The challenge of the international organic certification: 
a new opportunity for agricultural trading?

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The challenge of the international organic certification: a new opportunity for agricultural trading?

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Abstract
The successful literature about gravitational models stresses that bilateral trade flows among countries is influenced by GDP factors and transaction costs. In other words the mass of bilateral trade would be related to the typical demand-supply factors which explain the quantity of traded goods in perfect competition models and a wide series of variables which express transaction costs whose role is strongly highlighted by institutional economists. If compared to the previous literature our paper shows a twofold novelty. First it is the first attempt to analyse the bilateral trade of specific agricultural goods for Italy by a cross country and panel analysis and second it provides an original specification for transaction costs. In particular, other than the distance as typical approximation for transaction costs, we clearly distinguish transaction costs which affect the whole economic system and those which specifically affect the agricultural sector. We assume that the level of organic certification standards harmonisation between Italy and extra-european countries could represent a good “proxy” for the cultural, political and social affinity in the agricultural sector. Interestingly we find that the absence of specific import harmonisation rules between Italy and other extra-european countries decreases the level of bilateral trade for all the agricultural produce. A plausible explanation could be that trust and affinity in trading partnership for agricultural products among countries promotes harmonisation of organic standards. In this context for a specific country the awareness of a high harmonisation level of organic standards towards another region could represent the signal of a more general awareness of the affinity in the trading activities for the whole agricultural produce. The policy agenda about the harmonisation of the agricultural standards should be tackled in the context of a more complex agenda concerning the affinity of political, cultural and social practices among different regions in the agricultural sector.

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Introduction

Traditional gravitational models point out that the magnitude of import and export among countries strongly depends on the distance among regions and on the size of the involved economies (Bergstrand 1985, Evenett and Keller 1998). The shorter the distance and the greater the GDP, the more trade will occur. However recent literature outlines that gravitational models could be suitable also to investigate the role of transaction costs in affecting trading. The concept of transaction costs is crucial in the New Institutional Economics questioning the general findings deriving from neoclassical theories (Williamson 2000). Williamson explains that transaction costs derive from contact, negotiation and control activities. Though a wide literature focussed on the investigation of transaction costs, only a few contributions provided reliable monetary estimations (Wallis and North 1986). Gravitational models are suitable for extensions capturing the impact of transaction costs for trading. Whereas Frankel and Rose (2002) study the impact of a common currency in the mass of bilateral flows, den Butter and Mosche (2003) find that trust has a statistically significant impact on the trading mass.

Our paper provides a contribution to this debate in the specific field of the agricultural sector. Starting from gravitational models we assume that trading of agricultural produce is affected by the same factors identified by the previous literature as the distance among regions and the size of the economy. As first step we will test these assumptions for the specific agricultural sector for Italy by a cross country analysis in 2003 and by a panel analysis in the lapse of time 1997 – 2003.

A novelty of this paper is that we assume that transaction costs cannot show the same nature in all economic sectors. Whereas different currencies can generate transaction costs affecting industrial and agricultural transactions, in our paper we will test the existence and the importance of sector specific transaction costs. The idea is that common habits, cultural and political behaviours in agricultural practices among regions could positively affect trading of agricultural produce. The difficulty to test this hypothesis lies in the identification of a reliable measure representing the “affinity” among countries in the agricultural sector.

Recently wide scientific debate regarded the growth of organic farming aimed at minimizing the negative externalities of farming on the environment and on social justice. Many researchers agree on the fact that production and consumption of organic food is driven by ethical and social values (Seyfang 2006). The pursue of organic practices is guaranteed by certification activities driven by professional inspectors. An important pitfall of this procedure is that organic standards are different in each country. Our assumption is that the extent of the differences among certification standards represent a good proxy of the differences in the “affinity” in the agricultural sector among countries.

Given this background our paper will answer the following research question. Assuming that differences in certification standards derive from different cultural and political behaviours and attitudes, how much do these transaction costs affect the trade of agricultural produce?

