The Impact of Resolving Territorial Claims on Bilateral Trade
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Although territorial claims have been receiving an increasing amount of scholarly attention, few studies have examined the impact of territorial claims on other phenomena. In this paper we study the impact of territorial claims on bilateral trade. We expect that an ongoing conflict over territory should serve as an obstacle to bilateral trade, but after the claim is resolved, trade will increase. We find support for this argument, with trade increasing substantially after a dyad's last territorial claim is settled, regardless of the way that the claim was settled. We conclude by discussing ways for future research to extend beyond this very preliminary study.

The Impact of Resolving Territorial Claims on Bilateral Trade

“Trade between the two countries has suffered a drop in the past two years due to border conflicts in 1995 and 1996. Bilateral trade went down to 90 million US dollars in 1996, but rebounded to 350 million dollars in 1997. Analysts here said that the signing of the peace pact could double their trade in 1999, while the volume is expected to reach 1.5 billion dollars in 2001.”

--Xinhua News Agency (12/8/1998), "Peruvian Trade Mission Visits Ecuador"

“Fujimori emphasized that after the signing of the peace agreement, Peru will be able to increase its trade with Ecuador, currently not higher than 300m dollars. It will also be possible ‘to attract investments that could reach 3 bn dollars within the framework of this new atmosphere.’”

--BBC Summary of World Broadcasts (10/27/1998), "Fujimori Says Border Ruling Marks 'New Chapter' with Ecuador"

‘Ever since I was a child, I was raised with the idea that Peru was our enemy. That’s what they always told us in school,’ said Mrs. A-Baki, who presented her credentials to Mr. Clinton last week. ‘With peace, our economy will completely open up. We’ll have even more trade with Peru than we have with Colombia.’”

--Ivonne A-Baki, Ecuadorian ambassador to the US (1999)

Although territorial claims have been receiving an increasing amount of scholarly attention over the last two decades, much of this research has focused on militarized conflict over territory. Scholars have found overlapping territorial claims to be one of the most likely causes of interstate conflict. They often lead to militarized interstate disputes and, once militarized, they are more likely to escalate to war than are other types of interstate disputes (Luard 1986; Holsti 1991; Hensel 1996, 2000).

Scholars have also examined the peaceful management of territorial claims. Even though territorial claims are more likely to lead to violent conflict between states than are other interstate differences, most territorial claims still do not lead to violent conflict between states. Less than half of all claimed territories (44.3%) escalate to a single militarized dispute, and barely one in eight (12.7%) end through armed conflict (Hensel et al. 2008). Instead, they are resolved via bilateral or multilateral negotiations. Goertz and Diehl (1990, 1992), Kacowicz (1994), Hensel
(2001), and Huth and Allee (2002), among many others, seek to understand how states resolve territorial disputes peacefully.

Given the salience of territory to interstate conflict, it is not surprising that disagreements over territory spill over into other areas in which states interact. Here, a third line of research has found that disputed borders between two states negatively affect bilateral trade flows (Simmons 2002, 2005). Uncertainty over where the border lies causes citizens, government officials, and officials to avoid engaging in trade between two neighboring states. Disputed international borders are just one subset of territorial claims as some states, such as Belize and Guatemala, claim ownership over territory that goes beyond an unsettled border (Guatemala claims over half of Belize’s territory) while other states, such as Nicaragua and Colombia, dispute territory that is noncontiguous to either state.

The quotes that opened this paper concerned the 1998 settlement of the territorial claim between Ecuador and Peru. Peru and Ecuador had engaged in a long-running territorial claim that led to a number of military confrontations, several of which produced hundreds of battle deaths. With the assistance of the international community, Ecuador and Peru finally signed a comprehensive peace accord on October 26, 1998, that established a framework for ending the dispute. These quotes clearly indicate the authors’ belief that conflict over territory impedes trade between the claimant states, and their expectation that resolving such a conflict will allow the states to reap economic rewards.

In this paper, we develop and test an argument that ties together the literature on territorial claims, conflict resolution, and bilateral trade. We expect that ongoing territorial claims are a serious obstacle to bilateral trade, so the successful resolution of territorial disputes should have a strong effect on trade flows between states. The uncertainty over ownership of the
disputed territory and the enmity between the leaders and citizens of the involved states will cause business owners to eschew investing in, or selling their products in, a state with which their home state has a conflict. Once a territorial dispute between two states is resolved, bilateral trade should increase, particularly if the claimants resolved their claim without resorting to violence. Our empirical analyses generally support these expectations, except that any form of claim resolution -- even those involving violence -- is followed by a substantial increase in trade. We conclude by discussing the implications of these findings and some directions for future research.

