International Cooperation over Resource Management in Post-Soviet Central Asia

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International water and energy management in post-Soviet Central Asia exhibits a great deal of volatility. In just the eleven years between 2000 and 2010, the six main dyads in the region ended periods of noncooperative management with new agreements as many as 52 times. In this article, I argue that this cycling between cooperative and noncooperative management is an example of an important, but understudied, phenomenon: the use of flexible, targeted goods provision policies. Policies like resource management in Central Asia are targeted because they distribute benefits only to some individuals or groups at the expense of others. And they are flexible in the sense that country leaders can turn them on or off at will, providing the associated benefits when, and only when, the support of the beneficiary groups is required.

When a leader employs an inflexible policy, the distribution of subnational costs and benefits cannot be altered even if doing so becomes attractive. For example, a leader’s estimation of the value of both beneficiary and nonbeneficiary groups may change over time. Likewise, there may be variation in the chosen policy’s value as a way of distributing benefits to the desired group. As these features change, so too will the attractiveness of using the policy for targeted goods provision. Selecting a flexible policy instead of an inflexible one allows the leader to target goods to subnational groups without committing to long-term provision. While utilizing such policies, a leader will “turn on” the benefits when doing so is particularly
attractive: for example, when the beneficiary group is more important to regime survival than the nonbeneficiary group, and when the size of the benefits received by the beneficiary groups are large compared to the size of the costs paid by the nonbeneficiary groups.

The theory presented in this article has important implications for our understanding of the world. First, it highlights the need for a dynamic theory of targeted goods provision; leaders will want to target different subnational groups over time and they will want to do so using different policies. Most of our goods provision theories are static, and those that do account for temporal changes are not explicitly tied into a framework of targeted goods provision. By integrating temporal and spatial targeting into a single framework, my theory provides a comprehensive way of looking at a broad range of political phenomena. The theory also emphasizes the importance of information in leaders’ goods provision decisions. Leaders prefer flexible policies when they are unsure about the relative value of policies and groups. They then utilize this flexibility to start or stop the flow of benefits as they receive more information about these crucial factors.

In Central Asia, the attractiveness of cooperative resource management changes over time, mirroring the variable nature of both cooperation’s costs and benefits, and the importance of the beneficiary and nonbeneficiary groups in each country. Faced with this variability, I argue that leaders have established a flexible form of resource management in which they cycle between cooperation and noncooperation in response to new information about the respective value of cooperation as a goods provision policy and the value of targeting goods to the beneficiary groups.

I use original data on the relationship between the Central Asian countries on the issue of international resource management from 2000-2010 to examine the dynamics of flexible, targeted goods provision. I focus on two factors that affect how leaders estimate the importance of beneficiary and nonbeneficiary groups: the occurrence of protest in beneficiary and nonbeneficiary regions and the presence of established patronage systems. I also look at how changes in the relative costs and benefits affect cooperation by examining both the availability of water and the profitability of out-of-region energy sales. I find strong support for the hypothesis that leaders are utilizing international cooperation over resource management as a flexible means
of targeting domestic groups with short-term benefits. Each of the four factors I identify as affecting the short-term attractiveness of cooperative resource management has a statistically significant and substantively important effect on the likelihood of a new agreement.

Water and energy management in Central Asia is a particularly important and useful case for studying the use of flexible, targeted goods provision. First, by focusing on an international-level policy, it is possible to explicitly link subnational dynamics to the national incentives of leaders, and subsequently to the international actions of five nondemocratic countries. This speaks directly to the existing literature on the relationship between domestic and international politics and highlights the wide applicability of my framework. Additionally, the topic of resource management is critically important in the modern world, as shortages and imbalances may threaten national, regional, and even international stability. This article has implications for how we should approach these issues, stressing the vital importance of aligning subnational interests across borders to engineer cooperation. Finally, the case of post-Soviet Central Asia is important in its own right and its location between Russia, China, Iran, and Afghanistan means there is a great deal of interest in maintaining regional stability. By arguing that a seeming source of volatility - international resource management - is actually a tool for engineering short-term within-country stability, this article provides a new perspective on how we might accomplish this goal.

The article proceeds as follows. First, I discuss the theory in more detail, outlining the key ideas of temporal targeting and policy flexibility. The second section introduces the case of Central Asian resource management and identifies the subnational beneficiaries and nonbeneficiaries of cooperation. Next, I present the main empirical results, examining the effect of changes in factors that affect both the importance of targeting the beneficiary groups and the value of cooperative management as a goods provision policy. The evidence presented supports the fact that the Central Asian leaders are using international resource management as a flexible, targeted goods provision policy. The final section concludes and discusses possible extensions to the project.

[Beuno De Mesquita and Smith (2012) provides an excellent overview of the literature linking domestic and international politics.]
1 Temporal targeting and policy flexibility

Flexible goods provision policies allow leaders to engage in what I call temporal targeting. We can think of each potential goods provision policy as having a spatial and temporal scope: the spatial scope refers to the identities of those that ‘win’ and ‘lose’ when the policy is enacted, while the temporal scope refers to how long the benefits and/or costs will last. Consider the example of constructing a new road in a small community. The spatial scope of this policy is the community in which it is built, since benefits are confined to those who use the road. The temporal scope of the building project is long, since the road will benefit this community for many years.

The selectorate theory proposed by Bueno De Mesquita et al. (2003) concisely explains the reasons why certain leaders engage in more spatial targeting than others. They argue that a leader who needs the support of a large portion of society will provide public goods rather than private ones. Public goods are typically cheaper per capita and there is not much to gain from excluding nonessential individuals or groups from receiving benefits. On the other hand, when the leader only needs the support of a relatively small group of citizens, it is more cost-effective to target them with private goods than it is to provide public goods to the country as a whole. Under such conditions, providing public goods unnecessarily benefits more of the population than is actually required to maintain power.²

A similar logic explains why leaders may wish to temporally target goods. Choosing goods provision policies that over-provide in terms of time is analogous to wasting resources on providing public goods when spatially targeted ones are cheaper. The temporal scope of a policy will thus enter into the leader’s calculation, regardless of whether he is using public or private (targeted) goods. In particularly, he will be more amenable to using a long-term goods provision policy if he requires the support of the beneficiary groups for the foreseeable future. On the other hand, if such support is only required in the short-term, he will prefer policies with much shorter temporal scopes.

