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Cluster Approach to Institutional Distance: Middlemen Hypothesis Application

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Abstract:

We propose a methodology for gravity models which overcomes weakness of institutional distance measures identified in international business literature (Shenkar, 2001). Our methodology is based on combination of the distance approach with cluster analysis of states according to their institutional level. The methodology reflects the critiques concerning symmetry, linearity and “discordance illusion” of traditional distance specification of institutional variables within gravity models and tries to bridge the gap between those two streams of literature. We also use the methodology to test the “middlemen hypothesis” theorising that intermediate corrupt countries can mediate the trade flows between low and high corrupt groups because they possess skills to succeed on both markets. To present the methodology and examine the hypothesis we estimate micro-founded augmented gravity model for bilateral exports of 131 countries within period 1995-2013. The model is estimated also on disaggregated data. The results confirm that the proposed methodology overcomes discussed weaknesses especially when we estimate the model on disaggregated data because we find significant heterogeneity between sectors. We conclude that when we are interested in causal claims about the impacts of institutions on trade we should abandon traditional distance specifications. However, we reject the middlemen hypothesis.

Keywords: gravity model; corruption; institutional distance; middlemen hypothesis
JEL: F14, F51, F55, M16, O17

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1. Introduction

Institutional variables in gravity models reflect commonly acknowledged impact of institutions on trade. However, there is a methodological gap between International Trade and International Business research regarding institutional distance. Authors use two basic strategies how to include institutional variables into a gravity model. The first way is to include variables on both partner's and reporter's side (e.g. Francois & Manchin (2013)). The second approach creates a distance of those variables often represented as a difference in absolute terms (e.g. Kuncic (2012)). However, the standardly used concepts of institutional distance by trade researchers have been deeply revised and criticized by scholars from International Business area with seminal contribution of Shenkar (2001) who identified several questionable assumptions behind the idea of institutional and cultural distance. One example can be the "illusion of symmetry" meaning that the flow from country A to country B is the same as flow from B to A. The "distance" approach implicitly assumes that both cases are the same. Another illustration relates to the treatment of institutional levels. The absolute difference of 10 points can refer to trade between two low corrupt or two high corrupt countries. The distance ignores the different "level position" of trade partners and, again, both instances are identical.

The aim of our study is to present a methodology which overcomes several weaknesses identified by Shenkar (2001) and at least partially bridges the gap between those two streams of literature. In particular we are interested in the "illusion of symmetry", "illusion of linearity" and "illusion of discordance" (all three weaknesses are explained later). Our methodology relies on combination of the distance approach with cluster analysis of states dividing them into groups with different institutional level (Paulus & Kristoufek, 2015). That enables us to analyse trade flows between groups with different institutional level while still using the institutional distance methodology which is easy to implement and interpret.

Using our methodology we test what we call the "middlemen hypothesis" which is inspired by the study of Brada, Drabek, & Perez (2012). Their findings imply that the intermediate corrupt countries can become middlemen and mediate the FDI between low and high corrupt groups because they possess skills to succeed on both markets. Our intention is to examine this hypothesis in case of trade flows because the same logic can be applied there: Low and high corrupt countries possess different skills (or business practices) and therefore they cannot easily trade directly with each other. Hence the middle corrupt countries can mediate the trade. The obstacles in trade between high and low corrupt countries are also supported by empirical studies examining the role of institutions on trade flows regardless of the chosen strategy to institutional variable implementation (Francois & Manchin, 2013; Kuncic, 2012).

We contribute to the existing literature in two ways: empirically and methodologically. The empirical contribution is based on the examination of the middlemen hypothesis in the case of trade flows and the methodological one lies in the presentation and application of the cluster approach which reveals and overcomes the weaknesses of the standard institutional distance specification. Another methodological contribution is our aim to decrease the "methodological distance" between International Trade and International Business (IB) research related to cultural and institutional measures. We try to present a solution to several weaknesses identified by IB scholars while not

abandoning the concept of distance which is of high usefulness especially for bilateral specification when we need to take into account three dimensions: reporter, importer and time.

We estimate the augmented gravity model incorporating our “cluster” methodology when we are particularly interested in the effects of corruption on trade. The model is estimated on aggregated as well as disaggregated SITC data. Our results show that the focus on trade flows between groups of states with various institutional qualities reveals interesting heterogeneity which primarily arises when we shift our attention to sectoral data (SITC S0-S9). We can find specific trade flows when the distance coefficient is positive implying that higher “corruption distance” is stimulating trade. We argue that the corruption level of trade partners matters and should be taken into account. However, we cannot find strong support for the middlemen hypothesis. When we focus on country groups in more details then the results reveal very surprising results that the highest number of positive distance coefficients is in the case of the least corrupt countries being exporters when we approximate corruption level via CPI¹ index of the Transparency International.

The paper is organized in the following order: the subsequent chapter summarizes relevant literature. Third chapter briefly summarizes the methodology of the cluster analysis and then focuses on the methodology of our estimation and incorporation of the clusters into our gravity model with distance specification. We also present our hypotheses. Chapter four presents results and discussion. The last chapter concludes.

2. Literature review

In general, the studies show that better institutions promote trade or FDI. When we focus on corruption the empirics follows this general finding. The negative effects of corruption on FDI has been confirmed by e.g. Egger and Hanes (2006), Habib and Zurawicki (2001) or Busse and Hefeker (2007). Similarly there is a lot of evidence that low institutional quality in terms of high corruption harms mutual trade (Francois & Manchin, 2013; Horsewood & Voicu, 2012; Kuncic, 2012; Musila & Sigué, 2010).

Except from those studies we can find papers showing that under certain circumstances there can be also positive effects of corruption on FDI or trade. For example de Jong and Bogmans (2011) conclude that corruption should generally be considered harmful to international trade; however there is a significant difference between the exporting and importing economy because bribes paid to the customs bureaucracy can actually boost imports. In case of FDI Brada, Drabek and Perez (2012) reveal that the direction of trade matters while the middle corrupt countries have highest probability of FDI undertaking because those countries can succeed in corrupted as well as non-corrupted environment due to knowledge and skills needed on both markets. However, these papers belong to minority because studies primarily support claim that bad institutions are harming trade or FDI.

The papers utilizing gravity models are characterized by two basic approaches (or their combination) to incorporation of institutions into the model. The first approach simply includes institutional variable in levels for exporter and importer if the model is bilateral (same logic applies to FDI). Examples of this approach can be found in Francois & Manchin (2013) or Groot, Linders, Rietveld, &

¹Corruption Perception Index.

Subramanian (2004). The second approach utilizes so called institutional distance. These papers often use simple difference in institutional variable of trading partners and put it into absolute terms (Cezar & Escobar, 2015; Egger & Winner, 2005; Horsewood & Voicu, 2012; Kuncic, 2012; Musila & Sigué, 2010). Many studies prefer more sophisticated distance specification based primarily on Kogut & Singh (1988) and usually utilizing governance quality indicators of Kaufmann, Kraay, & Mastruzzi (2004)².

If we want to examine weaknesses of the standard approaches to institutional distance in gravity modelling we should turn our attention to the IB research because the appropriate methodology how to measure institutional or cultural differences has been intensively studied and discussed by IB scholars for several years. The seminal criticism of the institutional and cultural but also of psychic distance measures came from Shenkar (2001)³ who identified what he called “hidden assumptions” behind standardly used distance measures. The term psychic distance introduced by Beckerman (1956) should not be equalled to a cultural or institutional distance because a psychic distance is more complex concept referring to “primarily a cognitive category capturing the knowledge and amount of information individuals have (or believe they have) of other countries” (Håkanson & Ambos, 2010, p. 198). In other words, cultural and institutional distances are natural and important determinants of the psychical distance⁴.

Because of the mutual relationship of these concepts we shall focus also on literature examining the psychic distance because the criticisms and examined features of the psychical distance also hold or are significantly related to institutional and cultural differences between states. For example, the assumption of symmetry is problematic for cultural, institutional and psychic distance regardless of the different definitions of those concepts and the very likely fact that the resulting form of asymmetry can differ within those concepts. From our perspective the key outcomes of the research focused on the measurement of those distances are methodological flaws associated with empirical estimations which can inspire us for inventing new forms of non-geographical distance variables specification in gravity models.

From our perspective the most important “Shenkar’s” hidden assumptions are the “illusion of symmetry”, “illusion of linearity”, “illusion of discordance”⁵. The illusion of symmetry criticizes that the distance measure treats the distance between country A and B equally to distance between B and A. There is no proof to assume that the cultural distance of e.g. British firm investing in Russia is the same as the opposite flow because each flow is associated with different domestic and foreign “investment cultures” and also legal frameworks. The probability of investments success or FDI

² See e.g. Burger, van Oort, & Linders (2009), Lankhuizen, de Groot, & Linders (2011) or Linders, Slangen, de Groot, & Beugelsdijk (2005) as examples.

³ His personal retrospective can be found in Shenkar (2012). See also Zaheer, Schomaker, & Nachum (2012) for extensive review and discussion of Shenkar’s impact.

⁴ For further discussions see for example Hosseini (2008) or Dow & Ferencikova (2010). However we can find also different classification such as of Ojala (2015, p. 826): “In the context of this study, distance dimensions can be divided into geographic, cultural, and psychic distance”. We stick to the more general interpretation of psychic distance covering also institutional and cultural distance because all relevant weakness related to one “type” of distance are relevant for the others.

⁵ E.g. The “illusion of causality” does not fit to the contemporary gravity literature because it does not claim that “the culture is the only determinant of distance with relevance to FDI” (Shenkar, 2001, p. 524). For other few hidden assumptions and more detailed discussion see the original article.

undertaking can be simply different when we compare both cases. The asymmetric nature of the physic distance was also confirmed e.g. by Brock, Shenkar, Shoham, & Siscovick (2008), Håkanson, Ambos, Schuster, & Leicht-Deobald (2016) or Ellis (2008).

Illusion of linearity relates to the linear impact of the distance on the dependent variable. The findings of Brada, Drabek and Perez (2012) are precise examples when the linearity does not hold. If the investment undertaking probability is related to the possession of the necessary business skills concentrated in the middle corrupt countries, then when the distance reaches certain threshold the probability simply drops to zero because the partners would lack commonly shared business skills and manners.

The third problem we are interested in is the discordance problem. It questions the general idea of the institutional distance that the higher distance should increase obstacles for trade or FDI. Again findings of Brada, Drabek and Perez (2012) clearly contradict this assumption. Positive effects of cultural or psychic distance on investments under certain assumptions have been identified also by e.g. Nachum, Zaheer, & Gross (2008), Dikova (2009) or A. Zaheer & Hernandez (2011).

Another interesting contribution has been made by Hakanson & Ambos (2010) who examined the predictors of psychic distance. Authors nevertheless expect that important determinants are also cultural differences because cultural similarity should make the information access and efficient interpretation easier. Unfortunately they found that the cultural distance based on Kogut & Singh (1988) performs poorly while the key predictor is the geographical distance. Key message of Hakanson & Ambos (2010) then is that the construction of the cultural distance based on Kogut & Singh (1988) not reflecting above discussed criticisms should be avoided and can be in fact replaced by geographical distance if we examine effects of psychic distance without better cultural proxy. That position is also supported by Zaheer, Schomaker, & Nachum (2012, p. 20) who go even further: “such objective, lower-order distance constructs such as time, space and perhaps even language and religion may in fact provide more powerful tools of investigation than complex higher-order distance constructs whose multidimensionality has been reduced”.

The purpose of our study is therefore to propose a methodology which would respect the criticisms stemming from IB research on psychic, cultural and institutional distance and would be suitable for gravity modelling. Our goal is hence to “decrease methodological distance” between gravity and IB literature. We present a methodology which is overcoming the three mentioned Shenkar’s illusions while not abandoning the distance approach. The core idea of our solution is that we divide countries into groups according their institutional level. Using these clusters we can then distinguish trade flows between these groups and relate the flows to the institutional variables of our interest. Our reasoning explaining how we solve aforementioned problems will be presented in the following methodology chapter.