**Bilateral Trade, Territorial Claims, and Conflict**

Much of the literature examining bilateral trade illustrates this relationship using a gravity model (Tinberger 1962; Linnemann 1966). The classic gravity model suggests that states that are larger in size and geographically close to one another are more likely to have higher levels of trade than pairs of states that have a relatively larger distance between them. This is based on rising costs related to transportation over long distances. Political scientists have adopted the use of the gravity model in order to understand why certain pairs of states trade more than others. Bliss and Russett (1998) find higher levels of trade between democracies, states that share a common language, and states with a higher level of trade openness.

However, scholars also point to geographical proximity as being one of the strongest indicators of a dyad’s probability of war. Contiguity could lead to a territorial claim (Diehl and Goertz 1992; Hensel 2000) or a border dispute (Carter and Goemans 2011). Therefore, while the gravity model suggests that dyads that are physically close to one another trade more, these are also the same states that have higher probabilities of conflict.
In the democratic peace literature, conflict and trade are mutually exclusive. Conflict disrupts trade, and, therefore, states would like to avoid any loss of trade benefits. Therefore, they pursue a peaceful path to solve their disagreements rather than resorting to a military solution (Doyle 1999). Kantian scholars such as Russett and Oneal (2001) find that trade, shared memberships in international organization, and joint democracy mutually reinforce peace. States that trade with one another are less likely to be involved in a conflict, and shared similar characteristics (along with the absence of conflict) increase a dyad’s trade with each other.

The rational expectations school grows out of this mindset; states that trade are less likely to fight, but for different reasons. Morrow (1999) finds that trade partners are less likely to resort to violent conflict for fears of interrupting their trade relationship, but that this is a result of firms being selective in where they will invest. Therefore, the possibility of conflict between two states could reduce their trade magnitude before hostilities flare (Anderton and Carter 2001; Barbieri and Levy 2001; Li and Sacko 2002; Long 2008). The rational expectations school also holds that a risk of other economic interruptions, mainly in the form of capital flight, can also promote peace between interdependent states (Gartzke, Li, and Boehmer 2001?).

Simmons (2005) uses this rational approach to examine the relationship between border claims and international trade. She claims that firms “face costs and risks of developing business linkages in countries with which their government has a dispute” (829). Therefore, states involved in border disputes (whether force has been used or not) have lower levels of trade than a dyad where a border claim is not present, an expectation that is supported by her empirical analyses. It should be noted that Simmons' focus was on the negative impact of an ongoing territorial claim, so her analyses compared dyad-years when there was such a claim with years when there was not. This established strong evidence that trade is lower between territorial claim
participants than between other states, but the comparison group included both dyads that had already resolved their claims and dyads that had never engaged in territorial claims in the first place. This leaves us unable to determine whether former territorial claimants were able to increase their trade after settling the claim (as well as whether details of how they settled their claim change this effect), though, or whether the findings are largely due to the comparison with states that had never engaged in claims. Answering such questions is the purpose of the present study.

**Hypotheses**

Our starting point is consistent with past research that suggests we should take an issue-based approach to understanding states’ approach to foreign policy decision-making. State leaders choose from a variety of cooperative and conflictual foreign policy tools in order to achieve their goals over specific issues. Past research has consistently shown that territorial issues are very dangerous, being more likely to lead to the outbreak or escalation of armed conflict than other issue types. With few exceptions, this research has not examined the impact of territorial claims on other dimensions of international relations.

If territory is as salient and dangerous an issue as research has shown, it appears reasonable to expect ongoing territorial questions to shape other dimensions of the relationship between the claimant states. Vasquez (1993: 147) makes this point clearly: "So long as there is a struggle over contiguous territory, then world politics is a struggle for power, but once boundaries are settled, world politics has other characteristics. Conflict and disagreement are still present, but violence is less likely and power transitions no longer war producing." He continues (Vasquez 1993: 152), "for most neighbors, once territorial issues are resolved, peaceful relations
eventually ensue. They learn to live with each other." As noted above, Simmons (2005) also finds that ongoing territorial disputes seem to reduce trade between the claimant states, which is consistent with this argument.