The provision of short-term benefits to potential voters in the time leading up to elections

²This conclusion is similar to that of Deacon (2009), who argues that the relatively even distribution of power among groups in democracies favors the distribution of public goods, while the relatively concentrated pattern of political power in nondemocracies leads to targeted transfers to powerful groups.
is an example of temporal targeting. This phenomenon is well documented. Blaydes (2011) demonstrates that the poor in Mubarak-era Egypt were ‘better off’ during election years than during non-election years, as candidates provide them with food and other hand-outs in exchange for votes. Similarly, Stokes (2005) outlines how the Peronist party in Argentina distributes money (through brokers) to voters in advance of elections. In these cases, leaders know they only need support for a short period (i.e. through election day) and therefore provide cash, food, or other material goods rather than adopting policies with long temporal scopes.

The difficulty, however, is that it is not always clear which targeted goods provision policy has an appropriate temporal scope. There are two types of uncertainty that pose a particular challenge to leaders. First, leaders may have limited information about whose support is most important for retaining power and their evaluation of this may change over time. For example, suppose there are two subnational groups in a country with a stake in the policy decision of their leader. One group, call it group $B$, benefits from the policy. The other, group $N$, does not benefit and may even bear some of the costs from this choice. A policy that redistributes benefits from a nonbeneficiary group $N$ to a beneficiary group $B$ will remain attractive if the leader continues to require the support of $B$ and not need the support of $N$. However, if circumstances change and $N$ becomes more important, the policy may no longer be attractive.

The leader’s evaluation of group importance may change over time if the domestic situation is particularly volatile. For example, rapidly changing political allegiances, particularly during regime transitions, may simply alter the importance of groups over time. Additionally, his evaluation may change as he gathers new information about whose support he needs and how strongly he needs it. If his initial information is poor, then any additional information he receives will have a large impact on his estimation of threats in his country. Both situations may cause the leader to re-evaluate his desired distribution of benefits over time. I refer to this as variability in the importance of groups.\(^3\)

The second kind of variation that makes it difficult to determine the appropriate temporal scope concerns the value of the policy itself relative to other potential goods provision policies. The size of the benefits and costs associated with a particular policy are not necessarily static.

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\(^{3}\)The fact that this importance is in the estimation of the leader is implied.
For example, suppose a policy provides a benefit of $b_B$ to group $B$ at a cost of $c_N$ to group $N$. In some cases, the size of $b_B$ and $c_N$ may change over time. A goods provision policy is attractive when the benefits are large relative to the costs; when the costs are large relative to the benefits, however, the leader may prefer to use a different policy to target $B$ with benefits. In other words, a policy with costs and benefits that fluctuate over time exhibits variability in the value of the policy.

When there is a high degree of variability in one or both of these features, leaders will find flexible goods provision policies attractive. The benefits of such policies can then be started or stopped in response to changes in the domestic situation, the information leaders have about potential challenges, and the relative size of the policies’ costs and benefits. This allows leaders to provide benefits for appropriate periods of time, without having to identify the desired temporal scope when the policy is first adopted.

Logically, I expect leaders will ‘turn on” the benefits of flexible goods provision policies when the policy is at its most attractive. Returning to the hypothetical example from above, suppose that the leader, $L$, weights the utility of group $B$ by $\alpha$ and group $N$ by $1 - \alpha$. This parameter captures the importance of the beneficiary group compared to the nonbeneficiary group. Then we can write the leader’s utility from the policy as: $U_L(policy) = \alpha b_B + (1-\alpha) c_N$.

The relative sizes of $b_B$ and $c_N$ capture the value of the policy at a given moment in time: that is, how large are the benefits of using it compared to the costs. As $b_B$ increases, the overall attractiveness of the policy will increase; conversely, as $c_N$ increases, the overall value of the policy will decrease. The size of $\alpha$ represents the leaders belief about which group he should be targeting with goods. When $\alpha$ is large, the leader believes there is a lot of value in providing benefits to group $B$. When $\alpha$ is small, these benefits are much lower and he cares more about the costs paid by group $N$. Uncertainty over $\alpha$, $b_B$ and $c_N$ mean the leader does not know $U_L(policy)$ in advance and is thus unwilling to commit to a long-term distribution of benefits. But as he learns more about these factors, the comparative statics above describe how we should expect his behavior to change. This yields two general hypotheses:

\[ H1 \) The likelihood “turning on” a flexible goods provision policy increases as the leader places
greater importance on providing goods to those who benefit and decreases as the leader places
greater importance on providing goods to those who do not benefit

H2) The likelihood of “turning on” a flexible goods provision policy increases as the size of the
benefits increase and decreases as the size of the costs increase

Although these hypotheses apply wherever a flexible goods provision policy is used, I argue
that the adoption and use of flexible goods provision is most likely in nondemocratic contexts.
Information about citizen preferences is notoriously hard to obtain in nondemocracies. Repres-
sion, of a political and/or violent nature, is one of the hallmarks of such countries (see Poe and
Tate, 1994; Davenport, 1999). Citizens understandably fear reprisals from the regime if they
express criticism and, given this, are unlikely to reveal their true feelings about the government
(Kuran, 1991). This creates a situation in which leaders are unable to accurately evaluate when,
where from, and how strong threats to their power will be (see Wintrobe, 1998). This is true
even when some leaders attempt to alleviate uncertainty through the adoption of seemingly
democratic institutions (see Gandhi and Lust-Okar, 2009). While elections and legislatures
may, in theory, provide regular forums for information gathering, they do little to alleviate the
ever-present threat of repression, so incentives for preference falsification remain.

Simply put, the source and strength of challenges are more difficult to predict in nondemoc-
racies than they are in democracies. This, in turn, means that nondemocratic leaders place
greater value on new information about the domestic political situation and are more likely to
utilize this information, resulting in a higher variability in the perceived importance of groups.

In addition, as the selectorate theory outlines, targeted goods provision is generally more
attractive in nondemocracies than democracies (Bueno De Mesquita et al., 2003). Nondemo-
ocratic leaders typically have smaller winner coalitions than democratic ones. This makes them
more likely to target private or semi-private goods to supporters. Likewise, if they are uncertain
about which small group of individuals to benefit, they will be unwilling to commit to long-
term provision. In contrast, democratic leaders use more public goods policies, since they are
less concerned with over-provision. Such policies benefit citizens equally and, consequently,
there is no cost to committing to them for long periods of time even if there is uncertainty over whose support will be needed in the future.

Finally, I should note that several international relations scholars have identified a relationship between variability and the desire to avoid committing to long-term international agreements. For example, Koremenos (2005) argues that a higher variance of shocks around the expected benefit of an international agreement leads countries to adopt shorter term agreements. In other words, if the size of the expected benefit is uncertain, leaders are unwilling to commit to providing it for long periods of time. Along similar lines, Rosendorff and Milner (2001) predict that escape clauses in the agreements - which institutionalize flexibility - are more important for maintaining cooperation over international trade when the government is sensitive to shocks in the influence of firms. While flexibility as a feature of resource management is an important part of my argument, I move beyond these existing approaches and look at how this flexibility is utilized. In doing so, I link short-term changes in the domestic situation of leaders to their decisions to pursue cooperative or noncooperative resource management at the international level.

