11-2016

Distributive Outcomes in Contested Maritime Areas: The Role of Inside Options in Settling Competing Claims

Áslaug Ásgeirsdóttir
Bates College, aasgeirs@bates.edu

Martin Steinwand
Stony Brook University

Recommended Citation
Ásgeirsdóttir, Á & Steinwand, M. (2016) "Distributive Outcomes in Contested Maritime Areas: The Role of Inside Options in Settling Competing Claims." Journal of Conflict Resolution, 62(6), pp. 1284-1313. https://doi.org/10.1177/0022002716677568

Distributive Outcomes in Contested Maritime Areas: The Role of Inside Options in Settling Competing Claims

Outside options can induce bargaining asymmetries that influence the outcome of international negotiations.[1] Existing works on the use of outside options primarily focus on their use in multilateral forums, particularly by the United States (Odell 2000; Voeten 2001; Sattler and Bernauer 2011). But what happens to bargaining outcomes when an international regime provides states with an institutionalized alternative to a negotiated agreement that levels the playing field between states? In the case of maritime boundaries, the Law of the Sea (LOS) establishes the geographic median line as the maximum any state can claim in the absence of an agreement.[2] This 'inside option' (Muthoo 2000) changes the calculations of states and influences both the decision to cooperate and the distributive outcome reached. Until the maritime boundary is settled bilaterally, the median line serves as the de facto status quo, which is supported by international norms, but lacks the legal certainty of a formal agreement. During negotiations, the ability to revert to the inside option of the median line provides leverage to states that are willing to tolerate continued legal uncertainty.

We find that the inside option is associated with more even bargaining outcomes, despite economic and power asymmetries. When states have the choice between continuing to use the status quo or create legal certainty around their maritime boundaries, the discovery of offshore oil or gas deposits increases the likelihood of settlement and results in more even distributive outcomes. Our results show that the potential to develop valuable resources in the maritime areas

[1] Outside options are also known as Best Alternatives to a Negotiated Agreement (BATNA).

[2] Law of the Sea, Article 15, defines the median line as "equidistant from the nearest points on the baseline from which the breadth of the territorial seas of each of the two States is measured."

fosters cooperation, even if offshore production never materializes. This is interesting because the division of potential resources often suggests more conflictual and uneven outcomes.

There exist about 400 maritime boundaries in the world, half of which have been settled through bilateral negotiations. Many were settled during the 1970s and 1980s, as states were negotiating the Third United Nations Convention on the Law of the Sea (LOS), which opened for signature in 1982. The LOS sanctioned the creation of 200-mile Exclusive Economic Zones (EEZ) for every coastal state, within which each state gained the exclusive right to use resources, such as off-shore oil, fishing and deep-sea mining. EEZs do overlap, however, either when states are adjacent or where coasts are less than 400 miles apart. Thus the LOS created a need for cooperation. If states do not settle maritime claims, their boundaries lack the legal certainty that they will not change in the future, limiting their ability to extract resources from the contested area.

Our first question is why some pairs of states pursue legal certainty and settle their maritime boundaries bilaterally, while others rely solely on the median line established by the LOS. The LOS encourages the peaceful settlement of maritime boundaries, but leaves the choice of how to solve disagreement to the states, which overwhelmingly have used bilateral negotiations to reach settlement. We argue that states cooperate over maritime boundaries to create legal certainty, especially when there is the potential for offshore oil or gas production, which requires large investments. These investments in turn depend on the legal certainty of a settled maritime boundary.

Our second question is how the LOS regime affects how states draw maritime boundary lines. In international relations, cooperation is hard to achieve in the presence of distributional conflicts. Even if cooperation succeeds, international regimes frequently reflect the interests of

powerful members such as the United States, which can go outside the regime if their vital interests are at stake (Stone 2011; Gilligan and Johns 2012). In contrast, the median line provision of the LOS establishes a status quo division of the contested area that is independent of power relations. In the language of bargaining theory, the median line is a reversion point or an 'inside option' (Muthoo 2000).

Settling the boundary reduces uncertainty, making investment more attractive, but these gains can be different for different states. We argue that if legal clarity benefits both sides equally, the settled boundary will stick closer to the median line. If gains are asymmetric, the settled boundary line will deviate from the median line to compensate the state who gains less from cooperation for its willingness to settle. To our knowledge, this is the first work to argue that an international regime can reverse the logic of bargaining with outside options by establishing a strong status quo that provides bargaining leverage even to relatively weak states.[3]

Because of uncertainty surrounding the development of offshore production, states face low asymmetries when dealing with oil and gas deposits. Instead the mere presence of these resources in the maritime area is enough to influence the outcome.[4] None of the existing

[3] Regimes can also reduce the influence of outside options through norms of reciprocity (Keohane 1986). However, reciprocity is dependent on a history of positive interactions or the existence of side payments, which is not the case here.

[4] Offshore oil and gas production is surrounded by uncertainty and more costly than drilling on land. Geologists can identify geological strata that are likely to include oil and gas deposits, which are found widely around the globe. Exploratory drilling then determines the viability of a well for production (Hyne 2012). Because oil companies assume the risk of drilling in exchange for future production contracts, the size and geographic spread of offshore deposits is private information owned by oil companies. Exploratory drilling is costly and payoffs are uncertain as the example of the Chukchi Sea shows, an area of great offshore oil and gas potential. Shell spent nine years and

boundary agreements divide the oil, but they often outline what should be done if production were to be started (Ásgeirsdóttir and Steinwand 2015). A handful of states have created joint development zones with revenue sharing, but it is unclear to what extent they are active (Schofield 2012).

The following examples illustrate how maritime boundary agreements vary. In 1992, Italy and Albania settled their competing maritime claims, making the median line their permanent maritime boundary. Italy heavily depends on energy imports, and planned to widen its offshore production in the Adriatic Sea. But the political will to expand domestic production quickly waned, and in 2010 the government imposed a total offshore drilling ban. Since then, the ban has been gradually lifted (Dinmore 2012).

Contrast this with the settlement of the boundary between Estonia and Latvia in 1996.[5] The new boundary significantly deviates from the median line, giving Latvia a larger part of the contested area. Offshore oil production played no role in this agreement; instead the boundary ensures Latvian access to deep water shipping lanes in the Gulf of Riga. While a dispute over fisheries preceded the boundary settlement, the agreement does not address this issue at all (Charney and Smith 2002).

Our study contributes to the literature on international cooperation in several ways. Existing works overwhelmingly focus on explaining the decision to cooperate (Krasner 1983; Keohane 1984; Oye 1986; Grieco 1990; Milner 1997; Putnam 1988; Young 1989, 1999). Only recently have scholars begun to explore how bargaining asymmetries influence the distribution

---

seven billion dollars before deciding the area identified would not reach profitable production levels (Krauss and Reed 2015).

[5] See Figure 1 for a map of the area.

of mutual gains. We contribute to this literature by showing how the 'inside option' provided by the LOS leads to more even outcomes. In addition, we take on two challenges that hinder the study of distributional outcomes. First, while cooperation usually results in a written agreement, it is difficult to identify instances when states could have cooperated, but did not. Overlapping economic zones are defined by geography, which allows us to study the full set of possible agreements. Second, distributive outcomes are difficult to measure as we seldom know the starting point of negotiations (Odell 2002; Huth, Croco and Appel 2013). For maritime boundary agreements, the median line provides an ideal basis to derive a continuous measure of distributive outcomes. This paper uses a new geocoded global dataset on maritime boundaries to identify which distributive outcomes were reached.

Few political scientists have paid attention to the LOS (Nemeth et al. 2014). This paper is among the first to systematically explore how the LOS affects state behavior, as states continue to develop this important international institution. By establishing how bilateral agreements create legal certainty in contested maritime areas, this article shows ways to cooperation in maritime areas that involve a greater number of actors, such as the South China Sea and in the waters beyond national jurisdiction in the Arctic Ocean.

In the following sections, we develop our theory and derive hypotheses about the factors that facilitate agreements and drive distributional outcomes. We then introduce our database, discuss the measurement of distributional outcomes, and provide descriptive statistics of existing boundary settlements. Next we discuss the nature of maritime boundary conflicts, before delving into the empirical analysis and presenting our results before concluding.

We find substantial evidence that the possibility to invest in offshore oil or gas developments facilitates cooperation and leads to smaller distributional adjustments. Where

cooperation touches on vested interests and affects both sides unevenly, such as in the presence of territorial conflict or when states are existing oil producers, they are less likely to settle their maritime boundaries, and boundary agreements tend to deviate more from the median line.

Distributional Outcomes, International Cooperation and the Law of the Sea

International cooperation results from a desire to realize mutual gains, where "actors adjust their behavior to the actual or anticipated preferences of others, through a process of policy coordination" (Keohane 1984).[6] Similarly, we start from the premise that states bilaterally delineate their maritime boundaries if they expect to benefit from such an agreement. Given that the LOS provides all states with the geographic median line as inside option, why do states benefit from delineating their maritime boundary bilaterally? Our answer is that settling maritime boundaries provides states with legal certainty and facilitates investments for the exploitation of offshore resources. This is the case especially for oil and gas exploration, costly investments shrouded in uncertainty and entailing large sunk costs.

The factors explaining distributional outcomes remain poorly explored. Given the inherent connection between distributive outcomes and the decision to cooperate, this is a lacuna in the literature. There are recent advances, however. Stone (2008, 2011), shows how the institutional design of the International Monetary Fund reflects power asymmetries between the US and its allies at the time of the IMF's creation, codifying the outside option of the powerful state. Similarly, Sattler and Bernauer (2011) show that trade disputes between countries with

[6] According to bargaining theory, the contract set must be non-empty. Another mechanism that could produce agreement is when a powerful state imposes its will on its neighbors (Krasner 1983).

power asymmetries are frequently settled outside the framework of the World Trade Organization.

