A Study of Conflict and Cooperation in the Mekong River Basin: How Issues and Scale Matter

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Introduction

Transboundary rivers are paramount to the survival of a significant portion of the world's population. They provide water for drinking and industrial processes, transportation routes, hydropower, irrigation supplies, species habitat, and fisheries production. The quality and availability of these resources also can affect public health (e.g. through water borne disease), and pose risks to communities and critical infrastructure (e.g. through floods or droughts). The challenges of maintaining the supply and health of transboundary rivers and the challenges of deciding how to allocate transboundary water among the countries and sectors, can lead to political tensions - or hydropolitics.

According to Elhance (2000), the complexity of hydropolitics makes it one of the most challenging arenas of international interaction in some regions of the world. Fears of increasing hydropolitical tensions across international river basins has led to some scholars' concern about military conflict over water (e.g. Gleick, 1993, 2008; Homer-Dixon, 1999: Klare, 2001). At the same time, the importance of water to the health and growth of human populations has also been seen as an incentive for countries to address their shared problems cooperatively and peacefully. Moreover, scholars studying the politics of transboundary rivers increasingly have recognized that in interactions over shared rivers, states engage in both conflictual and cooperative behavior, and the two often are closely intertwined (Dinar, 2008; Zawahri and Gerlak, 2009).

Given the importance of transboundary rivers for societies, economies and the environment, it is important to understand the conditions under which hydropolitics result in untenable political outcomes, such as militarized disputes, versus more cooperative outcomes, such as international agreements. This importance is underscored by the changing and emerging nature of the issues that affect water management. Coupled with the existing and growing demand for fresh water resulting from expanding populations and economic development, changes in the availability of fresh water could have serious and possibly devastating implications for agricultural production, economic development, the environment, human health, population growth, and power generation (Vivekanandan and Nair, 2009; Kundewicz, 2008). Demands for water are beginning to outstrip supply in some places, existing water sources are becoming unusable due to pollution or overuse, and global climate change appears likely to alter seasonal river flow patterns and to produce more extreme weather conditions, droughts, and floods (for example, Falkenmark, Berntell, Jägerskog, Lundqvist, Matz, and Tropp, 2007; UN-Water, 2008; WWAP, 2012). While these types of water management challenges and issues are widely recognized as playing an important role in hydropolitics, few scholars are systematically exploring how the nature of these issues or different types of issues relate to conflict or cooperation over water.

At the same time, some research in the field of hydropolitics has begun to question whether the literature should pay closer attention to domestic politics over water,

particularly as they relate to or compare with international hydropolitics. To date, little research has explored whether we are seeing more or less conflict and cooperation at international and domestic scales, or whether different types of issues might be associated with conflict or cooperation at domestic versus international scales.

To address these gaps in the literature, this paper asks: 1) *How do water management issues relate to the levels of conflict or cooperation*?; 2) *Are there differences in levels of conflict or cooperation at international versus domestic scales*?; and 3) *Are there differences in the issues associated with conflict versus cooperation at domestic versus international scales*? We explore these questions within the context of the Mekong River basin, using data on events between 1950 and 2013, at the international and the domestic scale. Although we cannot generalize the findings from the Mekong case to other basins worldwide, it does provide a valuable test case for preliminary propositions, which we present in our review of the literature. Additionally, the significance of the Mekong Basin for millions of people and multiple countries in Asia, as we describe in more detail in the following section, make it an important case, in and of itself, to study questions of hydropolitics.

The Mekong River Basin: Historic Cooperation and Emerging Pressures

The Mekong River Basin, depicted in Figure 1 below, originates in the Chinese Tibetan plateau and crosses the boundaries of five other riparian states – Myanmar, Thailand, Laos, Cambodia, and Vietnam – before draining into the South China Sea. As the river flows through Cambodia, Laos, Thailand, and Viet Nam, the Lower Mekong remains one of the world's last great stretches of undammed rivers (The Economist, 2004; Grumbine et al., 2012). It provides the more than 70 million people living the Lower and Upper stretches of the river a range of benefits, like drinking water, fisheries, biodiversity hotspots, agricultural irrigation, and industrial uses (MRC, 2011).