It should be stated that the whole discussion associated to the weaknesses of institutional distance measurements is of high significance when we want to deduce causal claims about the impact of institutions on trade or FDI. Then all critical points and related theory matter⁶. However, if the

⁶ Missing theory which would specify the institutional measures is the key topic of Shenkar (2012, p. 16): “The main point here is that until and unless culture is appropriately incorporated into the theoretical landscape,

institutional variables play a role of just control variables, then the problem is of limited relevance and standard institutional distance measures serve as very useful and pragmatic tools easy to implement.

In the next chapter we briefly explain the clustering methodology and then we shift our attention to the gravity model specification and hypotheses.

3. Methodology

a. Cluster Analysis

The basic stone of our methodology is the cluster analysis of countries according to their institutional level. Using this information we can then decompose trade into separate flows between groups with various institutional levels.

Because our empirical application is focused on the role of corruption in trade flows we use the results of the cluster analysis of Paulus & Kristoufek (2015). The goal of the paper was to create clusters of countries according to their corruption status. Authors used the methods of hierarchical clustering and topology classification utilized in the analysis of economic networks. The methodology is primarily based on the work of Mantegna (1999). However, because of the lack of the reliable corruption level index with large time series and broad coverage they used the CPI index of the Transparency International. The study covered period 1996-2014 and 134 countries. The methodology together with further details can be found in the Appendix I. The clusters not only reflect the levels but also time development of the variable because it clusters time-series.

The analysis identified 4 clusters according to the states' corruption level. The Table 1 shows summary of resulting clusters when the cluster number 1 gathers the least corrupt countries and the cluster number 4 the opposite states. List of countries with their cluster "membership" can be found in the Appendix I.

Table 1: Clusters Summary

Cluster	Av. corr.	Av. GDP (p.c. current USD)	ratio richest/poorest	No. of countries	Corruption level (CPI)
1	82.9	52 138	6.8	22	Lowest
2	59.2	23 521	7.8	15	Middle
3	41.3	9 751	45.1	60	Middle
4	24.2	3 888	52.9	37	Highest

Another step is the decomposition of trade into flows between specific groups defined by different corruption levels of partners and reporters. We construct two dummy variables: XD_m and ID_n . The XD_m is a dummy equalling 1 (zero otherwise) if the exporter belongs to the cluster m . ID_n dummy refers to the destination country (importer) and it equals 1 if the country belongs to the cluster n .

rather than reduced to questionable and frankly indefensible proxies, worthwhile efforts directed at increasing research rigor will have limited value."

Table 2: Cluster dummies combinations

	ID_1	ID_2	ID_3	ID_4
XD_1	XD_1ID_1	...	...	...
XD_2	...	...	...	...
XD_3	...	...	...	...
XD_4	...	...	...	XD_4ID_4

In the next step we construct corruption distance variable $DISTCr_{ijt}$. Then we multiply the distance variable by all combinations of the two dummy variables (see Table 2):

$$DISTCr_{ijt} = \sum_{m=1}^4 \sum_{n=1}^4 XD_m ID_n DISTCr_{ijt}, \quad (1)$$

where i stands for exporter, j denotes importer and t stand for time. In other words, we transform our original corruption distance variable (one time series representing distance values for all observations) into 16 time series when each distance time series represents values of only one specific trade flow (equation 1) when for any observation just one dummy combination would equal 1 and all others would equal 0. For example, the time series $XD_2ID_3DISTCr_{ijt}$ would then represent corruption distance only for those trade flows when the exporter belongs to the second cluster and importer to the third cluster.

We incorporate the new time series into the regression and we would then estimate 16 coefficients (β_{mn}):

$$\sum_{m=1}^4 \sum_{n=1}^4 \beta_{mn} XD_m ID_n DISTCr_{ijt} \quad (2)$$

This transformation improves standard approach in several aspects. Using the language of Shenkar (2001) we propose solution to these problematic “hidden assumptions”:

Illusion of symmetry

The decomposition of the trade flows abandons the assumption of symmetry because we treat each direction within the two groups separately. In other words, high asymmetry is allowed and should be revealed if it is of high significance.

Illusion of linearity

We also significantly relax the assumption of linear impact of the distance on the dependent variable. The linearity is assumed only within each trade flow because every combination dummy is multiplied by simple institutional distance. The differences in the impact of distance between separate trade flows are therefore allowed and can be estimated.

Illusion of discordance

Because of the decomposition we can estimate heterogeneous effects of corruption distance between various flows. Therefore, we can much more likely identify those flows where corruption

plays positive and negative role. These heterogeneous effects cannot be revealed when we use simple distance measure because we estimate just one coefficient averaging all trade flows with potentially heterogeneous effects. Therefore, the transformation does not assume that corruption distance is primarily obstacle of trade and allows also for potentially positive effects.

b. Incorporation of the clusters into the gravity model and data

Our estimated gravity model specification with incorporated results of our transformation is following:

$$\log(X_{ijt}) = \beta_0 + \beta_1 \log(Y_{jt}) + \beta_2 \log(Y_{it}) + \beta_3 \log(D_{ijt}) + \sum_{m=1}^4 \sum_{n=1}^4 \beta_{mn} X D_m I D_n DIST C r_{ijt} + \delta \log(t_{ijt}) + \lambda I_t + \varepsilon_{ijt} \quad (3)$$

Where Y_{it} stands for exporters' GDP, Y_{jt} refers to importers' GDP, D_{ijt} represents geographical distance, λI_t denotes time dummies with respective coefficients (λ and I_t are coefficient and dummy vectors) and t_{ijt} is a vector of trade barrier variables except corruption and geographical distance with coefficient vector δ . X_{ijt} represents exports on aggregate but also on sectoral level (SITC 0-9)⁷. Each export data type is estimated separately.

We have used standard set of CEPII control variables such as common language or colonial history which are part of the trade barrier vector t_{ijt} . The mutual trade agreements were measured via dataset of de Sousa (2012). The institutional control variables were taken from the Heritage Foundation. The detailed list of used variables can be found in the Appendix III.

Our methodology is based on a standard version of the micro-founded gravity model (Anderson & Wincoop, 2003). To overcome the problem of multilateral resistance terms we approximate them via Taylor expansion (Baier & Bergstrand, 2009). The specification of the Taylor expansion follows Shepherd (2013)⁸ and is presented in the Appendix IV. The model is estimated via PPML to deal with zero trade observations and heteroscedasticity of residuals (Santos Silva & Tenreyro, 2006). We also include other institutional variables as controls. To deal with potential endogeneity between institutions and exports we follow approach of Francois & Manchin (2013) and lag all institutional variables by one year. Then we run a principal component analysis of all institutional variables except corruption variables to increase the degrees of freedom and also to solve the multicollinearity problem between those variables (Francois & Manchin, 2013). Based on the Kaiser's rule just two components were chosen (the results of the PCA analysis can be found in Appendix V).

The dataset covers years 1995-2013 and 131 states. All of them are assigned to certain cluster group. Compared to the dataset used in Paulus & Kristoufek (2015) just three countries are missing because of various data unavailability: Albania, North Korea and Taiwan. Taking into account these three missing states then the list of countries is in fact provided in the Appendix I.

⁷ See Appendix II for description of the sectors. We are aware of the fact the first SITC level is too broad category however we want to avoid arbitrary selection of specific sectors. Therefore, we have decided to examine only 1st level of SITC classification.

⁸ See Appendix IV for related equation.

Our corruption measure is primarily the “Freedom From Corruption index” (FFC) constructed by the Heritage Foundation. However, it is in fact the CPI index multiplied by 10. Therefore, up to the end of the article we will talk about CPI. The CPI index belongs to the “perception” class of corruption measures. Hence it suffers from several weaknesses which have been discussed for many years⁹. However, for the purpose of our analysis we need to apply an index with sufficiently large data sample. Therefore, in spite of those weaknesses, we use the CPI index. To at least partially avoid biased results we run the estimates also using the “Control of Corruption Index” (CCI) of the World Bank and the ICRG corruption index made by the PRS Group. We should not expect large divergences because the CCI and CPI indices are mutually correlated (Woodruff, 2006). Even though we use the ICRG index in our robustness checks we should be careful interpreting this variable because it measures more political instability than corruption level (Lambsdorff, 2007).

It is also important to realize what is and what is not measured by the CPI. The corruption definition used in this concept is the “misuse of public power for private benefit” (Lambsdorff, 2006). Hence forms of corruption such as bribes to customs officials or state officials are covered in the methodology. On the other side all other forms of corruption (e.g. just within private sector) are ignored.

c. Hypotheses

We can divide our hypotheses into two groups. First group consists of two hypotheses related generally to the application of our cluster approach. At first we expect that the simple institutional distance hides heterogeneity in the corruption-trade relationship. Following the problems of symmetry and discordance there is no reason to expect that all coefficients should have same signs or values. Therefore, we state our first hypothesis in following way:

H1: The corruption distance coefficients exhibit significant heterogeneity when we decompose the variable into several time-series associated with various trade flows defined by the corruption levels of trading countries.

The second hypothesis represents our expectation that the resulting coefficients are not the same between sectors. We expect heterogeneity on the sectoral level.

H2: There is significant heterogeneity between sectors.

The first two hypotheses are examining performance of our method. If we do not reject them then our method is contributive and offers more detailed and less methodologically biased results for researches interested in the role of institutions in trade flows. In case of rejection then the simple distance would be preferred because of his easy implementation.

We treat the third hypothesis as a separate one because it is related to our empirical application. In other words its aim is not to check the performance of our method in general. The hypothesis examines the position of middlemen countries. As previously stated the paper of Brada, Drabek, & Perez (2012) identified middle corrupt countries as those with the highest probability of FDI “undertakers” because they possess necessary skills for success on both markets.

⁹ For the summary of those debates see e.g. Andersson & Heywood (2009), Galtung (2006), Heywood (2015) or Philp (2006).

Based on these results we hypothesise that those skills are important not only for FDI but may play a role also in trade. Therefore, the middle corruption countries are potentially motivated to play a role of mediators of trade flows between high and low corrupt countries. Hence we define our third hypothesis in following way:

H3: There is a specific position of middle corrupt countries which can play the role of middleman between highly and lowly corrupted countries.

We can hardly examine this hypothesis directly because the data on re-exports and re-imports are of insufficient coverage. Therefore, we try to deduce the middlemen position from the trade flows between variously corrupt groups. The clusters are numbered according to the Table 1 when cluster 1 refers to least corrupt countries, clusters 2 and 3 depict the middle corrupt states and cluster 4 includes the highest corrupt states.

The test of the hypothesis is done in two steps. Firstly, we test for the very **basic assumption** of the hypothesis which is that high and low corrupt country groups have obstacles to directly trade with each other because of too high institutional distance. The assumption tests in fact the motivation of those countries to use the services of middlemen. Hence we assume following negative coefficients:

$$\beta_{14} < 0$$

$$\beta_{41} < 0$$

when β_{14} and β_{41} are coefficients related to trade flows between highest and lowest corrupt country groups.

While the evaluation of the “basic assumption” is straightforward the second step is more complicated because we need to approximate the position of middlemen countries to be estimated. Because we cannot examine it directly we look at trade flows of our high and low corrupt country groups with the two middle corrupt country groups (clusters no. 2 and 3).

