Negotiating transboundary water-sharing policies: conflict, cooperation and governance of international river systems

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ABSTRACT
Riparians in transboundary river systems negotiate water-sharing policies to promote political stability, regional security, economic prosperity, and environmental sustainability. Yet interstate disputes are occurring within most multistate river systems, and weak riparians are often coerced to agree to water-sharing policies that adversely affect them. This research examines the strategies weak riparians use to assert leverage in international river basins with asymmetrical power, and the success of those strategies in achieving cooperation versus conflict. Grounded in the theoretical framework of hydro hegemony, hard power, and soft power, this study uses cross national analysis to test the effects of geographic, military, political, economic, technological, and external influence on water governance in eight international river systems. The results demonstrate that weak riparians mobilize the assets and capacities of external actors, such as donor countries and the World Bank, to increase their leverage within the river system. The study finds that strategies to balance hard power are largely ineffective; they fail to achieve cooperative water-sharing arrangements and often exacerbate conflict. In contrast, strategies to balance economic power and soft power, such as market access and political legitimacy, are more successful in promoting cooperation and preventing conflict in transboundary river systems.

KEY WORDS: *transboundary water management, conflict and cooperation, water governance.*

INTRODUCTION

Riparians in transboundary river systems negotiate water-sharing policies to promote political stability, regional security, economic prosperity, and environmental sustainability. Yet international water disputes are occurring within most multistate river systems. The decision to resolve these disputes through negotiated settlements or to escalate the disputes into violence is a complicated and contentious calculation. Water-based explanations of conflict and cooperation need to incorporate economy, ecology, technology, security, politics and policy. As Arun Elhance articulates in his seminal work *Hydropolitics in the Third World: Conflict and Cooperation in International River Basins*, the multiple-use of transboundary water makes hydropolitics "one of the most urgent, complex, and contentious issues that the developing countries and the international community will have to face and resolve in the next century" (1999:4). Although there are successful water-sharing arrangements, the cooperative management of international water basins is still extremely rare (Elhance, 2000). One substantive impediment to cooperative management is power asymmetry in transboundary systems, which affects the legitimacy, complexity, and feasibility of international water-sharing arrangements.

The purpose of this research is to examine the dynamics of transboundary river systems –international organizations of states that share a river system- and the strategies weak riparians use to promote cooperation in international river systems with asymmetrical power. Riparians have a land bank adjacent to a natural watercourse or body of water, and they have a right to reasonable use of the water, albeit undefined. International river systems have multiple riparians, which are sovereign but interdependent.

Strong riparians with a disproportionately high amount of political, economic, and military leverage can often coerce weaker riparians to agree to water-sharing policies that adversely affect them. Weak riparians do not have sufficient resources to balance asymmetrical power, so they frequently appeal to international actors outside the hydropolitical complex. The cross sectional analysis in this research provides empirical evidence to support the importance of external international influence on asymmetrical power relations, negotiations, and cooperation within transboundary river systems. The research also offers additional insights to support previous work that has illustrated the complexity and necessity, in many cases, of international involvement in river system management. Three important examples stand out: first, the research of Ariel Dinar and Senai Alemu on the impasse in the negotiations over the Nile water-sharing policies in 1997, which resulted in the Nile riparians requesting the involvement of the World Bank to provide financial incentives to promote cooperation (Dinar & Alemu, 2000). Second, Greg Browder's research on the Mekong Agreement emphasizes the role of donor assistance to overcome the mistrust that had tainted negotiations in the past (Browder, 2000). Finally, Elhance and Dinar's critical works on hydropolitics conclude, "during the long and often frustrating process of negotiating water-sharing agreements many formidable obstacles have to be overcome. Sustained support by third parties is often critical in creating and maintaining the momentum for such negotiations" (Dinar, 2000:220; Elhance, 2000). In the interest of understanding the role of third parties and the strategies of weak riparians to promote cooperation in international river systems with asymmetrical power, the guiding questions of this analysis are: How do weak states encourage strong states to establish equitable water-sharing agreements? How do weak states gain leverage in negotiations? How do weak states re-negotiate water-sharing policies that adversely affect them in the long-run? To what degree do weak

riparians turn to external forces, resources, and allies to balance power within the hydropolitical complex?