However, these lessons do not easily translate to areas of cooperation without preponderant actor and where interests are more closely aligned. Paul Huth et al (2011 and 2013) investigate the conditions under which states are able to settle terrestrial conflicts through negotiations. They show that international law creates focal points that influence the outcome. We argue that the median line is more than a focal point, because it institutionalizes the status quo as an inside option and reversion point during negotiations.

Unequal patience and risk aversion skew bargaining outcomes, and delay results from uncertainty about the other side's stake (Muthoo 1999, 2000). The possibility of future offshore oil or gas production can introduce information asymmetries when two states have very different capabilities to implement offshore production. Thus, factors that account for deviations from the median line also causes bargaining delay.

The role of the median line in settling competing maritime claims predates the formal passage of the LOS in 1982. From the beginning of the negotiations of the treaty in 1973, the median line provision was central. In fact, the LOS codified a legal practice that had emerged as far back as 1969. In the North Sea Continental Shelf cases, the International Court of Justice sided with Germany against Denmark and the Netherlands, concluding that the median line was not always an equitable solution. Instead it recognized the median line as a starting point for negotiations (International Court of Justice 1969).

The informal status quo of the median line does not provide the legal certainty of an agreement that the boundary will not change in the future, which is necessary for future investments. However, the median line serves as reversion point in negotiations, as states can

walk away from the table and continue to claim the median line. Thus the LOS encodes an international norm that offers an inside option for all states. This unique institutional setup provides us with a yard stick to measure how much a country is willing to forgo in order to realize the benefits from cooperation.

Delineating maritime boundaries differs from drawing terrestrial boundaries in important ways. Maritime areas are not fit for human habitation, there is a great deal of uncertainty about the value and location of both renewable and non-renewable resources, there are few landmarks to serve as reference points and there are no established administrative frontiers that can guide the division (Carter and Goemans 2011). In addition, projecting power across oceans is difficult and expensive, and lies beyond the military capabilities of most members of the international system.[7] While conflict over terrestrial boundaries can involve mutual gains (Huth 1996; Simmons 2006; Hensel et al 2008), states often have problems securing their land boundaries because of real or perceived zero-sum nature of the conflict. The cooperation problem that states face in maritime areas, however, is primarily one of realizing and distributing mutual gains.

The Role of Offshore Oil and Gas Deposits

Achieving cooperation and deciding on the exact maritime boundary results from a bargaining process. Any agreement that both parties enter into voluntarily must make both sides better off, but this does not answer the question how the gains from cooperation will be distributed. Bargaining outcomes depend on the relative salience that both parties attribute to resolving the legal uncertainty associated with an unsettled boundary. Issue salience in turn

[7] Only Britain, France, the United States, and perhaps Russia, have navies capable of operating across deep oceans.

affects patience and risk aversion during negotiations, benefitting the side that can afford to wait and has greater appetite for risk.[8] Both point to the degree of symmetry in gains as driver of bargaining outcomes.

Several factors can give rise to asymmetric or symmetric opportunity costs (i.e. forgone gains if cooperation fails). We concentrate on the role of economic resources located in the maritime area. The two main sources of economic value of an exclusive economic zone are offshore oil and gas deposits and fisheries.[9] These resources affect the symmetry of gains from cooperation in different ways. Offshore oil exploration, drilling and production are expensive affairs shrouded in the uncertainty of the exact location and future value of the resource (Hyne 2012). In order to recoup their investments, oil companies depend on legal clarity about the status of the maritime area they are working in. Therefore, the presence of offshore oil or gas deposits will be associated with relatively large expected gains from cooperation. Holding other factors constant, we argue that the opportunity costs from foregoing future exploration of potential offshore oil or gas reserves in a shared maritime area should affect both sides relative equally. This is because the size, exact location and potential value of hydrocarbon production are uncertain, so that both sides have a realistic chance of producing oil. For example, in 1974, Japan and South Korea partially settled their maritime boundary in the Korea Strait in the hope of finding oil. Production never materialized, but the prospect of developing this potential resource facilitated an agreement (Charney and Alexander 1993, p. 1059).

[8] Maritime boundaries are determined by geography, therefore determining possible negotiating partners.

[9] Current technology does not allow for economical deep sea mining of these resources, but this may change in the future.

Hypothesis 1: *The discovery of offshore oil or gas deposits in a boundary region increases the likelihood that two states settle their maritime boundary.*

What is the relationship between offshore oil discovery and distributional outcomes? As long as both sides expect to benefit equally from reducing uncertainty to enable future offshore oil or gas production, there will be no systematic differences in bargaining stance, and we expect an outcome that is close to the median line. But what if the oil or gas field is located fully to one side of the median line? The state with the reserves stands to gain more from cooperation, but the ability to exploit an oil field is uncertain and does not depend on controlling its full geographic spread as some areas of the field are better for drilling than others (Hyne 2012). In addition, the exact location of oil reserves cannot be precisely established even with modern geological methods. Therefore the exact location of the boundary line relative to expected oil reserves is less important than reducing legal uncertainty.

Hypothesis 2: *Boundary agreements in areas where states have discovered offshore oil or gas tend to fall on the median line.*

Other factors can decrease the gains from cooperation and potentially shift the settled boundary away from the median line. If either or both parties are already oil-producing countries, they enjoy revenues from existing production and they possess in-country expertise. The former lessens pressures to develop additional oil fields while the latter reduces the uncertainty associated with oil exploration and the need to attract outside investment. These effects will be larger if existing production is onshore because offshore production is expensive. Paradoxically,

the advantage of existing oil production reduces the pressure to settle the maritime boundary, as potential gains from cooperation are lower and legal uncertainty is a smaller obstacle to investment. Accordingly, existing oil producers stand to gain less from delineating their maritime boundaries.[10] To avoid unnecessary complexity in the empirical analysis, we do not distinguish between situations with one or two oil producers.

Hypothesis 3: *If states are established oil or gas producers, the discovery of offshore oil or gas in the boundary region is less likely to induce settlement.*

Existing oil and gas production can also affect how the new boundary is drawn because, as we argued above, the marginal benefit from bringing new fields online is less for existing oil or gas producers. An established producer might also view its neighboring state as a competitior, and therefore have a higher reservation value for settling the boundary. Existing production therefore should be associated with settlements that deviate from the median line. It is theoretically unclear whether this effect is greater if one or both countries are established oil producers. In the one-sided case, the country with existing production has a bargaining advantage because it stands to gain less from developing the new oil. However, bargaining asymmetries are not necessarily reduced when both sides are producers. Their existing operations can vary widely in scope and sophistication, resulting in a wide range of possible differences in uncertainty about future oil production, marginal costs of developing new fields and sensitivity to bargaining delays. We therefore compare boundary settlements without

[10] The effect likely is stronger when both countries have existing oil production compared to only one country, but this distinction is not central to our argument.

existing oil producers to those with one or two existing producers. On average, the latter case should result in greater deviations from the median line.

Hypothesis 4: *If states are existing oil or gas producers, boundary agreements deviate more from the median line in the presence of offshore oil or gas in the boundary region.*

The second main economic activity in Exclusive Economic Zones are fisheries, an area of frequent conflict between states. Having control over fisheries is often seen as one of the main benefits of exclusive access to an EEZ. For example, the conflict between the US and Canada over the maritime boundary in the Gulf of Maine centered on securing access to major fishing areas (Prelli and Larsen-Becker 2001; McDorman 2009). We argue, however, that the case for the exclusive utilization of fisheries as a driver of cooperation is overstated because the ability to exploit fisheries does not depend on delineating the maritime boundary. Not only are fisheries mobile, but there is often insufficient scientific information to predict stock size and location. In addition, the capital investment in fishing vessels is also mobile. Settling a boundary can improve domestic regulation of fisheries and enforcement of rules by clarifying jurisdiction, but this can be achieved in different ways. For example, until 2010 Norway and Russia were unable to settle their boundary in the Barents Sea for over 30 years. They did, however jointly manage the fisheries in the area during this time (Schram Stokke et al 1999). We still include fisheries in the analysis, but do not expect that they affect the settlement process in a meaningful way.

Our source of oil and gas production data comes from BP's Statistical Review (2012), which contains production data as far back as 1965. Our data on the location of off-shore oil and gas deposits and the year of discovery comes from The Petroleum Dataset (Lujala et al 2007).

For fisheries, we rely on the Food and Agricultural Organization's FISHSTAT database (2010), which contains the type and quantity of catch of each state across time.[11]

Empirical Analysis

We identify all instances where states have signed bilateral agreements to delineate the new boundary. We expand Martin Pratt's list of maritime boundaries worldwide (Pratt 2002) to include the years 1960 to 2008. Using the Global Maritime Boundaries Database (Spring 2011) we identify the geolocation of EEZs, the median line and the delineated line for settled boundaries.[12] When dealing with pairs of states who share more than one boundary, we treat each section as an independent boundary, which in practice they often are. For example, the United States has only settled one of its four boundaries with Canada. In bilateral discussions, the US has insisted on treating each boundary independently (Kirkey 1995). Hence some pairs of states enter the dataset more than once.