Our first hypothesis concerns the impact of settling territorial claims in trade between the former adversaries. The quotes about the ending of the Ecuador-Peru claim that were presented at the beginning of this paper suggest that ending a claim should have a positive effect on trade between the claimants. Without the constant threat and tension posed by the disagreement over territorial sovereignty, they should be able to focus on the potential benefits of trade with and investment in the other economy, particularly to the extent that they are geographic neighbors (with the positive expectations for trade that the gravity model would suggest).

**Hypothesis 1**: Bilateral trade between states should increase substantially after they settle their territorial issues.

This first hypothesis may not tell the entire story, though. How the states are able to settle their territorial claims may have important implications for their subsequent relations. For example, past research on the aftermath of militarized disputes, crises, or wars suggests that how a given confrontation ends has an important impact on the likelihood of recurrent armed conflict breaking out in the relatively near future. Settlements where both sides agree to a compromise tend to reduce the likelihood of renewed conflict. Settlements where one side decisively defeats the other in battle also seem to reduce the likelihood of conflict in the immediate aftermath, although this may be at least partly because of the need to rearm and prepare for a future challenge. More dangerous are conflicts that ended in stalemate, where neither side was able to
achieve most of its goals, and neither side was decisively defeated (Maoz 1984; Hensel 1994, 1999; Werner 1999; Fortna 2003; Senese and Quackenbush 2003). Similarly, research has found that subsequent disputes and conflicts are less likely to occur when territorial changes are achieved nonviolently than when they occur through the use of violence (Goertz and Diehl 1992; Tir et al. 1998; Tir 2003, 2005a,b).

We expect that similar patterns will be at work in the aftermath of territorial claims. As Vasquez (1993: 149, 151) suggests, "settling territorial disputes non-violently should lead to a long-term peaceful relationship" and "How neighboring states deal with their concerns shapes the relationship they will have and helps construct the world in which they live." If a territorial claim is resolved through peaceful means, both sides should be satisfied with the outcome, either because they agreed to the specific terms (as in agreements reached through bilateral negotiations) or because they agreed to the process and agreed to accept whatever decision was ultimately reached (as in legally binding arbitration or adjudication). The process of settling the issue in such a cooperative fashion should create goodwill between the governments and stability between their societies, removing many of the obstacles to trade that Simmons discussed and perhaps creating positive incentives for governments to encourage bilateral trade and investment. On the other hand, settling a territorial claim through violent means may well end contention over a dangerous issue, but likely without the accompanying benefits of goodwill or governmental encouragement of future trade and investment. Trade after a violent claim resolution may not decrease compared to the already difficult situation while the claim was ongoing, but this logic would suggest that it should not be likely to increase substantially once the claim is resolved.
Hypothesis 2: Bilateral trade between states should increase substantially after they settle their territorial issues through peaceful means, although there should be little impact after a territorial claim is resolved violently.

Research Design

We test these expectations using the ICOW territorial claims data set version 1.1, which includes all claims to territory in the Western Hemisphere and Western Europe between 1816 and 2001. Because of the more limited temporal coverage of the trade data that we employ, the analyses are limited to the period between 1870-2001. The ICOW project is close to releasing a version of the territorial claims data set that covers the entire world, so we will expand this study as soon as that new version of the data set is available.

We seek to model the level of trade between two states during and after their territorial claims, in order to determine whether the ending of their final claim is followed by a significant increase in trade.¹ Trade is measured using the Correlates of War (COW) project's International Trade data set, which begins coverage in 1870 and runs past the current end of the territorial claims data in 2001; trade is recorded in millions of current US dollars. We measure trade for each dyad-year as the total flow of imports from state 1 to state 2 as well as from state 2 to state 1, and transform this variable by taking the natural log.