2 Water and energy management in post-Soviet Central Asia

The five post-Soviet Central Asian countries - Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan (see Figure 1) - use international resource management as a flexible form of targeted goods provision. As such, the theory predicts that they will respond to changes in both the value of cooperative management as a means of goods provision and the importance of beneficiary and nonbeneficiary groups. In order to evaluate how well these features explain temporal patterns of cooperation and noncooperation, it is necessary to identify two features of the case: (1) the meaning of “cooperation” in the context of Central Asian resource management, and (2) the spatial scope of cooperative management (i.e. which subnational groups are beneficiaries of cooperation and which are nonbeneficiaries). This section discusses each of these features in turn.
Figure 1: Map of Post-Soviet Central Asia

Source: U.S. Central Intelligence Agency
2.1 Cooperative vs. noncooperative management

The meaning of “cooperation” in Central Asian resource management is rooted in the historical legacy of the Soviet period. The Soviets profoundly changed water and energy politics in the region. Under orders from Moscow, agricultural production in the region expanded rapidly. This was especially true of cotton, which was known as “white gold” (Peachey 2004). As agricultural production expanded, so too did the amount of land under irrigation: from about 2.6 million hectares, to a total of 7.5 million hectares (O’Hara 2000). In many years, so much water was diverted for irrigation that the two major rivers - the Amu Darya and the Syr Darya - never reached their natural drainage site, the Aral Sea (Micklin 1988).

To meet the almost insatiable demand for water, the Soviets developed a management regime that prioritized the needs of agriculture over all others. They constructed large upstream reservoirs, notably Toktogul in Kyrgyzstan and Nurek in Tajikistan, so that water could be stored during spring and early summer and then released in late summer and fall when irrigation demand was highest. The Soviets also recognized the energy potential of the upstream republics, equipping both Toktogul and Nurek with hydroelectric generation technology. However, in accordance with the agriculture-focused management regime, water was released for irrigation during the summer and autumn, leaving the reservoirs depleted with little prospect of refilling before spring. This deprived the upstream republics of hydroelectricity during the winter months when demand was highest. To compensate for this, the downstream republics, who had significant oil and gas resources, provided their upstream neighbors with the necessary winter fuel.

After independence, the region-wide system of water and energy resource management faltered. Exchanges of water for energy do not occur simultaneously: energy resources are provided in winter in exchange for water resources provided in summer (or vice versa). Without a central authority like the Soviet government to guarantee adherence, the temporal separation between the costs and benefits of agreement became a formidable obstacle to continuing the So-
viet era management scheme. If the upstream countries release water in the growing months for use by the downstream agricultural producers, they will not have enough stored water to meet their domestic energy demands during winter. Similarly, if the downstream countries provide energy during spring, they have no guarantee that the upstream country will supply adequate irrigation water in the summertime.

Despite these difficulties, “cooperation” continues to mean the modern analog of the Soviet era water-for-energy exchanges: upstream countries release water during the growing months in exchange for subsidized winter energy. Noncooperative management, in contrast, occurs when downstream countries do not send winter energy upstream and the upstream countries release their water in winter for use in hydroelectric production.

2.2 Beneficiary and nonbeneficiary groups

Whether a subnational group benefits from cooperation or not depends on who they are, where they are located and, in some cases, which season it is. In this section, I identify the beneficiaries and nonbeneficiaries of cooperation in each of the Central Asian countries. Table 1 illustrates the major groups.

In the downstream countries of Kazakhstan, Turkmenistan and Uzbekistan, the main beneficiaries of cooperation are individuals living in regions near the river governed by the agreement. Successful cooperation over water and energy management ensures adequate quantities of water for irrigation. Cotton production remains important, especially in Uzbekistan, where the cotton sector contributes around 13-18% to the national GDP (Kienzler, Djanibekov and Lamers 2011). However, food products are the major crops in all five countries. When more food is produced, prices at urban bazaars decrease. In a study on trade of consumer goods (especially food), Grafe, Raiser and Sakatsume (2008) found that the internal barriers to trade in

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4As Abbink, Moller and O’Hara (2010) discuss, trust (and thus cooperation) quickly became difficult to maintain.

5As Weinthal (2001) outlines, the needs of agriculture continued to play a crucial role in shaping these exchanges.
Table 1: Overview of subnational interest groups in downstream and upstream countries

<table>
<thead>
<tr>
<th>Group</th>
<th>Growing season</th>
<th>Non-growing season</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Downstream countries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>◦ Residents of regions near rivers</td>
<td>Always benefit</td>
<td>Always benefit</td>
</tr>
<tr>
<td>◦ Energy producers</td>
<td>Never benefit</td>
<td>Never benefit</td>
</tr>
<tr>
<td><strong>Upstream countries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>◦ Energy consumers in beneficiary areas*</td>
<td>Benefit if water is abundant; Do not benefit if water is scarce</td>
<td>Always benefit</td>
</tr>
<tr>
<td>◦ Energy consumers in nonbeneficiary areas**</td>
<td>Never benefit</td>
<td>Never benefit</td>
</tr>
</tbody>
</table>

*Refers to all energy consumers in Tajikistan and those in the South of Kyrgyzstan; **Refers to energy consumers in the North of Kyrgyzstan
the region were very high, suggesting the positive effects of increased food production would be felt most strongly in nearby urban centers as opposed to distant ones. Individuals living near the river - both agricultural producers and those that benefit from increased production - are thus strong supporters of cooperation, especially when water is in short supply.

On the other hand, individuals involved in the production of energy in these three downstream countries are active opponents of cooperation. The downstream countries all have significant non-renewable energy resources. There are 30 billion bbl proved reserve of crude oil and 2.407 trillion cubic meters proved reserves of natural gas within Kazakhstan, ranking it 12th and 15th in the world for these types of energy respectively. Turkmenistan possesses only 600 million bbl proven reserves of crude oil, but it has a massive 24.3 trillion cubic meters proven reserves of natural gas (ranked 5th in the world). Uzbekistan has a more modest, but still significant 594 million bbl proven reserves of crude oil and 1.841 trillion cubic meters of natural gas (CIA World Factbook).

Increasing the revenue from energy sales benefits only those directly involved in production, not the broader population. The energy sectors in all five Central Asian countries, including the three downstream ones, are plagued by corruption. Any gains in revenue are channeled out of the public treasury and into private bank accounts. This means that profits from energy sales benefit the energy elite much more than the general population. It also implies that the energy elite lose out when cooperation over resource management occurs. In accordance with the water-for-energy exchange scheme, at least some portion of energy must be sold to the upstream countries at a subsidized rate. Thus, energy producers pay the cost of cooperating without receiving any of the benefits.