We think that this paper could provide an interesting and original message. Harmonisation of certification standards cannot be considered an isolated activity. Policy makers should work to harmonize (without eliminating) cultural and habits differences in the agricultural sector among countries. This harmonisation could represent an impulse for integration of certification standards but also for trust in the relationships among regions driving a wider mass of trading and growth for all the agricultural produce. In the section 1 we will briefly introduce the model and we will explain the data source. In the section 2 we will show the results. Finally the conclusions.
1. Model and data

The gravitational model is characterised by a very simple and intuitive notion. The mass of bilateral trade among regions would is influenced by the typical factors influencing the trading of goods in a perfect competition market such as demand and supply factors and by transaction costs. The typical transaction costs which are expressed by the literature are transport costs (which are usually represented by the distance among regions). The conceptual model can be expressed by an equation as follows:

(1) \( T_{ij} = A \ast \frac{Y_i Y_j}{D_{ij}} \)

Where

\( T_{ij} = \text{bilateral trade} \)
\( A = \text{constant of proportionality} \)
\( Y_{ij} = \text{the GDP for countries i and j} \)
\( D_{ij} = \text{physical distance between the country i and the country j} \).

\( T_{ij} \) expresses the mass of bilateral trade among countries i and j, \( Y_{ij} \) represents the economic size of countries i and j and in particular the supply side factors. In other words the basic assumption is that more countries produce GDP and more is the trading attraction. Previous literature generally also identifies demand side factors. The willingness to buy trading goods is usually expressed by the level of GDP per capita between two countries.

On the basis of the previous comments a more accurate expression interprets the equation (1) by a Cobb Douglas function as follows:

(2) \( PX_{ij} = A^1 (Y_i \ast Y_j)^{\beta_1} ( (Y_i / L_i) \ast (Y_j / L_j))^{\beta_2} \ast (D_{ij})^{\beta_3} \)

Where \( P \) is the price, \( L \) is the level of population and \( X \) is the trading mass. \( (Y_i \ast Y_j) \) and the \( (Y_i / L_i) \) factors mean that the supply and demand factors are expressed as the interaction of economic size indicators for the involved countries. To make the previous equation suitable for an econometric analysis we should consider the following model:

(3) \( \log V_{ij} = \alpha_1 + \beta_1 \log(Y_i \ast Y_j) + \beta_2 \log((Y_i / L_i) \ast (Y_j / L_j)) + \beta_3 \log(D_{ij}) + \epsilon \)

where \( V_{ij} \) is the monetary value of the agricultural trading mass (import + export), \( \epsilon \) is the usual normal stochastic error and \( \log \) is the natural logarithm. Of course being the values expressed in natural logarithms, each coefficient should be interpreted as elasticity. We will label this model as the Basic Gravitational Model (BGM) that we will use to apply the gravitational model for the agricultural international trading in Italy by a cross country and a panel analysis. Empirical studies focussing on the specific topic of the agricultural produce are not wide-spread in the previous literature(Sevela 2002, Dalton et al.2002) and our specific case study for Italy is quite original.

The second step will be to introduce a more sophisticated set of variables expressing transaction costs in the trading of agricultural produce. A novelty of this paper is that we clearly distinguish between two levels of transaction costs. In the first level we introduce those transaction costs which generally affect the whole economic system. Currency dummies or variables expressing law/political transaction costs are variables which typically express transaction costs which strongly
affect each sector of the economic activity. As proxy and most representative variable of “general”
transaction costs we will consider a dummy variable as follows:

4) DEU = 1 if the trading partner is an EU member and 0 if it is not.

It is a very intuitive assumption. The underlying hypothesis is that the agricultural trading between
Italy and another European countries will be facilitated because of the absence of transaction costs
deriving from factors such as borders, currency exchange costs and trust relationships. Of course if
we applied the same analysis to the other European Union partners this dummy variable would
express the same value for each country.

Moreover we introduce a more specific dummy variable which describes transaction costs for the
specific agricultural sector. Our aim is to identify a variable that could express the degree of
cultural, social and political “affinity” among countries about agricultural practices. To reach our
goal we focus on the specific sector of organic food. Our assumption is that the trust factor in the
organic sector among trading partners shows an even more important role than in the whole
agricultural sector. For this reason policies implemented by countries in order to facilitate the
import procedures of organic food from other regions could represent a concrete and interesting
signal showing affinity between countries in the agricultural habits and practices. If this assumption
is true a high level of organic standards harmonisation among regions should indicate both a high
level of trust and a lower level of transaction costs among trading countries. This will determine a
higher level of bilateral trade. The important consequence of this assumption is that the “hot” issue
concerning the harmonisation of organic standards should be assessed in a more general context
involving the cultural and social affinity among countries in the international food marketing.

In line with this strand of research we introduce a dummy variable as follows:

5) DEO = 1 if the trading partner can enjoy a privileged organic export procedure in Italy on the
basis of the European laws\(^1\) and DEO = 0 if it is not.