Our primary independent variables for studying trade reflect the ending of the last territorial claim between two states, and are based on the ICOW territorial claims data. To test

¹ By focusing only on years during and after territorial claims, we have excluded observations where the two states have not yet engaged in a territorial claim, but they will do so in the future. These make up a small portion of total observations (135 observations, or less than 2.3% of the total), and are not directly relevant to our primary interest in seeing whether trade increases significantly after the ending of territorial claims.
the basic hypothesis about the impact of settling claims, we use a dummy variable indicating whether the states have settled their territorial claims -- indicating that they had previously been involved in at least one such claim, but that all of their claims are now ended. In a follow-up analysis, we also distinguish between claims that ended in different ways. Peaceful techniques include claims that are ended through bilateral negotiations between the claimants, the non-binding activities of third parties (such as good offices or mediation, postwar peace conferences, and multilateral negotiations where the third party is an interested party with respect to the outcome of the claim), and the legally binding activities of third parties (typically arbitration or adjudication). Conflictual settlements are those that end a claim through physical violence (such as the conquest of the territory), or that use seemingly peaceful techniques to recognize or confirm the result of such violence. The final category, other settlements, ranges from cases that are renounced or simply dropped by one of the claimants to cases where the claim is no longer relevant (as when an island disappears under the waves or one country loses the territory to another country, rendering this dyad's claim irrelevant).

Our analyses will employ a gravity model, a well known approach from economics that estimates the expected level of trade between two countries using several economic and geographic factors. By analogy to the gravitational pull of planets in astrophysics, the gravity model suggests that the level of trade should be greater between larger economies and between more proximate trading partners. We measure the size of the economies by multiplying the two states' logged GDP per capita, using GDP data from Maddison (2003); similar results were also

2 This is based on the information at a given point in time, and is not recoded based on later events if the states subsequently become involved in another territorial claim. If two states end a claim in one year, last for twenty years with no claim, and then become involved in another claim, those twenty years are treated as having a settled claim, while years during which the original claim or the later claim are underway are treated as having an ongoing claim.
obtained using full GDP values rather than GDP per capita. We measure distance using the CEPII GeoDist data set's measure of the distance between the states' most populated cities (Mayer and Zignago 2011), as well as with a dummy variable indicating whether or not the states share a common land border as measured by the COW Direct Contiguity data set.³

We also control for two other factors that have been found to increase trade when present. Political democracy is measured using the Polity IV data set, coding the dyad as jointly democratic if both states have "Polity II" values of seven or greater out of ten. Finally, military alliance is measured using the Alliance Treaty Obligations and Provisions (ATOP) data set, coding the states as allied if they share at least one military alliance during the year of observation.

**Empirical Analyses**

We run a regression analysis with time fixed effects, which is consistent with a number of past political science applications of gravity models. This approach essentially means adding a separate dummy variable to the model for each year in the 1870-2001 period of study, in order to control for temporal effects that might affect trade levels across the international system. We present three models that use different measures of claim termination. Model I uses a simple dummy variable to indicate that the last claim between two states has ended, while Model II distinguishes between claims that ended through peaceful, conflictual, or other means, and Model III further distinguishes between different types of peaceful settlement.

³ Some applications of the gravity model add variables to measure shared culture between the states, although others leave out such variables. We reran our analyses using CEPII data on shared languages and on colonial heritage, but there was no impact on the results that we report below.
All three models perform well, with strong goodness of fit results (F=2511.35 for Model I, 2162.90 for Model II, and 1846.04 for Model III, all p<.001) and impressive adjusted R2 figures (all between .765 and .770). An F-test examining the group intercepts to determine whether a fixed effects model is appropriate also produces significant results (F=13.05 or better, p<.001), supporting the time fixed effects model used here. The gravity model elements and control variables all produce significant effects on trade. Trade is significantly higher when the two economies are larger (p<.001), contiguous (p<.001), both democratic (p<.001), and share at least one military alliance (p<.001).4

Turning to our primary independent variables, Model I reveals that trade is significantly higher after two states have settled their last territorial claim. The coefficient of 0.24 indicates that holding constant all other variables in the model, trade -- a logged dependent variable -- is expected to be 24% higher once the dyad's territorial claims are completed. This is consistent with the sentiments about trade between Ecuador and Peru that were used to begin this paper, and suggests strong support for our hypothesis that settling claims has a significant and positive effect on trade between the former claimants.

Models II and III investigate whether this is a general result of settling territorial claims, or whether it depends on the way in which the claim was settled. The results of these two models suggest that the positive impact on trade is a general result rather than limited to certain types of claim settlements -- every type of claim settlement in either model has a significant and positive effect on trade (p<.001). There are some notable differences in the magnitude of this increase in trade, though.