In the upstream countries of Kyrgyzstan and Tajikistan, ordinary energy consumers have an important stake in how water is managed. Residents in both of these countries rely pre-

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6 Their study focuses on Kazakhstan, but given Kazakhstan is relatively developed (economically and with respect to infrastructure), we can infer the same is true of the other Central Asian countries.

7 This observation arose many times during interviews conducted by the author with representatives of international organizations, local nongovernmental organizations, and even employees of government-controlled energy companies. Almost 40 of these interviews were conducted over 9 months of field research.

8 In some cases, the prices are at market level, but regular debt forgiveness means the energy is de facto subsidized.

9 Although I will not focus on this, water and energy management also affects the welfare of individuals involved in the production of hydroelectric power. In general, the interests of these individuals are aligned with those of energy consumers in beneficiary regions. They typically benefit from cooperation, however, they benefit
dominantly on electricity to power and heat their homes. Electricity tends to be cheaper than
cool and gas and, due to the extensive electric grid constructed during Soviet times, it remains
the most widely available and accessible type of energy. In the absence of cooperation, at
least some segments of the population lack electricity during winter when temperatures are ex-
tremely low, harming the health and economic well-being of ordinary citizens and hindering
the development of the country more broadly. Cooperation over resource management is espe-
cially beneficial for such citizens during the winter, when the fuel energy from the downstream
countries is delivered and used. In summer, these individuals support cooperation when water
is plentiful. However, they are not supportive when when water is in short supply, since releas-
ing the scarce reserves of water in summer and autumn prevents the reservoirs from filling up
in time for the winter hydroelectric season.

Although international cooperation over water and energy management benefits large groups
of upstream energy consumers, it does not benefit them all. In Tajikistan, the relatively small
storage capacity of the Nurek reservoir (10.5km$^3$) means that all citizens - even those in the
capital city - benefit in expectation from the import of energy from their downstream neighbors.
The Tajiks cannot store adequate quantities of water during the peak flow months, so they face a
serious energy deficit in winter when water inflows are lowest and domestic demand is highest.
Electricity rationing, when implemented, tends to be countrywide (For example, Chorshani-
biyev 2008). In the Kyrgyz case, on the other hand, there is a distinct regional dimension.
The Toktogul reservoir in Kyrgyzstan has a greater storage capacity (19.5km$^3$) than the Nurek
reservoir in Tajikistan, theoretically reducing the size of the energy deficit Kyrgyzstan faces in
winter under a noncooperative regime. However, the configuration of the Soviet-constructed
electric grid means that electricity produced by hydropower cascades associated with Toktogul
cannot reach the South of the country without passing through Uzbekistan. This makes cooper-
ation necessary for Kyrgyz energy to reach southern Kyrgyz citizens. Consequently, residents
of the South benefit from cooperation over water and energy management, while those in North

more in winter when water is abundant than when it is scarce. As with the downstream countries, corruption limits
the benefits of hydroelectric production to those directly involved in the sector.

10 Interview conducted by the author with a local employee of a state-controlled energy company. June 15,

11 This dynamic will be discussed in more detail later in the paper.
To summarize, the main beneficiaries of cooperation in the downstream countries are agricultural producers and residents of nearby urban areas. The main nonbeneficiaries in these countries are energy producers. In the upstream countries, on the other hand, the beneficiaries are energy consumers in areas that rely on outside supplies (although they do not benefit in growing months when water is scarce) and nonbeneficiaries are those that do not require such outside sources. As the next section will make clear, the subnational groups identified here are crucial to our understanding of when and why cooperative management occurs.

3 Empirical analysis

Do the Central Asian countries actually use water and energy management as a means of flexible, targeted goods provision? The previous section provided some background information about the Central Asian case and identified the various subnational interest groups with a stake in how resources are managed. This section combines these features with the general theory to predict, and ultimately evaluate, when cooperation occurs over water and energy in Central Asia.

The empirical analysis uses an original dataset that tracks the relationship between the relevant pairs of Central Asian countries over water and energy management for the period January 2000 to December 2010. The theory concerns the occurrence of transitions from noncooperative to cooperative management. Therefore, I restrict attention to the dyad-months in which the countries were not previously cooperating. For example, if Kazakhstan and Kyrgyzstan were not cooperating at time $t-1$, then the Kazakh-Kyrgyz dyad would be included in the dataset at time $t$. However, if they then signed an agreement at time $t$ and began cooperating, this dyad would not be included in the dataset at time $t+1$.

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12 This is true for cooperation with both downstream countries, not just Uzbekistan. Cooperation with Uzbekistan means that electricity can be imported from the North, while cooperation with Kazakhstan means greater quantities of coal to generate electricity at the Osh thermo-electric plant that can then be distributed to other areas in the South.

13 I used mostly secondary sources in the English and Russian language, which were supplemented where necessary, with primary sources obtained during my fieldwork. The dataset includes all six of the major dyads: Kazakh-Kyrgyz, Kazakh-Uzbek, and Kyrgyz-Uzbek for the Syr Darya and Tajik-Turkmen, Tajik-Uzbek, and Turkmen-Uzbek for the Amu Darya.
In the dataset, an agreement is defined as a contract between two or more countries that includes concrete provisions regarding quantities, prices, or schedules. Despite the emergence of many regional organizations in the immediate post-Soviet period (see Weinthal, 2002), even the largest of these have little actual influence. Instead, agreements over resource management are usually bilateral and occur outside of formal institutions. As mentioned above, agreements are only included if they follow a period of noncooperation between countries. The most common dependent variables takes a value of 1 if an agreement is signed and 0 if noncooperation is maintained. Agreement occurs 25% of the time in the full dataset. The proportion of cooperative months in a particular subsample is also used as the dependent variable for one of the empirical tests. This is the number of cooperative observations divided by the number of total months.

<table>
<thead>
<tr>
<th>Number of months with an agreement</th>
<th>Syr Darya basin</th>
<th>Amu Darya basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazakh-Kyrgyz</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Kazakh-Uzbek</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Kyrgyz-Uzbek</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Tajik-Turkmen</td>
<td>3</td>
<td>71</td>
</tr>
<tr>
<td>Tajik-Uzbek</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>Turkmen-Uzbek</td>
<td>48</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proportion of months with an agreement</th>
<th>Syr Darya basin</th>
<th>Amu Darya basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazakh-Kyrgyz</td>
<td>0.4</td>
<td>0.04</td>
</tr>
<tr>
<td>Kazakh-Uzbek</td>
<td>0.6</td>
<td>0.51</td>
</tr>
<tr>
<td>Kyrgyz-Uzbek</td>
<td>0.21</td>
<td>n/a</td>
</tr>
<tr>
<td>Tajik-Turkmen</td>
<td>0.04</td>
<td>0.44</td>
</tr>
<tr>
<td>Tajik-Uzbek</td>
<td>0.51</td>
<td>0.55</td>
</tr>
<tr>
<td>Turkmen-Uzbek</td>
<td>n/a</td>
<td>1</td>
</tr>
</tbody>
</table>

*This refers to the number of noncooperative months that follow a previous noncooperative month*

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observations - cooperative and noncooperative - within that subsample. Summary statistics of the dependent variables are presented in Table 2.