Figure 1 illustrates how we compare the median line with the negotiated boundary, using Latvia and Estonia as example. The green line is the median line that is defined by equidistance to the territorial baseline. The red line shows the result of the negotiated agreement. We calculate the additional sea area that each side obtains as a result from the changes (darker shade for gains by Latvia, lighter shade for gains by Estonia). We then compare how much each side gained

[11] This is the most complete dataset on global fisheries in existence, but it only lists quantity of fish caught, not geo-coordinates.

[12] Where the GMDB provides a baseline, we use this to identify the median line. Otherwise we use the coastline, mostly in the case of tiny island states. The authors are deeply grateful for the work done by Mathieu Duval, Director of the Bates College Imaging Center, who performed the ArcView calculations.

relative to the total area that was re-allocated. In instances where the final distributive outcome is the median line or both sides receive the same area, the result is completely balanced and the ratio of gains is 1 (each side obtains ½, .5/.5=1). Where the negotiated boundary falls in its entirety to one side of the median line, the ratio of gains for the disadvantaged state is 0 (0%/ 100%=0).

[Figure 1 about here]

Our dataset contains 417 bilateral maritime boundaries and boundary segments and 189 agreements. Because we study the incidence of agreement jointly with distributional outcomes, we also need temporal information on agreement timing and covariates. For 1960 to 2008 we have a total of 20,433 dyad-year observations. We address missing data with multiple imputations.[13] Using an event history model of coming to agreement, we discard later dyad-years, leaving 15,913 dyad years.

We first look at historic patterns of agreement. Figure 2 shows that bilateral delineation of economic zones occurred in several waves since 1960. The first and largest wave arose in the 1970s, coinciding with the Third United Nations Conference on the Law of the Sea (UNCLOS

[13] Using Amelia II in R, we generate 10 imputed datasets (Honaker et.al. 2011). The share of missing observations ranges from 4.7% (population) to 34% (polity2). Missing data results from underreporting. This information is missing at random (MAR). E.g., population data might be missing because poor countries do not reliably collect this information, but we can infer it using other information, for example GDP data. Nonignorable (NI) missingness remains a problem, but information losses from listwise deletion are large enough, given the low number of agreements, to justify introducing potential bias from the NI condition (King et al. 2001). A negligible number of missing observations for the polity2 variable result from interruption periods (polity code -66, < 0.7% of cases). We impute these values too, but results remain unchanged when we exclude them from the analysis.

III). A second wave occurred in the mid-1980s, and a third wave after the LOS became international law in 1994.

[Figure 2 about here]

Figure 3 shows to what extent agreements deviate from the median line. Zero indicates a completely lopsided division, with one country receiving the entire area, whereas 1 arises from a 50/50 split. The resulting distribution of ratios are heavily bimodal. Seventy of the 188 agreements split the difference perfectly 50/50 (37 percent), 27 agreements move the boundary entirely to one side of the median line (27 percent). If we also count outcomes that have ratios very close to 0 or 1 (within a bandwidth of 0.1), the total number of agreements on the extremes of the distribution is 131, more than 70 percent.

[Figure 3 about here]

This pattern generates an important first insight into how states distribute the gains from cooperation. Despite the possibility of coming to any division, the most agreements either preserve the status quo, or shift the boundary entirely to one side of the median line. This contrasts with the theoretical expectation that bargaining advantages and resulting deviations away from the median line vary gradually.

The observed bimodal distribution suggests that additional factors are at work. One possibility is that focal points help actors coordinate equilibrium behavior when many different outcomes are possible (Schelling 1960; Huth et al 2013). Since there are infinite ways to split the gains from cooperation, the median line could provide guidance how to choose the division. Behavioral research has shown that individuals shun deals that they perceive as unfair even if they could benefit from them (Gueth et al. 1990). The 50/50 split appeals to a notion of fairness, as neither side loses sea area relative to the status quo. The 0/100 ratio is more difficult to

interpret, as one side appears to reap all the gains. Why would the other side be willing to have its economic zone reduced? It is important to remember that a country that agrees to a smaller EEZ does not necessarily lose out, but rather is willing to trade uncertainty over the control of the median line against the certainty of a bilaterally agreed boundary. The 0/100 split acknowledges asymmetries in the two countries' bargaining positions, with the 'loser' having a higher reservation value for reducing uncertainty than the 'winner'.[14]

The bimodal distribution of settlement ratios has implications for statistical modeling. A simple approach with a continuous but bounded dependent variable is ordinary least squares regression. However, treating outcomes as linear does not recognize that the dependent variable cannot take on values smaller than 0 or greater than 1. In addition, in our data most variation occurs between the values on the bounds. As an alternative, we consider a probit setup, with observations dichotomized as 0 and 1.[15]

Distributional outcomes affect the decision to settle, i.e. they are endogenous to whether we are able to observe cooperation or not. Also, because the decision to come to an agreement is not random, the observed sample of agreements is not random, giving rise to selection issues in the analysis of bargaining outcomes. To deal with the first problem is difficult. We cannot observe negotiations that did not lead to an agreement. Sometimes it might be possible to retrieve information about offers from the historical record, but often governments will not even start

[14] It is also possible that these outcomes are facilitated with non-territorial side payments. However, there are no explicit references to side payments in the text of the actual agreements (Ásgeirsdóttir and Steinwand 2015).

[15] Yet another possibility would be to use a one and zero inflated beta regression. However, this approach requires separately modeling the point probabilities of achieving the end points. We have no theoretical reason to distinguish between the processes giving rise to values in (0,1) and on the endpoints, hence we do not pursue this venue.

negotiations if they expect to fail. It might be possible to treat some boundaries as more salient as others (Xiang 2010), but this would require finding measures of dyadic salience that are not correlated with bargaining duration and is very difficult. We concentrate our efforts on the issue of non-random selection instead.

The classic Heckman selection model calls for a linear dependent variable in the outcome equation (Heckman 1979). We pursue a pragmatic approach, preserving the stepwise estimation of the Heckman model, but with a dichotomous dependent variable in the outcome equation. Thus, we effectively apply Heckman's selection correction to the latent dimension governing deviations from the median line, where observed values are censored to take on values of either 0 or 1.[16] The stepwise approach is advantageous because we can accommodate the event-history character of the selection process by including a baseline hazard term. The resulting model is

$$y_{1,t}^{*} = z_t\gamma + h(t) + u, \quad (1)$$

$$y_{2}^{*} = x\beta + \varepsilon, \quad (2)$$

where y_2^* is the latent distributional outcome and $y_{1,t}^*$ is the latent dimension of the decision to come to an agreement. The error terms u and ε are distributed jointly normal with mean zero and correlation ρ. Covariates are denoted $z_t\gamma$ and $x\beta$. The h(t) term is a baseline hazard of the time until agreement is reached. Because of its latent nature, we only observe $y_{1,t} = 0$ if $y_{1,t}^* < 0$ and

[16] We utilize a probit link to preserve Heckman's assumption of normal errors.

$y_{1,t} = 1$ if $y_{1,t}^{*} \geq 0$. The same applies for observed values of y_2. In addition, censoring implies that we only can observe y_2 if $y_{1,t} = 1$.[17]

While the Heckman model is in principle identified through distributional assumptions on the error terms, we also meet substantive exclusion restrictions (Sovey and Green 2009). Instrumental variables are the number of previous worldwide agreements and 5-year period dummies starting in 1960. We expect the number of countries that have settled their boundary to be a strong indicator for a norm to settle bilaterally under the provisions of the LOS, and we generally expect settlement activity to vary across time. Neither of these variables must be correlated with bargaining outcomes. This seems reasonable because the LOS does not define equitable distribution. The data confirm that settlement ratios move very little over time. The average split hovers between 57 percent and 60 percent across all years in the analysis, with no apparent time trend. The only exceptions are the first five years from 1960 to 1964 with a more lopsided split of 65.7 to 34.3 percent. Accordingly, we leave out this time dummy from the exclusion restrictions.

The decision to settle and the choice of exact boundary line can be influenced by other factors that can confound the effects of offshore oil and gas deposits. We turn to the literature to identify suitable control variables. Neo-liberal institutionalism has generated important insights about the factors that facilitate cooperation between self-interested states. Pairs of democracies behave in systematically different ways in international affairs than mixed pairs or pairs of authoritarian states, i.e. democracies fight less and cooperate more (Huth and Allee 2003). In

[17] Following Greene (2003, p. 784 f) we estimate (1) as a probit equation. We then compute the inverse Mills ratio for agreement years and include it as independent variable into (2). We then estimate equation (2) and correct for heteroskedasticity in the latent dimension using robust standard errors.

addition, pairs of democracies are more likely to adjudicate trade claims using international courts (Davis 2012). Democratic norms of give and take translate from the domestic level to the international level. Democratic publics share ideals of cooperative modes of conflict resolution, and public accountability of leaders ensures that these preferences translate to foreign policy outcomes.[18] In addition, democratic leaders themselves might share norms of equitability. Negotiations to settle maritime boundaries often have low public visibility, making it easier for leaders to act on these norms. Shared norms should help pairs of democracies to realize symmetric gains from cooperation compared to pairs of autocracies or mixed pairs (Mansfield et al 2002). We expect that democracies have a greater likelihood of cooperation and settle their boundaries closer to the median line. Based on Polity IV (Marshall et al, 2010), we define democracies as having a combined polity score of 7 and higher.[19]

States which trade with each other are also less likely to engage in conflict (Oneal and Russett 1999; Gartzke et al 2001; Mansfield and Pollins 2001; Lu 2010). Trade and international economic cooperation are closely connected. States with significant trade relations therefore are more likely to settle their boundary claims and should settle closer to the median line. While we are agnostic regarding the causal mechanism, classic arguments about complex interdependence suggest that trade and cooperation over maritime boundaries are interconnected (Keohane and Nye 2000). We test this proposition using the Bilateral Trade (v3) data from the Correlates of War Project (Barbieri et al 2009; Barbieri and Keshk 2012).

