

Cross-Border Troubles? Interstate River Conflicts and Intrastate Violence

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Abstract: I examine the relationship between interstate river conflicts and intrastate violence such as riots, strikes, demonstrations, and civil wars. I focus my analysis on three regions: the Western Hemisphere, Western Europe, and the Middle East. I argue that interstate disagreements over cross-border river basins increase the potential for intrastate conflict by creating unequal access to water resources, displacing populations due to damming and diversion projects, and increasing demands for freshwater as population growth occurs. I find that states that experience more interstate conflicts over shared river basins are at a higher risk for multiple forms of intrastate conflict, raising the risk of internal conflict by as much as 800%. I also find that as the salience of contested river basins increase, states experience higher risks for internal conflict. Water quantity issues tend to be the strongest factor increasing domestic conflict, while navigational, water quality, and irrigation issues have little influence on civil conflict. States with international rivers that have shared dams see a reduction in the risk for armed conflict. Cooperation between countries over shared water resources can have positive spillover effects for internal security as well, although the construction of dams has been conflict inducing in some places.

In the 1980s and 1990s, many scholars and prognosticators warned of impending water wars between countries. In 1984, John Cooley argued that “the constant struggle for the waters of the Jordan, Litani, Orontes, Yarmuk, and other life-giving Middle East rivers...was a principal cause of the 1967 Arab-Israeli war and could help spark a new all-out conflict” (p. 3). He viewed the Israeli occupation of Lebanon at the time as a potential spark for future regional conflict, especially over the Litani River. In 1991, Joyce Starr described the potential for increased military frictions over the Jordan River basin, while identifying additional challenges in the Nile, and Tigris-Euphrates river basins. Thomas Homer-Dixon (1994) elaborated on the linkages between environmental scarcities and violent conflict within and between states, including conflict over water rights in the West Bank (see also Lowi 1993). However, empirical analyses of interactions between countries over shared river basins reveals much more cooperation than conflict (Wolf 1998). Regions with greater water scarcity (e.g. the Middle East) experience more militarized disputes than water abundant regions (e.g. North America), but conflicts tend to remain less severe than disputes involving land borders (Hensel, Mitchell, and Sowers 2006). Large-N analyses of shared rivers and militarized conflicts produce disparate findings as well (e.g. Tose et al 2000; Brochmann and Gleditsch 2012). While states experience some conflicts over shared river resources, they tend to engage in cooperation more frequently to resolve issues involving water quantity, water quality, and navigation rights.

Perhaps the effects of interstate water conflicts are more localized. Many of Homer-Dixon’s (1994) case studies focus on the tensions that can arise between groups inside the state as a result of unequal access to important resources like fresh water. Recent studies have linked the drought and river conflicts in the Tigris-Euphrates river basins between Turkey, Iraq, and Syria to the outbreak of civil conflict in Syria in 2011 (Beck 2014). Damming projects by

Turkey had reduced water supplies in Syria and the 2006-2011 droughts displaced close to a million citizens, forcing them into nearby cities. The massive influx of people into urban areas put stress on food and water supplies, generating grievances by citizens living in these areas, such as Dara'a (where the uprising began in March 2011), which led to protests and subsequent crackdowns by Bashar al-Assad's regime (Beck, 2014: 2-5). While these types of relationships between water resources and civil conflict can be identified in individual cases, they are not often studied in large N studies. Civil war scholars have considered the relationship between climate change and civil wars, using measures such as average rainfall and migration due to climate displacement (Barnett and Adger 2007; Reuveny 2007; Hendrix and Glaser 2007; Burke et al 2008; Buhaug 2010; Hendrix and Salehyan 2012). Yet these studies emphasize climate conditions *within* a country without considering the regional context of water rights.

In this paper, I integrate these approaches by examining the relationship between interstate river conflicts and intrastate violence such as riots, strikes, and armed conflict. I focus my analysis on three regions: the Western Hemisphere, Western Europe, and the Middle East. I find that states that experience more interstate conflicts over shared river basins are at a higher risk for multiple forms of intrastate conflict. I also find that as the salience or importance of the contested river basins increases, states experience higher risks for internal conflict. Water quantity issues tend to be the strongest factor increasing domestic conflict, while navigational, water quality, and irrigation issues have little influence on civil conflict. States with international rivers that have shared dams see a reduction in the risk for armed conflict, although several case studies of the negative consequences of damming projects may give us some pause in building dams as a cooperative solution. My findings do suggest that cooperation between countries over shared water resources can have positive spillover effects for internal security as well.

The paper is organized as follows. First, I summarize research linking water resources and civil conflict. I also describe cases that have been identified in the literature as examples of this relationship. Second, I describe the importance of focusing on the transnational effects of interstate water conflicts. Many states' rivers flow through other countries, putting them at risk for diminished water supplies or water quality, especially if the country is located downstream in a river basin. Externalities created by interstate water conflicts can spillover into domestic politics; states that face a more insecure regional water environment also face more threats to their regime internally. Third, I describe the data and research design employed to evaluate the relationship between interstate river conflicts and intrastate violence. I then present the empirical results. I conclude by describing the policy implications of my findings and I discuss avenues for future analyses. I show that we must consider the transnational nature of environmental resources when considering the potential influence they have on domestic conflict.

Water Resources and Civil Conflicts

There is a surprising gap between studies of interstate river basins and civil wars. Scholars who analyze river basins tend to focus on interstate conflicts between states in the basin, while civil war scholars tend to focus on resources inside the state, ignoring the transnational nature of many fresh-water supplies. In this section, I summarize work in each of these traditions and then discuss productive ways to integrate ideas from these literatures.

Conflicts over international river basins are viewed as part of a broader class of issues involving resource conflicts (Klare 2002, 2012). Shared rivers can be contested as traditional border disputes, such as the Sino-Soviet border dispute in the late 1960's involving the Ussuri River and ownership of Chenpao Island (Gleditsch et al 2006, 365). Conflicts can also arise

because rivers flow from upstream states (e.g. Sudan) to downstream states (e.g. Egypt) and the use of water resources upstream can have negative effects on other states in the river basin.

Many river conflicts involve water quantity issues, where states upstream use more water than is viewed as fair by downstream states. Jordan has contested the amount of water Israel uses upstream in the Jordan River basin (Lowi 1993). Kyrgyzstan and Tajikistan, both located in upstream areas of the Amu Darya and the Syr Darya rivers, have used significant quantities of water for hydropower facilities to supplement their deficient energy supplies, creating conflict with downstream states Uzbekistan and Kazakhstan (Dinar 2009).