METHODS

Cross Sectional Time Series regression is used to test statistical correlations in this analysis to illustrate spatial relations and temporal dynamics of the strategies that promote cooperation versus conflict. It identifies distinct patterns in the use of geographic, military, political, economic, technological, and external-appeals strategies by the weak riparians and strong riparians, and the outcomes of those strategies in achieving cooperation and preventing conflict. The analysis also tests the effects of contributing factors such as ethnic conflict, economic inequality, and the level of dependence on the shared water source. The data consist of 52 country-cases in eight major international river basins from 1950-2007: the Nile, Zambezi, Parana-La Plata, Amazon, Jordan, Ganges-Brahmaputra-Barak, Indus, and Tigris-Euphrates basins. If cooperation is achieved and a water-sharing agreement is established in an international river system, the study assesses the sustainability of the negotiated settlement by testing a lag to verify if the agreement was maintained or broken within a year.

The international river systems are selected based on wide variation in the power distribution within the hydropolitical complex and the types of strategies used to assert influence, which translates into maximum variation in the independent variables for the statistical analysis. The second essential consideration in the case selection is the availability of data that are double documented. The eight international basins selected for this analysis have data that can be measured and documented, whereas other basins require additional data collection in the field before the variables can be quantified and verified. Substantive examples from the Nile Basin are used to illustrate the central points of this quantitative analysis, which will be followed by a qualitative comparative case study of hard and soft power dynamics in the eight transboundary river systems, a seven-year field work study nearing completion in 2009.

Dependent Variable

Conflict and Cooperation. The dependent variable, cooperation versus conflict, is specified on a spectrum developed by the North Atlantic Trade Organization (NATO): 1) negotiated settlement, 2) qualified negotiated settlement, 3) unresolved dispute, and 4) violent conflict (NATO 1999). At the turn of the century, NATO re-articulated its definition of security alliances with a stronger emphasis on the relationship between energy security, resources security, and economic security. Applied to international water management, NATO describes a *negotiated settlement* as the result of cooperation to achieve a water-sharing policy or to resolve a water dispute. A *qualified negotiated settlement* is cooperation that is preceded by any form of military action or perceived threat. An *unresolved dispute* is the failure to achieve a negotiated settlement, and *violent conflict* is the failure to avoid the use of violence in addition to the failure to achieve a negotiated settlement (NATO, 1999). transboundary river systems are not always in a state of negotiating settlements or experiencing conflict, and the absence of conflict does not necessarily indicate the presence of cooperation. Thus, for the purpose of this study, the dependent variable measures a change in the status quo of conflict or cooperation, or lack of either. The NATO designation of the dependent variables is widely accepted and internationally recognized as a measure of cooperation and conflict; and, despite its limitations, holds considerable explanatory value for understanding the levels of conflict and cooperation in transboundary river systems.

Independent Variables

The independent variables represent conceptual categories of power.

Military mobilization. The leveraging of military power is indicated by the change in the level of military mobilization at the border of other riparian countries.

Control of headwaters. Geographic location is the most intuitive type of leverage in transboundary rivers, and the most static: measured as proximity in kilometers to the headwaters. Countries that control the headwaters or the points of contention can assert leverage by threatening to alter the water supply to countries down river.

Trade and aid. Trade and aid can be easily leveraged. Riparians can promise to increase trade and aid as an incentive to promote cooperation, and they can threaten to reduce trade and aid to enforce cooperation. It is important to note that economic leverage can also be used to compel dependent riparians to agree to water-sharing policies that adversely affect them in the long run, for fear of losing trade and aid from wealthier riparians. The variable *trade and aid* is measured as the bilateral trade plus aid between diads of riparians, as a percent of GDP.

Political accountability. Political power is the capacity to offer political gains or threaten political condemnation, which affects economic relations, diplomatic relations, military relations, and inclusion in the decision-making structure of the hydropolitical complex. The efficacy of offering political gains or levying political threats is largely determined by the credibility of the regime that leverages the gains and losses. Political credibility, in the form of political accountability, is also salient for transboundary river systems because accountability is a strong indicator of the willingness of states to enter into water-sharing agreements with other states.

Technology transfer. Another source of soft power that can be leveraged is ideational power: access to and diffusion of information and advanced technologies. Accurate information, reliable data, energy, infrastructure, and access to technologies that improve water-use efficiency in industry or agriculture are highly valuable in water-scarce regions. Technology transfer is measured as a change in the level of technological capacity, documented by the World Bank, which can be indicative of diffusion.

