HOW DISTANCE AND DIFFERENT AREAS OF CULTIVATION DETERMINE EUROPEAN FOOD AND AGRICULTURAL TRADE FLOWS

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How distance and different areas of cultivation determine European food and agricultural trade flows

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1 Hypothesis

Distance in agricultural trade reflects more than transport costs.

Traditional trade analysis includes a distance variable as a measure of transport costs.

However, trade in agricultural products may also occur due to the possibility to grow different cultures in different areas of cultivation. Different growing conditions are connected to distance. Thus, **without accounting for specific features of growing areas the transport cost effect could be biased.**

2 Method

Gravity approach explains trade flows ($T_{ij,t}$) via the GDP of trade partners *i* and *j*, distance between the countries and various trade facilitating and hampering effects summarized in the vector *Z*:

$$ln(T_{ijt}) = \alpha + \beta_1 ln(GDP_{jt}) + \beta_2 ln(GDP_{it}) + \beta_3 ln(Dist_{ij}) + \gamma Z_{ij(t)} + \varepsilon_{ijt}$$

New: Areas of cultivation are taken into account in different ways:

a) Average rainfall & temperature
b) Proximity to the equator
c) Latitude and longitude

each as difference between trading partners.

3 Data

Annual panel (1991-2010) with trade flows of EU27 countries with all trade partners for different product groups and levels of aggregation (Sources: Uncomtrade, IMF, World Bank, CEPII…)

4 Results

Temperature and rainfall differences are to a certain extent correlated with distance (0.37 and 0.43) and with each other (0.39) and, thus, capture a part of the distance effect (see table). Decomposing distance into latitude and longitude leads to fruitful insights. **The difference in countries' longitude explains the major distance effect, whereas difference in the latitude has no significant or even a positive impact.**

	Total Sector							
	European Imports				European Exports			
Distance	-0.38*	-0.38*	-0.30*		-0.50*	-0.52*	-0.43*	
Rainfall		-0.04*				-0.10*		
Temperature			-0.21*				-0.20*	
Latitude				-0.01				-0.09*
Longitude				-0.32*				-0.37*
adjusted R^2	0.67	0.69	0.67	0.72	0.72	0.74	0.72	0.72
	Fruits and Vegetable							
Distance	-0.28*	-0.28*	-0.19*		-0.50*	-0.51*	-0.47*	
Rainfall		-0.01				-0.04*		
Temperature			-0.27*				-0.08	
Latitude				**0.07***				-0.01
Longitude				**-0.31***				-0.41*
adjusted R^2	0.42	0.42	0.42	0.44	0.46	0.46	0.46	0.51

Note: Each estimated equation also includes a constant, trade partners' GDP, GDP p.c., openness to trade, remoteness, tariffs as well as dummies for a common religion, language, land border, colonial ties, see access and membership in EU and euro zone. Estimation method is PPML as suggested by SILVA and TENREYRO (2006) and include zero trade flows. Coefficients displayed are elasticities of exports and imports, respectively . * denotes significance at 5% error-term level. Source: own estimations.

5 Conclusion

Distance seems not to be underestimated. Climatic measures of growing areas seem to replace distance effects. Differences in latitudes actually increase trade flows (e.g. due to European imports of tropical fruits).

New methods as BAIER and BERGSTRAND (2009) need to be considered.

Your comments and ideas are very welcome!

Literature

BAIER, S.L. and J.H. BERGSTRAND (2009): Bonus Vetus OLS: A Simple Method for Approximating International Trade-cost Effects Using the Gravity Equation. In: Journal of International Economics 77: 77-85.

SILVA, J.M.C.S. and S. TENREYRO (2006): The Log of Gravity. In: The Review of Economics and Statistics 88: 641-658.

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