Other cross-border river conflicts stem from water quality issues such as pollution by businesses or farmers upstream. Pollution in the Rhine River primarily from chemical and mining plants in Switzerland, Germany, and France created water quality problems for the Netherlands downstream (Haftendorn 2000: 55). Rivers can also involve navigational issues, where states seek access to transport goods through rivers that flow through other states. Costa Rica and Nicaragua, for example, had a conflict over navigational rights on the San Juan River, a case that was ultimately resolved by the International Court of Justice. Freshwater is more likely to become an important security issue when there is significant scarcity of the resource, when states depend on other states for water supplies, when relative power in a river basin is asymmetric, and when there are few alternative sources of water (Gleick 1993: 84-85). Upstream/downstream dyadic configurations in river basins also face higher risks for conflicts than other types of river configurations such as sideways or mixed river relationships (Brochmann and Gleditsch 2012).¹

¹ In mixed relationships, states are both upstream and downstream on the same river or the river forms the border. In sideways relationships, two states share the same basin but no water flows from one state to another.

When examining the relationship between shared rivers and interstate conflict using large-N statistical analyses, the findings are mixed. Some studies find that shared river basins increase the risk of dyadic militarized disputes (e.g. Toset et al 2000), while other studies find that these results are weakened once controls for land contiguity are included (Brochmann and Gleditsch 2012). Other scholars emphasize variation in the salience of the contested river issues, with highly salient river claims in water scarce regions like the Middle East being more prone to militarized conflict than river issues in water abundant regions like North America (Hensel, Mitchell, and Sowers 2006). Yet even when studies find evidence of lower levels of militarized conflict, there are very few instances of interstate wars or severe militarized disputes. Aaron Wolf and his colleagues have categorized conflict and cooperation events for over 260 international rivers. They find evidence of much more frequent cooperation over rivers than conflict, including the signing of several thousand river treaties (Wolf 1998; Hamner and Wolf 1998). These findings are somewhat surprising in light of several detailed case studies that discuss conflict and tensions among states in several river basins including the Jordan (Lowi 1993), the Nile (Swain 1997), the Tigris-Euphrates (Daoudy 2009), and the Ganges (Crow and Singh 2000). As I will describe later, the case study literature points to causal mechanisms that portend for greater risks to states' internal security than necessarily leading states down a path to interstate war.

Research on civil wars has examined the relationship between natural resources, such as oil, diamonds, and fisheries, on the onset and duration of civil conflicts (Fearon and Laitin 2003; Lujala, Gleditsch, and Gilmore 2005; Buhaug, Gates, and Lujala 2009; Ross 2004a, 2004b; Theisen 2008; Hendrix and Glaser 2011; Mitchell and Thies 2012). This literature tends to emphasize resources located within a state, with little consideration of resources that are shared

by multiple countries and how the transnational nature of some natural resources might influence the chances for civil conflict. Le Billon (2001) identifies characteristics of resources that can influence the chances for conflict such as lootability, geographical location (proximate or distant from capital city), and resource concentration (point vs. diffuse). Competition over proximate, point resources such as oil refineries can lead to center-seeking civil wars or coups (e.g. Angola, Chad), while competition over diffuse resources can lead to secessionist conflicts (e.g. Sudan) or areas of warlordism (e.g. Afghanistan, Columbia). The resources that le Billon focuses on are generally those whose production is controlled by private firms or the state (e.g. oil, natural gas, coffee, copper, cobalt, gold, phosphate). Water resources, on the other hand, are typically controlled by the government. Rivers are part of a state's sovereign territory and governments must negotiate with other states when such resources originate outside their own territory. Civil war studies that have looked at water resources often frame them in terms of climate change, focusing on such measures as annual rainfall (Theisen, Holtermann, and Buhaug 2011), deviations from normal rainfall levels (Hendrix and Salehyan 2012), freshwater resources per capita² (Hendrix and Glaser 2007), and water scarcity (Raleigh and Urdal 2007). These internal water resource measures fail to capture their transnational qualities.

Civil war scholars have considered some transnational factors that influence the prospects for conflict, such as support from diasporas (Collier and Hoeffler 2004), the existence of rebel sanctuaries across state borders (Salehyan 2007), the disruptive effects of refugee flows (Salehyan and Gleditsch 2006), verbal condemnation of the ruling regime (Thyne 2007), and the diffusion of civil conflict across space (Gleditsch 2007). Yet the internal security implications of cross-border river troubles have been largely unexplored in the quantitative literature.

² Hendrix and Glaser (2007) find that higher levels of freshwater resources per capita increase the risks of civil conflict in Sub-Saharan Africa from 1981-2002.

Interstate River Conflicts and Intrastate Violence

How do interstate diplomatic conflicts over shared river basins increase the risks for intrastate conflict for states in the river basin? The case study literature on river basins and environmental conflict provides some clues for thinking about this relationship. Only 3% of global water is fresh water and water supplies vary greatly across geographic areas (Feldman 2012). Water is essential for human consumption, agriculture, and industrial production. Increases in global population have increased demands for agricultural production and hence water and energy demands (Feldman 2012, 31). Agricultural production is resulting in large scale migration of people in some areas, which is putting greater pressure on water resources in large cities. Furthermore, water demands are growing at twice the rate of the world's population (Feldman 2012, 5) and climate changes are projected to aggravate water shortage in water-scarce regions, such as the Middle East and North Africa. Critchley and Terriff (1993:332) discuss the security implications of these changes: "Intensifying population growth, agricultural production, and economic development will place ever more pressure on current water supplies in the coming years, increasing the prospects for conflict and violence." Freshwater demand is growing around the world and international rivers provide a large supply of such water resources.

Yet the lack of severe interstate conflict over river basins suggests that countries might find ways to manage these increasing water demands and tightening water supplies cooperatively. We must then ask how diplomatic conflicts over international water supplies could increase conflict between groups inside a state or between groups and the central government. Case studies of specific river basins (Homer-Dixon 1994; Klare 2002) suggest several possible causal mechanisms between river conflicts and civil wars including unequal access to water resources, displacement due to dams, and increases in population leading to

higher demands for fresh water. Homer-Dixon (1994, 31) argues that decreases in the quality and quantity of renewable resources, when combined with population growth and unequal resource access, lead to decreased economic productivity and migration or expulsion of particular populations. These processes weaken the state and increase the chances for ethnic conflicts, coups, or deprivation conflicts.

First, if countries depend on international rivers for part of their domestic water supply, then conflict with other states in the basin could alter the amount of water available for citizens, farmers, and business owners. Syria and Iraq, both downstream states on the Tigris and Euphrates Rivers, face problems from the expansion of damming projects in Turkey³ because the two states obtain 85 to nearly 100% of their renewable water supply from the rivers (Klare 2002, 175). Problems are very likely to arise if diminished water supplies as a result of conflict with other states on the river basin (e.g. through damming upstream) result in unequal access to water resources or land rights near river areas. These problems are particularly acute if access to water-based resources are linked to specific ethnic groups. Consider the case of the Senegal River which experienced severe droughts in the 1970s (Homer-Dixon 1994, 12). Dams were constructed in Mali and near the mouth of the Senegal River between Senegal and Mauritania. “Anticipation of the new dams sharply increased land values along the river in areas where high-intensity agriculture would be feasible. The elite in Mauritania...then rewrote legislation governing land ownership, effectively abrogating the rights of black Africans to continue farming, herding, and fishing along the Mauritanian riverbank (Homer-Dixon 1994, 12).” One sees similar dynamics in the Jordan River basin where the Israeli government has restricted water use in the West Bank, allowing Israeli settlers much greater access to water supplies than

³ The project is known in Turkey as the Southeast Anatolian Project or Guneydogu Anadolu Projesi (GAP), with original plans to build 22 high dams, 19 hydroelectric power stations, and various irrigation projects (Klare 2002, 178).