The Mekong Region is undergoing rapid transitions socially, economically, and environmentally (Keskinen, 2008; Keskinen et al., 2012a; Keskinen et al., 2012b). The basin has become increasingly vulnerable to various physical and human-induced stressors, including variability in the size and timing of the flood pulse, hydropower development, and climate change. In particular, climate change and hydropower power development pose challenges to cooperation in the basin. Ever shifting interactions among different water uses—such as hydropower, irrigation, and fisheries—are thought to be major challenges for water resource management and interact strongly with climate-induced changes (Costa- Cabral et al., 2007).

Figure 1: The Mekong River Basin

Climate change research suggests that seasonal water shortages and extreme flooding may be exacerbated in the basin (Hoanh et al., 2003, Snidvongs et al., 2003, Chinvanno, 2004; Kiem et al., 2008; Eastham et al. 2008). More precipitation in the wet season, together with snow melt from the Himalayas, could increase the overall runoff of the river and thus flood risks for riparian communities (especially in Laos, Cambodia, and Viet Nam). Decreasing dry season run-off, on the other hand, may negatively influence irrigated agriculture and threaten the Vietnamese delta due to an increase in saltwater intrusion. Whether the overall consequences of climate change will bring losses or benefits to the basin and how these will be distributed across riparian states is still unknown. Nonetheless, the anticipated changes to climate and the flow of the Mekong are expected to affect agriculture and food production in the region (Hoanh et al., 2003, Snidvongs and Teng, 2006, Eastham et al., 2008).

Hydropower development is an emerging stress in the basin. In the Lower Basin, there are currently twenty-five operational hydropower dams and an additional ninety-nine tributary hydropower projects at various stages of exploration in the Lower Mekong Basin (ICEM, 2010a; MRC, 2010). Most Mekong tributaries have cascades of dams either already in place or planned for completion by 2030 (ICEM, 2010a). The blocking of migration routes by dams on the mainstream of the Mekong may cause major damage to fisheries (Barlow et al., 2008), by both creating physical barriers to migration and by degrading and destroying fish habitats (Sarkkula et al., 2009). The strategic environmental assessment of hydropower on the Mekong concluded that the main stem projects would have significantly negative net impacts on both fisheries and agricultural sectors (ICEM, 2010b). A reduced fish catch will place heightened demands on the resources necessary to replace lost protein and calories (Orr et al., 2012). Hydropower dams in the lower Mekong are thought to

harm ecosystems and threaten food security across the basin (Duga et al., 2010; Stone, 2011; Grumbine and Xu, 2011). Generally, at least in the short term, the cumulative impacts of infrastructure on flow regimes are thought to be much larger than those arising from climate change (Keskinen et al., 2010).

International institutional arrangements in the Mekong have existed since the 1950s, and the Mekong River Commission (MRC) has been regarded as relatively successful in mitigating conflicts and maintaining cooperation in the basin (Jacobs, 2002; Ha, 2011; Macquarrie et al., 2008; Yun, 2010). The MRC has been seen as a hub for information and knowledge generation, and the institution to link regional and national development in the basin (Lauridsen, 2004). Recent research suggests that the MRC demonstrates some adaptive capacity to deal with these stressors (Heikkila et al., 2012).

In looking at the history of international institution building and conflict in the Mekong, Stahl (2006) has found that interstate political interactions around water water have been relatively cooperative over time. Other studies have also suggested that interstate tensions can be mitigated in the basin, citing some combination of 'the complex interdependencies that exist among the Mekong countries' (Hirsch, 2004; Ravnborg, 2004; Macquarrie et al., 2008; Keskinen et al., 2008; Yun, 2010; Pearse-Smith, 2012). Kirby et al. (2010) similarly argue that the tensions of hydropower development and climate change are unlikely to be principal drivers of international conflict in the Mekong.

However, some research underscores fears of increasing hydropolitical tensions that may lead to war between Mekong nations (Macan-Markar, 2009; Hoyle, 2010; Mony, 2011; Gleick, 2010). The Mekong Basin has even been suggested as 'Asia's new battleground' (Chellaney, 2011). Tensions between dam development and fisheries and local communities have been increasing in recent years (Sneddon and Fox, 2006; Foran and Manoram, 2009, Friend, 2009; Friend et al., 2009; Lawrence, 2009).

Conflict and Cooperation in Transboundary River Basins: A Turn toward Issues

The literature on conflict and cooperation in international river basins is robust and growing. Some of this literature has focused on examining the extent to which we see conflict versus cooperation within international river basins. Although Wolf and other scholars conclude that shared water resources are more likely to be associated with interstate cooperation, rather than conflict (Wolf, 1999; Nicol, 2003; Wolf et al., 2003; MacQuarrie et al., 2008; Wolf, 2007), empirical analyses also have identified a significant number of low-level conflicts in international basins (e.g. Toset et. al., 2000; Gleditsch et al., 2006; Brochmann and Gleditsch, 2006; Brochmann and Hensel, 2007).