The general idea is that if the cluster 1 (least corrupt) country wants to trade with country from cluster 4 (most corrupt) via middleman then it is trying to find a sufficiently corrupt country from cluster 2 or 3 (middle corrupt) because if the country has sufficient experience with corruption, then the businessmen from that country knows the business practices necessary for trade with cluster 4. Country with similar corruption level would be no use in this case. Therefore, we would expect that $\beta_{12} > 0$ or $\beta_{13} > 0$ and not the opposite. Similar logic holds for the perspective of cluster 4 countries. They need to find sufficiently non-corrupt partners. Therefore, we again assume that distance is positively correlated with their mutual trade ($\beta_{42} > 0$ or $\beta_{43} > 0$).

There are three important limitations of this approach stemming from the fact that the hypothesis is examined indirectly. Firstly, because of the indirect nature of the test we in fact examine whether the “middlemen trade flow” is sufficiently strong that it significantly influences the coefficient. In other words, that it outweighs other (“standard”) trade flows. Hence the rejection of our hypothesis does not mean that there is no trade of this sort but we reject that the trade is of high significance in terms of the impact on the coefficient.

Secondly, because we cannot precisely identify the trade flows we are interested in we examine aggregate flows between the clusters 1, 4 and 2, 3. To have at least some evidence that the

middlemen services may be used we search for positive correlations from both sides: from clusters 1 to 2 (or 3) and from 4 to 2 (or 3). Hence we claim that the hypothesis is corroborated only if the distance to middle corrupt country is positively correlated with trade from both sides: exports from most and least corrupt countries.

If there was positive correlation just on one side (e.g. from least corruption country to middle one, but the positive correlation of flow from most corrupt countries would not be identified) then that finding could be interpreted in two ways. The first straightforward interpretation would be that we reject the hypothesis because of the lack of evidence. The second possible scenario is that we would find an indication for just one-way trade through mediator. If we had detailed data on re-exports and re-imports then this conclusion would be sound. Unfortunately, this is not our case and taking into account all mentioned weaknesses we demand to find positive correlation on both sides to have more robust result.

Thirdly, we seek for positive distance effect from both sides to get more robust results. But even in this case we must realize that the support of our hypothesis does not mean that we have proof of this trade behaviour. We would claim that we have strong incidence of that behaviour. This is the reason that in the hypothesis we state that the middle corrupt countries “can play the role” and not that the “countries play the role”.

We do not impose conditions on the trade flows from middle corrupt countries because we cannot find a sufficient justification for that.

Our expectations regarding the coefficients are summarized in Table 3.

Table 3: Middlemen hypothesis summary

Middlemen hypothesis: basic assumption	Middlemen hypothesis: core
$\beta_{14} < 0$	$\beta_{12} > 0$
$\beta_{41} < 0$	$\beta_{42} > 0$
	OR
	$\beta_{13} > 0$
	$\beta_{43} > 0$

4. Results

a. Performance of the cluster approach

The estimated β_{mn} coefficients are summarized in Tables 4-6. Complete results can be found in the Appendix VI. At first we focus on the CPI estimates and then we examine the CCI and ICRG for robustness check. We are primarily interested in the coefficient sign because studies usually estimate negative correlation between institutional distance and mutual trade (negative coefficient).

The results reveal significant heterogeneity not only across sectors but also clusters. We cannot confirm that the effect of distance is generally negative even though that the majority of coefficients is negative. We also confirm that aggregate exports hide relevant heterogeneity in the results while just one coefficient is positive and significant in the case of aggregate trade but the sectoral results

are much more diverse. Hence the studies estimating models only on aggregate data miss many cases of positive effects of distance on trade.

If we shift our attention to sectors, a surprising finding is that there is no sector with only negative coefficients. In every sector there is at least one flow where the distance plays stimulating role in trade. 9 out of 10 sectors have no more than 3 positive coefficients. However, the sector S3 (mineral fuels) is an exception from many perspectives. Firstly, 7 trade flows are characterized by positive distance effects. Secondly, all positive coefficients belong to flows where the two groups of most corrupt countries are exporters (clusters no. 3 and 4). At least partially similar are sector S4 (animal and vegetable oils, fats), S7 (machinery, transport) and S8 (various manufacture) because all their positive distance coefficients belong to exporters belonging to clusters 3 and 4.

However there is another group of sectors which positive coefficients are primarily or only grouped in the least corrupt cluster no. 1 (exporter perspective). These are S0 (food and animals), S1 (beverages and tobacco), S2 (crude materials except fuel), S5 (chemicals) and S9 (remaining category). Those results partially distort picture of institutional distance harming trade because not only have we many flows with positive distance effect but also one half of sectors has majority or all positive effects associated with exporters from the least corrupt country group. To sum it up the sectors can be divided into those where the positive distance effect is primarily associated with exporters from cluster 1 and those sectors where it is related primarily to two most corrupt exporter groups (clusters 3 and 4).

Based on these results we claim that the simple institutional distance measure neglects significant heterogeneity in the results when we try to account also for levels of the variable which we approximate via trade flows clusters. Therefore, when we are interested in causal claims about the effects of institutions on trade we should abandon usage of the simple absolute difference in levels only. Another point is the importance of the data disaggregation because sectors simply behave differently. Hence we regard our two first hypotheses corroborated by the results.

Table 4: Results for CPI (FFC)

VARIABLES	Total EX	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	Exporter
β_{11}	-		+	-	-	-	-	-	-	-	+	Least corrupt
β_{12}		+	+	-	-	-	+	-		-	+	
β_{13}		+	-		-	-	+	-	-	-	+	
β_{14}	-	-	-	+	-	-	-	-	-	-	-	
β_{21}	-			-	-	-	-	+	-	-	-	Middle corrupt
β_{22}	-			-	-		-		-			
β_{23}	-	-	-	-	-		-	-	-	-	-	
β_{24}	-	-		-	-	-	-	-	-	-	-	
β_{31}	+	+		-	+	-	-	-	+	+	-	Middle corrupt
β_{32}	-		-	-	+	-	-	-	-	-	-	
β_{33}	-		-	-	+	+	-	-	-	-	-	
β_{34}	-	-	-	-		+				-	-	
β_{41}		-	-	-	+		-	+	-	+	-	Most corrupt
β_{42}	-	-	-		+	-	-	-	-	-	-	
β_{43}	-	-	-	-	+		-	-	-	-	-	
β_{44}	-	-	-	-	+	+	-	-	-	-		

b. Middlemen hypothesis

The basic assumptions¹⁰ of the middlemen hypothesis are in most sectors valid. However, in sector S2 ($\beta_{14} > 0$) and sectors S3, S6 and S8 ($\beta_{41} > 0$) the assumptions are violated. When we shift our attention to sectors with valid assumptions then we cannot find valid any set of our remaining expectations about the coefficients. We can always find just part of the story: only one cluster (least or most corrupt) is characterized by positive distance effect on trade with middle corrupt country. However, the other side of the relationship is missing. An example is the sector S1 where the basic assumption is valid but only cluster 1 has positive distance coefficient with at least one middle corrupt cluster. The most corrupt cluster has all distance coefficients negative.

Taking into account the limitations discussed above we reject our hypothesis and claim that this trade behaviour is not statistically significant enough to change the coefficient signs. That means that the behaviour is of small size or does not exist at all¹¹. Contrary to the hypothesis we also reveal that at least in four cases there is a positive distance effect between most and least corrupt cluster, or vice versa (the violation of the basic assumption – see above). In other words, in some sectors those country groups do not need middlemen.

c. Robustness check

The comparison of the CPI estimates with CCI and ICRG confirms key findings but also reveals several differences. In both estimates we find heterogeneity in results. The aggregate exports are again hiding important differences between clusters but also the sectors differ from each other (H1 and H2 again corroborated). The specific position of S3 is confirmed by all estimates. The middlemen hypothesis is also rejected for all sectors in those estimates.

On the other side in the CCI estimates the positive coefficients are primarily concentrated around the exporters from clusters 3 and 4 with much fewer positive coefficients associated with cluster 1 exporters compared to the CPI. There are also two sectors with only negative or insignificant distance effects in the case of the CCI. The ICRG estimate supports more the picture stemming from CPI. Also in the case of ICRG the exporters in cluster 1 have surprisingly experienced many positive distance effects while this picture is in contradiction to the CCI estimate.

The several different results between CPI and CCI estimates can be caused by lower number of observations in case of CCI¹² because these two variables should be otherwise highly correlated (Woodruff, 2006). The differences associated with the ICRG estimates can be related to the characteristics of the measure raised by Lambsdorff (2007).

However, except from the differences still several results are robust across all estimates: 1) aggregate exports hide significant heterogeneity, 2) sectors are not homogenous, 3) sector S3 is “outlier” between the sectors and 4) middlemen hypothesis is rejected.

¹⁰ $\beta_{14} < 0$ and $\beta_{41} < 0$.

¹¹ We are more favor for the first implication.

¹² 295,352 for CPI and 235,072 for CCI estimates.

Table 5: Results for CCI

VARIABLES	Total EX	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	Exporter
β_{11}	-	-		-	-	-	-	-	-	-		Least corrupt
β_{12}	-		+	-	-	-		-		-		
β_{13}			-	+		-	+	-		-		
β_{14}	-	-	-	+	-	-	-	-		-	-	
β_{21}	-	-	-	-	-	-	-		-	-	-	Middle corrupt
β_{22}	-	-	-	-	-	-	-	-	-	-	-	
β_{23}	-	-	-	-	-	-	-	-	-	-	-	
β_{24}	-	-	-	-	-	-	-	-	-	-	-	
β_{31}	+	-	-	-	+	-	-	-	+		-	Middle corrupt
β_{32}		-	-	-	+	-	-	-		-	-	
β_{33}	+	-	-	-	+		-		+		-	
β_{34}	+	-	-	-		+	+	+	+	+	-	
β_{41}	+	-	-	-	+	-	-	+	+	+	-	Most corrupt
β_{42}		-	-		+	-	-	-	-		-	
β_{43}		-	-	+	+		-		-	-	-	
β_{44}	-		-		+		-	-	-	-	-	

Table 6: Results for ICRG

VARIABLES	Total EX	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	Exporter
β_{11}	-	-		-	-	-	-	-	-	-		Least corrupt
β_{12}		+	+	-	-	-		-		-		
β_{13}	-	+	+	+	-	-	+		+	-	+	
β_{14}	-	-	-	+	-	-	-	-		-	-	
β_{21}	-	-	-	-	-	-	-		-	-	-	Middle corrupt
β_{22}	-	-	-	-	-		-	-	-	-	-	
β_{23}	-			-	-		-		-	-	-	
β_{24}	-	-	-	-	-	-	-	-	-	-	-	
β_{31}	+	+	+	-	+	-	-		+	+	-	Middle corrupt
β_{32}			-	-	+	-	-	-	-		-	
β_{33}	-	-	-	-			-			-	-	
β_{34}					-	+	+				-	
β_{41}	+	-	-	-	+	-	-	+	+	+	-	Most corrupt
β_{42}		-	-	+	+	-	-		-		-	
β_{43}		-		+	+		-		-		-	
β_{44}	-		-			+	-	-	-	-		

5. Conclusion

We propose an alternative measure of institutional distance which overcomes several weaknesses raised by Shenkar (2001): “illusion of symmetry”, “illusion of linearity” and “illusion of discordance”. The weaknesses of institutional distance measures are intensively discussed within international business literature however empirical papers utilizing gravity models of trade still have not reflected the debate and suffer from above mentioned drawbacks. Our aim is therefore to offer a suitable methodology for gravity models which would bridge the gap and between those two research streams.

Our methodology is based on cluster approach to institutional distance. We simply divide countries into clusters according to their institutional level using the study of Paulus & Kristoufek (2015). We use the clusters to transform the institutional distance variable of our interest to examine the effects of the variable on trade flows between the groups. The transformation then combines institutional distance with the clusters reflecting also the institutional level of the trading partners. The methodology is applied to the middlemen hypothesis examining the mediator position of middle corrupt countries in trade between least and most corrupt countries.