This description of this dummy variable needs further comments. As the reader can notice our
implicit assumption is that if Italy allows a third country simplified import procedures both the
import and export mass between these countries will increase. We should specify that this dummy
variable does not properly represent equivalency between Italy and other regions. As expressed by
IFOAM (2004) the issue of standards equivalency cannot be safely assessed on the basis of
unambiguous criteria. For this reason the meaning of this dummy variable is the perception of
equivalence rather than a strict and objective interpretation of equivalence in organic standards.
Evidence of this interpretation can be considered the fact that equivalence is very seldom bilateral.
For this reason what we are investigating is the impulse on the agricultural trading deriving from the
recognition of an “unilateral” concept of equivalence, without considering if the third country
reciprocally accepts equivalence.

Now that we have clarified the meaning of our dummy variables we can set up our Adjusted Basic
Gravitational Model (ABGM) as follows:

\(6) \log V_y = \alpha + \beta_1 \log(Y_i \cdot Y_j) + \beta_2 \log((Y_i / L_i) \cdot (Y_j / L_j)) + \beta_3 \log(D_y) + \beta_4 DEU + \beta_5 DEO + \epsilon\)

\(^1\) The European Law 2092/91 recognises for some non European countries equivalency in organic standards. Actually 8
countries benefit from this law: Australia, Argentina, Costa Rica, Hungary, New Zealand, Czech Republic, Switzerland
and Israel. Hungary and Czech Republic in the lapse of time 1997-2003, which is the period of interest of our analysis,
had not joined the European union.
Data are extracted from different sources. Data about V are extrapolated from the FAOSTAT dataset. Data about GDP are taken from the International Monetary Fund Dataset. Data about the distance among regions are extracted from the Frenkel and Rose’s (2002) dataset. The analysis is driven by a 130 cross country (2003) and a balanced panel (1997 – 2003) dataset. Data about GDP and V in the panel data are expressed in real terms. Next section shows the results.

2. The results

The analysis is driven by the E-Views Software. First we present results for the cross country analysis with the BGM model.

Table 1. Cross country analysis. 2003. BGM model.

<table>
<thead>
<tr>
<th>Dependent Variable: V</th>
<th>Method: Least Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Coefficient</strong></td>
</tr>
<tr>
<td>C</td>
<td>-19.01587</td>
</tr>
<tr>
<td>PROD Y</td>
<td>0.799991</td>
</tr>
<tr>
<td>PROD YPC</td>
<td>0.038697</td>
</tr>
<tr>
<td>D</td>
<td>-0.811694</td>
</tr>
</tbody>
</table>

R-squared 0.735473 Mean dependent var 16.70109
Adjusted R-squared 0.729174 S.D. dependent var 2.563739

From the basic model we get interesting information. The distance (D) and the interaction variable concerning GDP (PROD Y) show significant coefficients. The interaction variable expressing GDP per capita (PROD YPC) is statistically insignificant (5% significativity level). The model is satisfactorily performing if we consider a 0.73 value of the adjusted $R^2$ index. Both the significant coefficients associated to D and PROD Y show the expected signs highlighted by the previous published literature about gravitational models. Now we can consider the more complete ABGM model. Results are again rather encouraging.

Table 2. Cross country analysis. 2003. ABGM model

<table>
<thead>
<tr>
<th>Dependent Variable: V</th>
<th>Method: Least Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Coefficient</strong></td>
</tr>
<tr>
<td>C</td>
<td>-17.28720</td>
</tr>
<tr>
<td>PROD Y</td>
<td>0.769765</td>
</tr>
<tr>
<td>PROD YPC</td>
<td>-0.059669</td>
</tr>
<tr>
<td>D</td>
<td>-0.634896</td>
</tr>
<tr>
<td>DEU</td>
<td>1.192956</td>
</tr>
<tr>
<td>DEO</td>
<td>1.276640</td>
</tr>
</tbody>
</table>

R-squared 0.754018 Mean dependent var 16.70109
Adjusted R-squared 0.744100 S.D. dependent var 2.563739
As the reader can notice from the table 1 the ABGM model confirms the results we obtained in the table 1 and mainly both dummy variables DEU and DEO are significant. Moreover both dummy variables are associated to coefficients showing a strong positive impact. This result would suggest that bilateral trade of agricultural produce is more strongly addressed towards EU countries because of political, economic and cultural reasons and lower transactions costs and towards extra-EU countries if they enjoy a privileged export procedure of organic produce in Italy. The fact that those countries can benefit from privileged export procedures could be the signal that Italy recognises those countries as affine in agricultural practices and this would stimulate bilateral trade flows.