Although these dependent variables do not distinguish between agreements with respect to their specific terms, there is no reason to believe this is problematic for testing the theory. All of these agreements relate to water, energy, or both and may include a variety of factors related to quantities, pricing, and payment. The combination of these, including their very presence or absence, determine how favorable an agreement is to each of the two countries engaged in negotiations. It is reasonable to assume that these terms are endogenous, especially given the wide variation in agreements. As such, they will change depending on how strongly each leader desires agreement. If one leader offers more favorable terms, the likelihood of an agreement being signed is higher. Thus, factors that increase the value of cooperation to one or other of the leaders should increase the likelihood of an agreement and, similarly, factors that decrease the value of cooperation to one or more leader should decrease the likelihood of an agreement.

The next two sections evaluate the effect of changes in the importance of beneficiary and nonbeneficiary groups, and in the value of cooperation as a goods provision policy on the likelihood that cooperation occurs. Together, they provide empirical evidence to demonstrate that leaders do use the informal flexibility of their international agreements to respond to changes in their domestic incentive structures.

### 3.1 Value of beneficiary groups

**Hypothesis.** The first prediction from the theory is that leaders alter their goods provision policies in response to changes in the relative importance of beneficiaries and nonbeneficiaries.

In this section, I examine two factors that affect this consideration. First, as groups pose an

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15For example, different agreements include: (1) price of nonrenewable energy supplied by downstream country (coal/gas/electricity); (2) amount of nonrenewable energy supplied by downstream country; (3) timing of deliveries of energy by downstream country; (4) balance between 100% prepayment for energy and allowable debt levels; (5) guaranteed amount and timing of water released by upstream country; (6) guaranteed quantity of hydroelectricity to be purchased by downstream country; (7) price of hydroelectricity to be purchased by downstream country; (8) prepayment for hydroelectricity by downstream country.
increased threat to the stability of the regime, their interests will become more important to the leader. He must change or expand his winning coalition, at least temporarily, to overcome the challenge, “buying off” would-be supporters of the challenge.

In Central Asia, the occurrence of protests in a particular location increase the perceived threat of that region. Of course, nondemocracies like the Central Asian countries, often respond to protests with repression. The leaders or even participants of a protest may be subject to political or violent reprisals. However, providing goods to those most likely to be sympathetic to the cause of these protagonists may prevent the threat from expanding. Even the most repressive dictator understands the value of using the carrot to supplement the stick. For example, when faced with the specter of an Arab Spring-inspired uprising, King Abdullah of Saudi Arabia spent $130 billion on public welfare to keep the people off the streets (MacFarquhar, 2012). Furthermore, in information-poor environments like nondemocratic Central Asia, protests can serve as costly signals of discontent and foreshadow brewing challenges to the regime (Lohmann, 1993). Since nondemocratic leaders have poor information about these preferences, the information gleaned from protests is taken very seriously, incentivizing leaders to supplement repression with the gentler tactic of goods provision to alleviate threats. When members of a particular subnational group threatens the regime, the leader will weight that group’s views on international cooperation or noncooperation more highly. In Central Asia, region - which overlaps with important ethnic and religious divides - is an appropriate way to identify potential supporters of a protest.

Applying Hypothesis 1 from above, we would expect that as protest levels increase in beneficiary regions, the likelihood of a cooperative agreement increases; likewise, as protest levels increase in nonbeneficiary regions, the likelihood of cooperative agreement increases.

When evaluating relative group importance, leaders will also consider the need to reward key bastions of support and privileged patronage networks. Unlike the previous hypothesis, which focuses on responses to waxing and waning threats posed by identifiable groups, this consideration can explain more sustained differences in international behavior. In Central Asia, the provision of such goods to supporting groups and networks is an accepted part of the politi-
cal game (for example Schatz, 2004; Collins, 2006; Markowitz, 2013). Goods distribution networks are embedded within Central Asian society, such that the identity of supporters is generally fixed over time. However, leadership turnover may produce a shift in the identity of privileged patronage networks. When this happens, the value of cooperation to the new leader may also change. Again, drawing on Hypothesis 1, we expect that *if the leadership change privileges groups that benefit from cooperation, then the likelihood of cooperation increases; if, on the other hand, the leadership change benefits subnational groups that oppose cooperation, then the likelihood of cooperation increases.*

*Measures.* To examine the protest hypothesis, I use an original dataset of protests occurring in each of the Central Asian countries. Data on protests are drawn from extensive article searches using the EastView database. Each event is coded with respect to date (year and month), severity, and location within the country. Almost every event is cross-referenced with at least two sources in an attempt to ensure the accuracy of the severity measure. Severity of protests is coded as one of four categories: small protests (less than 1,000 people), multiple small protests or one large protest (greater than 1,000 people), multiple large protests or single large protests with violence, and multiple large protests with violence.

The geographic location of protests within each country is vital to testing the theory. I split these events with respect to whether they involve beneficiaries or non-beneficiaries. As discussed above, the beneficiaries in the downstream countries are residents of regions near the relevant river. In Kazakhstan, protests that involve beneficiaries occur in or near the Syr Darya river; specifically, in either the South Kazakhstan, Jambul or Almaty provinces. In Uzbekistan, the beneficiary region depends on which river is involved. For the Amu Darya dyads

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16When a policy is of particular importance to a core supporting group, the value of flexibility may decline. However, there are two reasons why we should expect some incentives for flexibility to remain. First, as discussed above, the leader may want to preserve the ability to make concessions to would-be opponents in the case of a challenge. Second, the leader may value the ability to “turn off” the benefits of the goods provision policies in the event of disloyalty.

17With only two possible exceptions, these protests are unrelated to water and energy management. The first is the Kyrgyz 2010 revolution which had an increase in electricity tariffs as one proximate cause. However, the increase was explicitly domestic and therefore not directly related to international cooperation. The second is a protest in Tajikistan over the closing of rail links with Uzbekistan, which was, at least in the mind of Tajiks, a retaliation for moving forward with the Roghun project.

18I conducted only English language searches, using the following key words for each country: protest*, demonstrat*, attack*.