Palestinians, with Palestinians paying as much as six times more for water than Israeli settlers (Lowi 1993, 127). When access to water supplies is unequal and when access cuts across ethnic or racial groups, intrastate conflict is more likely to occur.

Second, restricting water supplies upstream or altering the course of the water flow through diversion projects can result in the displacement of populations downstream. Those individuals displaced are more likely to have stronger grievances against the downstream government. In recent years, the Egyptian government has issued strong threats against the Ethiopian regime in response to the construction of the Renaissance dam on the Blue Nile at the border with Sudan. Ethiopia began to change the course of the river, a move that will have implications for downstream Egypt's future water supplies, with 98% of its freshwater coming from the Nile.⁴ Significant changes to Egypt's water supply would increase the potential for Egyptians to be displaced from farming and other activities downstream and increase their grievances against the government. Changes to upstream water supplies via damming can be particularly acute in river basins that depend on flooding for farming and fishery stocks, as seen in the Senegal River's loss of farming and fish as a result of constructions of the Manantali and Diama dams (Richter et al 2010). Conflict among states on the Syr Darya and Amu Darya rivers stems from downstream states' needs for water for agricultural irrigation, with diminished supplies occurring due to dams upstream utilized to generate power in the winter months (Dinar 2009). Various damming projects by Turkey, Iraq, and Syria in the Tigris and Euphrates Rivers have brought the countries close to militarized conflict (Klare 2002, chapter 7). Some of these dams have significant potential to displace downstream populations. For example, current construction of the Ilisu Dam and Hydroelectric Power Plan, part of the GAP project in Turkey,

⁴ See <http://www.rappler.com/world/31553-egypt-ethiopia-conflict-over-nile-waters-flares>

could displace over 78,000 thousand people, mainly ethnic Kurds.⁵ Due to the multi-year drought that began in the late 1990s in the Aral Sea river basin, over 200,000 citizens of Uzbekistan were displaced from their homes due to lack of water supplies from upstream states on the Syr Darya and Amu Darya rivers (Glantz 2005). Governments downstream can face unrest from local populations that are displaced due to damming or diversion projects upstream and these problems are exacerbated if the affected populations are specific ethnic groups, such as Kurds in Syria or Iraq or black Africans in Mauritania.

Third, population growth puts pressures on governments to increase water supplies for consumption, agriculture, and industry. Larger populations require more land devoted to agricultural production, which can result in migration of citizens to larger cities. Water problems (both quantity and quality) can emerge in rural and urban locations. In rural sites, larger swathes of land devoted to farming require larger supplies of freshwater. In urban areas, massive influxes of new people overload the cities' water supply systems and create greater pollution through increased runoff and flooding of developed areas (Feldman 2012, 37). Governments may engage in damming projects to protect their own water supplies, but this can also generate domestic conflict. India, for example, built the Tehri Dam on the Bhagirathi River, a tribute of the Ganges River, which displaced over 100,000 citizens downstream (Feldman 2012, 36). This resulted in water-grabbing conflicts between neighboring citizens of villages along the river basin (conflicts between groups) and law suits and other grievances against the Indian government (conflicts with the central government).

The importance of water resources in many civil conflicts is apparent when we consider the actions of rebels and governments once the conflicts are underway. Governments target food

⁵ This damming project lost international funding due to the political pressures brought to bear by Iraq and Syria (Daoudy 2009).

and water supplies of citizens in particular villages or areas to force displacement of threatening groups. For example, state attacks on food and water in 2003 and 2004 by the Sudanese government were designed to displace Black Africans from Darfur (Hagan and Kaiser 2011). Rebels and governments also seek to take control of important dams or to destroy dams controlled by the other side. In the Syrian civil war, for example, opposition forces captured the Tishrin dam near Aleppo in November 2012 and the Taqba dam near Raqqah three months later (Beck 2014: 5). The Syrian government responded by launching air strikes on the Tabqa dam, which generated concerns about potential flooding in the rebel controlled areas. These patterns are similar to other attacks on resources during civil wars, such as rebels sabotaging oil pipelines or burning timber.

I have shown that cross-border river conflicts can increase the risks for civil conflict through multiple causal mechanisms. To evaluate this general relationship, my first hypothesis is that states who are involved in one or more interstate diplomatic conflicts involving cross-border rivers face a higher risk for intrastate violence. As the number of river conflicts increases, the risks for civil conflict should rise as well. Governments face greater security threats in situations where they depend on major water supplies that flow from other states and the larger the number of water related conflicts, the greater the number of negative externalities (e.g. population displacement, ethnic conflict) that governments face in these scenarios. While not tested in this paper, I also expect downstream states to face more acute internal security threats when dealing with resource conflicts over international rivers. These states have less control over water quantity and quality and are forced to deal with the negative effects of diminished and lower quality water supplies for their citizens.

My second hypothesis is that international river conflicts of higher importance to the countries involved will also put states at higher risk for intrastate violence. Rivers that flow through state's homeland territories will be more important than rivers that flow through colonial or other areas. Rivers that are used extensively for many resources (e.g. fishing) and for agricultural and energy production have the potential to generate more internal conflict. When countries depend more heavily on international rivers for water supplies, governments face higher risks for domestic conflict precisely because the potential for water-based grievances are more acute as the quantity and quality of water from international river basins diminishes.

Finally, I hypothesize that water quantity issues will have more severe security implications for governments than water quality or navigational issues. Excessive water quantity usage by upstream states by extraction, damming, and diversion projects can result in significant displacement of downstream populations along the river. The Syrian civil war is a good example, where the supply of water from the Tigris-Euphrates basin had declined for many years due to damming projects upstream; water supplies were further depleted during the period of severe drought. While water quality issues can also be problematic, downstream states can pay upstream users to engage in better practices, something that occurred in the Rhine River when the Netherlands invested to improve pollution practices by upstream businesses. Water quantity issues generally arise in water scarce regions like the Middle East and states are already using water at a rate beyond the natural replenishment of freshwater supplies. In these cases, states are more likely to experience domestic unrest because their dependence on water supplies outside state borders will put their regime at greater risk for water-based grievances.