The results confirm that the simple institutional distance hides relevant heterogeneity in the estimated impact of institutions (corruption in our case) on trade. The same holds for the estimates on aggregate export data. We argue that when we are interested in causal claims about the impact of institutions on trade we should abandon the simple distance approach and search for an alternative overcoming weakness (Shenkar, 2001) of this simple but also useful measure. We propose a solution of this manner implementing a clustering analysis and taking advantage of the distance approach.

Our results do not support the middlemen hypothesis in trade data. We do not want to claim that this trade behaviour does not exist because of several limitations of our approach. However, we believe that this behaviour is of no high statistical significance and therefore it does not appear in sufficiently high volumes. Another more detailed estimation would require data on re-exports and re-imports with large country and data coverage.

The paper therefore contributes methodologically and empirically to the contemporary literature. Firstly, we propose a novel methodology improving institutional distance measure. Secondly we do not support the middlemen hypothesis as a sufficiently significant behaviour between trade partners.

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Appendix I: Cluster analysis methodology of Paulus & Kristoufek (2015)

The method investigates the structure of pairwise time series correlations and visualizes the structure of the network. Each time series is regarded as a node in the network and hence we can estimate the correlation coefficients between our nodes. Then we examine the edge weights between nodes and relate them to the correlation coefficients. These procedures create a network of our interest which is then filtered to abstract the most important information (the weakest links are removed). At the end we get the minimal skeleton of links.

In other words, authors investigated the correlation coefficients; using them we can create a proper metric to set a distance matrix. The distance matrix determines the minimal spanning tree which connects the time series of our interests¹³.

The correlation coefficients are computed as follows:

$$\rho_{ij} = \frac{\langle Y_i Y_j \rangle - \langle Y_i \rangle \langle Y_j \rangle}{\sqrt{(\langle Y_i^2 \rangle - \langle Y_i \rangle^2)(\langle Y_j^2 \rangle - \langle Y_j \rangle^2)}} \quad (4)$$

where i and j represent the time series. The distance follows Euclidian distance: which constitutes the distance matrix D :

$$d_{Y_i Y_j} = \sqrt{\sum_{t=1}^T (Y_{it} - Y_{jt})^2} \quad (5)$$

As a result, we get the clusters of countries regarding their corruption level (measured via corruption perception in this case). However, the methodology can be used to any other institutional variable.

¹³

See the original paper for a visualization.

Table 7: Countries and Corruption Clusters

United Arab Em.	1	Spain	2	Albania	3	Ethiopia	3	Croatia	4
Denmark	1	Estonia	2	Georgia	3	Dominican Rep.	3	Greece	4
Finland	1	Slovenia	2	Belarus	3	Guyana	3	Trinidad and Tob.	4
New Zealand	1	Uruguay	2	Kenya	3	Mauritania	3	El Salvador	4
Singapore	1	Israel	2	Nigeria	3	Bolivia	3	Jamaica	4
Sweden	1	Kuwait	2	Colombia	3	Madagascar	3	Morocco	4
Un.Kingdom	1	Bahrain	2	Turkey	3	Moldova	3	Algeria	4
Australia	1	Oman	2	Fiji	3	Mozambique	3	Mongolia	4
Luxembourg	1	Portugal	2	Bulgaria	3	Nicaragua	3	Sri Lanka	4
Switzerland	1	The Bahamas	2	Brazil	3	Vietnam	3	Gabon	4
Norway	1	North Korea	3	Peru	3	Guinea	3	Panama	4
Canada	1	Cuba	3	Romania	3	Venezuela	3	Cape Verde	4
Netherlands	1	Laos	3	India	3	Bangladesh	3	Latvia	4
Chile	1	Burma	3	Malawi	3	Azerbaijan	3	Lithuania	4
Ireland	1	Haiti	3	China	3	Cameroon	3	Italy	4
France	1	Paraguay	3	Lesotho	3	Indonesia	3	Jordan	4
Belgium	1	Lebanon	3	Swaziland	3	Saudi Arabia	4	South Korea	4
Japan	1	Mali	3	Zimbabwe	3	Belize	4	Czech Republic	4
United States	1	Iran	3	Pakistan	3	Benin	4	Slovakia	4
Germany	1	Syria	3	Honduras	3	Senegal	4	Costa Rica	4
Austria	1	Rep. of Congo	3	Tanzania	3	Guatemala	4	Malaysia	4
Hong Kong	1	Libya	3	Ivory Coast	3	Zambia	4	Hungary	4
Malta	2	Yemen	3	Ecuador	3	Argentina	4	South Africa	4
Botswana	2	Nepal	3	Russia	3	Thailand	4	Tunisia	4
Taiwan	2	Niger	3	Uganda	3	Armenia	4	Ghana	4
Barbados	2	Suriname	3	Ukraine	3	Egypt	4	Poland	4
Cyprus	2	Burkina Faso	3	The Philippines	3	Mexico	4		

Appendix II: SITC Sectors

Table 8: Aggregated Sectors (SITC rev.3)

Aggregate group	Aggregated codes
0	Food & live animals
1	Beverages and tobacco
2	Crude mater.ex. food/fuel
3	Mineral fuel/lubricants
4	Animal/veg oil/fat/wax
5	Chemicals/products n.e.s
6	Manufactured goods
7	Machinery/transp. equipmt.
8	Miscellaneous manuf. Arts
9	Commodities nes

Appendix III: Variable list

Variable	Characteristics and Notes	Source
Exports	SITC 3 rd revision, In thousands USD	WITS
GDP of exporting country	GDP (current US\$)	WDI WB
GDP of destination country	GDP (current US\$)	WDI WB
Distance	Adjusted distance between economic centers. In km.	CEPII
RTA	Regional trade agreements	de Sousa (2012)
Business freedom	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Trade freedom	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Fiscal freedom	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Government spending	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Monetary freedom	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Investment freedom	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Financial freedom	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Property rights	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Freedom from Corruption	Value btw. 0 (worst) and 100 (best)	Heritage Foundations
Control of corruption index	Value btw. 0 (worst) and 100 (best)	World bank
International country risk guide – corruption index	For robustness checks, Value btw. 0 (worst) and 6 (best)	epub.prsgroup.com
Common official language	Dummy (0;1)	CEPII
landlocked	Dummy (0;1)	CEPII
colonial link	Dummy (0;1)	CEPII
Contiguity	Dummy (0;1)	CEPII
Same country before	Dummy (0;1)	CEPII

Appendix IV: Taylor Expansion

We follow the approach of Shepherd (2013). Instead of using GDP weights we apply weighting via number of countries (N) in the sample. The first equation represents a general gravity model where t_{ijt} stands for trade barriers. That variable is then approximated via Taylor expansion. The third and fourth equation then presents the result of the approximation.

$$\log(X_{ijt}) = \beta_0 + \beta_1 \log(Y_{jt}) + \beta_2 \log(Y_{it}) + \delta \log(t_{ijt}) + \lambda_t + \varepsilon_{ijt} \quad (1)$$

$$\log(t_{ijt}) = \log(t_{ijt}) - P_i - P_j \quad (2)$$

$$P_i = \frac{1}{N} \sum_{j=1}^N \ln t_{ij} - \frac{1}{2} \frac{1}{N^2} \sum_{k=1}^N \sum_{m=1}^N \ln t_{km} \quad (3)$$

$$P_j = \frac{1}{N} \sum_{i=1}^N \ln t_{ij} - \frac{1}{2} \frac{1}{N^2} \quad (4)$$

Appendix V: PCA Analysis

At first the distances of all institutional variables were constructed. Then the variables were lagged. On the lagged institutional distances the PCA was run.

Table 9: Overview of the components

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.43	1.18	0.31	0.31
Comp2	1.26	0.28	0.16	0.47
Comp3	0.98	0.08	0.13	0.59
Comp4	0.91	0.16	0.12	0.70
Comp5	0.75	0.10	0.10	0.79
Comp6	0.66	0.11	0.09	0.88
Comp7	0.55	0.07	0.07	0.94
Comp8	0.49		0.07	1.00

Table 10: Final PCA composition

Variable	Comp1	Comp2
Property rights	0.50	-0.03
Fiscal freedom	0.20	0.68
Government spending	0.23	0.66
Business freedom	0.44	-0.12
Monetary freedom	0.18	-0.02
Trade freedom	0.23	-0.03
Investment freedom	0.45	-0.24
Financial freedom	0.45	-0.24

Appendix VI: Complete Results

Table 11: Regression variables

	Variable	Description
Shared variables across all specifications	Inhdpdestination	Importer GDP in log
	Inhdpreporter	Exporter GDP in log
	dist	Distance (taylor approx.)
	pc1	PCA (distance) 1st component
	pc2	PCA (distance) 2nd component
	plandlocked	Landlocked (importer)
	rlandlocked	Landlocked (exporter)
	contig	Contiguity (taylor approx.)
	comlang_off	Common official lang. (taylor approx.)
	colony	Colonial link (taylor approx.)
	smctry	Same country before (taylor approx.)
	rta	Regional trade ag. (taylor approx.)
Corruption-cluster variables for FFC(CPI) estimate	ffc_r1p1	CPI (FFC) corr. variable for, reporter from cluster 1, importer from cluster 1
	ffc_r1p2	CPI (FFC) corr. variable for, reporter from cluster 1, importer from cluster 2
	ffc_r1p3	CPI (FFC) corr. variable for, reporter from cluster 1, importer from cluster 3
	ffc_r1p4	CPI (FFC) corr. variable for, reporter from cluster 1, importer from cluster 4
	ffc_r2p1	CPI (FFC) corr. variable for, reporter from cluster 2, importer from cluster 1
	ffc_r2p2	CPI (FFC) corr. variable for, reporter from cluster 2, importer from cluster 2
	ffc_r2p3	CPI (FFC) corr. variable for, reporter from cluster 2, importer from cluster 3
	ffc_r2p4	CPI (FFC) corr. variable for, reporter from cluster 2, importer from cluster 4
	ffc_r3p1	CPI (FFC) corr. variable for, reporter from cluster 3, importer from cluster 1
	ffc_r3p2	CPI (FFC) corr. variable for, reporter from cluster 3, importer from cluster 2
	ffc_r3p3	CPI (FFC) corr. variable for, reporter from cluster 3, importer from cluster 3
	ffc_r3p4	CPI (FFC) corr. variable for, reporter from cluster 3, importer from cluster 4
	ffc_r4p1	CPI (FFC) corr. variable for, reporter from cluster 4, importer from cluster 1
	ffc_r4p2	CPI (FFC) corr. variable for, reporter from cluster 4, importer from cluster 2
	ffc_r4p3	CPI (FFC) corr. variable for, reporter from cluster 4, importer from cluster 3
	ffc_r4p4	CPI (FFC) corr. variable for, reporter from cluster 4, importer from cluster 4

The cluster dummies for CCI and ICRG estimates follow same logic as the notation of the FFC(CPI) estimate.