The literature also has investigated particular factors associated with higher levels of conflict versus cooperation in international river basins. One of the more widely accepted empirical findings across the literature is that the presence of institutions within a basin can assist to mitigate the potential for conflict (Wolf et al., 2003; Yoffe et al., 2003; Giordano et al., 2005). River-specific institutions have been found to reduce militarized conflict and increase the effectiveness of peaceful settlement attempts (Hensel et al., 2006). Research has found that while the existence of an international water agreement may not necessarily prevent the emergence of country grievances, these often result in negotiations or peaceful management when an agreement already governs the basin (Brochmann and Hensel, 2009). Additionally, research finds that provisions within international agreements to deal with water variability can help to reduce tensions that may arise during extreme climatic events by providing riparian countries with mechanisms suited to facing climate uncertainty (Wolf et. al., 2003, Odom and Wolf, 2008, Fischhendler, 2004; De Stefano et al., 2012).

Some of the literature that has focused on the role of institutions in water conflict and cooperation also has touched on, at least implicitly, how water management issues relate to conflict and cooperation. For instance, some studies recognize that a cause of escalated tensions in international river basins can be a change in resource environments that outpaces the capacity of existing institutions to deal with that change (Wolf, 2001; Yoffe et al., 2003; Wolf et al., 2003). Rapid changes that can take place in a basin can include the creation of new riparian nations, or 'the development of a large-scale dam or diversion project' (Wolf, 2001: 10). As Pearse-Smith (2012: 152) has argued, in basins like the Mekong, "Large-scale hydro-development projects can therefore be expected to create proportionately larger and more intense disagreements and tensions."

Other scholars have explored the nature of issues in water conflicts and cooperation in international basins more directly. Water scarcity, in particular, has featured prominently as a key issue in efforts to explain conflict and cooperation. While some studies have suggested that insufficient access to water can lead to conflict between states (Gleick, 1993; Postel and Wolf, 2002; Selby, 2005; Hensel et al., 2006), others conclude that water scarcity does not necessarily drive conflict (Furlong et al., 2006; Gleditsch et al., 2006). More recently, Brochman and Hensel (2009) argue that water scarcity may incentivize either conflict or cooperation in an international basin – with cooperation emerging in water scarce regions because of the critical importance of peacefully managing limited supplies. This finding fits with Dinar's (2009) argument that the relationship between water scarcity and levels of conflict and cooperation follows a u-shaped curve. That is, a certain level of scarcity may incentivize cooperation, but as scarcity increases the benefits of cooperation may diminish and lead to more conflict. Although Tir & Stinnett (2012) more recently find that the risk of conflict in the face of scarcity is reduced when international institutions are in place in interstate river basins.

Beyond water scarcity issues, Hensel et al. (2008) have argued that a more extensive

"issues based approach" is often lacking in research on international conflicts and cooperation. Their research has sought to categorize issues in a way that allows for more generalizable explanations of how issues matter by folding them into types or levels of salience. Heikkila and Schlager (2012), in studying how water conflict issues at the domestic scale relate to conflict resolution forums, have also argued that it is valuable to organize issues within a theoretically grounded typology in order to develop hypotheses that would explain the relationship between issues and outcomes. Further, Heikkila et al. (2013) have also argued that the nature of issues that act as stressors on water resources in an international basin -- namely the level of uncertainty and visibility of issues -- can influence the extent to which an international institution is capable of adapting to those issues.

One type of issue that has been recognized as important in the literature on water and other environmental conflicts is "distributional" issues (Brochman and Hensel, 2011; Heikkila and Schlager, 2012). Distributional issues are those that affect who gets what, how much, when and of what quality (Burgess, 2004). Distributional issues are also about actions taken on the river by one state that may lead to externalities or harm to others (Barrett, 2003). Some scholars have argued that distributional issues can be difficult to overcome even when states are engaged in negotiation, or cooperation (Morrow, 1994; Brochman and Hensel, 2011). Similarly, the environmental conflict resolution literature in the United States has argued that these issues can be particularly challenging to resolve (Campbell, 2003; Lewicki et al., 2003).