Exploring the causal mechanisms between interstate river conflicts and intrastate conflict is a long term goal of this project. While we have some case studies that provide empirical

evidence of this linkage, we do not have a good understanding about whether these cases generalize to the broader population of river conflicts. This paper provides a first-cut for empirical analysis, looking at how interstate river claims influence various forms of domestic conflict. Future analyses will explore the mechanisms more carefully involving upstream/downstream distinctions and the connection between water issues and ethnic conflict.

Research Design

I begin this section by describing the datasets used to capture intrastate violence and then I describe the data for interstate conflicts over rivers and the control variables. All of the dependent variables are transformed to dummy variables where a value of one indicates at least one instance of a particular type of intrastate conflict (e.g. riots) in a given year and zero otherwise. See Table 2 for descriptive statistics for all variables.

Dependent Variables: Intrastate Conflict

The data on intrastate violence are taken from Arthur Banks' Cross-National Time-Series Data Archive (2011) and the UCDP/PRIO Armed Conflict Dataset.⁶ Banks' dataset records counts of intrastate violence in eight major forms based on newspaper reports (primarily from the *New York Times*): assassinations, general strikes, guerrilla warfare, major government crises, purges, riots, and anti-government demonstrations.⁷ Demonstrations and riots are the most

⁶ The 2011 Banks dataset was purchased by the Department of Political Science at the University of Iowa. I use Version 4-2012 of the UCDP/PRIO dataset covering the years 1946-2011, available at http://www.pcr.uu.se/research/ucdp/datasets/onset_of_intrastate_armed_conflict/.

⁷ This information comes from the codebook for the Banks dataset, p. 11. Assassinations involve "any politically motivated murder...of a high government official or politician". General strikes involve "1,000 or more...workers...aimed at national government policies or authority." Guerrilla warfare is "any armed activity, sabotage, or bombings carried out by independent bands or citizens or irregular forces and aimed at overthrow of the... regime". Major government crises are situations "that threaten(s) to bring the downfall of the present regime". Purges involve "any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition". Riots are "violent demonstration(s) or clash(es) of more than 100 citizens involving the use of physical force". Revolutions include "any illegal or forced change in the top government elite...or any

frequent forms of violence, while purges are the least frequent. I estimate separate logit models for each form of violence (in a dichotomous format) to see how interstate river conflicts influence different types of domestic conflict. I also include two measures from the UCDP/PRIO Armed Conflict dataset: 1) a dummy variable for incidences of intrastate conflict (in any years with active conflict and more than 25 battle deaths) and 2) a dummy variable to capture years in which conflict passes the 1,000 battle death civil war threshold. Armed conflict occurs in 13.8% of the state-years, while civil war occurs in 3.3% of the cases.

Independent Variables: Interstate River Claims

Many studies linking shared rivers and interstate conflict tend to code for the presence or absence of a shared river basin in a pair of states (a dyad) and then determine if sharing a river basin increases the risk of interstate militarized conflict or cooperation. The problem with this approach is that it is hard to disentangle the influence of shared river basins from land contiguity, given the high amount of overlap (Brochmann and Gleditsch 2010). A different approach is taken by the Issue Correlates of War (ICOW) Project (Hensel, Mitchell, Sowers, and Thyne 2008). The ICOW project identifies contentious *issue claims* based on explicit evidence of diplomatic contention involving official representatives of two or more states over a given issue. In this approach, some pairs of states sharing an interstate river have diplomatic conflicts over the basin, while other pairs of states do not. The focus on issue claims also allows for variation in conflict management; some river claims involve militarized disputes while others do not.

The ICOW project has collected data on three distinct contentious issues: territorial claims, maritime claims, and river claims. Given my theoretical focus, I include only *river claims* data in my analysis, which covers the years 1900-2001. The ICOW Project has made available

successful or unsuccessful armed rebellion whose aim is independence from the central government”. Anti-government demonstrations involve peaceful gatherings of at least 100 people in opposition to government policy or authority.

data for river claims in three regions: the Americas (North, Central, and South America and the Caribbean), the Middle East, and Western Europe. The ICOW Project looks for explicit contention between official representatives over the use or abuse of such rivers.

A river claim involves explicit contention between two or more states over the usage of an international river. Official representatives of the government of at least one state must make explicit demands over the quality or quantity of river water reaching their state through the territory of another state or over navigation rights on the river. Examples include demands to change policies -- or to enact new policies -- over the quantity of water flowing across the border (typically related to dams, irrigation, or other diversion projects), the quality of this water (typically related to pollution by industrial, agricultural, or human waste, or to excessive salination or sedimentation because of upstream activities), or the right to navigate along the river (typically for purposes of commerce or travel). (Hensel 2013: 2).

A list of all ICOW river claims for the three regions is presented in Table 1 (taken from Hensel, Mitchell, and Sowers 2006: 399-401). There are 28 dyadic river claims in the Western Hemisphere, 47 in the Middle East, and 7 in Western Europe.

The ICOW data is organized by claim-dyad-year and allows for the same pair of states to have more than one river claim at the same point in time. For example, Israel and Jordan have three ongoing river claims in 1989 involving the Jordan River, the Yarmuk River, and the East Ghor Canal. For this project, I am interested in analyzing the risk of intrastate violence and thus I utilize the state-year as my unit of analysis. As noted above, the data on intrastate violence are taken from Arthur Banks' Cross-National Time-Series Data Archive (2011). While the CNTS data covers all states from 1815-2010, I included only those countries in regions covered by the ICOW dataset. This includes countries with Correlates of War country codes 2-199 (Western Hemisphere), 200-265 (Western Europe), and 600-699 (Middle East). There are a total of 5,163 state year observations in these regions from 1900-2001 (the temporal span of the ICOW data). Given that the same pair of states can have more than one river claim in the same year, I need to aggregate the data in a way that allows for integration with the state-year dataset.

I generate a state-year dataset recording any instance where the state in question (e.g. Israel) was involved as a challenger or a target state in an ICOW river claim.⁸ I then count the total number of ongoing river claims for each country each year. Israel, for example, had no river claims in some years (e.g. 1948-1950) and as many as six river claims in other years (1964-1966). When considering all state-year cases (N=5,163), 80.57% of the cases have no interstate river claims, 13.11% have one river claim, 4.22% have two river claims, while the remaining cases have three to six river claims (2.09%). I expect higher values for the number of river claims to increase the likelihood of intrastate violence.