19This section ignores fuel energy producers, since they do not have a precise geographic location.
Figure 2: Geographic Divisions

Kazakhstan

Kyrgyzstan

Uzbekistan
(Tajik-Uzbek, Turkmen-Uzbek), events involve beneficiaries if they occur in Bukhara, Khorazm, Kashkadarya, Karakalpakstan or Surkhandarya provinces and all other events do not involve beneficiaries. For the Syr Darya dyads (Kazakh-Uzbek, Kyrgyz-Uzbek), events occurring in Andijan, Ferghana, Namangan, Tashkent, Syrdarya, and Jizzakh provinces involve beneficiaries and all others do not. In Kyrgyzstan, any events that occur in the South (Batken, Osh, Jalalabad) involve beneficiaries of cooperation, while those in the North do not since northern energy consumers receive adequate energy in the absence of cooperation. In Tajikistan - where energy consumers all benefit from cooperation - and Turkmenistan\textsuperscript{20} all regions are considered beneficiaries of cooperation. The geographic divisions for Kazakhstan, Kyrgyzstan, and Uzbekistan are depicted in Figure 2. Tajikistan and Turkmenistan are omitted because there are no territorial distinctions.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.png}
\caption{Geographic divisions for Kazakhstan, Kyrgyzstan, and Uzbekistan.}
\end{figure}

I make one adjustment to these straightforward geographic divisions: it is necessary to account for the effect of scarcity on these preferences in upstream Kyrgyzstan and Tajikistan. In growing season months when water availability is below average, all regions of Kyrgyzstan and Tajikistan are coded as nonbeneficiaries, since all energy consumers prefer noncooperation under these conditions. For example, a protest that occurs in the South of Kyrgyzstan in September would be coded as a beneficiary protest if the water level is above average and as a nonbeneficiary protest if it is below average\textsuperscript{21}

I use two distinct independent variables in the statistical analysis. The first captures the level of protest within the geographic range of beneficiaries (beneficiary protests) and the second measures the protest level outside the geographic range of beneficiaries (nonbeneficiary protests). Since the dependent variable is dyadic, I take the higher value for each event for beneficiary and nonbeneficiary groups respectively from the countries in the dyad\textsuperscript{22} I use a lagged three-month average of protest level to account for cumulative effects.

\textsuperscript{20}This point is moot for Turkmenistan, since it experienced no incidences of protest during the time period under study.
\textsuperscript{21}Alternate codings are discussed and used in the online appendix.
\textsuperscript{22}Results using average protest levels are similar. See the online appendix for more details.
Kyrgyzstan is the only country with distinct shifts in the privileged patronage networks during the time under study. Therefore, I exclusively focus on dyads involving Kyrgyz to evaluate the second hypothesis. As discussed above, the primary beneficiaries of cooperation are residents of the South. The most pertinent division in Kyrgyz society is also between the North and South. The first leader, President Akayev was from the North and privileged the Northern clans. He was replaced by President Bakiev in April 2005, who was from the South and shifted the privileged patronage networks accordingly. In April 2010, power shifted back to the North with President Otunbayeva (and then President Atambayev). The theory suggests that cooperation was more valuable to President Bakiev than it was to the other Kyrgyz presidents. Of course, a change in leadership is associated with many changes in the way policies are made, not just a change in the leader’s primary support base. The evidence presented below must therefore be viewed as suggestive rather than causal.

Results. The major findings are displayed in Table 3. The first hypothesis predicted that agreement would be more likely when there is protest in beneficiary areas and less likely when there is protest in nonbeneficiary levels. Models 1 and 3 demonstrate that this is, indeed, the case. Protest in beneficiary regions is positively related to the likelihood of agreement, while protest in nonbeneficiary regions is negatively related, although this result does not quite reach statistical significant at the 0.10 level. These effects are illustrated in Figure 3, which depicts the predicted effect of protest on the likelihood of agreement, holding protest in the other region at zero.

Some suggest the underlying difference between the North and South is clan-based, others that it is ethnic or religious, since the South has a higher concentration of both ethnic Uzbeks and devout Muslims. Regardless, the result is a clear divide between the North and South that I will, for the sake of simplicity, treat as regional based.
Table 3: Importance of groups and international resource management

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beneficiary protest level</td>
<td>0.811***</td>
<td>1.021***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.161)</td>
<td>(0.290)</td>
<td></td>
</tr>
<tr>
<td>Nonbeneficiary protest level</td>
<td>−0.795</td>
<td>−1.186*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.496)</td>
<td>(0.657)</td>
<td></td>
</tr>
<tr>
<td>Beneficiary violence level</td>
<td>0.606***</td>
<td>0.762***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td>(0.281)</td>
<td></td>
</tr>
<tr>
<td>Nonbeneficiary violence level</td>
<td>−0.543***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.206)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South in power</td>
<td>−0.519***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.133)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in energy prices</td>
<td>−0.477***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative water scarcity</td>
<td>0.435*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.230)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing season</td>
<td>−1.105*</td>
<td>−1.299***</td>
<td>−0.837***</td>
</tr>
<tr>
<td></td>
<td>(0.635)</td>
<td>(0.300)</td>
<td>(0.050)</td>
</tr>
<tr>
<td>N</td>
<td>205</td>
<td>77</td>
<td>75</td>
</tr>
</tbody>
</table>

***p < .01; **p < .05; *p < .1

Dependent variable is the signing of a new agreement. Results are from logit models with robust standard errors clustered at the dyad level. ***p < .01; **p < .05; *p < .1
Figure 3: Predicted effect of beneficiary and nonbeneficiary protests on cooperation
The substantive effect of protest on the transition from noncooperation to agreement is much larger for the case of beneficiary territories than it is for nonbeneficiary territories. This should not be surprising. Individuals located in territories designated “beneficiary” are active supporters of cooperation; they include the agricultural producers that receive irrigation water and the energy consumers that receive electricity. On the other hand, individuals located in territories designated “nonbeneficiaries” are mainly just passive opponents of cooperation; they do not receive any benefits from this strategy, but nor do they pay any substantial costs. If they do pay costs, these tend to be more diffuse than the benefits received by active supporters. For example, given the antagonism between citizens of the Central Asian countries, they might simply not like cooperating and, therefore, oppose doing so in the absence of any tangible benefits. Consequently, we expect that the effect of nonbeneficiary protests will be smaller than the effect of beneficiary protests which, as is evident in Figure 3, is in fact the case.