Non-distributional issues, on the other hand would be those concerns or water management challenges that do not impose clear winners and losers, significant externalities, or upstream-downstream effects in watersheds. These are often associated with public goods type issues such as the need for information or the maintenance of navigation or flood control infrastructure. Yet in the context of international river basins, few studies have considered whether or how distributional issues, relative to non-distributional issues are related to conflicts and cooperation. Our first proposition is that distributional issues will be associated with higher levels of conflict in transboundary watersheds (Proposition 1a), while non-distributional issues will be associated with higher levels of cooperation (Proposition 1b).

In addition to the question of how the nature of water management issues relate to international water conflict and cooperation, the literature has not paid significant attention to exploring questions of how scale matters in water conflict and cooperation. Pearse-Smith (2012) and Hirsch (2004) maintain that in focusing too squarely on water conflict at the interstate level, scholars are neglecting many more intense conflicts playing out at the intrastate level. Others have emphasized that water conflicts and cooperation take place in multi-level contexts, which are often ignored in the transboundary literature (Warner and Zahwari, 2012).

Additionally the lack of attention to sub-national scales within the literature means that the theory or hypotheses put forth about the factors that are related to water conflict and cooperation have not been tested or explored adequately outside of the international context. Therefore, understanding 1) whether events in international river basins are more conflictual or cooperative than intrastate water events, and 2) whether similar issues are related to conflict and cooperation at the intrastate (versus interstate) can help further advance the literature.

In looking to the broader literature for guidance on the first question, two competing propositions emerge. Given the research that has found that the presence of international institutions can mitigate conflict (or enhance cooperation) at the international scale, one proposition (Proposition 2a) would be that lower levels of conflict would be found at the international level when basins have agreements, relative to the domestic scales in those basins.

A competing proposition (Proposition 2b), however, would be that given the complexity and diversity of actors, issues, and interests at international scales, that we would see less conflict domestically within a basin than at the international scale. The complexity of conflicts has been associated with more intractable conflicts in the environmental conflict resolution literature (Campbell, 2003). Additionally, the literature on transboundary water relations has long assumed that the international scale can lead to significant conflicts, particularly when power asymmetries or a history of conflict outside of the water sector are present in a basin.

Finally, with respect to the question of how the issues associated with conflict and cooperation differ between the international and domestic scales, we have a paucity of literature guiding us. However, we might expect that similar to international scales, distributional issues are likely to be associated with higher levels of conflict versus cooperation. Yet, we might expect to see a lower magnitude of the relationship between distributional issues and conflict in domestic scales (Proposition 3), under the assumption that levels of conflict may be exacerbated once elevated to the international scale.

Research Design

The data we use were collected as part of the "Basins at Risk" project at Oregon State University. The dataset includes events that were identified in the Mekong River basin between 1950 and 2013 both at the international scale, and at the domestic scale, in the Upper Mekong in China.[1] An event is defined as any action or decision related to the use, allocation, management or sharing of water in the basin. Data come from publicly recorded media sources identified through Lexis Nexis (and other databases). An obvious limitation of these data sources is that they only

[1] Information on the Basins at Risk project and on the methodology are made available at: http://www.transboundarywaters.orst.edu/research/basins_at_risk/

capture events recorded in English or in major international media sources. This means the dataset may not include the full population of events related to water in the basin. Arguably, however, events that emerge in international and English speaking media may be thought of as the population of highly "visible" events. The codebook also includes an event summary and the source of information on the event.

The information on each event is then coded using the Basins at Risk coding protocol. The protocol includes a measure of the event's level of conflict or cooperation, which runs along a -7 to +7 "Basins at Risk" (BAR) scale. (Definitions of the types of events for each point in the scale are provided in Table A1 in the Appendix.) This BAR-scale provides the measure for the dependent variable in our analyses – which is *the level of conflict or cooperation identified in an event*, with the "event" as the unit of analysis.