[18] Both ideas have generated controversial debates. See Huth and Allee 2003 for a synopsis.

[19] We use the polity2 variable, and impute only truly missing observations and those coded as system missing (polity=-66). See footnote 13.

International regimes affect cooperation by coordinating expectations of what are acceptable norms of behavior (Krasner 1983). Accordingly, the LOS should facilitate the bilateral delineation of boundaries independent of bargaining processes. The LOS codifies the rules that define maritime boundaries, and states fill this international regime with life by drawing on these rules when delineating their boundaries. We use two indictors to capture how this norm affects unsettled maritime boundaries. First, the likelihood of cooperation should be higher when both states have signed and/or ratified the LOS. We do not separate signatures and ratifications because they are highly correlated and because some non-signatories have ratified the treaty nonetheless. The United Nations keeps a list of signatures and ratifications (United Nations 2016).

Second, the number of previously settled boundaries captures how well established the international maritime boundary regime is in practice worldwide. We expect that countries are more likely to settle their own maritime boundaries once they observe that others have successfully done so and bilateral settlement takes on the force of an international norm (Krasner 1983).

Legal scholars have shown that for boundaries settled by the International Court of Justice states with a proportionally longer coastline get a larger share (Kwiatkowska 2001, 2002a, 2002b; Tanaka 2001). We include this control variable.

Academic realists have traditionally dismissed cooperation for mutual gains as epiphenomenal, since states are mainly concerned about their survival and relative gains (Waltz 1979; Mearsheimer 2001). What appears on the surface as cooperation is instead an outflow of either balancing or band-wagoning of states in the face of power differentials. Pairs of states with a large difference in power should also have a large discrepancy in the opportunity costs of

sticking with the median line. We argue that the availability of the median line allows relatively weak states not to give in to powerful neighbors. Power differentials therefore will make agreements harder to achieve, and those agreements that are realized should deviate more from the median line. We include measures of relative capabilities as well as difference in GDP into the analysis. Relative capabilities come from the National Material Capabilities Version 4 data and the difference in GDP comes from the World Development Indicators (Singer et al 1972; Singer 1987).[20]

Terrestrial conflict touches on security concerns and is inherently more contentious than cooperation over maritime boundaries. The presence of terrestrial conflict in the boundary region makes it harder for countries to come to agreement and is likely to lead to asymmetries in gains, because accepting a maritime boundary also affects the wider terrestrial claims. Existing territorial conflict therefore reduces the likelyhood of cooperation, and existing agreements will deviate further from the median line. We identify existing territorial conflicts that center on maritime areas using the CIA's World Factbook.

Finally, many maritime boundries involve dependencies, often located far from the main land. Countries negotiating on part of overseas dependencies face two hurdles. The gains from cooperation do not necessarily accrue to the government of the "home" country, but to the economy and population of the dependency. Dependencies will introduce varying degrees of asymmetry into negotiations and negotiating on a part of a dependency is particularly costly in terms of diplomatic and political resources. Given the cost of negotiating and the potentially low issue salience, we expect pairs where both partners are negotiating on behalf of a dependency to

[20] Difference in GDP is calculated as $Abs(GDP_1–GDP_2)/(GDP_1+GDP_2)$.

be less likely to sign an agreement. This effect should be somewhat less if only one side in the negotiations is a dependency. Likewise we expect that the presence of a dependency causes boundary settlements to deviate from the median line.

Results

We structure the discussion of results thematically by first looking at the impact of our core variables – the possibility of offshore oil or gas development – on both the decision to settle the boundary and the distributional outcome, and then proceed in a similar fashion for the controls. In dealing with a multi-equation model, this keeps the focus on our core argument that the presence of oil and gas influences both the settlement of boundaries and the outcomes states reach.

The presence of offshore oil or gas reserves increases the value of settling the boundary for both parties involved, irrespective of the geographic extent of the reserves. Accordingly, offshore oil or gas discovery should facilitate agreement and result in boundaries drawn closely to the median line. Established oil or gas producers stand to gain less from cooperation and enjoy bargaining advantages, making settlement less likely and pushing bargaining outcomes away from the median line. To capture these relationships, we use dummy variables for the presence of oil or gas and existing oil or gas production and interact the two.[21] In addition, we break down the analysis to account for whether offshore oil or gas was discovered by one or both sides.

[Table 1 about here]

[21] We code the presence of oil production as 1 if either or both of the two countries have existing production capacities.

We find strong evidence that offshore oil or gas discovery facilitates agreement and is associated with settlement close to the median line. Starting with the selection equation, the existence of undeveloped oil reserves has a positive and highly statistically significant effect on the likelihood of agreement (table 1, model 2). Holding other variables at their medians, the discovery of offshore oil or gas reserves increases the likelihood of boundary settlement by 11.7 percentage points (figure 4, for two states that are not oil or gas producers).[22] This represents a huge increase over the baseline probability of agreement of 24.5 percent, providing strong evidence for hypothesis 1.

[Table 2 around here]

Looking at the outcome equation, we begin with the naive OLS model without selection correction (table 2, model 1). In this setup, we cannot discern any effect of oil discovery on how much the boundary deviates from the median line. Once we include the selection correction (model 2), the positive coefficient estimate more than doubles and gets close to statistical significance (p=0.115, two-tailed test). As we have shown above, most variation in the dependent variable is between the 0 and 1 values, i.e. those arrangements that fully shift the boundary to one side and those that stay close to the median line. We therefore dichotomize the dependent variable. While dichotomization usually reduces the information contained in the dependent variable, it is justified if the dependent variable is strongly non-normal, especially when this is caused by censoring at upper or lower bounds (Streiner 2002).

[22] Figure 4 shows marginal effects based on a profile of regressors that keeping other variables at their median. Dots represent point predictions and whiskers 90 percent confidence bounds.

Table 3 reports results from our probit analysis.[23] In line with our theoretical expectations, we find that offshore oil or gas discovery increases the likelihood that the boundary falls on the median line (model 2), though the variable attains only moderate statistical significance (p=0.087, countries without oil production). Substantively, figure 4 shows that offshore oil or gas discovery on average increases the probability of a solution along the median line by 28.4 percentage points, a very big effect in line with hypothesis 2.

[Table 3 around here]

Next we turn to the role of existing oil or gas production. The negative interaction term in the selection equation (table 1, model 2) and the outcome equation (table 3, model 2) indicates that for oil or gas producing countries the discovery of offshore oil or gas reserves changes bilateral boundary agreements. The marginal plots show that agreements indeed become rarer, with the effect of offshore oil or gas discovery on the likelihood of settlement dropping from 11.7 percentage points to 9.47 percentage points. Negotiated solutions also are less likely to fall on the median line. Existing oil production reduces the effect of oil discovery on the probability

[23] Incorrect use of dichotomization results in information loss, which makes it harder to find statistically significant relationships. We therefore are confident that our improved probit estimates result from choosing a model that better reflects the data generating process. For boundaries that fully fall to one side of the median line, our coding scheme does not differentiate between the magnitude of movements away from the median line. To check whether this masks important distributional effects, we rerun the analysis using relative gains measured as the absolute size of the sea area that country 1 wins in excess of country 2. Mathematically, we obtain |x-y|, where x is the sea area gained relative to the median line by country 1, y the area gained by country 2. The resulting values range between zero and 6.46 million square kilometers. We than add 1 and take the natural log. The results are obtained via OLS and remain substantively unchanged (table 2, model 4, note that direction of dependent variable and all signs of coefficients are flipped).

of choosing the median line by more than half from 28.4 to 10.6 percentage points. [24] While these patterns are less robust than the effects of oil discovery, we have some evidence that existing oil production reduces the value of reaching a boundary settlement and results in boundaries that tend to be further away from the median line, confirming hypotheses 3 and 4.

[Figure 4 about here]

We now explore in more depth whether oil discovery produces incentives to cooperate that outweigh any distributional struggles over the resource. As discussed earlier, information about the geographic extent of under-water oil deposits is so imprecise that the location of the maritime boundary matters less than reducing legal uncertainty to enable costly investments for commencing production. This uncertainty is reflected in the best dataset that is available to researchers. The Lujala et al dataset (2007) only provides aggregated geo-coded locations of drilling sites, and does not contain any information on the estimated size or extent of the oil or gas reserves. To our knowledge, no such data exists in the public domain. However, the information is sufficient for us to identify whether oil or gas was discovered in the maritime region between states. Up to this point, we have accounted for the presence of oil when the Lujala et al dataset identifies drilling within 100 miles on either side of the median line. We are also able to distinguish cases where discovered oil or gas reserves are fully to one side of the median line, and those where the reserves straddle the median line. In the next section, we leverage this information to probe in more depths how offshore oil and gas reserves affect cooperation and distributional outcomes.

[24] For existing oil production the 90 percent confidence interval also contains zero.

Differentiating between states that expect to benefit from offshore oil or gas production and those who do not presents a difficult test for hypothesis 2 because the discovery of reserves has the potential to infuse the states' cooperation problem with conflictual aspects, depending on the location of the discoveries. If the reserves are fully to one side of the median line, the country that controls the reserves has a greater interest in reducing legal uncertainty, giving the country without reserves a potential bargaining advantage. These situations should result in more lopsided distributional outcomes. On the other hand, if both countries can expect to gain access to the offshore oil or gas, shifting the maritime boundary could have distributional consequences. The uncertain nature of offshore oil and gas exploration could lead to bargaining inefficiencies and thus make cooperation more difficult to achieve. Thus, the incidence of agreement should be lower when both sides expect to develop oil production. Both of these predictions contradict hypothesis 2, which states that such distributional issues should be inconsequential compared to the joint gains from reducing legal uncertainty and making oil or gas production possible.

