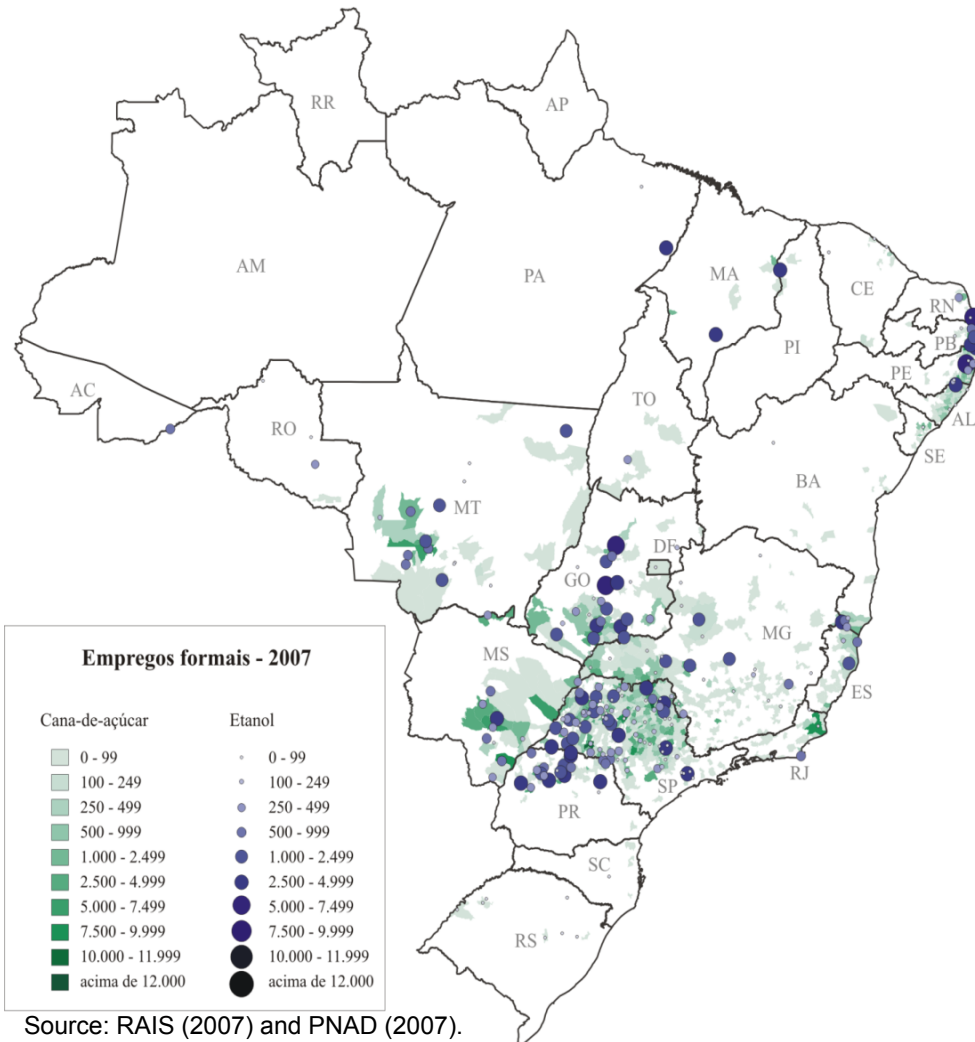


FORMAL JOBS BY PRODUCTIVE ACTIVITY IN THE STATES IN 2000 AND 2007

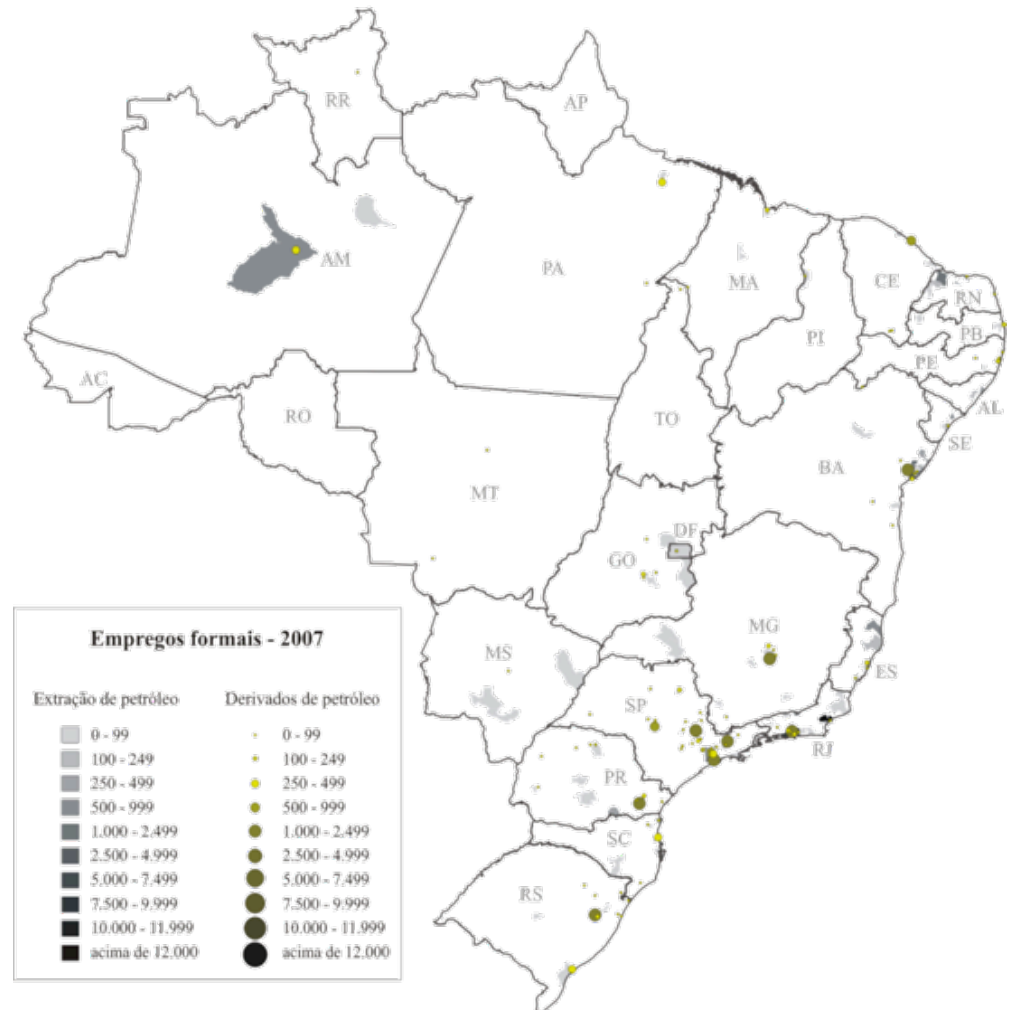


JOB PENETRATION - 2007

Sugarcane and ethanol



Petroleum extraction and oil by-products



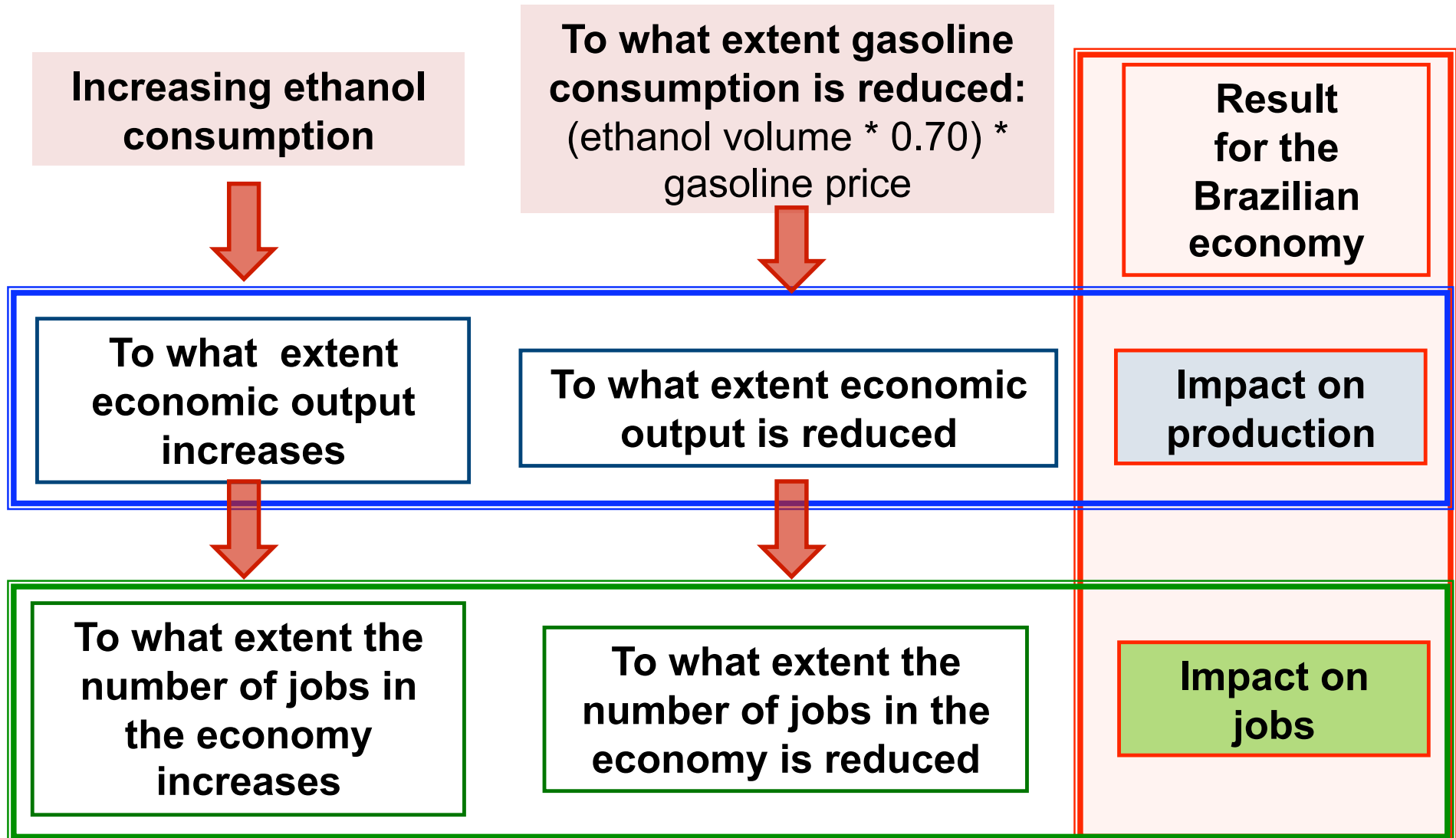
Source: RAIS (2007) and PNAD (2007).

SUGARCANE: MUNICIPALITIES BY LQ RANGE (2007)

Description		Sugarcane (SP)	Ethanol (SP)	Petroleum extraction (RJ)	Petroleum by-products (SP)
Municipalities	Number	397	80	15	28
	% Participation in the State	61.6	12.4	16.3	4.34
Municipalities by job LQ range	0 < LQ < 1	177	20	12	9
	1 < LQ < 5	96	13	2	10
	5 < LQ < 10	46	11	-	3