The coding protocol also provides a way to measure the main explanatory variable for this analysis, which is *the "issue" that the event deals with*. Like the BAR-scale, the types of water management issues (e.g. water quality, quantity, navigation, technical issues, fisheries, etc.) are defined (see Table A2 in the Appendix) and coders identified the primary issue, and any secondary issue if relevant, for each event. Each issue was also then categorized as distributional or non-distributional after the initial coding of the events was conducted. The distributional issues included water quality, water quantity, and hydropower issues. The non-distributional issues included navigation, flooding, joint management of water resources, technical advice, irrigation, fisheries, and border security.[2]

In addition to the issues, the coding protocol includes codes for the date of the event, the number of countries and actor names participating. For our analysis of how the issues relate to the level of conflict or cooperation, we included *the number of countries* and the *year of the conflict* as controls. Arguably the number of countries at the international scale can add complexity to the issues and can add to the difficulty of cooperation.[3] The year of the event can help control for the potential for states or actors to "learn" over time and become more cooperative, or potentially can capture variance that might be explained by unforeseen acts or events that occurred in a given year (e.g. a severe drought). Finally, as a proxy for the wet and dry season in the Mekong, we used the month of the event to create a dummy variable for the "*dry season*" (between November and April), under the assumption

[2] These issue categories were used for other studies in the Basins at Risk project, but the classification according to "distributional" or "non-distribution" issue types was done for the purposes of this particular study. The only modification made to the issue categories in this study was to re-name the "border" category as "border security". All events related to border issues in this dataset deal with security issues and not territory issues. That clarification made it more logical to place these issues under the "non-distributional" issue category. Border issues that would relate to territory, however, would logically be placed in the distributional category.

[3] We did not include this variable in the domestic scale analysis.

that potentially either low flows in the dry season, or perhaps even high flows in the wet season, may trigger more conflict or cooperation.

Analyses and Results

To analyze the data, we ran three separate ordered logit models regressing the BAR-Scale (as the dependent variable) on the issue variables (as dummies) and controls. The first model includes data from both the international and domestic events, and includes a dummy variable for the upper Mekong/domestic events. The second model includes just international events and the third model includes only the domestic events in the Upper Mekong in China. Ordered logit was chosen because the dependent variable is not continuous and does not assume equal variance between the categories on the scale. The coding on the scale is based on a defined category or type of event, with an underlying logic of the degree of "conflict" or "cooperation" associated with these different types of events.

The ordered logit models were also compared to simple OLS models and the results, including the magnitude of the coefficients and direction of signs were all similar.[4] Standard diagnostic tests for functional form, multi-collinearity, and outliers were also conducted.[5] The descriptive statistics summarizing the international and domestic cases, presented in our Appendix in Table A3, also show that the fishing issue was found in two international and zero domestic events, while the irrigation issue was coded in only one event internationally. As a result, these issues were excluded from all of the logit analyses. In the domestic events, we also excluded other issue variables with two or fewer observations (flood control, technical and economic/infrastructure development, border issues).

The results for the logit models, as shown in Table 1 below, provide some support for the propositions, but also reveal some unexpected findings. Among the three variables representing distributional issue types, hydropower is the only significant variable, and in the expected negative direction (per Proposition 1a), across all models. These results indicate that events where hydropower issues are involved are associated with higher levels of conflict. At the same time, the water quantity variable is significant and in the expected negative direction in the domestic model, suggesting that events where water quantity is involved are associated with higher levels of conflict in the domestic context.

With the non-distributional issues, most are in the expected positive direction according to Proposition 1b. Further, the majority of non-distributional issues are significant, except joint management and floods in the models that include the

[4] The authors can provide the results from the OLS models upon request.
[5] The distribution of the dependent variable was found to be normal, and no indicators of multi-collinearity (using the Variance Inflation Factor scores) were found in the independent variables. Using standard tests for leverage and influence, two extreme outlier cases were identified and removed from the dataset for the analyses.

international cases. In the domestic model, joint management is the only non-distributional variable that was included and it is significant and positive as expected.

In comparing the distributional versus non-distributional issues at the domestic versus international scale, we find some evidence that the issues associated with conflict or cooperation may differ at the international versus domestic scales. Water quantity, for example is significant and in the expected direction only in the domestic model. At the same time we see in the combined model that the variable for the domestic basin is significant and negative, suggesting that events in the domestic basin are more likely to be conflictual than at the international scale. This supports our alternative proposition (2b). Additionally, we do not find support for Proposition 3, that the magnitudes of the effects for issues at the domestic scale will be lower than at the international scale.

The findings for the control variables are also noteworthy. The control for the year of an event indicates that more recent conflicts are more likely to be conflictual in the international basin, which is contrary to the conventional wisdom that as time passes, experience with international institutions may foster more cooperation. However, it may support the assumption that the challenges facing international actors in the basin are becoming more difficult over time. The variable for the number of countries was not significant in Models 1 and 2 with the international cases, but it is negative as would be expected. Finally, the variable for the "dry season" is not significant in the international models, but it is positive and significant in the domestic model, indicating that dry seasons might be associated with higher levels of conflict in the domestic case.