[Table 4 around here]

To explore this issue, we begin with a simple bivariate analysis. Table 4 shows a comparison of means for pairs of countries with no offshore oil or gas deposits and those with one-sided and two-sided oil or gas discovery. Looking first at the frequency of settlement, moving from no offshore oil or gas to having either on both sides of the median line monotonically increases the chance of observing settlement. This confirms our finding that offshore oil and gas facilitate cooperation in line with hypothesis 1. There is no indication that distributional conflict makes cooperation more difficult if there is offshore oil or gas on both sides of the median line. In addition, when looking at the ratio of deviations from the median line

(the same variable we use in table 2), we note that cases of single-side oil discovery deviate much less from the median line (40.7 of 100) than those without offshore oil or gas or with two-sided oil (33.0 and 32.1). Thus asymmetries in oil and gas reserves do not lead to greater distributional adjustments, in line with hypothesis 2. Since the ratio of deviations is non-directional, in the third row of table 4 we compute the share of sea area gained by countries that have discovered oil or gas. We find that if oil or gas is fully to one side of the median line, the country that controls the reserves on average receives half of any reassigned sea areas, i.e gains are distributed almost exactly evenly. Where two sides have offshore oil or gas, or where there is no oil, distributions tend to be much more skewed, with an average split of around 83 to 17 percent (though we do not have enough information on the location of oil and gas reserves to know how they are effectively split). Thus again, we do not find that asymmetries in the distribution of offshore oil and gas reserves lead to more uneven distributional outcomes. Overall the bivariate analysis supports hypothesis 2.

However, bivariate correlations are only suggestive and we need to move to a multivariate setting. Here, again we have no evidence of conflictual relations. Model 3 in table 1 shows a positive effect of one- and two-sided oil or gas reserves on coming to agreement. Though the coefficient for two-sided offshore reserves is slightly larger than for one-sided reserves, the difference is not statistically significant ($p=0.368$). Similarly, for deviations from the median line, the coefficients reach marginal statistical significance individually but are almost identical in size (model 3 in table 3). Thus, once we control for the effects of other variables, we find that offshore oil and gas reserves uniformly increase the likelihood of cooperation and lead to agreements closer to the median line, irrespective of whether they are

located on one or both sides of the boundary. We therefore conclude that distributional issues are less salient than the gains from cooperation in the presence of oil and gas reserves.

We now look at results for the control variables. Fisheries have no statistically discernable effect, neither on settling the boundary nor on distributional outcomes. This is in line with our expectation that settling the maritime boundary is of little consequence for the ability of states to exploit and sometimes jointly manage straddling fisheries.

For factors associated with liberal institutionalism we expected symmetric gains and more cooperation for pairs of democracies, for countries that trade with each other and after the signing of the LOS. We find support for each of these predictions, although only for the selection equation. For deviations from the median line, all coefficients have the predicted direction but fall short of statistical significance. Substantively, pairs of democracies are on average 5.17 percentage points more likely to come to agreement than other country pairings. Given the median baseline probability of 24.5 percent, this is an important increase. For trade, each $1000 per capita increment increases the probability of agreement by 12.8 percentage points. Thus we find strong evidence that variables associated with liberal arguments about issue linkage and democratic institutions do facilitate cooperation.

The time dummy for the signature of the Law of the Sea is not statistically significant (though positive, as predicted), but the number of existing settled maritime boundaries increases the chance of agreement. For each additional boundary agreement in existence, the likelihood that an unsettled boundary will be delineated increases on average by 2.04 percentage points. Thus we find that the practice of bilateral cooperation in delineating EEZs establishes a powerful norm that drives more cooperation.

In contrast, our ability to identify similar effects of liberal institutionalist factors for distributional outcomes is severely hampered. Though all variables point in the expected direction, their effects cannot be reliably distinguished from zero. Despite the small *n*, we take this as evidence that the link between the symmetry of gains and the ability to cooperate is less important for institutionalist factors than the possibility of offshore oil or gas production, which requires legal certainty.

Next we look at the role of power and conflict. The expectation was that power differentials would facilitate agreement but also lead to lopsided outcomes, because powerful states can impose their will on weaker states. We find no evidence for this, both for differences in GDP and overall capabilities. Powerful states appear not more likely to force or block the settlement of maritime boundaries, nor is the distribution particularly lopsided.

The situation is different for territorial disputes. The evidence shows that pairs of countries that have a territorial dispute in the affected sea area are much less likely to agree on their maritime boundaries. This effect is strong, with a reduction in the predicted probability of agreement of 16.6 percentage points. It provides evidence that tying the settlement of boundaries to security concerns makes the issue more contentious. On the other hand, we only have weak evidence that agreements between pairs of countries with territorial conflict deviate from the median line more than other pairs. The coefficient is negative and the estimated change in the ratio of deviations is 19.8 percentage points. Although this is a large effect, there is too much uncertainty to distinguish it reliably from zero (p=0.137). One reason for this is that countries with territorial conflict rarely settle their maritime boundaries. There are only 14 cases in our sample, or 7.4 percent of all agreements.

For countries that negotiate on part of their dependencies, we expected that variation in issue salience and high bargaining costs would make cooperation more difficult and open the door for asymmetric bargaining outcomes. We find support for both of these predictions. In the presence of one dependency, the likelihood of coming to agreement decreases on average by 2.92 percentage points, though this prediction is not statistically significant (p=0.166). When countries negotiate on behalf of two dependencies, the effect further increases in size, and reaches statistical significance. The presence of two dependencies decreases the probability of agreement by 6.90 percentage points, a large effect relative to the baseline probability of 24.5 percent. This pattern repeats when looking how far the settlement deviates from the median line. Agreements that involve one dependency are more likely to deviate from the median line but the effect is too small to be statistically significant. For two dependencies the probability reaches statistical significance and increases by 39.5 percentage points, a substantively very large effect. In sum, we have strong evidence that states find it difficult to settle the boundaries of their dependencies, and when they do, the distribution tends to be asymmetric.

The last category of control variables are the predictors of agreement that serve as instruments in the Heckman selection setup. We find that all variables behave as expected. A greater number of previously settled maritime boundaries increases the probability of an agreement, and the period time dummies (not shown in Table 1) are jointly significant (p=0.0572 in a likelihood ratio test). Finally, the Heckman setup allows us to gauge the effect not only of structural variables, but also of unobserved factors. The selection correction is positive and highly statistically significant. The error terms of the two latent equations for agreement and outcome are positively correlated (ρ=0.25). This implies that unobserved factors that facilitate

agreement also are associated with smaller deviations from the median line, providing evidence that symmetric gains facilitate cooperation.

Overall there appears a tight link between the probability of agreement and distributional results in the data. This relationship is also reflected for the majority of independent variables in the analysis. Returning to figure 4, clear patterns emerge in the marginal effects of both equations. Variables that facilitate agreement tend to be associated with a more even ratio of deviations from the median line (closer to 1), even though many do not reach statistical significance in the outcomes equation. Variables that hinder agreement tend to produce larger deviations from the median line (closer to 0). In their totality, this pattern in the structural part of the analysis together with the positive link between the dependent variables in unobserved factors strongly supports that the decision to settle maritime boundaries influences the distributional outcome in systematic ways. This is especially prominent when there is potential for offshore oil or gas production that gives hopes of mutual gains for both states.

Conclusion

The median-line provision of the Law of the Sea creates a powerful inside option for states with overlapping or adjacent exclusive economic zones. It allows states to use the median line as a default boundary when cooperation does not require high legal clarity. However, when states find offshore oil or gas deposits in the disputed area, they push to create legal certainty which will allow for costly investment in future oil or gas production. The presence of offshore oil or gas also systematically influences the distributive outcomes states reach, as gains from cooperation outweigh distributional conflicts. This leads to bilateral agreements that draw the final boundary close to the median line.

The regime-defined inside option gives states the ability to walk away from unfavorable agreements and this clearly influences which economic zones get settled and under what terms. If achieving gains from cooperation necessitates large deviations from the median line, agreement is much harder to come by. The empirical analysis shows that the presence of offshore oil and gas deposits matters more than political factors of either the liberal institutionalist or the realist type. This suggests that economic interests are the most important driver in settling maritime boundaries.

Our key contribution is that a strong multilateral regime can change the incentives that states have in bilateral negotiations. In an anarchic environment in which states need to select into self-enforcing agreements, multilateral regimes can provide an inside option that serves as a default solution when bilateral negotiations fail. Thus, international regimes can change the close link between the outcomes of negotiations and the ability to come to agreement in unexpected ways. For maritime boundaries, our results generally point into one direction. Factors that facilitate agreement also make it more likely that the outcome is closer to the status quo of the median line. This insight opens up an important new direction for a more fine-grained and systematic study of international cooperation. If distributional outcomes affect the ability to achieve cooperation, we need to study this relationship across other international regimes.

We were surprised to find that existing deals on maritime boundaries follow a strong bimodal distribution. Bargaining theory suggests that no point along the contract curve should be privileged ex-ante. This possibly points to an existing norm in the international arena that privileges the median line as both a focal point representing the status quo and as a fair distribution that is sanctioned by the Law of the Sea. We are only at the beginning of understanding the role of focal points and behavioral norms for international cooperation. A

more systematic study of this issue will require efforts to collect data on distributional outcomes in other issue areas.