ICOW also records the *salience* of the contested river based on six indicators (Hensel, Mitchell, and Sowers 2006: 403): “(1) river location in the state’s homeland territory rather than in colonial or dependent territory, (2) navigational value of the river, (3) level of population served by the river, (4) the presence of a fishing or other resource extraction industry on the river, (5) hydroelectric power generation along the river, and (6) irrigational value of the river. Each factor contributes one score per state to the overall salience index, producing a dyadic measure that ranges from zero (lowest salience) to twelve (highest salience).” River claims involving higher salience levels are more likely to result in militarized conflict between the riparian states (Hensel 2001; Hensel, Mitchell, and Sowers 2006). In the state-year dataset, I record the highest river claim salience score for a state if it is involved in two or more river claims in the same year. In the three cases mentioned above involving Israel in 1989, the salience scores range from 4 (East Ghor Canal) to 5 (Yarmuk River) to 6 (Jordan River). Thus the state-year observation for the salience score comes from the Jordan River case in this instance. The highest salience variable values range from 4 to 11 in my dataset. States not involved in river

⁸ The challenger is the state that is challenging the status quo on the issue, while the target is the state that is defending the status quo on the issue. Future analyses may explore these differences, as citizens may be more likely to rally behind leaders to defend existing claims.

claims (80.57% of the observations) receive a zero on this variable. My expectation is that higher salience river claims will be more likely to result in civil conflict.

I also include several measures of the characteristics of river claims from the ICOW data in my analyses to discern which features of river conflicts are most likely to spill over into domestic conflict. This includes whether the river claim involves the following issues: water quantity, water quality, navigational rights, hydro-electric power generation, irrigation, and whether the river is used for resource extraction (e.g. fishing). Each of these variables can take on the values of 0 (no issue involved), 1 (potential future issue in the river basin), or 2 (current issue in the river basin). Navigation and irrigation are the most common issues involved in river claims, while water quality and hydro-electric power are the least common issues. I also control for the number of dams on the river which ranges from 0 to 9 in this dataset.

Independent Variables: Controls

To capture other factors that influence the potential for intrastate violence, I include three variables that are prominent in the civil war literature. First, I include a state's total population as recorded by the Correlates of War Project's National Material Capabilities dataset.⁹ Second, I include a state's iron and steel production using the same dataset. This measure is positively correlated with GDP per capita and has better temporal coverage.¹⁰ Third, I include a measure for a state's democracy score (0-10) from the Polity IV project. I also include democracy squared to capture the higher chances for civil conflict in the middle of the polity scale (Hegre et al

⁹ I use version 4.0 which is available at www.correlatesofwar.org. In separate analyses (not shown), I also use the natural logged population value in models and the results are similar to what is presented herein.

¹⁰ I also estimated models using the energy consumption measure from the COW dataset and the results (not shown) are similar to those presented herein. More observations are lost due to missing data on this alternative measure. While some historical sources for GDP data exist, they do not include the Middle East region, an important region in this particular analysis.

2001).¹¹ States with larger populations should be at higher risk for intrastate conflict, while states with high levels of iron and steel production should have lower conflict risks.

Empirical Results

I begin by analyzing the influence of the number of interstate river claims on the potential for various forms of intrastate violence. Countries with more frequent diplomatic issues over shared river resources face higher risks for domestic unrest because these issues can lead to forced migration, they can generate grievances among certain segments of the population, and they can increase populations in particular areas demanding more water. We see in Table 3 that states with higher numbers of interstate river claims experience a significantly higher risk for assassinations (Model 1), guerrilla warfare (Model 3), government crises (Model 4), purges (Model 5), riots (Model 6), demonstrations (Model 7), revolutions (Model 8), armed conflicts (25 or more deaths, Model 9), and civil wars (1000 or more deaths, Model 10). Table 6A shows the substantive effects of the number of river claims on the probability of each form of intrastate conflict, holding all other variables at their mean values. We can see that regional water diplomatic conflicts significantly raise the risk of intrastate conflict. Having a single claim over an interstate river (moving from 0 to 1) raises the probability of intrastate conflict by 5% (general strikes) to 48% (civil wars). Armed conflicts are 46% more likely, purges are 36% more likely, and government crises are 31% more likely when states experience just a single river interstate conflict. Countries who are embroiled in many simultaneous river claims, like Israel and Jordan, face even higher risks for intrastate violence. Raising the number of river claims from zero to six (maximum) increases the chances for civil wars by 829%, the chances for armed conflicts by

¹¹ I prefer to use the democracy scale rather than the polity scale which subtracts one ordinal scale (autocracy) from another (democracy). However, the results (not shown) are similar using an aggregated polity score.

475%, the chances for purges by 329%, and the chances for government crises by 261%. In short, regional water issues often create internal security problems for the countries involved.

In Table 4, I consider the highest issue salience value among any ongoing interstate river claims. Higher salience values reflect contested river basins that have more importance to the states involved due to important resources in the river, the navigational value of the river, and its importance for irrigation, fishing, or hydroelectric power. The results in Table 4 suggest that states with more salient river claims experience a significantly higher risk for assassinations (Model 1), guerrilla warfare (Model 3), government crises (Model 4), purges (Model 5), riots (Model 6), revolutions (Model 8), armed conflicts (Model 9), and civil wars (Model 10). In Table 6B, I report the predicted probabilities changing the highest salience score from 0 (minimum) to 4 to 7 to 11 (maximum). The most salient river claims raise the chances for purges by 172%, civil wars by 164%, armed conflicts by 98%, and government crises by 93%. This reflects the important water quantity, quality, resource, and navigational issues at stake in the most salient river claims.

In Table 5, I include several measures that capture the specific characteristics of interstate river claims. The characteristic that has the most consistent, positive effect on intrastate conflict is water quantity. Interstate river claims involving actual or potential water quantity issues increase the chances for assassinations (Model 1), general strikes (Model 2), government crises (Model 4), purges (Model 5), riots (Model 6), demonstrations (Model 7), revolutions (Model 8), and incidences of armed conflict (Model 9). Water quality is related only to riots (Model 6) and changes signs across the various models. Navigational issues increase the risks for government crises (Model 4), revolutions (Model 8), and armed conflict (Model 9). Hydroelectric power is not significantly related to any indicators from the Banks' dataset, but is positively and

significantly related to armed conflict and civil wars using the UCDP/PRIO data (Models 9 and 10). The same is true for irrigation issues, which have significant and negative effects only for the UCDP/PRIO variables. Whether a state extracts resources from the river has no effect on intrastate violence. The number of dams significantly reduces the chances for armed conflict (Model 9) and civil wars (Model 10). This represents one possible scenario for reducing states' internal security risks in the context of regional water disputes. Yet the conflict inducing findings for hydroelectric power suggest that not all damming strategies may be equally effective.¹²

As noted earlier, states in the Tigris-Euphrates river basins have experienced interstate conflict involving cross-border river resources. Syria and Turkey were involved in militarized interstate disputes in 1965, 1987, and 1989, and 1996-1998, with more recent conflict involving Turkish support for Syrian opposition groups. Syrian forces shot down a Turkish jet in June 2012 and Turkey increased its military capabilities along the Syrian border (Beck 2014: 7). Yet even in the midst of this situation, the two countries continued their cooperative effort to build the Orontes dam. While the level of interstate violence has been moderate, both countries have experienced significant amounts of civil violence since experience diplomatic disputes over their shared rivers from the 1960's forward. Syria witnessed 8 assassinations, 1 general strike, 15 government crises, 15 purges, 11 riots, 8 demonstrations, 16 revolutions, 5 armed conflicts, and one civil war year. Turkey has even higher levels of civil conflict, with 36 assassinations, 1 general strike, 31 government crises, 10 purges, 56 riots, 39 demonstrations, 24 revolutions, 27 armed conflicts, and 8 civil war years. While both states witnessed some violence prior to the onset of diplomatic river claims, they both experienced higher levels of violence in the era of cross-border river conflicts. Water resources are clearly not the only issues at stake in intrastate

¹² I am currently working to update the dam dataset using the World Register of Dams. This will allow me to provide a more accurate value for the number of dams along particular rivers and distinguish dams by their features such as size, water flow, and electricity generated.

conflicts, but scarcity of water supplies, especially those originating from transnational sources, can increase the risks of violence significantly.