Table 1. Ordered Logit Results for Levels of Cooperation or Conflict in Mekong Water Events

	Int'l & Domestic Events Model N = 336	Int'l Events Only Model N=292	Domestic Events Model N=44
	Coef. (s.e.)	Coef. (s.e.)	Coef. (s.e.)
Distributional Issues			
Water Quality	0.58 (0.48)	0.39 (0.51)	1.52 (1.22)
Water Quantity	0.25 (0.25)	0.42 (0.34)	-2.13* (1.24)
Hydropower	-0.84*** (0.31)	-0.89*** (0.33)	-1.49* (0.87)
Non-distributional issues			
Joint Management	0.35 (0.35)	0.20 (0.34)	1.78* (1.01)
Navigation	1.01* (0.54)	1.24** (0.59)	
Flood control	0.37 (0.43)	0.34 (0.44)	
Technical	1.37*** (0.44)	1.51*** (0.45)	
Econ or infrast develop	0.88*** (0.32)	0.94*** (0.33)	
Border security	1.19** (0.58)	1.16** (0.59)	
Upper Mekong (China)	-0.84** (0.39)		
Controls			
Year	-0.02*** (0.01)	-0.02** (0.01)	-0.04 (0.03)
Dry Season	-0.09 (0.21)	-0.31 (0.22)	1.83*** (0.66)
Number of Countries	-0.09 (0.08)	-0.08 (0.08)	
Significance levels: *p< .10; **p< .05; ***p< .01	LR chi2 =88.79*** Pseudo R2 = .07	LR chi2 =75.19*** Pseudo R2 = .07	LR chi2 =29.47*** Pseudo R2 = .18

Discussion and Conclusions

The findings from this study offer some support for our first proposition (1a and 1b), as summarized in Table 2 below, which expected that distributional issues are more likely to be associated with higher levels of conflict and non-distributional issues are more likely to be associated with higher levels of cooperation. The significant finding for the hydropower variable, as an indicator of distributional issues across all models supports Proposition 1a, but the lack of significant findings

in the expected direction for the other distributional variables raises questions as to whether the distributional nature of the issue is driving conflict or if hydropower may encompass a unique set of attributes or challenges that are associated with conflict.

These findings may be unique to the Mekong or may potentially reflect challenges that could emerge in the future across other basins. As others have noted, the Mekong is the scene for one of the most intensive hydropower developments globally (Keskinen et al., 2012a). The basin has been long characterized by "megaproject triumphalism complimented by faith that socio-political and ecological impacts can be mitigated and transcended," according to Molle et al. (2009: 12). Dams hold great symbolic power in the basin, as solutions to growing regional energy needs in the context of climate change but they energy concerns and sources of economic growth, but they also viewed as "juggernauts riding roughshod over people's lives" (Hirsch and Wilson, 2011: 1633).

Table 2: Expected findings compared with actual findings for Proposition 1

	International Events		**Domestic Events**	
	Expected relationship with BAR-Scale	Actual finding	Expected relationship with BAR-scale	Actual finding
Distributional issues				
Water quality	-	+ (n.s.)	-	+ (n.s.)
Water quantity	-	+ (n.s.)	-	-(significant)
Hydropower	-	- (significant)	-	-(significant)
Non-distributional issues				
Joint management	+	+ (n.s.)	+	+(significant)
Navigation	+	+ (significant)	n/a	n/a
Flood control	+	+ (n.s.)	n/a	n/a
Technical	+	+(n.s.)	n/a	n/a
Econ/infra. development	+	+ (significant)	n/a	n/a
Border Security	+	+ (significant)	n/a	n/a

Given that neither the water quantity nor the water quality variables are significant in the international model, our results might suggest that these are not issues of high concern at the international scale in Mekong River Basin. Indeed the MRC has not been historically attentive to water quantity or quality issues (Shmueli, 1999). We do find that the water quantity variable is significant and in the expected negative direction in the domestic model, but quality is not. The mixed results on water quantity may not be surprising given the lessons from previous literature, which finds that water quantity (in terms of scarcity) may be associated with either conflict or cooperation.