Our project breaks new ground in focusing IPE research more on how institutional underpinnings drive distributive outcomes of international cooperation. Focusing on distributional outcomes promises rich insights by providing us with a more detailed understanding of cooperation, and furthering the neoliberal institutionalist research agenda.

Bibliography

Ásgeirsdóttir, Áslaug and Martin Steinwand. 2015. "Dispute Settlement Mechanisms and Maritime Boundary Settlements." *Review of International Organizations* 10(2):119-143.

Barbieri, Katherine and Omar Keshk. 2012. "Correlates of War Project Trade Data Set Codebook, Version 3.0." Online: http://correlatesofwar.org.

Barbieri, Katherine, Omar M.G. Keshk, and Brian Pollins. 2009. "Trading Data: Evaluating our Assumptions and Coding Rules." *Conflict Management and Peace Science* 26(5):471-491.

British Petroleum. 2012. *Statistical Review of World Energy*. Online: http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

Carter, David B. and Hein E. Goemans. 2011. "The Making of the Territorial Order: New Borders and the Emergence of Interstate Conflict." *International Organization* 65(2):275-309.

Charney, Jonathan I., and Lewis M. Alexander eds. 1993a and b. *International Maritime Boundaries, Volume I& II*. Dordrecht: Martinus Nijhoff Publishers.

Charney, Jonathan I., and Robert W. Smith eds. 2002. *International Maritime Boundaries, Volume IV*. Dordrecht: Martinus Nijhoff Publishers.

CIA – The World Factbook. 2016. Online: https://www.cia.gov/library/publications/the-world-factbook/

Davis, Christina. 2012. *Why Adjudicate? Enforcing Trade Rules in the WTO*. Princeton: Princeton University Press.

Dinmore, Guy. 2012. "Italy's offshore oil sites set to resume." *The Financial Times, May 31*.

FishStat Plus. 2010. Fisheries and Aquaculture Department. Rome: Food and Agriculture Organization.

Gartzke, Erik, Quan Li and Charles Boehmer. 2001. "Investing in Peace: Economic Interdependence and International Conflict." *International Organization* 55(2):391-438.

Global Maritime Boundaries Database™. 2011. Herndon, VA: Global GIS Data Services LLC.

Gilligan, Michael J, and Leslie Johns. 2012. "Formal models of international institutions." *Annual Review of Political Science* 15:221–243.

Greene, William H. 2003, *Econometric Analysis, 5th Edition.* Upper Saddle River: Prentice Hall.

Grieco, Joseph. 1990. *Cooperation Among Nations: Europe, America, and Non-Tariff Barriers to Trade.* Ithaca: Cornell University Press.

Gueth, Werner, and Reinhard Tietz. 1990. "Ultimatum bargaining behavior: A survey and comparison of experimental results." *Journal of Economic Psychology,* 11:417–449.

Heckman, J. J. (1979). "Sample Selection Bias as a Specification Error." *Econometrica*, 47(1):153–161.

Hensel, Paul R., Sara McLaughlin Mitchell, Thomas E. Sowers and Clayton L. Thyne. 2008. "Bones of Contention: Comparing Territorial, Maritime and River Issues." *Journal of Conflict Resolution* 52(1):117-143.

Honaker, James, Gary King, and Matthew Blackwell. 2011. "Amelia II: A Program for Missing Data." *Journal of Statistical Software* 45:1–47.

Huth, Paul. 1996. *Standing Your Ground: Territorial Disputes and International Conflict.* Ann Arbor: University of Michigan Press.

Huth, Paul, Sarah E. Croco and Benjamin J. Appel. 2011. "Does International Law Promote the Peaceful Settlement of International Disputes?" *American Political Science Review* 105(2):415-436.

Huth, Paul, Sarah E. Croco and Benjamin J. Appel. 2013. "Bringing Law to the Table: Legal Claims, Focal Points and the Settlement of Territorial Disputes Since 1945." *American Journal of Political Science* 57(1): 90-103.

Huth, Paul and Todd Allee. 2003. *The Democratic Peace and Territorial Conflict in the Twentieth Century*. Cambridge: Cambridge University Press.

Hyne, Norman J. 2012. *Nontechnical Guide to Petroleum Geology, Exploration, Drilling and Production, 3rd Ed.*. Tulsa: PennWell.

International Court of Justice. 1969. "North Sea Continental Shelf Cases." Online: http://www.icj-cij.org/docket/files/51/5537.pdf

Keohane, Robert and Joseph Nye. 2000. *Power and Interdependence, 3rd Ed.* New York: Longman.

Keohane, Robert. 1984. *After Hegemony: Cooperation and Discord in the World Political Economy.* Princeton: Princeton University Press.

Keohane, R. 1986. "Reciprocity in International Relations." *International Organization* 40(1):1–27.

King, Gary, James Honaker, Anne Joseph, and Kenneth Scheve. 2001. "Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation." *American Political Science Review* 95(1):49-69.

Kirkey, Christopher. 1995. "Delineating Maritime Boundaries: The 1977-78 Canada-U.S. Beaufort Sea Continental Shelf Delimitation Boundary Negotiations." Canadian Review of American Studies 25(2):49-67.

Krasner, Stephen ed. 1983. *International Regimes.* Ithaca: Cornell University Press.

Krauss, Clifford and Stanley Reed. 2015. "Shell Exits Arctic as Slump in Oil Prices Forces Industry to Retrench." New York Times, September 28. Online: http://www.nytimes.com/2015/09/29/business/international/royal-dutch-shell-alaska-oil-exploration-halt.html?_r=0

Kwiatkowska, Barbara. 2001. "The Eritrea-Yemen Arbitration: Landmark Progress in the Acquisition of territorial Sovereignty and Equitable Maritime Boundary Delimitation." *Ocean Development & International Law* 31(1):1-25

Kwiatkowska, Barbara. 2002a. "The Qatar v. Bahrain Maritime Delimitation and Territorial Questions Case." *Ocean Development & International Law* 33(3&4):227-262.

Kwiatkowska, Barbara. 2002b. *Decisions of the World Court Relevant to the UN Convention on the Law of the Sea. A Reference Guide.* Hague: Kluwer Law International.

Lujala, Päivi, Jan Ketil Rød and Najda Thieme. 2007. "Fighting over Oil: Introducing a New Dataset." *Conflict Management and Peace Science*. 24(3):239-256.

McDorman, Ted. 2009. *Salt Water Neighbors: International Ocean Law Relations Between the United States and Canada.* New York: Oxford University Press.

Mansfield, Edward D. and B.M. Pollins. 2001. "The Study of Interdependence and Conflict: Recent Advances, Open Questions, and Directions for Future Research." *Journal of Conflict Resolution* 45(6):834-859.

Mansfield, Edward, Helen V. Milner and B. Peter Rosendorff. 2002. "Why Democracies Cooperate More: Electoral Control and International Trade Agreements," *International Organization* 56(3):477-513.

Marshall, Monty G., Keith Jaggers and Ted Gurr. 2011. "Polity™ IV Project: Political Regime Characteristics and Transitions, 1800-2010." Vienna, VA: Center for Systemic Peace and Societal-Systems Research Inc.

Mearsheimer, John. 2001. *The Tragedy of Great Power Politics.* New York: W.W. Norton.

Milner, Helen. 1997. *Interests, Institutions and Information: Domestic Politics and International Relations.* Princeton: Princeton University Press.

Muthoo, Abhinay. 1999. *Bargaining Theory with Applications.* Cambridge: Cambridge University Press.

Muthoo, Abhinay. 2000. "A non-technical introduction to bargaining theory." *World Economics* 1(2):145–166.

Nemeth, Stephen C., Sara McLaughlin Mitchell, Elizabeth A. Nyman and Paul R. Hensel. 2014. "Ruling the Sea: Managing Maritime Conflicts through UNCLOS and Exclusive Economic Zones." *International Interactions* 40:711-736.

Odell, John S. 2000. *Negotiating the World Economy.* Ithaca, NY: Cornell University Press.

Odell, John S. 2002. "Creating Data on International Negotiation Strategies, Alternatives and Outcomes." *International Negotiation* 7(1):39-52.

Oneal, John R. and Bruce Russett. 1999. "Assessing the Liberal Peace with Alternative Specifications: Trade Still Reduces Conflict." *Journal of Peace Research* 36(4):423-442.

Oye, Kenneth ed. 1986. *Cooperation under Anarchy.* Princeton: Princeton University Press.

Pratt, Martin. 2002. International Boundary Research Unit. Data shared in personal correspondence.

Prelli, Lawrence J. and Mimi Larsen-Becker. 2001. "Learning the Limits of an Adjudicatory Strategy for Resolving United States-Canada Fisheries Conflicts: Lessons from the Gulf of Maine." *Natural Resources Journal* 41:445.

Putnam, Robert. 1988. "Diplomacy and Domestic Politics: The Logic of Two-Level Games." *International Organization* 42(3):427-460.

Sattler, Thomas, and Thomas Bernauer. 2011. "Gravitation or discrimination? Determinants of litigation in the World Trade Organization." *European Journal of Political Research* 50:143–167.

Schram Stokke, Olaf, Lee G. Anderson and Natalia Mirovitskaya. 1999. "The Barents Sea Fisheries," in *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioral Mechanisms*, Oran Young (ed). Cambridge: MIT Press.