External power. If riparians do not have the resources or domestic capacity to assert leverage in negotiating water agreements, they can appeal to external international actors for support. Transboundary river systems are intended to offer incentives to cooperate and impose constraints on conflict over shared water. However, weak riparians often do not have the resources or power to offer incentives and levy constraints, and may appeal to external international actors to do so. Foreign governments, non-governmental organizations, and international financial institutions may assert economic, political, or military leverage on the member-states of transboundary river systems, if it is in their interests to promote cooperation versus conflict. Although external power has many dimensions, magnitudes, and

measures, this study uses the change in total trade plus aid from external sources (external to the hydropathical complex) to indicate the foreign interference effect.

Economic inequality. The level of economic inequality between the riparians within a hydropolitical complex affects the utility of different types of leverage. For example, if there is a high level of economic inequality, measured as the disparity in GDP per capita between states, economic leverage such as trade and aid might be more effective.

Ethnic conflict. Ethnic conflict may disrupt or distort the negotiation process of establishing water-sharing agreements. Ethnic conflict also destroys infrastructure, absorbs resources, and generates opportunity costs that affect the possibilities for cooperation in water-sharing policies. Ethnic conflict is measured as the events of ethnic conflicts that report human injuries, as documented by the Correlates of War database.

Dependence on the shared river. The level of dependence on the shared river also affects conflict and cooperation. Some riparians may be more dependent on one water source, whereas other riparians may have access to alternative water resources. For example, Egypt is almost entirely dependent on the Nile for its water. Therefore, Egypt may be more likely to heighten the intensity of conflict in order to maintain its dominance in the hydropolitical complex and its control over water-sharing policies. The level of dependence on the shared river is measured as the amount of water extracted from the river as a percent of total water use, which is documented as data by UNESCO and UN-Water.

It is important to reiterate that the measurements of the variables are interval data, which are appropriate for regression analysis. The temporal dynamics of the variables in the CSTS analysis are also informative, as the correlations alone do not demonstrate the direction of causality. The element of time in the CSTS and the original data must be reviewed to determine whether change in the independent variable precedes change in the dependent variable. Recall, time order is assumed for this analysis because the data are structured in chronological time-series panels with panel-corrected standard errors. This study focuses on factors that contribute to cooperation in transboundary river systems and negotiating water-sharing policies, thus, it analyzes the correlations in which changes in the use of political, structural, geographical, ideational, and economic leverage precede changes in the level of conflict or cooperation in international river systems.

RESULTS

Weak riparians in transboundary river systems are often coerced to agree to water-sharing policies that adversely affect them. The primary contribution of this research is to provide systematic analysis and statistical evidence to demonstrate that weak riparians can assert economic and soft power in water-sharing negotiations by appealing to and utilizing the capacities of external actors; and that economic and soft power are the most successful in achieving cooperative agreements in transboundary river systems. In other words, weak riparians may turn to external third parties such as foreign governments or international financial institutions to assert influence on the strong riparians within the hydropolitical complex, because the external forces have the resources to compensate for the disproportionately low amount of influence of weak riparians. The international community should be knowledgeable about this dynamic because as water scarcity increases and water-sharing policies become more contentious, the role of international actors will become more consequential. International influence will be a significant factor in promoting cooperation or provoking conflict in transboundary river systems, which affects regional stability and international security.

The results indicate the leverages and strategies used by weak and strong riparians, the outcomes of conflict or negotiated settlements, and the sustainability of the negotiated settlements.

Structural and Hard Power

Geographic Leverage. In all cases in the study, the country with the geographic advantage asserted it. This is not surprising. If a country controls the headwaters or the upriver point of contention, it uses the geographic advantage as leverage over other countries that may have an advantage in political power, military might, or economic dominance. Ethiopia, for example, is no match for the political, military, and economic prowess of Egypt, but Ethiopia controls the water upriver from Egypt on the Nile. Thus, Ethiopia has at least one powerful bargaining chip, and uses it in times of extreme scarcity; although this test of Egypt's resolve has not been pushed to the point of escalating conflict. The future power plays of Ethiopia and Sudan with Egypt, as well as plausible riparian alliances, is receiving an increasing amount of scholarly attention (Klare, 2001) but has yet to produce a source of hard power that trumps the military hard power or economic "sticky" power of Egypt.