Table 12: CPI (FFC) results

VARIABLES	(1) tradevaluein1000usd_zero	(2) S0	(3) S1	(4) S2	(5) S3	(6) S4	(7) S5	(8) S6	(9) S7	(10) S8	(11) S9
Inhdpdestination	0.707*** (0.00753)	0.620*** (0.00697)	0.709*** (0.0118)	0.779*** (0.0211)	0.733*** (0.0124)	0.535*** (0.0159)	0.692*** (0.00871)	0.649*** (0.00711)	0.730*** (0.0113)	0.770*** (0.0152)	0.670*** (0.0182)
Inhdpreporter	0.724*** (0.00818)	0.556*** (0.00726)	0.665*** (0.00946)	0.598*** (0.0123)	0.507*** (0.0118)	0.506*** (0.00770)	0.723*** (0.00943)	0.696*** (0.00787)	0.836*** (0.0118)	0.759*** (0.0149)	0.809*** (0.0144)
dist	-0.689*** (0.0197)	-0.679*** (0.0179)	-0.619*** (0.0269)	-0.517*** (0.0324)	-0.978*** (0.0261)	-0.612*** (0.0306)	-0.820*** (0.0178)	-0.711*** (0.0180)	-0.625*** (0.0284)	-0.561*** (0.0347)	-0.606*** (0.0407)
lag_pc1	0.0276*** (0.00360)	0.0358*** (0.00413)	0.0431*** (0.00568)	0.0222** (0.00937)	0.0162** (0.00640)	0.0107 (0.00914)	0.0566*** (0.00433)	0.00736* (0.00377)	0.00918* (0.00524)	0.0473*** (0.00576)	0.0677*** (0.00698)
lag_pc2	0.0818*** (0.00625)	0.0883*** (0.00673)	0.166*** (0.0106)	0.0872*** (0.0186)	-0.0117 (0.0168)	-0.0507*** (0.0172)	0.116*** (0.00773)	0.0823*** (0.00703)	0.0769*** (0.00851)	0.114*** (0.0101)	0.111*** (0.0135)
plandlocked	-5.431 (3.974)	-98.09*** (4.197)	3.898 (5.689)	-65.07*** (5.552)	-156.8*** (10.13)	-189.6*** (8.809)	36.70*** (5.221)	14.17*** (4.561)	24.55*** (5.854)	23.67*** (6.424)	-44.59*** (7.592)
rlandlocked	-3.537 (4.696)	-56.99*** (4.682)	9.895** (5.010)	-27.20*** (7.405)	-41.60*** (7.819)	-154.5*** (7.071)	7.018 (4.792)	-1.890 (4.808)	-17.21*** (6.206)	20.77*** (6.394)	127.4*** (17.68)
contig	0.327*** (0.0408)	0.751*** (0.0408)	0.206*** (0.0687)	0.565*** (0.0620)	0.235*** (0.0735)	0.156 (0.100)	0.134*** (0.0428)	0.411*** (0.0370)	0.242*** (0.0584)	0.414*** (0.0596)	0.280*** (0.0918)
comlang_off	0.152*** (0.0320)	-0.0666** (0.0337)	0.00674 (0.0562)	-0.175** (0.0681)	0.161** (0.0676)	0.279** (0.140)	0.289*** (0.0488)	0.198*** (0.0332)	0.152*** (0.0460)	0.287*** (0.0454)	0.0327 (0.104)
colony	0.108*** (0.0334)	0.0873* (0.0455)	0.356*** (0.0910)	0.304*** (0.0456)	0.0592 (0.0853)	0.258** (0.118)	0.0100 (0.0443)	0.217*** (0.0389)	-0.00778 (0.0371)	-0.00860 (0.0417)	0.849*** (0.136)
smctry	0.770*** (0.110)	0.336*** (0.0743)	0.821*** (0.0958)	0.445*** (0.106)	0.274*** (0.103)	0.234* (0.141)	0.190** (0.0763)	0.565*** (0.0843)	1.272*** (0.163)	1.278*** (0.151)	-0.0697 (0.172)
rta	0.393*** (0.0374)	0.449*** (0.0322)	0.473*** (0.0458)	0.406*** (0.0556)	0.129** (0.0631)	0.861*** (0.118)	0.0454 (0.0464)	0.522*** (0.0345)	0.540*** (0.0554)	0.295*** (0.0618)	0.583*** (0.0960)
ffc_r1p1	-0.000745*** (9.42e-05)	-0.000164 (0.000100)	0.000378*** (9.99e-05)	-0.000846*** (0.000204)	-0.000336* (0.000195)	-0.00225*** (0.000375)	-0.000380*** (0.000114)	-0.00143*** (0.000131)	-0.000928*** (0.000125)	-0.00170*** (0.000186)	0.000426*** (0.000140)
ffc_r1p2	-5.22e-05 (4.10e-05)	0.000120*** (4.23e-05)	0.000343*** (5.96e-05)	-0.000368*** (8.15e-05)	-0.000966*** (0.000136)	-0.00184*** (0.000233)	0.000116** (4.89e-05)	-0.000257*** (6.34e-05)	-4.37e-05 (4.80e-05)	-0.000217*** (5.40e-05)	0.000214** (8.46e-05)
ffc_r1p3	-2.25e-05 (2.11e-05)	0.000125*** (2.28e-05)	-0.000104** (4.87e-05)	-2.53e-05 (3.94e-05)	-0.000153** (6.00e-05)	-0.000633*** (6.11e-05)	0.000144*** (2.44e-05)	-0.000186*** (2.61e-05)	-4.86e-05* (2.72e-05)	-0.000282*** (3.10e-05)	0.000230*** (6.23e-05)
ffc_r1p4	-0.000202*** (2.41e-05)	-0.000135*** (2.14e-05)	-0.000327*** (3.62e-05)	0.000236*** (6.34e-05)	-0.000271*** (6.97e-05)	-0.000639*** (5.7e-05)	-0.000244*** (2.45e-05)	-0.000392*** (2.55e-05)	-0.000145*** (3.15e-05)	-0.000610*** (4.33e-05)	-0.000208*** (4.32e-05)
ffc_r2p1	-0.000353*** (6.55e-05)	-9.44e-05 (7.80e-05)	1.81e-05 (6.24e-05)	-0.00127*** (0.000130)	-0.00309*** (0.000435)	-0.00169*** (0.000275)	-0.000507*** (7.96e-05)	0.000115* (6.50e-05)	-0.000300*** (7.57e-05)	-0.000312*** (7.32e-05)	-0.00186*** (0.000284)
ffc_r2p2	-0.000727** (0.000370)	-0.000286 (0.000380)	-0.000422 (0.000624)	-0.00136*** (0.000434)	-0.00785*** (0.00187)	-0.000635 (0.000634)	-0.000885** (0.000366)	-7.73e-05 (0.000284)	-0.000932** (0.000417)	6.37e-05 (0.000288)	-0.000779 (0.000675)
ffc_r2p3	-0.000882*** (0.000113)	-0.000870*** (0.000179)	-0.000818*** (0.000131)	-0.00167*** (0.000161)	-0.00139*** (0.000284)	-0.000364 (0.000304)	-0.000588*** (8.98e-05)	-0.000446*** (0.000125)	-0.00107*** (0.000132)	-0.00114*** (0.000132)	-0.00149*** (0.000193)
ffc_r2p4	-0.00112*** (5.88e-05)	-0.000889*** (9.04e-05)	-0.000137 (0.000180)	-0.00141*** (0.000131)	-0.00156*** (0.000364)	-0.00110*** (0.000132)	-0.000742*** (5.91e-05)	-0.000997*** (6.58e-05)	-0.00132*** (7.70e-05)	-0.00159*** (0.000111)	-0.00105*** (0.000155)
ffc_r3p1	6.01e-05** (2.87e-05)	8.09e-05*** (2.37e-05)	6.38e-05 (3.97e-05)	-0.000712*** (5.08e-05)	0.000193*** (5.50e-05)	-0.000228*** (7.21e-05)	-0.000574*** (3.45e-05)	-8.80e-05*** (2.72e-05)	0.000210*** (3.77e-05)	0.000147*** (3.44e-05)	-0.000247*** (8.40e-05)
ffc_r3p2	-0.000439*** (0.000109)	-9.94e-07 (0.000152)	-0.00107*** (9.78e-05)	-0.00107*** (0.000144)	0.000626*** (0.000182)	-0.00172*** (0.000268)	-0.00108*** (0.000129)	-0.000849*** (0.000163)	-0.000897*** (0.000156)	-0.000475*** (0.000174)	-0.00357*** (0.000383)

ffc_r3p3	-0.000403*** (0.000107)	-0.000156 (0.000126)	-0.00307*** (0.000275)	-0.00113*** (0.000284)	0.000784** (0.000339)	0.00107*** (0.000187)	-0.00125*** (0.000164)	-0.000305** (0.000121)	-0.000436*** (0.000137)	-0.00102*** (0.000249)	-0.00535*** (0.000844)
ffc_r3p4	-0.000147*** (5.42e-05)	-0.000612*** (0.000103)	-0.000659*** (0.000132)	-0.00106*** (0.000150)	4.89e-05 (0.000178)	0.00111*** (9.14e-05)	-8.62e-05 (6.68e-05)	-0.000116 (7.15e-05)	-2.76e-05 (6.58e-05)	-0.000375*** (0.000136)	-0.00763*** (0.00131)
ffc_r4p1	2.64e-05 (2.47e-05)	-9.89e-05*** (1.96e-05)	-0.000752*** (4.27e-05)	-0.000282*** (4.25e-05)	0.000482*** (5.17e-05)	-0.000108 (7.31e-05)	-0.000917*** (3.84e-05)	4.90e-05** (2.09e-05)	-9.96e-05** (4.90e-05)	0.000261*** (2.56e-05)	-0.000351*** (6.21e-05)
ffc_r4p2	-0.000358*** (5.79e-05)	-0.000213*** (6.39e-05)	-0.00125*** (0.000226)	1.86e-05 (0.000103)	0.000743*** (7.66e-05)	-0.000383** (0.000176)	-0.00183*** (0.000110)	-0.000415*** (7.10e-05)	-0.00180*** (0.000201)	-0.000262** (0.000125)	-0.00291*** (0.000380)
ffc_r4p3	-0.000373*** (0.000101)	-0.000550*** (9.25e-05)	-0.00271*** (0.000522)	-0.000166* (9.74e-05)	0.00127*** (9.31e-05)	0.000163 (0.000196)	-0.00335*** (0.000295)	-0.000393*** (8.33e-05)	-0.00422*** (0.000525)	-0.00139*** (0.000262)	-0.00279*** (0.000531)
ffc_r4p4	-0.00191*** (0.000287)	-0.000491** (0.000243)	-0.00311*** (0.000617)	-0.00137** (0.000541)	0.00153*** (0.000421)	0.00128*** (0.000435)	-0.00317*** (0.000296)	-0.000652** (0.000270)	-0.00681*** (0.000656)	-0.00374*** (0.000769)	-0.000449 (0.00160)
1997.years	-0.0531 (0.0692)	-0.0579 (0.101)	-0.0578 (0.127)	-0.0808 (0.0990)	-0.0661 (0.146)	-0.123 (0.146)	0.0162 (0.0843)	-0.0970 (0.0791)	-0.0583 (0.0860)	-0.0270 (0.112)	0.0232 (0.156)
1998.years	-0.0916 (0.0687)	-0.175* (0.0978)	-0.207 (0.129)	-0.190* (0.0982)	-0.0863 (0.141)	0.186 (0.142)	-0.0336 (0.0833)	-0.101 (0.0784)	-0.0668 (0.0860)	-0.00310 (0.110)	-0.0450 (0.168)
1999.years	-0.00995 (0.0665)	-0.119 (0.0964)	-0.111 (0.127)	-0.187* (0.0970)	0.244* (0.143)	0.106 (0.143)	0.117 (0.0832)	-0.0298 (0.0760)	-0.000768 (0.0846)	0.0696 (0.106)	-0.0941 (0.176)
2000.years	0.120* (0.0690)	-0.142 (0.0978)	-0.155 (0.131)	-0.0849 (0.0952)	0.695*** (0.146)	-0.138 (0.140)	0.150* (0.0865)	0.0595 (0.0776)	0.102 (0.0865)	0.152 (0.108)	0.349** (0.159)
2001.years	0.104 (0.0695)	-0.0993 (0.0970)	-0.153 (0.128)	-0.118 (0.0956)	0.581*** (0.141)	-0.131 (0.137)	0.210** (0.0882)	0.0522 (0.0773)	0.0806 (0.0873)	0.180* (0.109)	0.237 (0.155)
2002.years	0.104 (0.0690)	-0.0809 (0.0946)	-0.116 (0.126)	-0.126 (0.0947)	0.565*** (0.141)	0.0830 (0.143)	0.275*** (0.0879)	0.0600 (0.0773)	0.0667 (0.0874)	0.179* (0.108)	0.160 (0.156)
2003.years	0.0647 (0.0714)	-0.0825 (0.0960)	-0.124 (0.125)	-0.143 (0.0974)	0.656*** (0.138)	0.138 (0.146)	0.273*** (0.0889)	0.00949 (0.0799)	-0.0174 (0.0890)	0.0946 (0.111)	0.256* (0.154)
2004.years	0.0314 (0.0724)	-0.111 (0.0957)	-0.186 (0.123)	-0.115 (0.0970)	0.579*** (0.139)	0.158 (0.145)	0.256*** (0.0880)	0.0259 (0.0802)	-0.0554 (0.0907)	0.00699 (0.112)	0.262* (0.154)
2005.years	0.0457 (0.0745)	-0.131 (0.0958)	-0.262** (0.124)	-0.0859 (0.101)	0.991*** (0.139)	0.103 (0.142)	0.260*** (0.0892)	0.0278 (0.0820)	-0.0888 (0.0934)	-0.0230 (0.117)	0.0777 (0.150)
2006.years	0.0571 (0.0763)	-0.153 (0.0952)	-0.282** (0.125)	-0.00960 (0.104)	1.122*** (0.141)	0.140 (0.142)	0.243*** (0.0890)	0.0618 (0.0836)	-0.0950 (0.0964)	-0.0707 (0.119)	0.137 (0.153)
2007.years	-0.0108 (0.0757)	-0.142 (0.0940)	-0.308** (0.121)	-0.00634 (0.105)	0.969*** (0.145)	0.306** (0.150)	0.200** (0.0882)	0.0362 (0.0838)	-0.177* (0.0959)	-0.156 (0.121)	0.295* (0.151)
2008.years	-0.0207 (0.0744)	-0.0807 (0.0936)	-0.329*** (0.118)	0.00143 (0.111)	1.120*** (0.135)	0.553*** (0.152)	0.204** (0.0875)	-0.00744 (0.0833)	-0.244** (0.0955)	-0.215* (0.120)	0.330** (0.157)
2009.years	-0.329*** (0.0695)	-0.224** (0.0940)	-0.461*** (0.119)	-0.330*** (0.132)	0.563*** (0.155)	0.194 (0.155)	-0.0125 (0.0890)	-0.388*** (0.0748)	-0.556*** (0.0892)	-0.414*** (0.110)	0.268* (0.149)
2010.years	-0.260*** (0.0692)	-0.211** (0.0938)	-0.518*** (0.120)	-0.0917 (0.125)	0.742*** (0.134)	0.288* (0.156)	0.0321 (0.0868)	-0.287*** (0.0739)	-0.491*** (0.0905)	-0.392*** (0.111)	0.281* (0.155)
2011.years	-0.246*** (0.0676)	-0.139 (0.0931)	-0.508*** (0.118)	0.00729 (0.129)	0.901*** (0.133)	0.469*** (0.150)	0.0411 (0.0826)	-0.254*** (0.0740)	-0.530*** (0.0891)	-0.398*** (0.109)	0.243 (0.160)
2012.years	-0.275*** (0.0690)	-0.154* (0.0927)	-0.504*** (0.118)	-0.0772 (0.129)	0.895*** (0.134)	0.428*** (0.147)	0.00480 (0.0841)	-0.329*** (0.0752)	-0.557*** (0.0913)	-0.402*** (0.115)	0.187 (0.148)
2013.years	-0.278*** (0.0675)	-0.110 (0.0923)	-0.488*** (0.118)	-0.0860 (0.138)	0.862*** (0.133)	0.357** (0.142)	0.0339 (0.0817)	-0.327*** (0.0733)	-0.559*** (0.0921)	-0.384*** (0.112)	0.178 (0.172)
Constant	-14.62*** (0.222)	-12.62*** (0.212)	-17.89*** (0.334)	-16.79*** (0.549)	-14.58*** (0.346)	-12.84*** (0.362)	-16.58*** (0.228)	-14.68*** (0.213)	-18.10*** (0.339)	-18.57*** (0.463)	-19.16*** (0.515)
Observations	295,352	295,352	295,352	295,352	295,352	295,352	295,352	295,352	295,352	295,352	295,352