4 One surprising result is that trade is significantly higher when the two states are more distant (p<.001), but this turns out to be due to the inclusion of contiguity in the model as well -- if the contiguity variable is removed, the distance variable has a significant negative effect on trade.
Model II reveals that, *ceteris paribus*, settling claims peacefully -- whether this occurs through bilateral or third party activity -- is expected to raise trade by about 12% compared to trade levels while the claim was ongoing. Model III shows that the strongest effect is for claims that ended through legally binding third party decisions, such as World Court rulings or arbitral decisions by foreign leaders, which are expected to be followed by a 60% increase in trade. Ending the last claim through bilateral negotiations is followed by 27% higher predicted trade and ending through non-binding third party activity is followed by 17% higher trade.

Both models reveal that the strongest effects for settlement follow claims settled through military action, either directly through territorial conquest or through a later agreement that confirmed the results of earlier violent action. Ceteris paribus, trade is expected to be 65-80% higher after the dyad's last claim ended in such a conflictual fashion, which is substantially higher than after most of the peaceful forms of settlement. Trade is also expected to be 17-34% greater after the residual category of other settlements, but the wide range of settlements included in this category make it difficult to draw any firm interpretations about this effect.

These results offer strong support for our first hypothesis, which suggested that trade should be much higher once two states' final territorial claim has been settled. This is very consistent with arguments about the high salience of territory, which suggest that unsettled borders make conflict likely and cooperation difficult until territorial questions have all been settled (e.g. Vasquez 1993). There is less support for our expectation that this pattern of increased trade depends heavily on the way in which the claim was settled. While there is a significant increase in trade after peaceful settlements, particularly those that were reached through binding third party activity, there is an even more pronounced increase in trade after conflictual settlements.
Simply settling the claim and removing it from further contention seems to be more important for the advancement of economic relations than the manner in which the claim is settled. One potential reason for this somewhat surprising result may be that military settlements that would not produce improved relations afterward are likely to be followed by a renewed claim by the losing side, as when claims over Alsace-Lorraine or the Golan Heights end through conquest but are followed almost immediately by a new claim demanding the return of the lost territory. If such a new claim does not begin, the side that lost the claim through military action may recognize that a renewed claim is likely to end just as badly if not worse, leading to grudging acceptance of the outcome and a desire to improve relations in the future.

**Discussion**

We began this paper with several quotes from the end of the territorial claim between Ecuador and Peru, suggesting optimism that ending the claim would be followed by a substantial increase in trade between the former enemies. It turns out that this claim was supported by subsequent events. Version 3.0 of the COW trade data set shows that trade between Ecuador and Peru tripled from $155 million in 1999 (the year that the settlement went into effect) to $457 million in 2000, and reached $1.7 billion by 2009. This study has sought to determine whether or not this is a general pattern, as well as whether the way that a territorial claim ends has a systematic impact.

Our analyses revealed that settling territorial claims has a substantial impact on trade, with the level of trade predicted to increase by nearly one-fourth once the last claim has ended. Trade is significantly higher after every type of claim settlement, though, rather than increasing after certain types of settlement but decreasing or remaining stagnant after others. In particular,
trade appears to increase the most after conflictual settlements that are reached through military action and binding third party settlements.

From a policy perspective, this suggests that there are important economic benefits to settling territorial claims. This study has not looked at the plausible expectation that there will be a "peace dividend" once the issue is settled and the states can reduce their military spending, potentially putting the resources to more economically productive use or reducing the strain on their economies. But there tends to be a substantial increase in trade between the former claimants, and this increase does not seem to depend on settling the claim in certain ways (although certain settlement types produce even more trade in their aftermath).

From an academic perspective, this study's findings are consistent with a variety of other recent research on territorial issues. As noted earlier, scholars such as Vasquez have suggested that territorial is such a central issue to the modern nation-state that unresolved territorial questions fundamentally alter its relationship with other states. Gibler (2007, Gibler and Tir 2010) suggests that settling territorial claims can facilitate the development of political democracy. Hensel (2013) has also found that settling territorial claims tends to reduce the risk of armed conflict before the claimants -- importantly, even conflict over non-territorial issues seems to become less frequent once claims are resolved than while they are ongoing. This study's findings on trade during and after claims add to this growing body of research on the beneficial consequences of settling territorial questions.