Schofield, Clive. 2012. "No Panacea?: Challenges in the Application of Provisional Arrangements of a Practical Nature," in Nordquist, M.H. and Moore, J.N. (eds), *Maritime Border Diplomacy*. Leiden: Martinus Nijhoff.

Simmons, Beth. 2006. "Trade and territorial conflict in Latin America: international borders as institutions," in *Territoriality and Conflict in the Era of Globalization*, Miles Kahler and Barbara F. Walter (eds). New York: Cambridge University Press.

Singer, J. David, Stuart Bremer, and John Stuckey. 1972. "Capability Distribution, Uncertainty, and Major Power War, 1820-1965." in Bruce Russett (ed), *Peace, War, and Numbers*, Beverly Hills: Sage, 19-48.

Singer, J. David. (1987). "Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816-1985." *International Interactions* 14:115-32. Version 4.0.

Sovey, Allison J. and Green, Donald P. 2011. "Instrumental Variables Estimation in Political Science: A Readers' Guide." *American Journal of Political Science* 55(1):188-200.

Stone, Randall W. 2008. "Choosing How to Cooperate: A Repeated Public-Goods Model of International Relations." *International Studies Quarterly* 52(2):335-362.

Stone, Randall W. 2011. *Controlling Institutions: International Organizations and the Global Economy.* Cambridge: Cambridge University Press.

Streiner, David L. 2002. "Breaking Up is Hard to Do: The Heartbreak of Dichotomizing Continuous Data." *Canadian Journal of Psychiatry* 47:262–266.

Tanaka, Yoshfumi. 2001. "Reflections on the Concept of Proportionality in the Law of Maritime Delimitation." *International Journal of Marine and Coastal Law* 16(3): 433-463.

United Nations. 2015. *United Nations Convention on the Law of the Sea.* Online: http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf.

Voeten, Erik. 2001. "Outside Options and the Logic of Security Council Action." *American Political Science Review* 95(4):845–858.

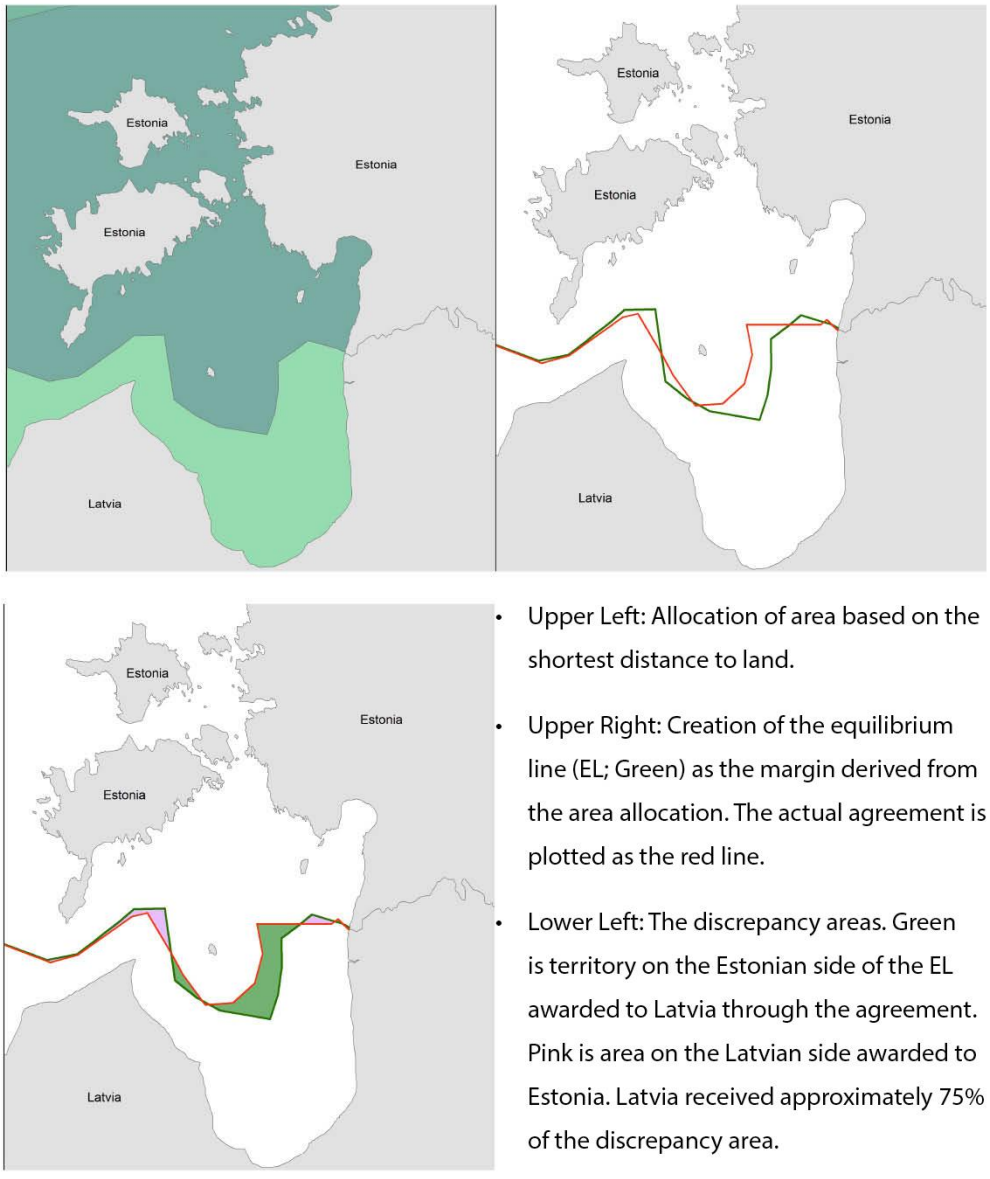
Waltz, Kenneth N. 1979. *Theory of International Politics.* Reading: Addison-Wesley.

Young, Oran. 1989. *International cooperation: Building Regimes for Natural Resources and the Environment.* Ithaca: Cornell University Press.

Young, Oran, ed. 1999. *The Effectiveness of International Environmental Regimes. Causal Connections and Behavioral Mechanisms.* Cambridge: MIT Press.

Xiang, Jun. 2010. “Relevance as a Latent Variable in Dyadic Analysis of Conflict.” *Journal of Politics* 72(2):484-498.

Latvia - Estonia



- Upper Left: Allocation of area based on the shortest distance to land.
- Upper Right: Creation of the equilibrium line (EL; Green) as the margin derived from the area allocation. The actual agreement is plotted as the red line.
- Lower Left: The discrepancy areas. Green is territory on the Estonian side of the EL awarded to Latvia through the agreement. Pink is area on the Latvian side awarded to Estonia. Latvia received approximately 75% of the discrepancy area.

Figure 1: Deciding who gets what. We first plot the median line and then the actual maritime boundary and calculate the difference between the two.

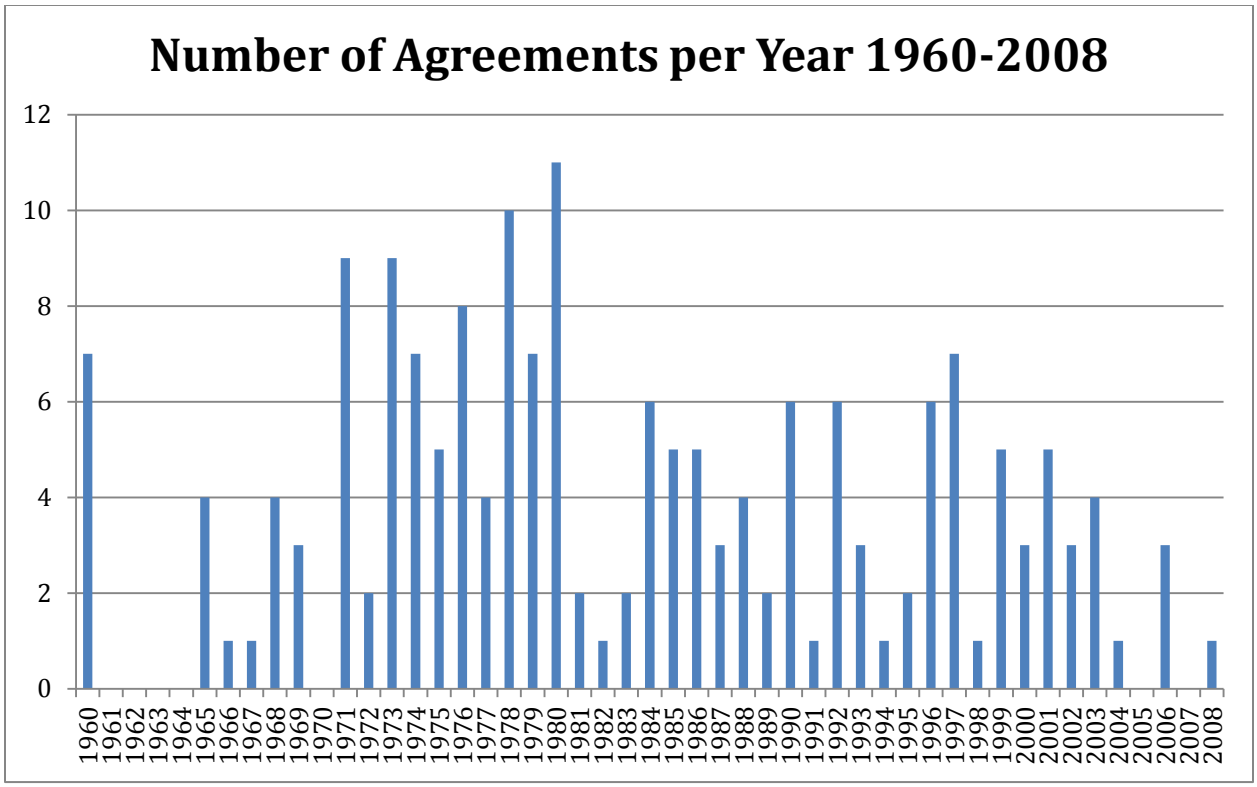


Figure 2: Number of agreements concluded between nations to divide ocean space each year 1960-2006. Please note that some of the agreements that count as being having been done in 1960 may have been concluded earlier.