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: CCI results

VARIABLES	(1) tradevaluein1000usd_zero	(2) S0	(3) S1	(4) S2	(5) S3	(6) S4	(7) S5	(8) S6	(9) S7	(10) S8	(11) S9
Inhdpdestination	0.716*** (0.00837)	0.626*** (0.00759)	0.716*** (0.0128)	0.814*** (0.0239)	0.737*** (0.0134)	0.553*** (0.0173)	0.702*** (0.00912)	0.660*** (0.00787)	0.741*** (0.0128)	0.788*** (0.0170)	0.665*** (0.0194)
Inhdpreporter	0.735*** (0.00887)	0.559*** (0.00764)	0.661*** (0.00994)	0.610*** (0.0138)	0.522*** (0.0125)	0.504*** (0.00812)	0.738*** (0.0102)	0.711*** (0.00883)	0.853*** (0.0128)	0.779*** (0.0158)	0.808*** (0.0152)
dist	-0.688*** (0.0208)	-0.677*** (0.0195)	-0.648*** (0.0298)	-0.527*** (0.0341)	-0.959*** (0.0290)	-0.621*** (0.0339)	-0.839*** (0.0180)	-0.724*** (0.0193)	-0.620*** (0.0289)	-0.569*** (0.0349)	-0.616*** (0.0444)
lag_pc1	0.0280*** (0.00368)	0.0350*** (0.00428)	0.0393*** (0.00588)	0.0245*** (0.00862)	0.0177*** (0.00665)	0.0200*** (0.00887)	0.0590*** (0.00431)	0.0114*** (0.00383)	0.00705 (0.00558)	0.0448*** (0.00597)	0.0620*** (0.00699)
lag_pc2	0.0926*** (0.00688)	0.0936*** (0.00730)	0.181*** (0.0112)	0.0935*** (0.0210)	0.00805 (0.0181)	-0.0836*** (0.0213)	0.126*** (0.00858)	0.0876*** (0.00791)	0.0890*** (0.00949)	0.128*** (0.0109)	0.129*** (0.0140)
plandlocked	-0.864 (4.277)	-96.66*** (4.481)	2.183 (6.218)	-66.05*** (5.974)	-147.6*** (10.65)	-191.5*** (9.336)	38.05*** (5.673)	16.59*** (4.961)	34.12*** (6.404)	29.10*** (6.983)	-52.54*** (8.320)
rlandlocked	0.0142 (5.008)	-53.23*** (5.424)	11.13** (8.364)	-18.37** (8.163)	-45.53*** (8.163)	-151.1*** (7.661)	7.429 (5.151)	0.228 (5.170)	-11.15* (6.871)	26.24*** (6.570)	129.6*** (18.85)
contig	0.357*** (0.0450)	0.749*** (0.0443)	0.207*** (0.0763)	0.535*** (0.0675)	0.267*** (0.0798)	0.0917 (0.105)	0.127*** (0.0451)	0.416*** (0.0388)	0.291*** (0.0677)	0.424*** (0.0635)	0.268*** (0.101)
comlang_off	0.157*** (0.0356)	-0.0712* (0.0364)	0.0168 (0.0607)	-0.148** (0.0737)	0.176** (0.0730)	0.260* (0.148)	0.314*** (0.0525)	0.204*** (0.0361)	0.151*** (0.0536)	0.280*** (0.0495)	0.0222 (0.112)
colony	0.102*** (0.0363)	0.104** (0.0493)	0.417*** (0.0976)	0.315*** (0.0528)	0.0340 (0.0945)	0.356*** (0.129)	0.0370 (0.0451)	0.261*** (0.0425)	-0.0605 (0.0460)	0.00411 (0.0461)	0.881*** (0.151)
smctry	0.740*** (0.113)	0.348*** (0.0794)	0.839*** (0.0988)	0.361*** (0.130)	0.144 (0.122)	0.303** (0.155)	0.230*** (0.0782)	0.524*** (0.0871)	1.296*** (0.160)	1.262*** (0.150)	0.0626 (0.180)
rta	0.405*** (0.0389)	0.454*** (0.0350)	0.399*** (0.0515)	0.408*** (0.0571)	0.249*** (0.0620)	0.898*** (0.124)	-0.000769 (0.0491)	0.502*** (0.0362)	0.554*** (0.0547)	0.295*** (0.0604)	0.529*** (0.102)
cci_r1p1	-0.500*** (0.0813)	-0.395*** (0.0915)	-0.0602 (0.0946)	-0.727*** (0.137)	-0.206* (0.124)	-1.747*** (0.217)	-0.454*** (0.0948)	-1.107*** (0.0867)	-0.427*** (0.102)	-1.062*** (0.125)	0.118 (0.114)
cci_r1p2	-0.0665** (0.0309)	0.0315 (0.0329)	0.227*** (0.0529)	-0.390*** (0.0636)	-0.799*** (0.0981)	-1.521*** (0.181)	0.0414 (0.0444)	-0.320*** (0.0391)	0.0220 (0.0397)	-0.156*** (0.0452)	0.102 (0.0696)
cci_r1p3	0.00462 (0.00689)	0.0157 (0.0114)	-0.0824*** (0.0195)	0.0822*** (0.0187)	-0.0358 (0.0250)	-0.284*** (0.0256)	0.0320*** (0.00768)	-0.0603*** (0.00841)	0.0141 (0.00874)	-0.0723*** (0.00926)	0.0164 (0.0215)
cci_r1p4	-0.0743*** (0.0138)	-0.0841*** (0.0131)	-0.212*** (0.0204)	0.181*** (0.0364)	-0.117*** (0.0338)	-0.350*** (0.0352)	-0.121*** (0.0137)	-0.181*** (0.0149)	-0.0234 (0.0191)	-0.282*** (0.0236)	-0.113*** (0.0232)
cci_r2p1	-0.395*** (0.0399)	-0.372*** (0.0652)	-0.195*** (0.0549)	-0.902*** (0.0981)	-1.184*** (0.230)	-1.867*** (0.173)	-0.356*** (0.0570)	0.0105 (0.0585)	-0.387*** (0.0546)	-0.434*** (0.0593)	-1.024*** (0.154)
cci_r2p2	-2.637*** (0.463)	-2.592*** (0.634)	-4.969** (2.077)	-4.417*** (0.761)	-3.792*** (1.444)	-4.478*** (1.362)	-2.025*** (0.418)	-1.941*** (0.491)	-3.024*** (0.619)	-1.669*** (0.464)	-6.379*** (1.539)
cci_r2p3	-0.352*** (0.0459)	-0.505*** (0.0747)	-0.482*** (0.0591)	-0.489*** (0.0661)	-0.283** (0.140)	-0.219** (0.0927)	-0.295*** (0.0358)	-0.244*** (0.0479)	-0.441*** (0.0516)	-0.459*** (0.0564)	-0.620*** (0.142)
cci_r2p4	-0.534*** (0.0300)	-0.390*** (0.0509)	-0.234*** (0.0557)	-0.478*** (0.0708)	-0.980*** (0.161)	-0.560*** (0.0724)	-0.394*** (0.0328)	-0.508*** (0.0332)	-0.554*** (0.0392)	-0.716*** (0.0566)	-0.702*** (0.102)
cci_r3p1	0.0274*** (0.0101)	-0.0647*** (0.00981)	-0.0785*** (0.0171)	-0.300*** (0.0200)	0.0824*** (0.0175)	-0.173*** (0.0328)	-0.176*** (0.0137)	-0.0265*** (0.0102)	0.106*** (0.0101)	0.000310 (0.0114)	-0.142*** (0.0334)
cci_r3p2	-0.0426 (0.0283)	-0.170*** (0.0549)	-0.785*** (0.0494)	-0.456*** (0.0504)	0.262*** (0.0483)	-0.889*** (0.118)	-0.378*** (0.0397)	-0.293*** (0.0563)	0.0484 (0.0360)	-0.231*** (0.0648)	-2.184*** (0.213)
cci_r3p3	0.0644*** (0.0238)	-0.604*** (0.0484)	-1.320*** (0.114)	-0.204*** (0.0606)	0.322*** (0.0745)	0.0517 (0.0839)	-0.243*** (0.0326)	0.0333 (0.0241)	0.206*** (0.0277)	-0.0266 (0.0597)	-2.215*** (0.566)
cci_r3p4	0.229***	-0.519***	-0.601***	-0.520***	-0.190	0.902***	0.230**	0.182**	0.522***	0.243**	-5.107***

