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Does political uncertainty affect water resources development? The case of the Eastern Nile

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Abstract

In water resources, there is a long tradition of utilization of methods to address hydrological and economic uncertainty. Less frequently considered, however, is how uncertainty rooted in political factors such as power asymmetry, the strength of institutions, and the interests of stakeholders, contributes to decision-making. This paper explores political uncertainty and its interaction with more routinely considered forms of uncertainty in international river basins. Using the example of the controversies surrounding major new infrastructure projects in the Eastern Nile Basin, we show that political uncertainty may play a key role in shaping the decisions of individual riparian countries about how to proceed with water resources development. Specifically, we consider whether uncertainty over the prospect of future cooperation might help explain why seemingly optimal economic outcomes that require cooperation (due to interconnectedness) remain elusive. We conclude with reflections on other dimensions of the water resources planning problem – climate change, changes in regional development matters, and preferences – that similarly require a framework that accounts for political uncertainty.

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1. Introduction

The stochastic nature of meteorological processes and the unpredictable dynamics of future demographic, economic and political conditions create multiple layers of uncertainty for riparian countries sharing international river basins. Surface water resources are highly variable in space and time; hydrological uncertainty in international river basins therefore creates particular management challenges (Loucks, Van Beek, Stedinger, Dijkman, & Villars, 2005; Ostrom, Burger, Field, Norgaard, & Policansky, 1999). In addition, because water resources are essential for so

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many human activities (Hanemann, 2006), the value of the resource to riparians depends critically on a broad range of factors that span varied economic sectors, such as population growth, technological innovations, water use efficiency, economic growth, market fluctuations, energy demand and supply, and economic development strategies. These issues may spill across national or other jurisdictional boundaries (Rogers, 1991), and may link with activities that take place outside of river basins (Berck, Robinson, & Goldman, 1991).

In the field of water resources planning and management, there is a long tradition of utilization of systems models that account for hydrological and economic uncertainty, and for the complex interlinkages between water and economic systems. Water resources engineers, for example, have developed sophisticated methods (such as various dynamic optimization models) to handle hydrological uncertainty (Sahinidis, 2004; Stedinger, Sule, & Loucks, 1984). Sensitivity analysis, decision-tree analysis, and Monte Carlo simulation are among the tools often used in dealing with economic uncertainty.

In comparison, the effects of political uncertainty – another major source of uncertainty in international river basins – are rarely explicitly considered (for exceptions, see Lowi, 1995; Mirumachi, 2015; Pahl-Wostl, 2002). The sources of such uncertainty arise from major events in the political arena, such as elections, military coups, and collapse of government (Gleditsch, Furlong, Hegre, Lacina, & Owen, 2006), as well as more gradual shifts in domestic priorities and discourse or international relations (Feitelson, 2002; LeMarquand, 1976). Political uncertainty may have significant implications for the functioning of resource management institutions (Giordano, Giordano, & Wolf, 2005), and may therefore play a key role in determining the prospect of cooperation among basin riparians. For example, new political leaders emerging from an election may denounce water treaties negotiated by their predecessors, and governments of upstream riparian countries may decide to operate their river-regulating facilities (such as dams and reservoirs) to gain strategic advantage over downstream riparian countries, once such facilities are in place.

Several characteristics of political uncertainty make it particularly difficult to predict and to mitigate, in comparison with hydrological and economic uncertainty. First, the patterns of political uncertainty involve myriad factors that are difficult to characterize and that may not overlap well with river basin boundaries (Islam & Susskind, 2012; Warner, Wester, & Bolding, 2008). Political processes, both in international relations and domestic affairs, can be extremely volatile and occur in non-recurring patterns, or may be highly path dependent and irreversible (Pierson, 2000). Second, basic behavioral assumptions about governance may be challenged in the presence of political uncertainty. Governments may behave irrationally in certain circumstances, engaging in activities that are harmful not only for other riparian countries but also for their own citizens (Shepsle & Bonchek, 2010). Third, unlike the case of hydrological and economic uncertainty, there is no robust mechanism to understand and mitigate the effects of political uncertainty on water resources development because the nature of such impacts is determined by government action, as are any uncertainty-mitigating mechanisms (Koremenos, 2005). To put it simply, governments cannot insure against the risks associated with their own actions.

Prospect theory may help to understand the impact of political uncertainty on decisions by individual riparian countries in water resources development projects (Kahneman and Tversky, 1979). Due to the difficulties in predicting political uncertainty, the fear of losses may outweigh potential gains for riparian countries contemplating new infrastructure projects. Such loss aversion may generate a strong *status quo* bias. Prospect theory may also help to explain why decision-makers would gravitate toward strategies that enable them to minimize potential losses in reputation and credibility (Levy, 1992). Egypt's long-standing position in opposing dam construction in upstream catchments of the Nile Basin may be due to fear of potential losses given the difficulties in assessing and addressing water retention and abstraction once such dams are built.

The omission of political uncertainty by analysts of international river basin dynamics may lead to unrealistic expectations about prospects for cooperation among riparians. In fact, the very mechanisms designed to mitigate hydrological and economic uncertainty may increase vulnerability to political uncertainty. For example, the consideration of hydrological uncertainty alone may suggest that there are compelling incentives for riparian countries to cooperate with each other to share benefits and overcome the adverse impacts of uncertainty. Enacting solutions such as large-scale river-regulating facilities or water treaties and river basin organizations might appear especially helpful for reducing such uncertainties (Fischhendler, 2004; Leary, 1999). In reality, however, joint development of large-scale river-regulating facilities has been rare, and the long-term sustainability of water treaties or other institutions cannot be taken for granted due to one or more parties' concerns about their implementation (Bernauer, 2002; Schmeier, 2014).

The reality of political uncertainty, and its complex interplay with the hydrological and economic uncertainties that play out over the long term, may result in so-called ambiguity or deep uncertainty (Groves & Lempert, 2007; Jeuland,

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