

*Modelling Methods for Trade
Policy II: Gravity Applications*

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Outline

- “Does the WTO promote trade?” A. Rose, AER 2004.
- “WTO promotes trade strongly, but unequally”
- What have we learned?
- Application using Stata

What did Rose do?

- Augmented gravity model

$$\begin{aligned} \ln(\text{Trade}_{ijt}) = & b_1 \ln(\text{Distance}_{ij}) + b_2 \ln(\text{GDP}_i \text{GDP}_j)_t \\ & + b_3 (\text{other control variables}) + c_1 \text{Bothin}_{ijt} \\ & + c_2 \text{Onein}_{ijt} + u_{ijt} \end{aligned}$$

- Rose argues that there is no evidence that GATT/WTO membership increases a country's trade. $c_1 = -0.04$ is not significant

Why Rose may be wrong?

- 1. Between 1950 and 1994, 63 developing countries joined the GATT, BUT they did not have commitments to liberalize their trade regimes;
 2. A transition period for tariff reduction is generally allowed for
 3. In many circumstances, countries benefited already from MFN treatment or preferential tariffs before the accession to GATT/WTO;
 4. In other cases, acceding countries removed important barriers to trade incompatible with WTO prior to accession.
 5. Many developing countries are exporters of fuels and minerals, and have a comparative advantage in agriculture. Fuels and minerals always faced low tariffs in developed countries on the one hand while agriculture still remains a highly protected sector.
 6. Points 1 to 5 imply that impact of membership should be higher in developed countries

Recent studies on GATT/WTO membership

- Issues neglected in Rose's papers:
 1. failure to distinguish country and sector asymmetries in terms of de facto liberalization (**excessive pooling**)
 2. the omission of zero trade observations (**selection bias**).
- When (1) and (2) are taken into account GATT/WTO membership has a positive impact on trade

(1) Excessive pooling

a) Across countries

- Developing countries that were not required to liberalised should not be included (Subramanian and Wei, 2006)

$$c_1=1.08$$

- Developing countries that were informal WTO members should also be included (Tomz et al. 2005)

$$c_1=0.17$$

b) Time and Industries

- Agriculture, textile, clothing and footwear have not be included in GATT liberalization effort, therefore should no be included (Subramanian and Wei, 2006)

(1) Excessive Pooling (cont')

- **Fixed effects (FE):**

- Country-specific FE

Note: Rose find a positive effect that GATT/WTO increases trade by 16%!

$C_1=0.16$ (Rose); $C_1=0.54$ (Tomz et al.)

- Country-pairs FE

$C_1=0.13$ (Rose); $C_1=0.48$ (Tomz et al.)

(2) Selection bias

- GATT/WTO membership may affect the probability that two countries trade (the extensive margin of trade)
 neglecting zero trade observation bias the results
- See Felbermayr and Koler, 2005; Helpman, Melitz and Rubinstein, 2005; Liu, 2006
 $C_1 = 0.5, 0.3$ and 1.45 respectively

Lessons from gravity models' applications

- **The property of standard gravity models of explaining a large percentage of the variation in the data does not guarantee that the part of the variation relevant for the policy variable is properly controlled for.**
 - A large number of studies that use the "standard" gravity approach simply plugs in an additional variable, the policy variable of interest, in an *ad hoc* manner.
 - Many studies do not take into account that **relative, as well as absolute, distance** and trade costs matter for understanding bilateral trade.
 - Disregarding **zero trade** observations introduces a sample selection bias in the estimations.
- **Gravity models explain the direction of bilateral trade flows and do **not** imply anything about **welfare**.**
- **Gravity models are *ex post* analysis models. They explain how a policy already implemented has worked in the past, but they are not intended to be used for predictions.**

Application using STATA

- Open Rose data base
- Run Rose's principal equation (Table 1 in Roses paper)
- Add time and country fixed effects