	LQ > 10	78	36	1	6
% of municipalities with an LQ > 1 in relation to municipalities where the activity was being carried out		55.4	75	20	68

**IMPACT OF A HIGHER HYDRATED
ETHANOL DEMAND TO THE DETRIMENT
OF GASOLINE C IN THE BRAZILIAN
ECONOMY**

INPUT PRODUCT MATRIX – IMPACTS



Number of jobs generated in the Brazilian economy as a result of a 15% increase in the demand for hydrated ethanol and of an equivalent reduction in the consumption of gasoline C, considering direct and indirect effects and the income effect

Higher hydrated ethanol consumption	15%			
<i>Impact / Shock</i>	NN	CS	SP	BRAZIL
<i>Rest of Brazil</i>	67,211	27,957	5,647	100,815
<i>São Paulo</i>	632	2,718	13,536	16,886
<i>Brazil</i>	67,843	30,674	19,184	117,701

Increase in the remuneration value in the Brazilian economy resulting from a 15% increase in the demand for hydrated ethanol and an equivalent reduction in the consumption of gasoline C, considering direct and indirect effects and the income effect

Amounts in million R\$

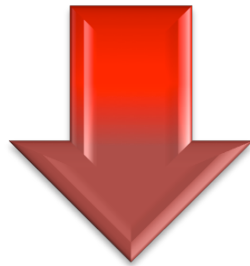
Increase in hydrated ethanol consumption	15%			
<i>Impact / Shock</i>	NN	CS	SP	BRAZIL
<i>Rest of Brazil</i>	97.08	77.93	-31.96	95.36
<i>São Paulo</i>	1.2	14.07	77.6	92.87
<i>Brazil</i>	98.27	92.01	45.63	235.91



