

Referee 1 report on
“Islands in trade: disentangling distance from border effects”
submitted to Economics: The Open-Access, the Open-Assessment E-Journal

Thank you very much for your careful review of our paper. We appreciate your constructive and thoughtful feedback. Below we describe in detail our responses to your comments. We are happy to revise the paper along the lines you propose and as described in the responses below.

General comment:

The paper deals with a novel and interesting research question, whether there is evidence of a difference in the border effect for territories being an island. In particular, the main hypothesis is that the maritime border implies high fixed costs, which makes the interregional trade flows, thus, on medium distances unprofitable. To empirically analyse this question, the authors choose the Spanish case, where two out of 17 regions are island regions. In their econometric investigation, they proceed in two steps. First, they estimate an augmented gravity model accounting for multilateral resistance terms. Second, based on the estimation results, they apply the Blinder-Oaxaca decomposition technique to precisely account for the “border-type discrimination” against the islands. The results support the main hypothesis. Although the paper potentially delivers a valuable contribution to the existing literature, there are still points which need to be clarified/improved.

Main comments:

1. *There is a substantial need to explain the exact nature of the fixed costs connected with the sea border. In the introduction (first paragraph) it is stated that “in the case of the sea border that fixed cost is due to the use of two modes of transport (road and sea typically)”. First, it is still difficult to understand where such fixed costs come from? Once the necessary (road and sea) infrastructure is established, do the fixed costs still exist? If, where do they come from? Second, why air transportation is not mentioned here? Third, considering that the mainland uses the road (and air) transport as well, shouldn't this imply the existence of the fixed cost in this case too? In this regard, the authors state (page 3, last to the least sentence) that “the fixed cost of trade between the Balearic Islands and Barcelona due to the sea border does not exist between Barcelona and Vigo, because the latter are both located in the Iberian Peninsula”, but it is not explained why the fixed costs in the former case exist, whereas in the latter case do not.*

Authors' response: We have rewritten the text interpreting “fixed” costs as “island-specific” costs. The referee is right that air transport is comparable to the intermodal road/sea combination with respect to these costs: we refer to all those fees and taxes that have to be incurred to place merchandise on a ship or an airplane, as well as time delays, which do not exist for the case of road-only transport. These additional costs are island-specific given that mainland regions need not incur them since they can use only road transport in mainland trade. Although there are no official data for those costs, they arise due to the existence of a time barrier, the need to combine different transport modes – usually truck plus ship or alternatively truck plus air transport – or to pay fees and taxes for the use of public infrastructures such as ports and airports. The literature provides a guide to consider some

major features that suppose a penalty for the maritime transport cost, such as the insurance cost, the special conditions required for the type of goods shipped (e.g. refrigerated transport, fuel, etc.), small economies of scale at the port-level and at the cargo-ship-level, legal regulations and the existence of anticompetitive practices. We call specific costs to all those extra costs for trade with the Islands, which do not exist when trade takes place between regions located in the Iberian Peninsula.

1. *In considering the two island regions, and in confronting them with the mainland regions, no particular attention is dedicated to more concrete economic characteristics, for instance and most importantly, related to their respective industrial structures. More precisely, the fact that the Spanish islands trade less with the mainland Spain could be related to their industrial specialization patterns, which could be less economically relevant for the mainland as compared to other non-Spanish territories. Think about the tourism sector that is one of the main exported economic activities by the Spanish island: a relatively higher share of these exports is supplied through international trade relations than to the mainland Spain. The only way to control for these peculiarities is through the fixed effects, which might be very imprecise or even unable (if the industrial structure is weakly time-varying) in accounting for such differences. Consequently, there would be space for improvements of the gravity specification equation, by singling out some factors that in principle are observable.*

Authors' response: As shown in Table 1, the main trading partners of island regions are mainland regions (24.7% of interregional exports against 17.5% of international exports and 52.2% of interregional imports against 20.8% of international imports), so their share of interregional trade is higher than the international one for both exports and imports.

But the referee is absolutely right since the islands' tourism-dependency may cause distortions in the estimations. We now discuss this issue in the newly created robustness checks section (subsection 5.1).

Naturally being islands makes the Balearic and Canary islands more attractive for sand and sun tourism, thus increasing internal demand during the high season and increasing imports during those months. Distance and tourism-dependency are likely to be positively correlated. We are already approaching the potential demand by two time-varying size measures: GDP, that includes the domestic revenue produced by all sectors in the economy, including the tourism sector; and permanent population, that controls for the number of regular consumers, part of which are workers in the tourism sector, but excludes the tourist visitors. It can be argued that our measure of population does not capture the sudden peak that potential visitors represent for demand during the tourism season and, therefore, we should try to control for this effect.