Conclusion

This paper explores the relationship between interstate conflicts over rivers and intrastate violence. Using data from the Issue Correlates of War (ICOW) project on river claims, I examine if states that are involved in interstate river claims have higher chances for domestic conflict such as civil wars, riots, revolutions, and strikes. Empirical analyses of three regions (Western Hemisphere, Western Europe, and the Middle East) show a strong relationship between interstate diplomatic conflicts over shared rivers and domestic conflict. States with a larger number of conflicts over shared river basins also face more internal security threats. As the salience of the contested river(s) increases to states in the basin, this also increases the risks for any basin state to experience more internal violence. Conflicts over water quantity tend to have the largest effect on the likelihood of intrastate violence, while interstate cooperation over rivers (e.g. through dams) can have positive spillover effects and reduce the likelihood of intrastate violence. The paper shows that there are strong transnational effects of interstate water conflicts. Thus perhaps the predictions about water wars were accurate, but focused in the wrong arena. Interstate conflicts over rivers may create greater risks for civil wars than for interstate wars involving states in the river basin.

Future analyses will explore the causal mechanisms linking river basin conflicts and intrastate violence more carefully. In particular, I will explore whether the relationship is stronger for downstream states, more acute for countries that depend more heavily on external water supplies, and more problematic for countries where particular ethnic groups are displaced.

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Table 1: ICOW River Claims, 1816-2001

Primary (Secondary) River and Claim Description	Challenger - Target	Dates
North America		
St. Lawrence River (Niagara) Chicago Diversion	Canada - USA	1925 - 1932
Milk River (St. Mary's) St. Mary's Diversion	UK (Canada) - USA	1902 - 1909
Milk River Diversion	USA - UK (Canada)	1904 - 1909
Red River (Souris) Garrison Diversion	Canada - USA	1973 - 1986
	Canada - USA	1999 -
Red River (Souris-Sheyenne) Devil's Lake Diversion	Canada - USA	1997 -
Souris River Rafferty-Alameda Dam	Canada - USA	1989 - 1992
Columbia River (Kootenay-Frasier) Libby Dam	Canada - USA	1951 - 1961
Skagit River High Ross Dam	Canada - USA	1972 - 1984
Taku River Tulsequah Chief Mine	USA - Canada	1998 -
Colorado River Alamo Canal	Mexico - USA	1901 - 1904
Colorado Apportionment	Mexico - USA	1905 - 1944
Wellton-Mohawk Salinity	Mexico - USA	1961 - 1973
All-American Canal Sealing	Mexico - USA	1989 - 1999
Río Grande Upper Rio Grande	Mexico - USA	1900 - 1906
Lower Rio Grande	USA - Mexico	1924 - 1944
Mexican Water Release	USA - Mexico	2000 -
Central America and Caribbean		
San Juan River San Juan Navigation	Costa Rica - Nicaragua	1982 -
South America		
Napo River Petroecuador Oil Spill	Peru - Ecuador	1992 - 1992
Iguazú River Segredo Reservoir	Argentina - Brazil	1998 - 1998
Paraná River Itaipú Dam	Argentina - Brazil	1972 - 1979
Yacyreta Dam	Paraguay - Argentina	1973 - 1979

Paraguay River		
Río Paraguay Navigation	Paraguay - Argentina	1941 - 1967
Pilcomayo River		
Lower Pilcomayo Diversion	Paraguay - Argentina	1980 - 1983
Uruguay River (La Plata)		
Uruguay River Border	Argentina - Uruguay	1900 - 1973
Mauri River		
Mauri Irrigation Project	Bolivia - Chile	1921 - 1922
Lauca River		
Lauca Diversion	Bolivia - Chile	1939 - 1978
Silala River		
Silala Fees (Ductec)	Chile - Bolivia	1999 -
Western Europe		
Meuse River		
Albert Canal	Netherlands - Belgium	1930 - 1937
Rhine River		
German Hydroelectric Plan	Switzerland - Germany	1918 - 1918
Grand Canal d'Alsace	Switzerland- France	1919 - 1922
Alsace Salt Releases	Netherlands - France	1979 - 1982
Scheldt River		
Scheldt/Wielingen Navigation	Belgium - Netherlands	1919 - 1932
Segre River (Ariege-Carol)		
Lake Lanoux Diversion	Spain - France	1917 - 1967
Duero - Tejo - Guadiana Rivers		
National Hydrological Plan	Portugal - Spain	1993 - 2000
Middle East		
Jordan River		
Lake Huleh Diversion	Syria - Israel	1951 - 1951
	Jordan - Israel	1951 - 1953
DMZ Diversion	Syria - Israel	1953 - 1954
National Water Carrier	Lebanon - Israel	1956 - 1966
	Syria - Israel	1956 - 1958
	UAR (Syria) - Israel	1959 - 1961
	Syria - Israel	1961 - 1966
	Jordan - Israel	1956 - 1966
Sewage Dumping	Jordan - Israel	1989 - 1989
West Bank Allocation	Jordan - Israel	1989 - 1989
Hasbani-Baniyas (Jordan)		
Jordan Headwaters Diversion	Israel - Lebanon	1964 - 1966
	Israel - Syria	1964 - 1966
	Israel - Jordan	1964 - 1966
Hasbani River (Jordan)		
Wazzani Pipe	Israel - Lebanon	2001 - 2001

