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# Welfare Analysis in International Sugar Trade: The Case of the EU-ACP Sugar Protocol

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## Abstract

Since its formation the European Union (EU) has employed a rather complicated policy to ensure high prices to domestic sugar growers and trade preferences to certain sugar exporting countries. One result of this policy is that the EU has been both the second largest importer and second largest exporter in the world market. Under pressure from the World Trade Organization (WTO), the EU agreed to reform its policies toward sugar in 2001, with the full effect of the reforms being fully implemented in 2006. In this paper, the impact of the EU sugar reform on global production, consumption, imports, and exports is examined. With a particular emphasis on the African Caribbean and Pacific (ACP) nations.

## Problem Statement

ACP and the Least Developed Countries under the Everything But Arms agreements are about to lose some rural income (agricultural production and export revenues, rural labor income) as the EU is further reforming its sugar policy. The loss of guaranteed high sugar prices could exacerbate rural poverty in ACP (and LDC) countries.

At stake is to investigate how to compensate them or what policies could be put in place to mitigate these potential losses.

## Research Objectives

- ❖ What are the effects of EU sugar policy reform on world production?
- ❖ How will this affect sugar production in the ACP countries and the rest of the world?
- ❖ To understand the welfare impacts of EU policies on ACP farmers

## Methodology

**Step 1:** Estimation of supply and demand equations for each country in the model

$$\text{Demand} \quad P_i = \lambda_i - w_i y_i \quad (1)$$

$$\text{Supply} \quad P^i = v_i + \eta_i x_i \quad (2)$$

Where  $P$  is price,  $y_i$  is quantity demanded,  $x_i$  is quantity supplied.

**Step 2:** Building a social welfare function that allows us to compute total surplus for all countries

$$W_i(y_i, x_i) = \int_{\hat{y}_i}^{y_i} (\lambda_i - w_i y_i) dy_i - \int_{\hat{x}_i}^{x_i} (v_i + \eta_i x_i) dx_i \quad (3.1)$$

Accounting for transport costs and tariffs/subsidies we get the following

$$NW = \frac{1}{1 + AD_i} W_i(y_i, x_i) - \sum_{i=1}^n \sum_{j=1}^n (t_{ij} + \pi_{ij} - \sigma_{ij}) x_{ij} \quad (3.2)$$

Where  $AD$  is ad-valorem tariff,  $t_{ij}$  is unit transport costs of moving sugar from region  $i$  to  $j$ ,  $\pi_{ij}$  is per unit import tariff and  $\sigma_{ij}$  is a per unit subsidy paid by  $i^{th}$  country.

**Step 3:** Incorporating the EU price floor into the model, we can form a mathematical programming problem

$$\text{Max} \sum \left[ \left( \frac{1}{1 + AD_i} \right) W_i(y_i, x_i) + \underline{P}_i U_i \right] - \sum_{i=1}^n \sum_{j=1}^n (t_{ij} + \pi_{ij} - \sigma_{ij}) x_{ij} \quad (3.3)$$

Subject to

$$y_i - x_i - \sum (x_{ji} - x_{ij}) + U_i = 0 \text{ for } (i = 1, \dots, I) \quad (3.4)$$

and  $x, y, t, U \geq 0$

Where  $\underline{P}_i$  is the price floor in the  $i^{th}$  region, while  $U_i$  denotes a possible excess supply in region  $i$ .

## Results

Solution provides equilibrium export quantities and prices for each supply region. Equilibrium imports and import prices for demand regions and the optimal shipments between demand and supply regions.

Country welfare changes will be computed for different time periods pre-reform (2006) compared to post-reform.

## References

- Takayama, T., Judge, G.G. (1971). Spatial and Temporal Price and Allocation Models. North-Holland Publishing Company.
- Thore, S. (1986). Spatial Disequilibrium. Journal of Regional Science, Vol. 26, No. 4.

## For further information

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