As a robustness check, I tested whether a similar dynamic occurs for violent attacks against the state or representatives of the state, like bombings or assassination attempts. These also represent threats to the leader’s power, but are carried out by a select group of individuals and are not necessarily supported by others in the region where they occur. They are also isolated in the sense that sympathizers do not pose an immediate threat as they do in the case of protest; terrorist attacks take time to plan and execute, while protest movements tend to expand rapidly. Targeting goods to regions where attacks occur is therefore unlikely to be an effective response. The contrast with protests is evident in Figure 4 which plots the predicted effect of increasing levels of violent attacks. Interestingly, these actions may actually elicit an opposite response from the government; violent attacks in nonbeneficiary regions are positively related to an increased likelihood of cooperative agreement. The contrast between these results and those

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24 To see this formally, recall the leader’s utility function: \( U_L(\text{cooperation}) = \alpha b_B - (1 - \alpha)c_B \). The derivative of this with respect to \( \alpha \) (i.e. the effect of increasing the importance of the beneficiary group on the leader’s utility) is greater when \( c_B > 0 \) than it is when \( c_N = 0 \), but it is always positive.

25 As with protests, this is coded on a zero to four scale and uses a lagged three month average. Data comes from original news articles collected from the EastView database.

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Figure 4: Predicted effect of beneficiary and nonbeneficiary violence on cooperation
regarding protests clearly indicate that leaders treat protests differently than they do violent attacks.

I turn now to the hypothesis concerning key supporters. Models 2 and 3 in Table 3 demonstrate the effect of southern dominance on the probability that a new agreement is signed. They suggest that periods of noncooperation are more likely to end (i.e. an agreement is more likely to be signed) when the South was in power. This effect is both statistically significant and substantively large. Unlike the other hypotheses, which focus on transition, the hypothesis regarding core supporters also has implications for the overall level of cooperation between countries. That is, we expect more cooperation during the period of Southern dominance than when the North predominates. The difference in means test presented in Figure 5 is consistent with this prediction. The proportion of cooperative months was higher by 0.222 during President Bakiyev’s regime compared to when the other two leaders - both from the North - were in power.
Figure 5: Effect of Kyrgyz power shift on cooperation
In general, the evidence demonstrates that Kyrgyzstan was more likely to engage in cooperation during the period of Southern dominance. Furthermore, the probability of transition from noncooperation to agreement was higher. It is safe to say that the period of Southern dominance, which coincided with the rule of President Bakiyev, was therefore more cooperative than the periods of Northern dominance. The theory posits that this is because the South benefits from cooperation more than the North, although as mentioned above, this does not rule out idiosyncratic personality factors as an alternate cause.

Taken together, the evidence in this section strongly suggests that the Central Asian leaders take the identity and importance of the beneficiary and nonbeneficiary groups into consideration when making their short-term goods provision decisions.

### 3.2 Value of cooperation as a distributional policy

**Hypotheses.** The theory also predicts the likelihood of cooperation increases as the value of cooperation as a distributional policy grows. This value, in turn, increases when the benefits to supporting groups increase or the costs to opposing groups decrease. If the benefits are small relative to the costs, then the leader may be better off using an alternative distributional policy. In this section I explore the effect of two factors that influence the costs and benefits of cooperative resource management in Central Asia.

The first consideration is the relative availability of water in the region. The effect of water availability on relations among countries that share transboundary water resources has received a great deal of attention in recent years. Some argue that shortages of water will lead to conflict (Mandel 1992; Gleick 1993; Homer-Dixon 1994; Tarlock 2008), while others point out that the empirical record does not support a link between scarcity and conflict (Wolf, Yoffe and Giordano 2003; Barnaby 2009), and argue that cooperative solutions may be found instead.

Although the article does not evaluate the conflict side of this debate, it does examine the effect of water availability on the welfare of the relevant subnational groups and uses this to predict not just if scarcity causes cooperation, but when this kind of response will occur.

The previous section outlined the primary supporters of cooperation in downstream coun-

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26 A series of empirical studies by Brochmann and Hensel (2007, 2009, 2011) take seriously the idea that water scarcity can cause both cooperation and conflict.
tries: agricultural producers and residents of local urban areas. When rain water is abundant, the marginal value of additional irrigation water obtained through international cooperation is lower than it is when there is not enough rain water to obtain optimal yields. Consequently, cooperation becomes more important to these groups when water is scarce. This is true regardless of the season. In summer and fall, when irrigation is necessary, cooperation means an increased supply of water that will be used to keep crops alive. In the winter and spring, on the other hand, cooperation decreases the amount of water being used by the upstream countries for the production of hydroelectricity, allowing the reservoirs to fill. In the absence of cooperation, there would not be enough water in the reservoirs for irrigation during the upcoming summer.

The major supporters of cooperation in the upstream countries are the energy consumers who receive more reliable supplies of energy. Energy consumers receive the greatest benefits from cooperation during the winter and spring, when indigenous energy supplies are at their lowest and demand is at its highest. This is particularly true when water is scarce, because there is likely to be less hydroelectric production than usual. During this period, such groups would unambiguously support cooperation and do so with greater strength in times of water scarcity. On the other hand, they do not receive any immediate benefit from cooperation in summer and fall. Under conditions of abundance, they are relatively indifferent between cooperation and noncooperation. However, when water is scarce, upstream energy consumers clearly prefer the available water be preserved for energy generation in the coming winter. Failure to do so decreases future production capacity and results in a greater likelihood of energy shortages, especially if downstream countries do not follow through with their promised energy supplies.

Combining these observations results in a conditional prediction. Water scarcity increases the value of cooperation to downstream leaders by increasing the marginal utility of cooperation to beneficiary groups. However, although it increases the value of cooperation to upstream leaders during non-growing months, it actually decreases the value of cooperation to upstream leaders during the growing season. Applying Hypothesis 2 from above, we therefore expect that low water availability increases the likelihood of cooperative agreement during nongrowing months, but has an ambiguous effect on this likelihood during growing months.

The second consideration is the profitability of outside fuel energy sales, which influences
the costs of cooperation. As discussed in the previous section, Kazakhstan, Uzbekistan and Turkmenistan are all endowed with significant energy resources. Energy elites generally oppose cooperation because agreement with upstream countries over water and energy management means that some quantity of energy resources is sold to Kyrgyzstan and Tajikistan rather than other potential buyers. The prices of such sales are typically well below market price because they implicitly include payment for the water to be delivered during growing months. A higher price could therefore be obtained by selling to non-Central Asia markets. Since the exchange of energy for water reduces the quantity available to sell to such markets, the beneficiaries of energy sales - i.e. energy elites - pay a direct cost. Energy and agriculture are managed by separate ministries and there is very little coordination among disparate ministries that could result in side-payments. Thus, cooperation provides no direct benefit to energy elites.

The marginal disutility from cooperation depends on how profitable the “lost sales” are to downstream energy elites. The costs are large when the energy exchanged for water has a particularly high potential value in alternative markets. On the other hand, when the difference between the sale price of energy to upstream countries and the price that could be obtained in other markets is relatively small, the costs are lower. From Hypothesis 2, we expect that an increase in the profitability of outside sales will lead to a decrease in the likelihood of agreement.