In practical terms we should add the "appropriate" measure of floating population to the importer regions but not to the exporter ones. Introducing such a measure will reduce the explanatory power of the distance variable *only* if both variables, floating population and distance, are not orthogonal.¹ On the other hand, this raises some measurement issues to tackle. First, we have to consider that tourist arrivals for each region should be weighted according to the average length of the stay. Second, we have some data availability problems because data on international tourist arrivals by destination region are available only from 2001. For domestic tourism, data are available since 2006. Third, there would be an underreporting of the domestic tourism flows since it is much harder to detect people's

¹ This is unlikely given that all Spanish regions experience a high increase in the number of visitors during the summer season.

movement when there are no border crossings. Moreover, in the longer term, tourist visits may also increase exports to their regions of origin. Fixed effects would pick this up, but it can also be isolated in the way described above in the exports equation.

Therefore, we have extended our baseline regressions for imports and exports to include the floating population of the reporter region. However, there is a reduction in the number of observations and the coefficients are not significant in either equation. Moreover the Oaxaca decomposition shows now a higher relevance of the unexplained component of the distance variables. Alternatively, we have also estimated the baseline model with the share of tourism in GDP and the results are quantitatively the same as this variable is not significant either. Moreover, we have performed an additional check (not reported) introducing origin-time and destination-time dummies in the gravity model and obtained higher distance coefficients for island regions. This means that our results remain robust to the introduction of tourism and the structure of the economy does not affect our results.

2. *There is still not much told about the further going implications of the results. I am conscious about the difficulty to provide any valid policy implication for Spain. Indeed, provided that the results are true, there is not much to be done about the fact of having a particular kind of geographic border. Still, the authors themselves recognize (p. 10) that “the issue assumes greater political economy relevance for these regions, because the small economic size of island regions elevates their trade deficit up to 27.3% of their GDP, whilst they account for only 2.3% and 4.5% of Spain’s export and import flows, respectively.” In my opinion, it should be the case to comment (at least) on this in the conclusions. Additionally, it would be interesting to have an opinion on the extendibility of the results to territories outside Spain. In particular, could we expect that the maritime border effect is a disadvantage in trade for countries being islands? Could there be a U-shape relationship between the distance effect and trade for such sovereign islands? This would be an important counterfactual investigation, also permitting to negate the hypothesis raised in the previous point. Clearly, if it is the industrial specialization (which I suppose to be much more intensive in island regions within a country than in sovereign islands) that drives the direction of trade, there could be not much left to be explained by the discrimination against the maritime border.*

Authors’ response: The referee makes an important point regarding the distinction between sovereign and non-sovereign islands. However, it is true that tourism is also an important activity in sovereign islands (a few examples are located in the Indian Ocean and Pacific Ocean, and even in the Mediterranean, as in the case of Malta). The distinction is relevant when the analysis calls for some regional policy intervention. We have extended the conclusions to suggest that we are proposing a methodology of general applicability, leaving the use of non-Spanish data for further research. We also control for non-linearities in the distance effect (see description of robustness checks in subsection 5.2). In that section, we also describe the inclusion of tourist population and tourism share of GDP, as explained above. The main results are robust. We now leave policy recommendations at the end. As the referee points out, these are suggested and can be inferred from the analysis (e.g., the need for subsidizing the transport of merchandise in and out of islands or investing in transport infrastructure).

Minor comments:

1. *The discussion introducing the gravity approach, and particularly regarding the multilateral resistance terms should be more organized. What is still missing is the clear conceptual explanation of the logic of multilateral resistance. This is important in my opinion, given that the journal is directed to a broader economic audience and not only trade experts. Related to this, the last two sentences of the first paragraph on page 3 should be elaborated. In particular, it is difficult to understand the meaning of “the model specified with economic variables” as opposed to the fixed effects model. Moreover, this part of the paragraph is quite disconnected from its previous part.*

Authors’ response: The two sentences that the referee comments on indeed are unnecessary and have been removed. On the other hand, more motivation on the need to consider multilateral resistance has been added and a whole subsection is now dedicated to it (subsection 5.3).

2. *The introductory sentences in Section 2 could be excluded, as much of the information provided there has been already given in the introduction.*

Authors’ response: These sentences have been excluded.

3. *It is still not very clear to me, how the passage from eq. 6 to eq. 7 was made. By substituting Y_{St} in place of $\sum_i Y_{it}$, and subsequently substituting S_{it} for the ratio Y_{it}/Y_{St} , one should end with $M_{ijt} = Y_{jt} S_{it}$ (bilateral costs expression).*

Authors’ response: We have rechecked this and it is correct, but perhaps it is more easily seen when going backwards from (7) to (6): in (7), insert Y_{St} in the summation and multiply it by S_{it} to obtain Y_{it} as in (6).

