

# Preferences erosion and the developing countries exports to the EU: a dynamic panel gravity approach

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# Motivation

- Trade liberalization may imply preferences erosion
- **An interesting example is the EU rice policy:** sharp reduction of MFN tariffs since 2004 , preferential tariffs have been almost the same as before → preferences erosion

## The key policy issues:

- What is the **size** and what the **trade impact** of the **preferences erosion** occurred after the 2004 EU policy change?

## Two contributions to the literature

- A new empirical approach to determine the preferential margin under tariff rate quotas which is consistent with economies of scale and imperfect competition
- A dynamic panel gravity model to account for **endogeneity** and **persistency** of trade with a **quantitative variable** (not a dummy) measuring preferences

# The preferential margin (PM)

The PM of the  $j$  partner for the product  $k$  is:

$$PM_{kj} = \frac{T_k^{MFN} - T_{kj}^{PREF}}{1 + T_{kj}^{PREF}}$$

- $T_{kj}^{PREF}$  : when preferences are granted by means of tariff rate quotas (TRQs) (i.e. two tariff system, with a tariff lower than the MFN one applied to the in-quota imports) what is their tariff equivalent?

# The tariff equivalent of TRQs

To date the literature has determined the tariff equivalent of the TRQ on the basis of the perfect competition-increasing marginal cost model (marginal protection) ; the tariff equivalent is:

- the **in-quota tariff** if imports are lower than the quota;
- the **out-of-quota tariff** if imports are higher than the quota

## However:

- Fixed costs and economies of scale prevail in the international trade of agricultural products

What is the tariff equivalent of a TRQ under economies of scale?

- We use the traditional Dixit-Stiglitz-Krugman model: symmetric firms importing a differentiated product, fixed costs + constant marginal cost → decreasing average costs; monopolistic competition with free entry and exit;
- in equilibrium the price is equal to the average cost

The average cost under a TRQ is :

$$AC_{T^{in}, T^{out}} = \left\{ \begin{array}{ll} \frac{FC}{Q} + c + \frac{T^{in}\bar{Q} + T^{out}(Q - \bar{Q})}{Q} & \text{if } Q > \bar{Q} \\ \frac{FC}{Q} + c + T^{in} & \text{if } Q \leq \bar{Q} \end{array} \right\}$$

**FC** = fixed cost      **c** = marginal cost;       $\bar{Q}$  = quota

$T^{in}$  = in quota tariff       $T^{out}$  = out-of-quota tariff,

**Q**: total imports

## The tariff equivalent is:

- The weighted average of the two tariffs if imports are higher than the quota:

$$\frac{T^{in} \bar{Q} + T^{out} (Q - \bar{Q})}{Q} \text{ if } Q > \bar{Q}$$

- The in-quota tariff if imports are lower than the quota:

$$T^{in} \text{ if } Q < \bar{Q}$$

Hence, the tariff equivalent consistent with perfect competition if imports exceed the quota is **higher** than the one determined under economies of scale and monopolistic competition