The problem verified in this study, however, is that asserting geographic leverage results in conflict in almost all cases. In the case of the Nile, when Ethiopia asserts its geographic advantage, Egypt responds by increasing its political pressure, military threats, and economic leverage, which often exacerbate conflict rather than promote cooperation. In sum, geographic leverage is statistically significant because the riparians that have the geographic advantage use it, but the use of geographic leverage is highly correlated with conflict, not cooperation.

Military Strategy. Countries will mobilize their militaries to protect access to vital water resources. Part of the objective of hydropolitical security complexes is to minimize the need for military mobilization around contentious water issues, and to promote cooperation between interdependent states in international river systems. The results of this research demonstrate that many negotiations over water-sharing policies are *qualified negotiated settlements*, which indicates that a form of military leverage such as threats or mobilization preceded negotiations. This suggests that the application of military leverage can bring both sides to the negotiation table because military threats, mobilization and use of force are not generally ignored, especially if the military power of the weaker riparian is asserted through terrorist attacks or backed by external military capacity. Other types of leverage such as economic constraints can be neglected while time passes, even if the initial water-sharing dispute is not resolved. The problem with bringing riparians to the negotiating table by threatening or mobilizing military options, is that the subsequent settlements are not sustainable.

Economic and Sticky Power

Economic Leverage. Weak riparians use economic leverage to achieve negotiated settlements on water-sharing policies, and the negotiated settlements are sustainable for at least a year. This can be explained, in part, by the reality that market access is highly coveted. The promise to increase market access can serve as an incentive to promote cooperation. Leveraging market access can alter the cost-benefit analysis by making cooperation more beneficial: cooperation will result in gaining access to markets, conflict will be more "costly" because it will result in sanctions or the loss of access to markets. The difference between strong and weak riparians in this regard, is that the strong riparians can assert economic leverage based on their own markets and assets, while weak riparians often have to turn to external actors such ash the World Bank to provide economic incentives and constraints on their behalf to promote cooperation in the region.

External Influence

To avoid being coerced to accept water-sharing policies that adversely affect them, weak riparians often appeal to external forces to assert power and leverage in the negotiations of hydropolitical security complexes. The use of external influence is statistically significant in promoting cooperation in transboundary river systems, and the negotiated settlements are sustainable. As concluded by Arun Elhance, international financial institutions can offer "powerful economic leverages to persuade reluctant states to cooperate," and the cooperative arrangements tend to endure at least as long as the aid keeps flowing (2000:216). The promise of international aid can serve as an incentive to resolve resource disputes through cooperation. Donor organizations can design aid programs to alter the cost-benefit analysis of resolving disputes through negotiated settlements as opposed to violent conflict. Recipient countries can use international financial aid to promote development, build infrastructure, increase government capacity to provide public services, and many other projects to increase economic and political stability. Financial aid operates through mechanisms such as contingencies on how the money can be used and what degree of accountability must be achieved. In addition to general development goals, "aid conditionality can help strengthen incentives for ending conflict and discourage a return to war" (Boyce, 2002). For example, the World Bank will give financial aid to help develop large regional water supply systems for potable water, irrigation, and hydroelectric projects. However, the loans are contingent on the agreement and cooperation of all riparians. If one riparian does not agree with the proposed water development project, the World Bank will withhold financial aid until a negotiated settlement can be reached.

Soft, Political, and Ideational Power

Political Leverage. Political leverage is not a statistically significant factor in the capacity of weak riparians to promote cooperation, but it does correlate with the ability of strong riparians to achieve negotiated settlements. This is interesting for two main reasons. First, political legitimacy is significant for strong riparians but not for weak riparians, presumably because strong riparians meet a threshold of legitimacy that allows them to offer credible political gains and to allocate political losses, whereas weak riparians do not generally have the capacity to do so. Second, it exposes a probable source of multicollinearity, which was tested and verified, between military power, political legitimacy, and economic resources. Political leverage is only effective in cases where the riparian has overlapping advantages in military capacity and economic assets that can be leveraged. In addition, the settlements are *qualified negotiated settlements*, which means that the negotiations were preceded by military actions such as threats or mobilization, and the settlements are not sustainable. The weaker riparian may have succumbed to political pressure to conform to policies that adversely affect them, but these policies may not be sustainable if the political pressure lets up for any reason in the future.