Results are robust to normality tests (Jarque-Bera) and misspecification tests (Ramsey test). We only find heteroscedasticity but as showed in the table 3, adjusting the estimation procedure to correct heteroscedasticity, we do not find particular results differences in the significance of the coefficients. The value of each coefficient by a White correction does not vary.

Table 3. Cross section analysis. 2003. ABGM model

<table>
<thead>
<tr>
<th>Dependent Variable: V</th>
<th>Method: Least Squares</th>
<th>White Heteroskedasticity-Consistent Standard Errors &amp; Covariance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Coefficient</strong></td>
<td><strong>Std. Error</strong></td>
</tr>
<tr>
<td>C</td>
<td>-17.28720</td>
<td>2.926786</td>
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<tr>
<td>PROD Y</td>
<td>0.769765</td>
<td>0.056822</td>
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<tr>
<td>PROD YPC</td>
<td>-0.059669</td>
<td>0.091811</td>
</tr>
<tr>
<td>D</td>
<td>-0.634896</td>
<td>0.143805</td>
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<tr>
<td>DEU</td>
<td>1.192956</td>
<td>0.317079</td>
</tr>
<tr>
<td>DEO</td>
<td>1.276640</td>
<td>0.403152</td>
</tr>
</tbody>
</table>

R-squared 0.754018 | Mean dependent var 16.70109
Adjusted R-squared 0.744100 | S.D. dependent var 2.563739

The panel data analysis does not significantly change our conclusions. We estimate an ABGM model by a random coefficients model introducing time period effects as in Frenkel and Rose (2002).

\[
\text{Results are available upon request to the authors.}
\]
Dependent Variable: V
Method: Panel EGLS (Period random effects)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROD Y</td>
<td>0.752168</td>
<td>0.025800</td>
<td>29.15408</td>
<td>0.0000</td>
</tr>
<tr>
<td>PROD YPC</td>
<td>-0.012072</td>
<td>0.033845</td>
<td>-0.356678</td>
<td>0.7214</td>
</tr>
<tr>
<td>D</td>
<td>-0.647331</td>
<td>0.068491</td>
<td>-9.451336</td>
<td>0.0000</td>
</tr>
<tr>
<td>DEU</td>
<td>1.057688</td>
<td>0.204495</td>
<td>5.172195</td>
<td>0.0000</td>
</tr>
<tr>
<td>DEO</td>
<td>0.843219</td>
<td>0.240815</td>
<td>3.501520</td>
<td>0.0005</td>
</tr>
</tbody>
</table>

As the reader can see from the table 4 results are similar to those concerning the cross country analysis. The panel analysis confirms the sign and the significativity of our previous estimations. The choice of the random effects model is justified by the Hausmann test. From the table 5 we show that a 0.69 p-value indicates that the fixed effects model would not be suitable to describe data.


<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq. d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period random</td>
<td>3.000930</td>
<td>5</td>
<td>0.6998</td>
</tr>
</tbody>
</table>

3. Conclusions

In this paper we focus on the application of the empirical gravitational for bilateral trade flows between Italy and other world countries by a cross country and a panel analysis for agricultural produce. Whereas the traditional variables designed by the previous literature to explain the mass of trade are significant and the statistically robustness of the model is quite reliable for this specific case study the novelty of our paper is that we introduce a variable explaining the perception of affinity in the agricultural practices between Italy and other non European Union Countries. The crucial concept of our paper is that we analyse the impact of the country’s acknowledgement of equivalence among organic standards on the whole mass of trading of agricultural produce (imports plus exports). Our intuition is that if a country specifically recognises equivalence in organic standards the whole agricultural produce trading would benefit. This intuition is confirmed by empirical results for the Italian case. A second important novelty is that in the literature of transactions costs we distinguish more clearly transaction costs which affect all the sectors of the economic activity and transaction costs which affect a specific sector, in our case, the agricultural one. The important policy implication of our contribution is that “unilateral” equivalence in organic standards could be considered as the signal of the awareness for a country of a more general cultural, social and political affinity in the agricultural sector. Policy maker aimed at reducing (without of course eliminating) contrasts and different habits in the international relationships would work also for more harmonised organic standards and for more intense trading relationships.

Acknowledgment

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3 Intercept and time effects are not reported.
4. References