	(0.0692)	(0.0932)	(0.140)	(0.122)	(0.124)	(0.104)	(0.0923)	(0.0727)	(0.0722)	(0.113)	(0.931)
cci_r4p1	0.0605***	-0.0948***	-0.440***	-0.162***	0.281***	-0.115***	-0.419***	0.0518***	0.0576**	0.174***	-0.236***
	(0.0147)	(0.0113)	(0.0273)	(0.0223)	(0.0279)	(0.0415)	(0.0206)	(0.0130)	(0.0255)	(0.0150)	(0.0340)
cci_r4p2	-0.0432	-0.114**	-1.020***	0.0893	0.577***	-0.178**	-0.770***	-0.126***	-0.587***	0.0198	-1.312***
	(0.0307)	(0.0492)	(0.0807)	(0.0617)	(0.0405)	(0.0895)	(0.0547)	(0.0409)	(0.0826)	(0.0683)	(0.212)
cci_r4p3	0.0592	-0.432***	-1.749***	0.436***	1.390***	-0.223	-1.548***	0.0821	-1.168***	-0.535***	-2.599***
	(0.0945)	(0.0962)	(0.418)	(0.0897)	(0.0839)	(0.167)	(0.174)	(0.0973)	(0.227)	(0.180)	(0.384)
cci_r4p4	-0.776***	0.154	-1.278***	0.0344	0.927***	-0.292	-1.395***	-0.402***	-3.350***	-2.039***	-3.014***
	(0.145)	(0.147)	(0.206)	(0.290)	(0.220)	(0.251)	(0.150)	(0.148)	(0.302)	(0.298)	(1.138)
1999.years	0.0532	-0.0109	0.00895	-0.119	-0.0148	-0.0180	0.140**	0.0455	0.0794	0.0562	-0.0678
	(0.0562)	(0.0777)	(0.117)	(0.0863)	(0.126)	(0.124)	(0.0695)	(0.0578)	(0.0767)	(0.0917)	(0.154)
2001.years	0.120*	-0.00817	0.00874	-0.0819	0.308**	-0.301**	0.213***	0.0512	0.102	0.0724	0.317**
	(0.0619)	(0.0798)	(0.118)	(0.0819)	(0.124)	(0.120)	(0.0778)	(0.0637)	(0.0814)	(0.0983)	(0.129)
2003.years	0.0997	0.00426	0.0180	-0.0898	0.406***	-0.0376	0.278***	0.0136	0.0368	0.00517	0.326**
	(0.0678)	(0.0813)	(0.115)	(0.0847)	(0.121)	(0.137)	(0.0825)	(0.0757)	(0.0860)	(0.106)	(0.128)
2004.years	0.0620	-0.0390	-0.0656	-0.0655	0.336***	-0.0141	0.249***	0.0355	-0.0127	-0.0743	0.318**
	(0.0664)	(0.0791)	(0.112)	(0.0851)	(0.122)	(0.133)	(0.0791)	(0.0717)	(0.0854)	(0.105)	(0.126)
2005.years	0.0612	-0.0637	-0.133	-0.0572	0.741***	-0.0957	0.243***	0.00865	-0.0613	-0.134	0.146
	(0.0690)	(0.0795)	(0.113)	(0.0913)	(0.123)	(0.131)	(0.0806)	(0.0751)	(0.0884)	(0.111)	(0.122)
2006.years	0.0830	-0.0865	-0.170	0.0131	0.885***	-0.0704	0.221***	0.0524	-0.0474	-0.165	0.194
	(0.0692)	(0.0774)	(0.113)	(0.0949)	(0.124)	(0.127)	(0.0786)	(0.0723)	(0.0905)	(0.110)	(0.125)
2007.years	0.0375	-0.0581	-0.196*	0.0290	0.733***	0.131	0.194***	0.0676	-0.110	-0.202*	0.347***
	(0.0648)	(0.0738)	(0.109)	(0.0954)	(0.129)	(0.131)	(0.0743)	(0.0639)	(0.0869)	(0.107)	(0.125)
2008.years	0.0355	0.00453	-0.228**	0.0438	0.896***	0.393***	0.199***	0.0391	-0.173**	-0.244**	0.372***
	(0.0628)	(0.0732)	(0.106)	(0.102)	(0.116)	(0.133)	(0.0730)	(0.0628)	(0.0857)	(0.106)	(0.132)
2009.years	-0.290***	-0.145*	-0.341***	-0.306***	0.307***	0.00230	-0.0238	-0.370***	-0.499***	-0.480***	0.335***
	(0.0594)	(0.0743)	(0.107)	(0.111)	(0.116)	(0.137)	(0.0766)	(0.0571)	(0.0799)	(0.0955)	(0.121)
2010.years	-0.218***	-0.130*	-0.394***	-0.0658	0.503***	0.134	0.0346	-0.257***	-0.436***	-0.462***	0.353***
	(0.0575)	(0.0726)	(0.107)	(0.112)	(0.116)	(0.135)	(0.0719)	(0.0540)	(0.0806)	(0.0945)	(0.129)
2011.years	-0.206***	-0.0596	-0.379***	0.0281	0.654***	0.333**	0.0478	-0.223***	-0.486***	-0.477***	0.318**
	(0.0554)	(0.0720)	(0.106)	(0.113)	(0.113)	(0.130)	(0.0674)	(0.0537)	(0.0791)	(0.0919)	(0.137)
2012.years	-0.239***	-0.0759	-0.377***	-0.0656	0.645***	0.273**	0.00127	-0.307***	-0.512***	-0.483***	0.265**
	(0.0574)	(0.0725)	(0.106)	(0.113)	(0.114)	(0.129)	(0.0698)	(0.0552)	(0.0814)	(0.0964)	(0.122)
2013.years	-0.263***	-0.0396	-0.351***	-0.0902	0.596***	0.164	0.0167	-0.339***	-0.535***	-0.498***	0.270*
	(0.0593)	(0.0734)	(0.105)	(0.124)	(0.114)	(0.126)	(0.0709)	(0.0589)	(0.0845)	(0.0993)	(0.151)
Constant	-15.08***	-12.80***	-17.98***	-17.82***	-14.79***	-12.91***	-17.10***	-15.26***	-18.78***	-19.28***	-19.07***
	(0.237)	(0.218)	(0.340)	(0.618)	(0.345)	(0.382)	(0.232)	(0.230)	(0.367)	(0.501)	(0.531)
Observations	235,072	235,072	235,072	235,072	235,072	235,072	235,072	235,072	235,072	235,072	235,072

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: ICRG results

VARIABLES	(1) tradevaluein1000usd_zero	(2) S0	(3) S1	(4) S2	(5) S3	(6) S4	(7) S5	(8) S6	(9) S7	(10) S8	(11) S9
lnhdpdestination	0.715*** (0.00774)	0.631*** (0.00717)	0.727*** (0.0121)	0.782*** (0.0207)	0.730*** (0.0124)	0.538*** (0.0157)	0.691*** (0.00869)	0.658*** (0.00734)	0.740*** (0.0117)	0.789*** (0.0157)	0.672*** (0.0183)
lnhdpreporter	0.724*** (0.00806)	0.551*** (0.00734)	0.680*** (0.00972)	0.615*** (0.0133)	0.482*** (0.0105)	0.488*** (0.00743)	0.739*** (0.00969)	0.688*** (0.00783)	0.841*** (0.0115)	0.754*** (0.0147)	0.814*** (0.0144)
dist	-0.696*** (0.0198)	-0.685*** (0.0182)	-0.631*** (0.0277)	-0.530*** (0.0312)	-0.965*** (0.0257)	-0.625*** (0.0304)	-0.834*** (0.0180)	-0.721*** (0.0180)	-0.626*** (0.0293)	-0.566*** (0.0354)	-0.603*** (0.0412)
lag_pc1	0.0261*** (0.00363)	0.0384*** (0.00415)	0.0499*** (0.00564)	0.0204** (0.00921)	0.0252*** (0.00641)	0.0121 (0.00947)	0.0588*** (0.00435)	0.00655* (0.00375)	0.00563 (0.00530)	0.0459*** (0.00568)	0.0727*** (0.00697)
lag_pc2	0.0818*** (0.00623)	0.0883*** (0.00683)	0.172*** (0.0110)	0.0880*** (0.0185)	-0.00486 (0.0164)	-0.0432** (0.0175)	0.118*** (0.00803)	0.0829*** (0.00696)	0.0755*** (0.00854)	0.115*** (0.0102)	0.118*** (0.0135)
plandlocked	-2.871 (3.981)	-94.4*** (4.151)	11.61** (5.766)	-55.50*** (5.463)	-158.7*** (10.16)	-188.7*** (8.948)	44.59*** (5.175)	14.40*** (4.604)	28.83*** (5.917)	22.15*** (6.276)	-40.47*** (7.481)
rlandlocked	0.709 (4.687)	-51.46*** (4.701)	16.39*** (5.131)	-26.65*** (7.063)	-43.91*** (7.928)	-149.0*** (7.052)	10.19** (4.747)	2.975 (4.878)	-11.06* (6.116)	27.31*** (6.343)	132.9*** (17.44)
contig	0.337*** (0.0406)	0.765*** (0.0404)	0.213*** (0.0703)	0.545*** (0.0659)	0.222*** (0.0741)	0.186* (0.0988)	0.151*** (0.0436)	0.429*** (0.0368)	0.258*** (0.0599)	0.418*** (0.0598)	0.300*** (0.0927)
comlang_off	0.140*** (0.0326)	-0.0802** (0.0340)	0.0109 (0.0575)	-0.156** (0.0688)	0.140** (0.0675)	0.285** (0.138)	0.289*** (0.0492)	0.187*** (0.0332)	0.133*** (0.0482)	0.261*** (0.0461)	0.0214 (0.103)
colony	0.121*** (0.0331)	0.0740 (0.0456)	0.339*** (0.0950)	0.310*** (0.0452)	0.0409 (0.0848)	0.240** (0.118)	0.0170 (0.0451)	0.232*** (0.0386)	0.0285 (0.0364)	0.0100 (0.0417)	0.841*** (0.137)
smctry	0.740*** (0.110)	0.322*** (0.0766)	0.792*** (0.102)	0.407*** (0.105)	0.243** (0.0983)	0.107 (0.142)	0.145* (0.0790)	0.519*** (0.0858)	1.212*** (0.165)	1.254*** (0.157)	-0.0593 (0.171)
rta	0.398*** (0.0378)	0.451*** (0.0325)	0.468*** (0.0468)	0.408*** (0.0545)	0.117* (0.0634)	0.816*** (0.116)	0.0471 (0.0470)	0.516*** (0.0347)	0.568*** (0.0561)	0.314*** (0.0635)	0.590*** (0.0970)
icrg_r1p1	-0.0894*** (0.0111)	-0.0525*** (0.0142)	0.0192 (0.0160)	-0.0467** (0.0228)	-0.148*** (0.0285)	-0.396*** (0.0494)	-0.0491*** (0.0145)	-0.162*** (0.0136)	-0.0729*** (0.0146)	-0.209*** (0.0194)	-0.0131 (0.0188)
icrg_r1p2	-0.0106 (0.00902)	0.0149** (0.00675)	0.0511*** (0.00861)	-0.0809*** (0.0201)	-0.464*** (0.0502)	-0.530*** (0.0494)	0.00687 (0.0101)	-0.0261** (0.0131)	0.0100 (0.00936)	-0.0317** (0.0136)	0.00621 (0.0204)
icrg_r1p3	0.0175*** (0.00614)	0.0746*** (0.00567)	0.0249* (0.0143)	0.0265*** (0.00989)	-0.104*** (0.0163)	-0.176*** (0.0166)	0.0670*** (0.00703)	-0.00915 (0.00765)	0.0163** (0.00791)	-0.0511*** (0.00919)	0.0675*** (0.0136)
icrg_r1p4	-0.0333*** (0.00883)	-0.0160** (0.00803)	-0.0999*** (0.0141)	0.133*** (0.0179)	-0.205*** (0.0257)	-0.168*** (0.0245)	-0.0505*** (0.00860)	-0.0818*** (0.0107)	0.00220 (0.0120)	-0.174*** (0.0176)	-0.0712*** (0.0165)
icrg_r2p1	-0.110*** (0.0194)	-0.106*** (0.0264)	-0.0754*** (0.0219)	-0.202*** (0.0332)	-0.836*** (0.115)	-0.693*** (0.0716)	-0.115*** (0.0208)	0.0102 (0.0133)	-0.0906*** (0.0249)	-0.0655** (0.0285)	-0.314*** (0.0690)
icrg_r2p2	-0.275*** (0.0868)	-0.272* (0.143)	-0.396* (0.234)	-0.556*** (0.131)	-1.493*** (0.288)	-0.436 (0.266)	-0.126** (0.0574)	-0.166** (0.0833)	-0.219** (0.0882)	-0.163** (0.0797)	-0.458** (0.210)
icrg_r2p3	-0.167*** (0.0240)	-0.0634 (0.0390)	-0.0417 (0.0264)	-0.418*** (0.0421)	-0.747*** (0.111)	0.0537 (0.0409)	-0.0639*** (0.0237)	-0.0249 (0.0203)	-0.198*** (0.0246)	-0.201*** (0.0311)	-0.498*** (0.0611)
icrg_r2p4	-0.317*** (0.0204)	-0.208*** (0.0309)	-0.0620*** (0.0238)	-0.141*** (0.0526)	-1.135*** (0.104)	-0.208*** (0.0401)	-0.216*** (0.0190)	-0.262*** (0.0198)	-0.318*** (0.0264)	-0.426*** (0.0343)	-0.351*** (0.0880)
icrg_r3p1	0.0293*** (0.00756)	0.0273*** (0.00693)	0.0395*** (0.0120)	-0.156*** (0.0141)	0.0659*** (0.0143)	-0.0416** (0.0210)	-0.122*** (0.0112)	-0.00669 (0.00916)	0.0688*** (0.00992)	0.0518*** (0.00959)	-0.149*** (0.0242)
icrg_r3p2	-0.00571 (0.0174)	-0.00691 (0.0245)	-0.249*** (0.0314)	-0.262*** (0.0351)	0.208*** (0.0155)	-0.335*** (0.0765)	-0.183*** (0.0360)	-0.0956** (0.0398)	-0.124*** (0.0335)	-0.0510 (0.0388)	-0.833*** (0.106)
icrg_r3p3	-0.0622*** (0.0195)	-0.0441** (0.0187)	-0.321*** (0.0599)	-0.0861** (0.0449)	0.00300 (0.0296)	0.0411 (0.0312)	-0.126*** (0.0190)	-0.0305 (0.0190)	-0.0403 (0.0283)	-0.170*** (0.0524)	-1.072*** (0.368)
icrg_r3p4	-0.00190	-0.0125	0.0317	-0.000117	-0.185**	0.166***	0.0785***	0.0220	0.0147	-0.0607	-3.825***