Diffusion of Technology. The capacity to leverage access to valuable technologies can bring riparians to the negotiating table. Both strong and weak riparians can offer to provide or use technologies that increase water-use efficiency or produce hydroelectric power, which may have distinct benefits or consequences for different riparians. The primary issue with leveraging technology, however, is that most countries will turn to external sources to gain access to new technologies or the money to finance them. International financial institutions such as the World Bank typically get involved in large infrastructure development projects and technology transfers. The definitive work of Bertram Spector demonstrates that cooperation often depends on external "facilitating elements" such as technology, which can be engineered to promote cooperation and prevent conflict (Spector, 2000: 224).

Contextual Factors. There is a complicated relationship between economic inequality and regional conflict. Economic inequality can provoke violent conflict within and between countries. Regarding resource disputes, however, economic tensions have a dual effect: inequality can exacerbate conflict or bring countries to the bargaining table. The statistical results of this study show that economic inequality results in *qualified negotiated settlements*; negotiations that follow volatile disputes, which indicates that contradictory forces are in play. In contrast, the effects of ethnic conflict are clear and consequential. Ethnic conflict disrupts the negotiation process and distracts the attentions and resources of the participants. It is not surprising that ethnic conflict has a statistically significant correlation with the continuation of conflict. Another complicating factor is the level of dependence on the shared river system. A high level of dependence means a high likelihood of conflict. However, the implications of this finding more substantial. As demand increases and water scarcity increases, the level of competition to control the resource will also increase. Strategies for conflict prevention and resolution will need to address this increase the intensity of competition to control the water source.

CONCLUSION

Weak riparians are most successful at influencing water-sharing policies when they utilize the resources of external actors to augment their economic and technological capacity. With external support, weak riparians can assert economic leverage and soft power, which this study shows to be the most effective in achieving cooperation in transboundary river systems. However, these exogenous sources of influence are used the least often. The types of power that are asserted most frequently are geographic

location and military capacity, which are shown in this study to be the least successful in achieving consistent cooperation and sustainable settlements. The general conclusion is highly problematic for the cooperative management of international river systems: the strategies that are the most successful at promoting cooperation are used the least often. This is, in part, because transboundary river systems are intended to be regional security organizations that promote regional stability and prosperity concerning shared water resources. However, if weak riparians find that they are being coerced to accept water-sharing policies that adversely affect them, owing to power asymmetry in the regional complex, they may turn to external actors to gain the leverage necessary to negotiate better arrangements. A positive spin on this finding is that the external actors tend to augment economic and soft power, as opposed to promoting hard power. There are known strategies for asserting economic power, such as altering the amount of trade and aid, and for leveraging soft power, such as technology transfers, that can be used to increase cooperation. This serves the objectives of transboundary river systems, albeit indirectly, which are to increase regional cooperation and achieve negotiated settlements for water-sharing policies in shared river systems.

The weakest riparians do not have the economic resources, political capacity, or non-violent leverage to balance asymmetrical power in transboundary river systems, so they often appeal to external actors to augment their power. The cross sectional analysis provides empirical evidence to support the importance of external international influence on asymmetrical power relations and cooperation within transboundary river systems. The role of external actors will become increasingly important in the internal power dynamics of transboundary river systems as competition between riparians intensifies. The decision to promote cooperation or provoke conflict will become more consequential as water use and water scarcity increase. International actors that choose to get involved in international water disputes and regional transboundary river systems will need to keep pace with these changes.

Future research needs to disaggregate the findings of this study, and others, as well as analyze the motives behind international involvement in transboundary river systems. We cannot ignore the temptation of external actors to manipulate water disputes in order to increase or maintain their own access to vital resources. New research also needs to be conducted on the effects of multinational corporations, as external international actors, asserting leverage in transboundary river systems. A systematic comparative analysis of variation in the strategies and outcomes of foreign influence by multinational corporations, foreign governments, and international financial institutions would be informative. As water becomes increasingly privatized and corporations consolidate their control over vital resources, it is useful to anticipate the impact on international river systems so that the international community can offer alternative forms of economic and soft power to promote cooperation and prevent conflict.

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