In terms of the non-distributional issues, the navigation issue, which is significant in

the international model, also raises questions for further exploration. Earlier research suggests that navigation issues can lead to both conflict and cooperation in a basin, and are particularly significant for countries that lack other forms of transportation infrastructure or are dependent on riverine transportation for international trade (Dinar, 2009). Until very recently, the upper Mekong had not been used for large-scale navigation. But navigation has been extending in upper stretches of the Mekong and it is expected that China will continue to extend its navigational reach, negatively impacting fisheries and potentially generating conflict in the basin (Osborne, 2009).

Our results also speak to the potential importance of international institutions in mitigating conflict or facilitating cooperation when we compare the results of the international and domestic models. The findings support the alternate proposition (2b) that levels of conflict at the domestic scale will be lower relative to the international scale. This counters the initial proposition (2a) we put forth suggesting that the complexity of issues and political interactions at the international scale would be associated with more conflict relative to the domestic scale. Additionally, when looking at the higher magnitude of the effects of the domestic model compared to the international model on the distribution issues, our findings counter Proposition 3. This finding, however, reinforces Proposition 2b that we would see less conflict domestically within a basin than at the international scale.

We would be remiss if we did not point to some of the limitations with our data and analysis. First, we recognize the potential for missing data or events not captured in this dataset. There is no way to verify if the events are a full population or biased toward particular types of events recorded in English. Second, the data used in this study have not yet been tested for intercoder reliability. Such tests will be conducted on a sample of the data in the coming months. Third, we recognize that our measures for water quantity and the dry/wet season may be too rudimentary to capture the extent to which resource availability or flows relate to events. Therefore, it would be useful to include data on actual streamflow prior to the timing of events to better explore these connections.

In addition to data limitations, interpretation of the results can be challenging. For instance, we recognize that endogeneities are likely to exist between event outcomes and issues. Such endogenities are difficult to tease out with this dataset. For this reason, we do not assume the relationships in our study to be causal. Case study research on particular events (e.g. extreme events) is one way to help flesh out whether and how issues are causally related to conflict or cooperation. Another overarching lesson from our research is that the distinction between distributional issues and non-distributional issues is perhaps too coarse and that it is useful to maintain distinct issue categorization schemes. However, we would argue that the differentiation between distributional and non-distributional issues provides a simple way of infusing a theoretical logic into the issue-based analysis and providing

some general guidance that may help generalize the issue-based analysis to other basins.

Despite these limitations, this paper has not only contributed to the growing knowledge of research on the Mekong, but has introduced an approach for understanding how issues may relate to conflict and cooperation, which other scholars to compare international to domestic basins. In addition to exploring the questions of issues and scales in other basins, this research can be complemented by bringing in new data and/or exploring alternative hypotheses. For instance, one next step might be to examine how the types of actors involved in events relate to levels of conflict or cooperation. Extending these analyses in new directions and exploring alternative measures and interpretation should prove to enhance our research agenda in fruitful ways.

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Appendix

Table A1. Issue Types and Definitions	
Distributional Issues	
Water Quality	Events relating to water quality or water-related environmental concerns
Water Quantity	Events relating to water quantity
Hydro-power/Hydro-electricity	Events relating to hydro-electricity or hydro-power facilities
Non-Distributional Issues	
5. Navigation	Events relating to navigation, shipping, ports
6. Flood Control/Relief	Events relating to flooding, flood control, flood damage, flood relief
Econ or Infrastr. Development	General economic/regional development OR infrastructure development projects
Joint Management	Events involving joint management of basin or water resources, especially where the management concerns cover a range of issue areas
Technical Assistance	Events relating to technical or economic cooperation or assistance, including project evaluations or river surveys and funds
Irrigation	Events relating to irrigation of agricultural areas
Fishing	Events relating to fishing
Border security	Events relating to maintaining/protecting rivers as shared borders/boundaries

Table A2. Descriptive Statistics

	Mekong Int'l (294 Events)	Mekong China (44 Events)
BAR-scale mean	1.38 (s.d. = 2.02)	.43 (s.d. = 1.93)
Year mean	2001 (s.d. 12.82)	1997 (s.d. = 10.64)
Dummy Variables	N	N
Water quality	16	4
Water quantity	52	4
Hydropower	105	23
Border issues	19	0
Navigation	13	1
Flood control	16	0
Joint management	84	8
Technical	25	1
Econ or infra development	50	2
Irrigation	1	0
Fishing	2	0
Dry Season	176	28