Finally, we must note that this has been a very preliminary effort to start investigating this question. There is a great deal of room for future improvement to this study before we can regard these findings as definitive. For example, we have only coded the form of settlement of the final territorial claim between two states, but a number of dyads have experienced multiple
claims (sometimes overlapping temporally). There may be a better way to address earlier claims, which may have ended in a very different fashion and with very different consequences for future relations than the final claim. We also have not addressed any elements of claims beyond their settlement, but there is much more information that we could use. Territorial claims vary in the salience of the claimed territory, and this variation in salience has been found to be an important predictor of armed conflict and negotiating behavior (e.g. Hensel et al. 2008). Salience may also have a systematic impact after the claim has ended, as may details like the duration of the claim or the extent to which the claim was militarized -- less than half of all claims see even a single military threat, but some produce multiple full-scale wars, and this might have important implications for relations after the claim has ended.

Beyond examining further details of territorial claims, there are other economic issues to consider. This study's analyses have focused on comparing the entire duration of each territorial claim with the entire post-claim period, at least to the extent that the needed economic and other data are available. There may be important temporal effects within the post-claim period, though. Future study could benefit from a more nuanced investigation, examining the initial years shortly after a claim has ended separately from later years. While each type of claim settlement was followed by a significant increase in post-claim trade in the present study's analyses, it may be that the first decade or two after the claim ends sees much greater variation across settlement types, perhaps with peaceful settlements seeing much faster increases in trade than conflictual settlements, and the observed results here might be heavily influenced by events three or four decades later. And past studies using gravity models to study trade have added a number of other factors that have not yet been considered here, so future work in this area might benefit from examining other economic or political factors that might affect trade patterns.
References


Table 1: Fixed-Effects Regression Results for Claim Termination and Trade

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model I</th>
<th>Model II</th>
<th>Model III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff. (robust SE)</td>
<td>Coeff. (robust SE)</td>
<td>Coeff. (robust SE)</td>
</tr>
<tr>
<td>After claim</td>
<td>0.24 (0.03)***</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Peaceful settlement</td>
<td>--</td>
<td>0.12 (0.03)***</td>
<td>--</td>
</tr>
<tr>
<td>Bilateral settlement</td>
<td>--</td>
<td>--</td>
<td>0.27 (0.05)***</td>
</tr>
<tr>
<td>Binding 3rd party</td>
<td>--</td>
<td>--</td>
<td>0.60 (0.04)***</td>
</tr>
<tr>
<td>Non-binding 3rd party</td>
<td>--</td>
<td>--</td>
<td>0.17 (0.04)***</td>
</tr>
<tr>
<td>Conflictual settlement</td>
<td>--</td>
<td>0.65 (0.10)***</td>
<td>0.80 (0.09)***</td>
</tr>
<tr>
<td>Other settlement</td>
<td>--</td>
<td>0.17 (0.02)***</td>
<td>0.34 (0.03)***</td>
</tr>
<tr>
<td>Ln(GDP/cap1*GDP/cap2)</td>
<td>0.20 (.004)***</td>
<td>0.20 (.004)***</td>
<td>0.20 (.004)***</td>
</tr>
<tr>
<td>Ln(Distance)</td>
<td>0.06 (0.01)***</td>
<td>0.07 (0.01)***</td>
<td>0.07 (0.01)***</td>
</tr>
<tr>
<td>Land contiguity</td>
<td>0.66 (0.04)***</td>
<td>0.68 (0.04)***</td>
<td>0.71 (0.04)***</td>
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<tr>
<td>Joint democracy</td>
<td>0.22 (0.04)***</td>
<td>0.22 (0.04)***</td>
<td>0.20 (0.04)***</td>
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<tr>
<td>Military alliance</td>
<td>0.86 (0.05)***</td>
<td>0.85 (0.05)***</td>
<td>0.90 (0.05)***</td>
</tr>
<tr>
<td>Constant</td>
<td>-10.93 (0.27)***</td>
<td>-10.86 (0.26)***</td>
<td>-11.08 (0.27)***</td>
</tr>
</tbody>
</table>

N 5850 5850 5850
F 2511.35 (p<.001) 2162.90 (0<.001) 1846.04 (<.001)
Adjusted R² .766 .765 .770

***p<.01, **p<.05, *p<.10

The model includes fixed effects by year (using 132 groups), calculated with the xtreg and areg functions in STATA 11.2.