Yarmuk River (Jordan)		
Bunger Plan	Israel - Syria	1953 - 1956
	Israel - Jordan	1953 - 1956
Unity Dam	Israel - Syria	1987 - 1998
	Israel - Jordan	1987 - 1998
East Ghor Canal (Yarmuk/Jordan)		
East Ghor Canal	Israel - Jordan	1969 - 1969
	Jordan - Israel	1976 - 1994
	Israel - Jordan	1999 - 1999
Yarmuk River		
Yarmuk Diversions	Jordan - Syria	1987 - 1987
	Jordan - Syria	1992 - 1998
Golan Heights Dam	Syria - Israel	1997 - 1998
	Jordan - Israel	1997 - 1998
Mafraq Spill	Syria - Jordan	2000 - 2000
Euphrates River		
Absolute Sovereignty	Syria - Turkey	1964 -
Keban Dam	Syria - Turkey	1964 - 1966
Tabqa (Thawrah) Dam	Iraq - Syria	1975 - 1975
Lake Assad	Syria - Turkey	1983 - 1983
Ataturk Dam	Syria - Turkey	1984 - 1990
	Iraq - Turkey	1990 - 1990
Karakaya Dam	Syria - Turkey	1986 - 1986
Iraqi Allocation	Iraq - Syria	1988 - 1990
Birecik Dam	Iraq - Turkey	1993 -
	Syria - Turkey	1995 -
Tigris/Euphrates Rivers		
Iraqi Allocation	Iraq - Turkey	1988 -
Tigris River		
Ilisu Dam	Iraq - Turkey	1999 -
Shatt al-Arab		
Thalweg & Navigation	Iran - UK (Iraq)	1921 - 1932
	Iran - Iraq	1932 - 1937
	Iran - Iraq	1953 - 1954
	Iraq - Iran	1958 - 1975
	Iran - Iraq	1959 - 1975
	Iraq - Iran	1979 - 1990
Orontes River		
Syrian Dam Plan	Turkey - Syria	1956 - 1958
	Turkey - UAR (Syria)	1958 - 1961
	Turkey - Syria	1961 -

Table 2: Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Assassinations	4544	.1133363	.3170383	0	1
General Strikes	4544	.1089349	.3115918	0	1
Guerrilla War	4544	.1439261	.3510534	0	1
Gov't Crises	4544	.1674736	.3734393	0	1
Purges	4544	.1060739	.3079661	0	1
Riots	4543	.2044904	.4033732	0	1
Demonstrations	4545	.2180418	.4129614	0	1
Revolutions	4543	.1470394	.3541842	0	1
Armed Conflict	3516	.1379408	.3448869	0	1
UCDP Civil War	3516	.0327076	.1778956	0	1
# River Claims	5163	.293434	.7235518	0	6
High Saliency	5163	1.396572	2.983399	0	11
Water Quantity	5163	.1766415	.5047053	0	2
Water Quality	5163	.0486151	.260687	0	2
Navigation	5163	.2200271	.5845832	0	2
Hydro-power	5163	.0507457	.2928519	0	2
Irrigation	5163	.1927174	.5506585	0	2
Resources	5163	.1733488	.4748321	0	2
Number of Dams	5163	.1628898	.9861507	0	9
Democracy	4372	4.297347	4.163592	0	10
Democracy ²	4372	35.79872	41.17065	0	100
Population	4791	17362.37	32990.22	29	301621
Iron & Steel	4773	3766.634	13027.58	0	136804

Table 3: Effect of Interstate River Claims (Number) on Intrastate Violence

Variable	Model 1 Assassinations	Model 2 General Strikes	Model 3 Guerrilla Warfare	Model 4 Gov't Crises	Model 5 Purges
# River Claims	0.12 (0.06)*	0.05 (0.06)	0.17 (0.05)**	0.32 (0.05)**	0.34 (0.05)**
Population	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)
Iron & Steel	-0.00 (0.00)	-0.00 (0.00)**	-0.00 (0.00)*	-0.00 (0.00)*	-0.00 (0.00)
Democracy	0.53 (0.05)**	0.52 (0.06)**	0.34 (0.05)**	0.41 (0.05)**	0.26 (0.06)**
Democracy ²	-0.05 (.01)**	-0.04 (.01)**	-0.04 (.01)**	-0.04 (.00)**	-0.05 (.01)**
Constant	-2.61 (0.10)**	-3.02 (0.11)**	-1.96 (0.08)**	-2.18 (0.08)**	-1.89 (0.08)**
Sample Size	3,668	3,668	3,668	3,668	3,668
Chi-square	143.52**	166.98**	98.10**	150.77**	191.91**

Table 3: Effect of Interstate River Claims (Number) on Intrastate Violence (continued)

Variable	Model 6 Riots	Model 7 Demonstrations	Model 8 Revolutions	Model 9 Armed Conflict	Model 10 Civil War
# River Claims	0.21 (0.05)**	0.10 (0.05)*	0.21 (0.05)**	0.44 (0.05)**	0.41 (0.08)**
Population	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**
Iron & Steel	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)**	-0.00 (0.00)**	-0.00 (0.00)*
Democracy	0.39 (0.04)**	0.38 (0.04)**	0.35 (0.05)**	0.17 (0.06)**	0.28 (0.12)*
Democracy ²	-0.04 (.00)**	-0.03 (.00)**	-0.05 (.01)**	-0.01 (.00)*	-0.04 (.01)**
Constant	-1.83 (0.07)**	-2.16 (0.08)**	-1.77 (0.08)**	-2.46 (0.10)**	-3.80 (0.18)**
Sample Size	3,667	3,669	3,667	3,010	3,010
Chi-square	168.23**	398.10**	190.51**	164.98**	51.72**

Entries are coefficients followed by standard errors; * p<.05, ** p<.01

Table 4: Effect of Interstate River Claims (Highest Salience) on Intrastate Violence

Variable	Model 1 Assassinations	Model 2 General Strikes	Model 3 Guerrilla Warfare	Model 4 Gov't Crises	Model 5 Purges
Highest Salience	0.04 (0.02)*	0.03 (0.02)	0.04 (0.01)**	0.08 (0.01)**	0.11 (0.01)**
Population	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)	0.00 (0.00)
Iron & Steel	-0.00 (0.00)	-0.00 (0.00)**	-0.00 (0.00)**	-0.00 (0.00)*	-0.00 (0.00)
Democracy	0.52 (0.05)**	0.52 (0.06)**	0.33 (0.05)**	0.40 (0.05)**	0.23 (0.06)**
Democracy ²	-0.05 (.01)**	-0.04 (.01)**	-0.04 (.01)**	-0.03 (.00)**	-0.04 (.01)**
Constant	-2.62 (0.10)**	-3.04 (0.12)**	-1.97 (0.08)**	-2.18 (0.08)**	-1.92 (0.08)**
Sample Size	3,668	3,668	3,668	3,668	3,668
Chi-square	145.16**	168.99**	97.49**	141.90**	203.42**

Table 4: Effect of Interstate River Claims (Highest Salience) on Intrastate Violence (continued)

Variable	Model 6 Riots	Model 7 Demonstrations	Model 8 Revolutions	Model 9 Armed Conflict	Model 10 Civil War
Highest Salience	0.06 (0.01)**	0.02 (0.01)	0.05 (0.01)**	0.07 (0.02)**	0.09 (0.03)**
Population	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**
Iron & Steel	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)**	-0.00 (0.00)**	-0.00 (0.00)*
Democracy	0.37 (0.04)**	0.38 (0.04)**	0.34 (0.05)**	0.15 (0.06)**	0.26 (0.11)*
Democracy ²	-0.04 (.00)**	-0.03 (.00)**	-0.04 (.01)**	-0.01 (.00)*	-0.03 (.01)**
Constant	-1.85 (0.07)**	-2.16 (0.08)**	-1.77 (0.08)**	-2.38 (0.10)**	-3.74 (0.18)**
Sample Size	3,667	3,669	3,667	3,010	3,010
Chi-square	171.54**	396.06**	189.04**	117.21**	41.43**