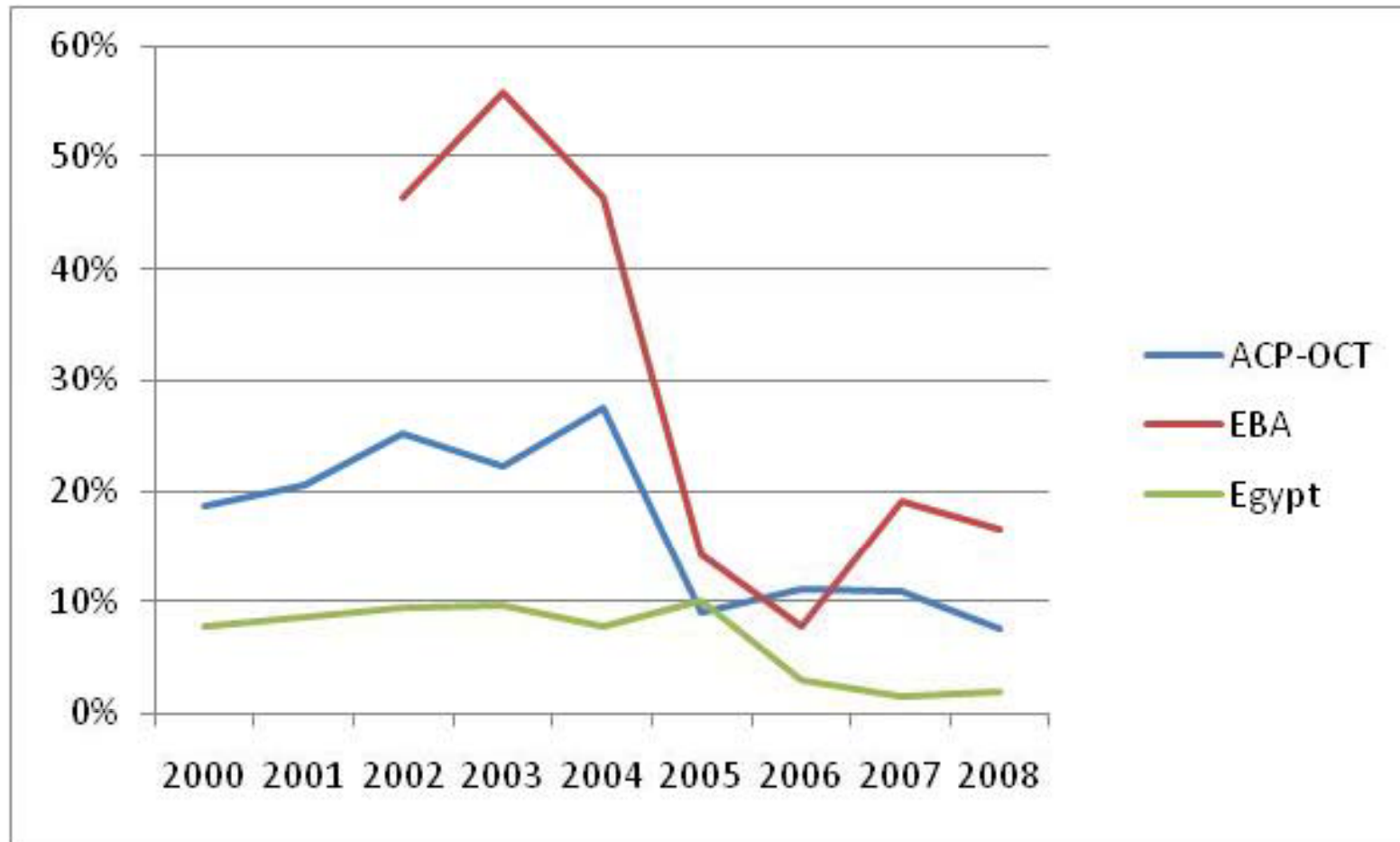
**Preferential margins (PM)** under the two hypotheses have been computed and then used into a gravity equation:

- $PM^E$  under economies of scale
- $PM^P$  under perfect competition

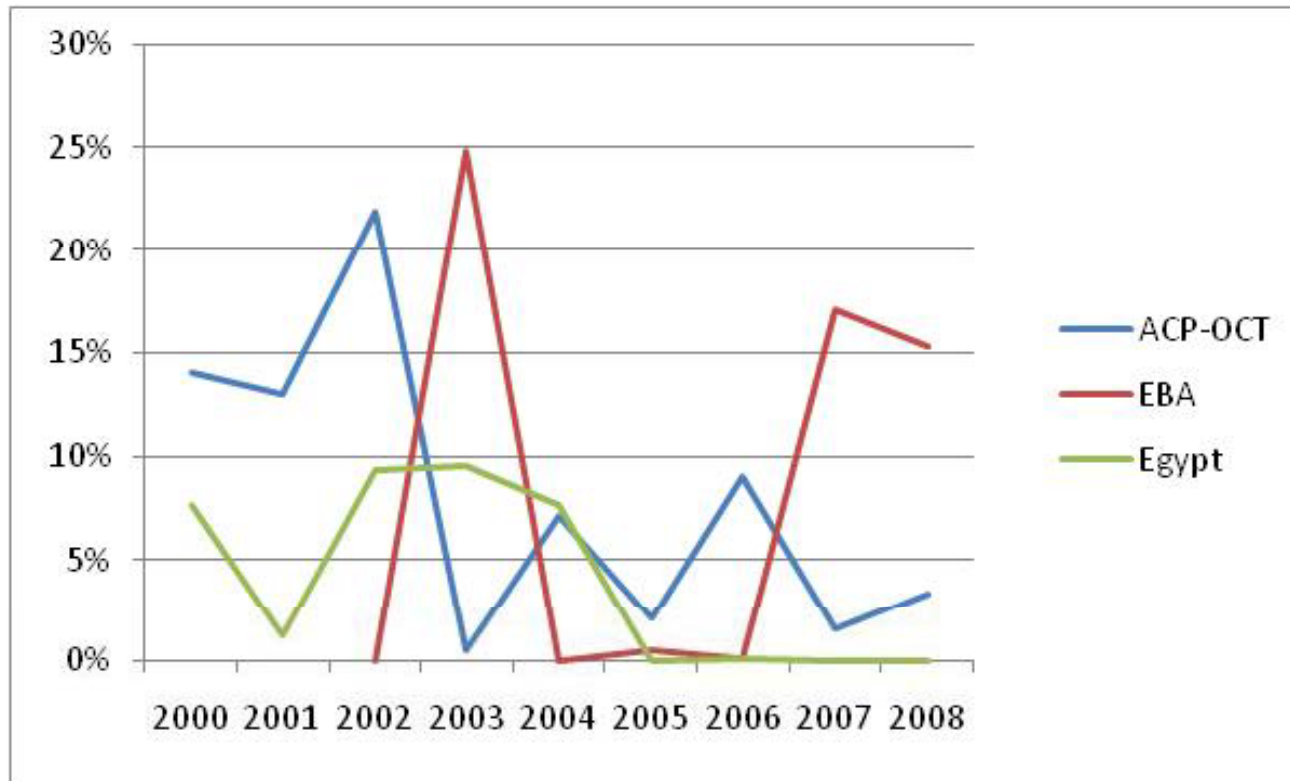
## Data

- 9 years (2000-08) and 34 rice products (HS8 digit)
- 123 partner countries of the EU;
- In-quota and MFN tariffs converted in *ad valorem* tariffs (no aggregation);
- Total imports (HS8 digit) from Comext;
- In-quota imports from EC Commission

**PME:** evidence of preferences erosion after 2004 for EBA ad ACP countries



***PMP: NO clear*** evidence of preferences erosion!!



Assumptions about market structure and costs matter!

# The empirical model

- Unobservable factors, often correlated with the level of trade, determine the governments' choice to select into a FTA
- This rises **endogeneity** in RHS variables
- Recent literature has shown that unbiased FTA effect can be estimated from (theoretically based) gravity models using **panel data** (e.g. Baier and Bergstrand, 2007)

# The panel gravity model specification

$$\ln m_{ijkt} = \beta_0 + \beta_1 \ln(1 + T_{ijkt}) + \alpha_{jt} + \alpha_{it} + \alpha_{ij} + \alpha_{hs6t} + \alpha_t$$

where

- $m_{ijkt}$  is the trade flow to country i from country j of good k in year t
- $T_{ijkt}$  is the ad valorem equivalent tariff
- $\alpha_{it}$  and  $\alpha_{jt}$  are the importer-year and exporter-year fixed effects
- $\alpha_{ij}$  are bilateral fixed effects to control for unobserved time-invariant heterogeneities
- $\alpha_t$  and  $\alpha_{hs6t}$  are year and product-time dummies

# The static panel gravity specification

$$\ln m_{ijkt} = \beta_0 + \beta_1 \ln(1 + T_{ijkt}) + \alpha_{jt} + \alpha_{it} + \alpha_{ij} + \alpha_{hs6t} + \alpha_t$$

$$(1 + PM_{kj}) = \frac{(1 + T_k^{MFN})}{(1 + T_{kj}^{PREF})} \quad \Rightarrow \quad (1 + T_{kjt}^{PREF}) = \frac{(1 + T_{kt}^{MFN})}{(1 + PM_{kjt})}$$

$$\ln m_{jkt} = \beta_0 + \beta_1 \left[ \ln(1 + T_{kt}^{MFN}) - \ln(1 + PM_{kjt}) \right] + \alpha_{jt} + \alpha_{hs6t} + \alpha_t$$

$$\ln m_{jkt} = \beta_0 + \beta_2 \ln(1 + PM_{kjt}) + \alpha_{jt} + \alpha_{hs6t} + \alpha_t$$

**Estimation Methods:** LSDV for  $m > 0$ ; Heckman;  
Poisson Pseudo Maximum Likelihood (PPML)

# Dynamic gravity equation specification

To account for **persistence**, the equation is specified dynamically by adding the lagged dependent variable on the RHS.

$$\ln m_{jkt} = \beta_0 + \beta_1 \ln m_{jk(t-1)} + \beta_2 \ln(1 + PM_{jkt}) + \alpha_{jt} + \alpha_{hs6t} + \alpha_t + u_{jkt}$$

Moreover, given the structure of our panel (short-time series and large cross-section) we used the **GMM** estimator.