4. *I have doubts about the rightness of the numbers provided for the shares of interregional trade over international trade for the island and mainland regions (p. 10, third sentence of the first full paragraph). From my calculations, the opposite is true, i.e. the shares of the international trade over the interregional trade are 71% and 63%, respectively.*

Authors’ response: The referee is right. Our apologies for this typo, which has been corrected.

5. *Please check the spelling in the x axis in Figure 2, as there is “Min” instead of “Main”.*

Authors’ response: Figure 2 has been corrected.

6. *I cannot fully agree with the interpretation of the adjacency result (p. 12 in the last paragraph). The authors state that the large positive effect suggests that the contiguous regions trade more “not because they are closer, but because the transport connectivity between them is higher and because they face lower information costs in their bilateral trade due to the existence of business and personal contacts leading to better knowledge of the consumers and producers, as well as of market opportunities”.*

In my opinion the short distance goes very much hand in hand with the fact of meeting mentioned economic opportunities. Thus, it is very much distance that is captured here. At least, this is what the new economic geography teaches us. This brings me to raise another issue regarding the specification: given that adjacency is captured by the short distance, do the results hold by excluding adjacency variable?

Authors' response: The referee's concern regarding the variable "Adjacency" is well taken because this variable is likely to pick up the effect of short distance on trade. It is well known in the literature that geographic aggregation produces strong economic effects (i.e. artificially large border effects and underestimation of distance on trade). For instance, Llano et al. (2011) point out that "If the sub-national unit is geographically large, trade between sub-national units may not pick the sharp reduction in value that happens at short distances." Our current results show that the relationship between distance and trade is different for island and for mainland regions, and that this fact can be explained by the existence of different trade costs, but the results could be contaminated by the way distance is treated.

We have checked whether our results are sensitive to this by inserting distance into the gravity equation in two different ways, while looking for changes in the adjacency coefficient. First, we have used our distance variable without logs entering as a second order polynomial, as in the baseline model of the Discussion Paper version. In both imports and exports equations now the distance linear term is highly significant with a negative sign, and the quadratic term is positive and significant. Interestingly, now the adjacency variable turns out insignificant, as presumed. So, we conclude that it is better not to log. Second, we have split the distance variable in ten equally frequent intervals (i.e. decile ranges) instead of treating it as a continuous variable. This increases the flexibility of our approach and allows us to capture a richer pattern of transport costs across several distance ranges. In all the ranges, distance coefficients are negative and highly significant and the adjacency variable is no longer significant. These results show more clearly that for each distance range coefficients are larger for island regions. The Oaxaca decomposition shows again that most of the trade gap among regions is due to the additional transportation costs that island regions suffer.

Although in both checks we find that distance affects trade following a U-shaped pattern, by estimating distance coefficients we find that the quadratic specification only approximates the actual shape and that the range-by-range does a better job in estimating the non-linearities found in the data. Therefore, the latter estimation is now our baseline model and quadratic distance is discussed as a robustness check in subsection 5.2. of the revised version.

Importantly, our main message remains valid after this change in the specification: the distance coefficients for island regions are larger than the coefficients of mainland regions. Hence, an important part of the trade gap is still explained by differences in coefficients and not by physical distance.

- 7. The results reported in column 4 in Table 4 are divergent from the results obtained with the other three methods (in the same table). The reason for this is not sufficiently discussed.*

Authors' response: The literature on discrimination establishes several methods to split the interaction effect to either characteristics or to coefficients, as explained in Section 2.2. In Table 5 (former Table 4) we present the four possible methods suggested in the literature. All of them, a priori, have advantages and disadvantages. In Column (1) we present the results from assuming that discrimination runs only against Group B (Island regions) but there is not

positive discrimination for Group A (Mainland regions), as in equation (14). In Column (2) we assume that discrimination is directed towards Group A (Mainland regions) but there is no positive discrimination for Group B (Island regions). In Column (3) we employ Reimers (1983) weight, which is a simple average of coefficients of both types of regions. This is a priori our preferred assumption because it doesn't imply a strong commitment regarding what region is most trade discriminated. Last, in Column (4) we present Neumark's (1988) approach consisting of the use of the coefficients from the pooled model.

We have added the following paragraph at the end of Section 4 for clarification:

The results in Table 5 show for exports and imports respectively that in 3 out of 4 decomposition methods the unexplained component of distance is significant. This suggests that there is a wide support for our hypothesis. Moreover, in the case of exports, the unexplained distance component is almost significant at 10 per cent level in the fourth method, which reinforces our earlier conclusion.

8. *The last sentence on page 12 is not very elegant; I suggest rewriting it.*

Authors' response: This sentence has been rewritten.

9. *Some editing work is still needed: some commas are missing, whereas some others are superfluous; some expressions are unusual (for instance, "on Table").*

Authors' response: The manuscript has been edited throughout in light of all the comments received.