	(0.0230)	(0.0242)	(0.0324)	(0.0401)	(0.0805)	(0.0172)	(0.0211)	(0.0297)	(0.0265)	(0.0476)	(0.470)
icrg_r4p1	0.0455***	-0.0415***	-0.235***	-0.0570***	0.126***	-0.0712**	-0.252***	0.0533***	0.0390**	0.122***	-0.226***
	(0.00900)	(0.00887)	(0.0181)	(0.0149)	(0.0129)	(0.0277)	(0.0161)	(0.00787)	(0.0162)	(0.00947)	(0.0276)
icrg_r4p2	0.00278	-0.0652***	-0.312***	0.0703***	0.234***	-0.127**	-0.424***	-0.0129	-0.340***	0.0434	-1.142***
	(0.0184)	(0.0189)	(0.0514)	(0.0238)	(0.0166)	(0.0556)	(0.0448)	(0.0233)	(0.0610)	(0.0369)	(0.170)
icrg_r4p3	-0.0273	-0.0904***	-0.171	0.119***	0.203***	-0.00295	-0.646***	0.00754	-0.648***	-0.0828	-1.053***
	(0.0300)	(0.0327)	(0.162)	(0.0172)	(0.0151)	(0.0497)	(0.110)	(0.0208)	(0.140)	(0.0605)	(0.320)
icrg_r4p4	-0.240***	-0.0266	-0.135**	0.129	0.0712	0.186***	-0.357***	-0.161***	-0.949***	-0.752***	0.106
	(0.0449)	(0.0404)	(0.0656)	(0.0837)	(0.0629)	(0.0468)	(0.0409)	(0.0411)	(0.0992)	(0.0901)	(0.172)
1997.years	-0.0549	-0.0663	-0.0679	-0.0755	-0.0120	-0.00737	0.0183	-0.0878	-0.0647	-0.0334	0.00121
	(0.0632)	(0.0975)	(0.127)	(0.101)	(0.143)	(0.135)	(0.0784)	(0.0697)	(0.0823)	(0.103)	(0.154)
1998.years	-0.0514	-0.117	-0.166	-0.192*	-0.289**	0.0978	0.0128	-0.0751	-0.0189	0.0121	-0.0105
	(0.0620)	(0.0932)	(0.131)	(0.101)	(0.145)	(0.134)	(0.0764)	(0.0687)	(0.0824)	(0.100)	(0.167)
1999.years	0.0513	-0.0500	-0.0801	-0.159	0.170	0.0529	0.176**	0.0213	0.0677	0.142	-0.0492
	(0.0611)	(0.0919)	(0.128)	(0.0989)	(0.144)	(0.135)	(0.0771)	(0.0667)	(0.0823)	(0.0983)	(0.174)
2000.years	0.171***	-0.0821	-0.115	-0.0555	0.620***	-0.174	0.211***	0.0979	0.152*	0.199**	0.421***
	(0.0627)	(0.0930)	(0.131)	(0.0954)	(0.147)	(0.132)	(0.0806)	(0.0677)	(0.0837)	(0.100)	(0.158)
2001.years	0.134**	-0.0385	-0.0940	-0.116	0.490***	-0.208	0.259***	0.0587	0.105	0.176*	0.311**
	(0.0627)	(0.0927)	(0.128)	(0.0967)	(0.144)	(0.130)	(0.0818)	(0.0676)	(0.0845)	(0.100)	(0.153)
2002.years	0.115*	-0.0281	-0.0474	-0.136	0.451***	-0.00954	0.318***	0.0405	0.0735	0.140	0.234
	(0.0637)	(0.0911)	(0.126)	(0.0954)	(0.142)	(0.137)	(0.0841)	(0.0689)	(0.0859)	(0.102)	(0.155)
2003.years	0.0461	-0.0615	-0.0661	-0.144	0.513***	0.0167	0.306***	-0.0467	-0.0392	0.00953	0.318**
	(0.0697)	(0.0945)	(0.125)	(0.0974)	(0.140)	(0.144)	(0.0873)	(0.0770)	(0.0890)	(0.109)	(0.152)
2004.years	0.0287	-0.0918	-0.149	-0.0928	0.444***	0.0528	0.295***	-0.00193	-0.0586	-0.0464	0.307**
	(0.0710)	(0.0939)	(0.123)	(0.0974)	(0.140)	(0.142)	(0.0865)	(0.0778)	(0.0908)	(0.111)	(0.152)
2005.years	0.0344	-0.119	-0.228*	-0.0560	0.850***	0.00866	0.290***	-0.00860	-0.110	-0.0861	0.123
	(0.0724)	(0.0937)	(0.123)	(0.102)	(0.141)	(0.138)	(0.0872)	(0.0788)	(0.0923)	(0.115)	(0.148)
2006.years	0.0483	-0.141	-0.249**	0.0217	0.948***	0.0350	0.278***	0.0301	-0.109	-0.133	0.181
	(0.0745)	(0.0932)	(0.124)	(0.105)	(0.142)	(0.139)	(0.0874)	(0.0810)	(0.0954)	(0.118)	(0.151)
2007.years	-0.00192	-0.120	-0.298**	0.0264	0.825***	0.205	0.225***	0.0265	-0.170*	-0.179	0.319**
	(0.0714)	(0.0912)	(0.121)	(0.106)	(0.146)	(0.143)	(0.0845)	(0.0763)	(0.0932)	(0.115)	(0.149)
2008.years	-0.00604	-0.0589	-0.332***	0.0379	0.984***	0.458***	0.226***	-0.00778	-0.232**	-0.226**	0.343**
	(0.0695)	(0.0907)	(0.118)	(0.111)	(0.136)	(0.144)	(0.0834)	(0.0749)	(0.0921)	(0.114)	(0.155)
2009.years	-0.319***	-0.209**	-0.477***	-0.289**	0.414***	0.0813	-0.00527	-0.395***	-0.555***	-0.440***	0.273*
	(0.0659)	(0.0916)	(0.119)	(0.122)	(0.134)	(0.148)	(0.0863)	(0.0685)	(0.0874)	(0.107)	(0.147)
2010.years	-0.262***	-0.200**	-0.534***	-0.0594	0.590***	0.167	0.0343	-0.307***	-0.503***	-0.443***	0.289*
	(0.0667)	(0.0916)	(0.120)	(0.125)	(0.136)	(0.148)	(0.0845)	(0.0690)	(0.0898)	(0.109)	(0.153)
2011.years	-0.254***	-0.128	-0.504***	0.0307	0.750***	0.375***	0.0652	-0.276***	-0.549***	-0.456***	0.272*
	(0.0642)	(0.0906)	(0.118)	(0.129)	(0.133)	(0.143)	(0.0798)	(0.0686)	(0.0875)	(0.105)	(0.159)
2012.years	-0.279***	-0.140	-0.498***	-0.0648	0.751***	0.331**	0.0321	-0.347***	-0.570***	-0.453***	0.227
	(0.0651)	(0.0903)	(0.118)	(0.128)	(0.134)	(0.142)	(0.0810)	(0.0688)	(0.0892)	(0.109)	(0.147)
2013.years	-0.295***	-0.100	-0.477***	-0.0765	0.710***	0.244*	0.0555	-0.365***	-0.589***	-0.459***	0.229
	(0.0653)	(0.0902)	(0.117)	(0.137)	(0.133)	(0.137)	(0.0802)	(0.0696)	(0.0913)	(0.110)	(0.170)
Constant	-14.81***	-12.79***	-18.64***	-17.29***	-13.76***	-12.45***	-17.00***	-14.77***	-18.46***	-18.87***	-19.34***
	(0.227)	(0.218)	(0.349)	(0.575)	(0.324)	(0.370)	(0.236)	(0.218)	(0.349)	(0.475)	(0.522)
Observations	248,536	248,536	248,536	248,536	248,536	248,536	248,536	248,536	248,536	248,536	248,536

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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