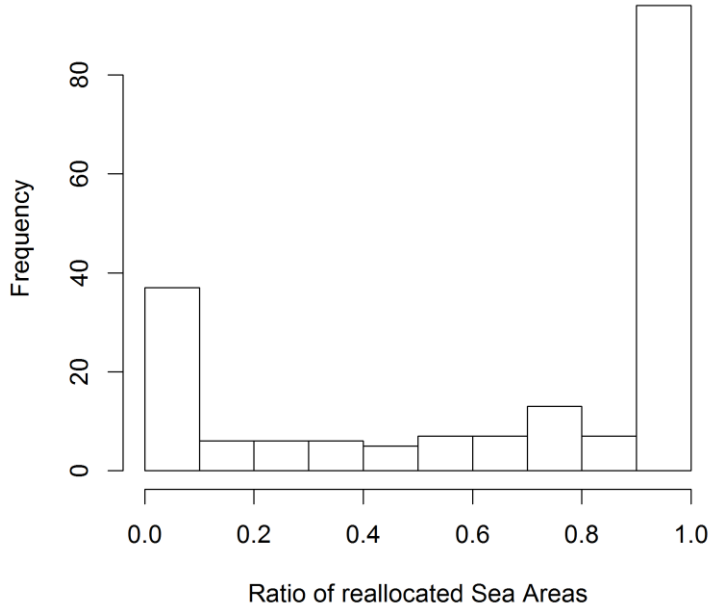


Figure 3: Distribution of Settlement Ratios

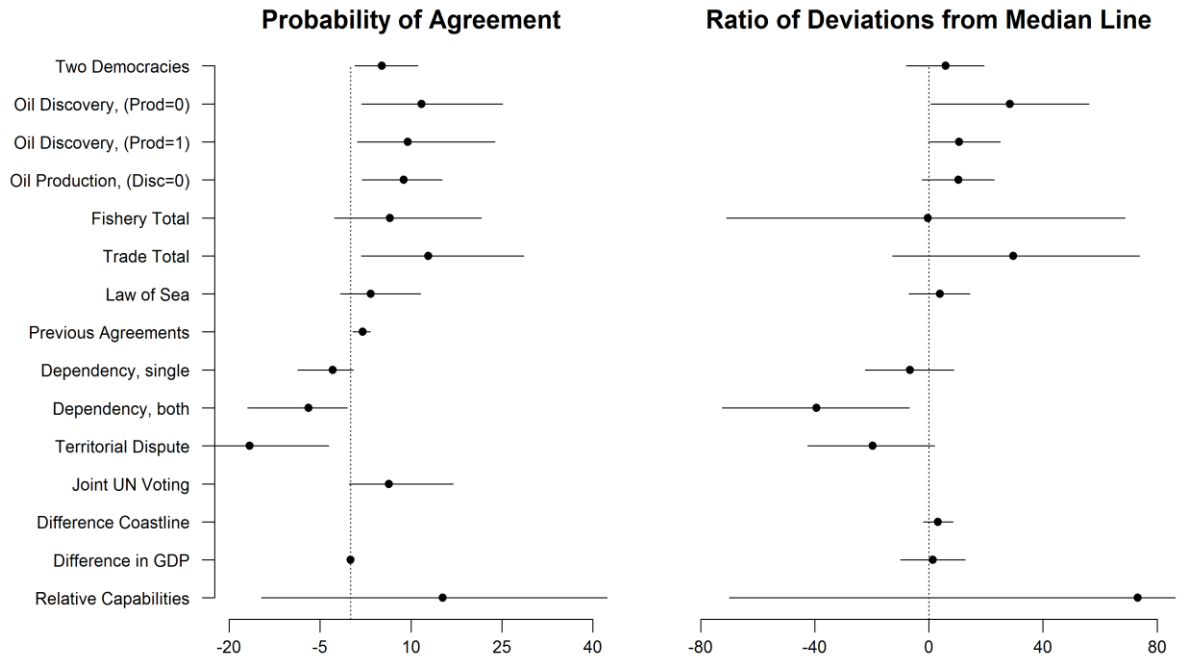


Figure 4: Marginal Effects, Selection & Outcome Equations

Table 1: Probit, Coming to Agreement

	1		2		3	
	coef.	p-value	coef.	p-value	coef.	p-value
Oil Discovery	**0.504**	0.002	**0.455**	0.011		
Discovery: One Country					**0.413**	0.026
Discovery: Both Countries					**0.538**	0.006
Oil Production	**0.293**	0.000	**0.319**	0.000	**0.319**	0.000
Discovery × Production	**-0.405**	0.024	***-0.375***	0.061	**-0.401**	0.045
Fishery Total			0.280	0.234	0.276	0.241
Trade Total			**0.504**	0.021	**0.517**	0.018
Law of Sea			0.144	0.264	0.142	0.269
Two Democracies			**0.200**	0.028	**0.201**	0.027
Previous Agreements			**0.0703**	0.000	**0.0703**	0.000
Dependency, single			-0.122	0.166	-0.123	0.162
Dependency, both			***-0.276***	0.054	***-0.280***	0.052
Territorial Dispute			**-0.585**	0.000	**-0.591**	0.000
Joint UN Voting			0.258	0.118	0.253	0.126
Difference in GDP			0.000555	0.866	0.000549	0.867
Relative Capabilities			0.678	0.370	0.663	0.38

$n = 15,913$, coefficients ***italic*** if $p \leq 0.1$, **bold** if $p \leq 0.05$.

Table 2: OLS, Distributional Outcomes

	ratio of deviations		ratio of deviations		ratio of deviations		absolute area gained	
	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value
Constant	**36.2**	0.000	**-71.6**	0.046	**-70.8**	0.0453	**12.0**	0.000
Selection Correction			**40.7**	0.002	**40.4**	0.00202	-1.76	0.166
Oil Discovery	8.81	0.579	27.2	0.115			0.284	0.803
Discovery: One Country					27.5	0.113		
Discovery: Both Countries					25.2	0.265		
Oil Production	-3.85	0.592	8.09	0.297	7.99	0.300	-0.0526	0.932
Discovery times Production	-10.5	0.559	-28.6	0.128	-27.4	0.195	-0.858	0.482
Fishery Total	-16.4	0.497	-2.49	0.919	-2.47	0.919	1.77	0.305
Trade Total	16.3	0.266	**29.8**	0.036	**29.6**	0.0359	**-4.75**	0.001
Law of Sea	1.71	0.782	0.905	0.882	0.849	6.08	-0.633	0.204
Two Democracies	4.47	0.586	10.2	0.211	10.2	0.209	-0.33	0.628
Dependency, single	-2.02	0.819	-5.98	0.506	-5.94	0.509	**1.62**	0.005
Dependency, both	**-28.7**	0.004	**-38.4**	0.000	**-38.4**	0.000	**5.97**	0.000
Territorial Dispute	7.69	0.5	-16.6	0.232	-16.3	0.239	1.77	0.155
Difference Coastline	2.14	0.412	1.81	0.504	1.80	0.507	-0.0574	0.752
Difference in GDP	1.72	0.789	1.30	0.815	1.27	0.820	0.812	0.468
Relative Capabilities	65.5	0.369	78.7	0.269	79.2	0.265	-0.889	0.890

$n = 189$, coefficients ***italic*** if $p \leq 0.1$, **bold** if $p \leq 0.05$.

Table 3: Probit, Distributional Outcomes

	1		2		3	
	coef.	p-value	coef.	p-value	coef.	p-value
Constant	**-2.79**	0.004	**-4.59**	0.000	**-4.61**	0.000
Selection Correction	**0.927**	0.011	**1.600**	0.001	**1.61**	0.001
Oil Discovery	0.848	0.103	***0.957***	0.087		
Discovery: One Country					***0.952***	0.088
Discovery: Both Countries					0.999	0.168
Oil Production	0.0581	0.797	0.347	0.181	0.349	0.178
Discovery times Production	-0.847	0.153	***-1.15***	0.069	***-1.17***	0.089
Fishery Total			-0.00939	0.993	-0.00971	0.993
Trade Total			0.783	0.257	0.790	0.25
Law of Sea			0.123	0.572	0.124	0.572
Two Democracies			0.210	0.493	0.208	0.495
Dependency, single			-0.238	0.452	-0.238	0.453
Dependency, both			**-1.32**	0.043	**-1.32**	0.042
Territorial Dispute			-0.653	0.137	-0.658	0.135
Difference Coastline			0.0832	0.485	0.0836	0.484
Difference in GDP			0.0349	0.913	0.0369	0.909
Relative Capabilities			1.95	0.415	1.94	0.421

$n = 189$, coefficients ***italic*** if $p \leq 0.1$, **bold** if $p \leq 0.05$.

Table 4: Settlement & Distributional Outcomes by Status of Oil Discovery

	No oil	Oil on one side	Oil on both sides
Frequency of settlement	19.4%	39.2%	46.4%
Ratio of deviations	33.0	40.7	32.1
Average share	83.5	50.5	83.9