Entries are coefficients followed by standard errors; * p<.05, ** p<.01

Table 5: Effect of Interstate River Claims Characteristics on Intrastate Violence

Variable	Model 1 Assassinations	Model 2 General Strikes	Model 3 Guerrilla Warfare	Model 4 Gov't Crises	Model 5 Purges
Water Quantity	0.28 (0.11)*	0.38 (0.11)**	0.15 (0.10)	0.55 (0.09)**	0.53 (0.11)**
Water Quality	-0.29 (0.20)	0.18 (0.19)	0.03 (0.17)	0.19 (0.16)	-0.02 (0.18)
Navigational Issues	0.03 (0.18)	0.20 (0.17)	0.09 (0.15)	0.30 (0.14)*	0.08 (0.18)
Hydroelectric Power	-0.01 (0.28)	-0.33 (0.35)	0.37 (0.27)	-0.47 (0.29)	-0.63 (0.35)
Irrigation Issues	0.19 (0.15)	0.08 (0.15)	-0.12 (0.13)	0.08 (0.12)	0.23 (0.15)
Resources Extracted	-0.10 (0.26)	-0.31 (0.24)	0.19 (0.22)	-0.26 (0.19)	0.18 (0.27)
Number of Dams	-0.06 (0.09)	-0.26 (0.14)	-0.11 (0.09)	-0.17 (0.10)	-0.15 (0.13)
Population	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)	0.00 (0.00)
Iron & Steel	-0.00 (0.00)	-0.00 (0.00)*	-0.00 (0.00)*	-0.00 (0.00)	-0.00 (0.00)
Democracy	0.52 (0.05)**	0.52 (0.06)**	0.34 (0.05)**	0.41 (0.05)**	0.22 (0.06)**
Democracy ²	-0.05 (.01)**	-0.04 (.01)**	-0.04 (.01)**	-0.03 (.00)**	-0.04 (.01)**
Constant	-2.61 (0.10)**	-3.08 (0.12)**	-1.97 (0.08)**	-2.20 (0.09)**	-1.92 (0.08)**
Sample Size	3,668	3,668	3,668	3,668	3,668
Chi-square	156.67**	199.21**	101.19**	181.36**	203.42**

Entries are coefficients followed by standard errors; * p<.05, ** p<.01

Table 5: Effect of Interstate River Claims Characteristics on Intrastate Violence (continued)

Variable	Model 6 Riots	Model 7 Demonstrations	Model 8 Revolutions	Model 9 Armed Conflict	Model 10 Civil War
Water Quantity	0.48 (0.09)**	0.38 (0.10)**	0.34 (0.11)**	0.50 (0.12)**	0.11 (0.30)
Water Quality	0.40 (0.14)**	0.05 (0.15)	-0.19 (0.19)	-0.47 (0.23)*	-0.94 (0.69)
Navigational Issues	0.18 (0.13)	0.18 (0.13)	0.38 (0.15)*	0.74 (0.15)**	0.51 (0.30)
Hydroelectric Power	-1.06 (0.27)**	-0.37 (0.26)	-0.05 (0.30)	1.41 (0.36)**	2.73 (0.73)**
Irrigation Issues	0.20 (0.11)	0.04 (0.12)	0.01 (0.15)	-0.74 (0.20)**	-1.15 (0.44)**
Resources Extracted	-0.25 (0.19)	-0.32 (0.19)	-0.36 (0.26)	-0.38 (0.25)	0.26 (0.55)
Number of Dams	-0.01 (0.08)	-0.09 (0.08)	0.04 (0.11)	-0.28 (0.12)*	-0.55 (0.26)*
Population	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)*
Iron & Steel	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)**	-0.00 (0.00)**	-0.00 (0.00)
Democracy	0.38 (0.04)**	0.38 (0.05)**	0.36 (0.05)**	0.19 (0.06)**	0.35 (0.12)**
Democracy ²	-0.04 (.00)**	-0.03 (.00)**	-0.05 (.01)**	-0.02 (.01)*	-0.04 (.01)**
Constant	-1.85 (0.07)**	-2.18 (0.08)**	-1.79 (0.08)**	-2.40 (0.10)**	-3.66 (0.18)**
Sample Size	3,667	3,669	3,667	3,010	3,010
Chi-square	234.56**	425.36**	198.78**	172.13**	73.78**

Entries are coefficients followed by standard errors; * p<.05, ** p<.01

Table 6A: Substantive Effects for Interstate River Claims (Number)¹³

Dependent Variable	Number of Interstate River Claims							% increase
	0	1	2	3	4	5	6	
Assassinations	0.108	0.120	0.132	0.146	0.162	0.178	0.195	81%
General strikes	0.102	0.107	0.112	0.117	0.122	0.128	0.133	30%
Guerrilla warfare	0.143	0.164	0.189	0.216	0.246	0.279	0.314	120%
Government crises	0.154	0.201	0.257	0.323	0.397	0.476	0.556	261%
Purges	0.087	0.118	0.159	0.210	0.273	0.347	0.428	392%
Riots	0.204	0.241	0.282	0.327	0.376	0.428	0.481	136%
Demonstrations	0.215	0.232	0.251	0.270	0.290	0.311	0.333	55%
Revolutions	0.122	0.147	0.176	0.209	0.247	0.289	0.334	174%
Armed conflicts	0.109	0.159	0.226	0.312	0.412	0.521	0.627	475%
Civil wars	0.021	0.031	0.046	0.067	0.097	0.139	0.195	829%

Table 6B: Substantive Effects for Interstate River Claims (Highest Salience)

Dependent Variable	Highest Salience Value				% increase
	0	4	7	11	
Assassinations	0.106	0.121	0.132	0.150	42%
General strikes	0.100	0.109	0.117	0.128	28%
Guerrilla warfare	0.141	0.164	0.182	0.209	48%
Government crises	0.153	0.197	0.235	0.295	93%
Purges	0.082	0.120	0.158	0.223	172%
Riots	0.200	0.241	0.276	0.327	64%
Demonstrations	0.216	0.228	0.238	0.251	16%
Revolutions	0.122	0.146	0.168	0.199	63%
Armed conflicts	0.116	0.150	0.181	0.230	98%
Civil wars	0.022	0.031	0.041	0.058	164%

¹³ Values are predicted probabilities calculated with the MFX command in STATA setting all control variables in Tables 3 and 4 at their mean while varying number of river claims (6A) or highest salience level (6B). % increase represents the change in probability from minimum to maximum value.