Replacing gasoline with ethanol in 15%

Jobs: 117,701

**Remuneration value: R\$236 Million
(US\$ 80.8 million)**



Replacing ethanol with gasoline in 0.8%

Jobs: 45,799

**Remuneration value: R\$120,2 Million
(US\$ 41 Million)**

FINAL CONSIDERATIONS

- ❖ High job generation in the two links of the ethanol production chain
 - BR: the sugarcane & ethanol industry employs **465,000 workers**, more than **6 times** the number of workers employed in petroleum production
- ❖ High penetration and interiorization of generated jobs:
 - BR: **1,042 municipalities** impacted by the sugarcane & ethanol industry versus **176 municipalities** in the petroleum and oil by-products industry
- ❖ Agricultural jobs in sugarcane-related activities: high number of low-schooled workers with an increasing average **wages**
- ❖ Multiplying effect on the economy: a 15% substitution of gasoline with ethanol generates almost **120,000 additional jobs** and almost **R\$ 240 million (US\$ 80.8 million) in wages and social contributions**
- ❖ These results show that public policies designed to stimulate ethanol consumption result in significant social and economic benefits when the location and number of jobs generated are considered

Study Proposal

To evaluate social and economical impacts from the establishment of new sugar and ethanol mills in local communities: case study

Some authors have studied the social, economical and environmental impacts from the establishment of new sugar and ethanol mills in a given region:

Souza & Shikida (2007):

- Highlighted how important job generation from the establishment of sugar and ethanol plant was in the state of Parana
- Emphasized the growth in activities, which match the local demand, and in current city's revenue.

Study Proposal

Souza and Santos (2009), have analyzed the economical and social impact from establishment of new sugar ethanol mill on savanna of the state of Goias

Positive aspects:

- Increase of acquisitive power,
- Rise in public invest,
- Betterment in health care,
- Establishment of new transportation companies, new machinery dealers of soil correction, tractor and vehicles;
- Establishment of new companies in city, in both areas, agribusiness and commerce; valuation of rural and urban areas.

Negative aspects:

- Change in the landscape,
- Eradication of traditional rural families,
- Changing their lifestyles,
- Increase in violence and prostitution,
- Increase in the number of poor families.

Study Proposal

The proposed case study will have the following targets:

- To present the evolution of indices (before and after the establishment) of a given mill in a certain region:
 - ✓ number of employees,
 - ✓ schooling level,
 - ✓ labor conditions (formal)
 - ✓ average age of employees.

- To analyze the economical growth of cities under the action of company X, highlighting the total and sectorial evolution of gross domestic production (GDP)

- To survey the wealth distribution in the cities, aiming to identify recent changes in ownership and use of land; including the analyses of land price valuation

- To Check if the expansion in the productive activities of the company demands migrant workers from other region in Brazil

Study Proposal

➤ To verify the perception of representatives in different levels of the society (government, labor unions, and population) on the social economical impacts from the establishment of the new mill concerning:

- ✓ Optimization of local commerce,
- ✓ Public services (education, health, social assistance),
- ✓ Safety Conditions,
- ✓ Changes in the professional qualification and level of earnings of employees, Change in the local landscape,
- ✓ Extirpation of traditional rural families,
- ✓ Change in violence and prostitution
- ✓ Change in the number of poor families.

Study Proposal

Methodology:

1. Survey of secondary data

- ✓ Indices of local labor market: Annual Record of Social Information (Relação Anual de Informações Sociais - RAIS) from the Ministry of Labor and Employment (MTE) between 2002 and 2008
- ✓ Municipal GDP and Value of Agricultural Production: data collected from Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics)

2. Field Survey

Field research using structural questionnaires or polls, according to the target public, in order to verify the opinion of the representatives of the civil society, government, labor unions, and the population, about the social and economical impacts from the establishment of new mills in the local communities.

Study Proposal

The following agents will be the target of the field survey:

- ✓ Municipal secretaries in several areas,
- ✓ Representatives of unions
- ✓ Businessmen
- ✓ People from non governmental organizations (ONGs)
- ✓ Employees of company X
- ✓ Citizens

The field survey will also approach the Notaries of Land in the cities comprehended in the study in order to survey the recent transactions of rural properties.

Length of the project:

6 months from the signing of the contract.



Thank you

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