In particular, the **System-GMM** because of

- short panel data, along the time dimension (9 years)
- highly persistent data (trade flows)

# Static model results - Panel

## (LSDV, Heckman, PPML)

	Dep. Variable: $\ln(\text{Import}_{jkt})$				Dep.Var.: $\text{Import}_{jkt}$	
	LSDV		HECKMAN		PPML	
	Standard- PM <sup>P</sup>	Weighted- PM <sup>E</sup>	Standard- PM <sup>P</sup>	Weighted- PM <sup>E</sup>	Standard- PM <sup>P</sup>	Weighted- PM <sup>E</sup>
	(1)	(2)	(3)	(4)	(5)	(6)
$\log(1+\text{PM}_{jkt})$	4.91** (2.28)	11.45*** (2.14)	20.54*** (4.41)	20.75*** (5.19)	10.64*** (1.90)	18.36*** (1.38)
Mills ratio			3.37*** (0.74)	1.85** (0.82)		
No. of obs.	3,195	3,195	3,195	3,195	17,944	17,944

- The estimated preferences effect **always increases in magnitude** when the PM is measured assuming scale economies and imperfect competition (**PM<sup>E</sup>**) (vis-à-vis perfect competition **PM<sup>P</sup>**)
- $\text{Elasticity}^{\text{Heckman}} > \text{Elasticity}^{\text{PPML}} > \text{Elasticity}^{\text{LSDV}}$



# Dynamic model results (System-GMM)

	Sys-GMM	
	Standard- PM <sup>P</sup>	Weighted- PM <sup>E</sup>
$\log(\text{trade}_{jk(t-1)})$	0.61*** (0.10)	0.61*** (0.07)
$\log(1+\text{PM}_{jkt})$	7.97 (7.64)	5.03** (2.13)
$\log(\text{distance}_j)$	-0.23 (1.96)	-0.17 (1.01)
$\log(\text{production}_{jt})$	0.15 (0.11)	0.16** (0.06)
No. Obs.	1,683	1,683
AR(2)	0.273	0.264
Hansen p-value	0.764	0.709
diff-in-Hansen p-value	0.436	0.692

## SHORT-RUN ELASTICITY

- A one percentage point increase in preferential margin factor is associated with a **5% increase** in rice exports to the European Union, *ceteris paribus*.

## LONG-RUN ELASTICITY

$$(\beta_2 / (1 - \beta_1))$$

- The long-run effect of the preferential margin factor on trade is **near to 13**
- The magnitude confirms the inertial behaviour of exports

# Dynamic model results in preferential groups

	System- GMM					
	PM <sup>P</sup> - Standard			PM <sup>E</sup> - Weighted		
	ACP-OCT	EBA	EGYPT	ACP-OCT	EBA	EGYPT
log(trade <sub>jk(t-1)</sub> )	0.70***	0.67***	0.65***	0.63***	0.67***	0.64***
log(1+PM <sub>jk(t)</sub> )	2.40	3.74	17.27	10.36*	3.70**	-3.82
log(distance <sub>j</sub> )	0.13	0.16	0.16	0.11	0.13	0.07
log(production <sub>jt</sub> )	0.11***	0.13***	0.14***	0.16***	0.14***	0.14***

The **preferences impacts** estimated using **PM<sup>P</sup>** are not significant

**PM<sup>E</sup>** \* **ACP-OCT** countries have the stronger impact of preferences on trade

\* **EBA** countries have a lower short-run average effect of preferences on trade flows (preferences have drastically decreased after 2004)

\* not significant for **EGYPT** (increased ability to export broken-rice out of quota occurred after 2004)

# Conclusions (1)

- The use of the “standard” tariff equivalent of tariff rate quotas may result in **misleading conclusions** about the extent of the trade preferences and of their impact on trade by:
  - **an overestimation of the tariff** equivalents and an **underestimation of preferences**
  - Empirically, this translates in an **underestimation** of trade elasticities to preferences (static model) **or** in **not significant elasticities** (dynamic model)
- Thus the assumptions about **market structure** and costs **matter** considerably when assessing the trade impact of preferences.

# Conclusions (2)

From a policy perspective:

- **Preferences erosion** has been considerable according to the preferential margin consistent with economies of scale and monopolistic competition
- **EU preferences still matter significantly** on the developing countries ability to export rice to the EU
- and this is especially true for **ACP countries**

**Thank you !!!!**