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27 There is serious resistance to paying for water directly, stemming from the belief that water is a gift from God, rather than a commodity (O’Hara, 2000).

28 Interview conducted by the author with the head of a local NGO involved in energy and environmental issues. October 24, 2011. Conducted in English. Bishkek, Kyrgyzstan.
Figure 6: Water flow deviation from monthly averages over time
Measures. The major independent variable for the first hypothesis is water availability. Data on the monthly inflow to the Toktogul reservoir in Kyrgyzstan captures water availability along the Syr Darya (Kazakh-Kyrgyz, Kazakh-Uzbek, and Kyrgyz-Uzbek dyads). Water withdrawals geographically prior to the Toktogul reservoir are minimal, so this is a good indication of how much water is available in the Syr Darya water basin. Monthly inflow to the Nurek reservoir in Tajikistan measures the relative availability of water in the Amu Darya (Tajik-Turkmen, Tajik-Uzbek, and Turkmen-Uzbek dyads). This inflow data is used to construct variables that measure the deviation from the 19 year monthly average. For example, I take the average inflow to the Toktogul reservoir in January for the period 1992-2010 and then subtract this from the actual inflow in a given January and convert it into standard deviations. Converting flows to standard deviations helps account for the fact that the variance around the average flow is higher during the growing months (June-November). Figure 6 illustrates this measure for both the Syr Darya and the Amu Darya over the entire time period. Although there are some differences, water levels in the two river basins follow roughly similar patterns. The water availability measure used in the analyses measures the lagged deviation from the three-month average. An indicator variable for the growing season (June-November) is used to capture the seasonal differences in the effect of water availability.

The major independent variable for the second hypothesis is energy prices, which captures broad trends in the global energy market. To make world prices of energy, coal, and oil comparable, these are converted into US dollars per British Thermal Unit (BTU)\textsuperscript{29}, using conversion rates suggested by the United States Energy Information Administration (www.eia.gov). These prices are then multiplied by the proportion of each type of energy produced in each country, which again is based on a conversion to BTU. Since the energy price hypothesis relates to proximate changes in energy prices, it is necessary for the measure to capture change. Therefore,

\textsuperscript{29}Data for the price of coal and crude oil (petroleum) come from the World Bank; data for natural gas comes from the International Monetary Fund. All three are available at http://www.indexmundi.com/commodities/; Last accessed 2/5/2013.
*energy prices* is a measure of change in the prices per BTU of energy lagged by one month.

**Results.** Table 4 displays the major findings for the first two hypotheses. Models 1 and 3 demonstrate the core results for the water availability hypothesis, although the effect is easier to see in Figure 7, which depicts the predicted probability of an agreement as water availability moves from its minimum to its maximum in the growing and non-growing seasons respectively. In the growing season, water availability does not seem to affect the likelihood of agreement. This is consistent with the fact that subnational interests in the upstream and downstream countries are in conflict during this period. On the other hand, in the non-growing season, the more water is available - and thus the less valuable cooperation is to both upstream and downstream beneficiaries - the less likely there is to be an agreement.

Table 4 also displays the major results for the energy price hypothesis. As is apparent in both Models 1 and 3, a positive change in energy prices is associated with a decrease in the likelihood of signing a cooperative agreement. This suggests that an agreement is less likely to occur when the outside energy prices - i.e. the costs associated with cooperation - are high. Figure 8 depicts this relationship graphically. Although the effect is statistically significant, the confidence intervals are quite wide. This may be because the measure of energy prices does not account for difficulties in transporting fuel energy to be sold. Especially in the earlier years of independence, transit options were very limited and it is unlikely that global energy prices exactly match the prices that could be obtained by the Central Asian countries, making these an imperfect proxy for the costs of cooperation.

Figure 8 about here]

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30 Alternative specifications presented in the appendix also indicate that this effect is less robust than the others.
Table 4: Policy effectiveness and international resource management

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative water availability</td>
<td>$-0.688^{***}$</td>
<td>$-0.664^{***}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.154)</td>
<td>(0.148)</td>
<td></td>
</tr>
<tr>
<td>Growing season</td>
<td>$-0.683^{***}$</td>
<td>$-0.704^{***}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.129)</td>
<td>(0.085)</td>
<td></td>
</tr>
<tr>
<td>Availability X growing season</td>
<td>0.604$^*$</td>
<td>0.760$^*$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.318)</td>
<td>(0.300)</td>
<td></td>
</tr>
<tr>
<td>Change in energy prices</td>
<td>$-0.316^{**}$</td>
<td>$-0.289^{**}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.137)</td>
<td>(0.140)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>$-0.740$</td>
<td>$-1.140^{**}$</td>
<td>$-0.785$</td>
</tr>
<tr>
<td></td>
<td>(0.606)</td>
<td>(0.545)</td>
<td>(0.595)</td>
</tr>
<tr>
<td>N</td>
<td>205</td>
<td>202</td>
<td>200</td>
</tr>
</tbody>
</table>

Dependent variable is the signing of a new agreement. Results are from logit models with robust standard errors clustered at the dyad level. $^{***}p < .01$; $^{**}p < .05$; $^*p < .1$
Figure 7: Predicted effect of water scarcity on cooperation
Figure 8: Predicted effect of energy changes on cooperation
The evidence in this section suggests the Central Asian leaders do, in fact, alter their international policies as the value of cooperation as a means of targeted goods provision changes.

4 Conclusion

The flexibility of resource management in Central Asia serves a useful and rational purpose: it allows leaders to respond to changing domestic incentives that alter their incentives for targeted goods provision. More broadly, policy flexibility - be it formal or informal - is an important feature of targeted goods provision policies wherever domestic uncertainty is prevalent.

As new information comes to light, leaders utilize the flexibility of their goods provision policies in predictable ways. In Central Asia, resource management agreements are more likely to occur when the benefits are high, the costs are low, and the beneficiary groups are important to the stability of the regime. In particular, cooperation is most likely in non-growing months of low water availability, when market energy prices are low, when there are protests in beneficiary regions, and when the leader’s core supporters are among the beneficiaries. The empirical analyses provides strong evidence that the nondemocratic of post-Soviet Central Asia are concerned with factors that influence both the effectiveness of goods provision policies and the importance of the beneficiary groups.

An additional implication of the theory is that nondemocratic leaders are more likely to choose policies that are intrinsically flexible than democratic ones. At the domestic level, there is some evidence to suggest this is the case. Consider the example of property rights. Knutsen (2011) demonstrates that, even after controlling for potential endogeneity, democratic countries tend to provide greater protection for property rights than do autocratic countries. In Tajikistan, land-rights remain unsettled almost 25 years after independence. In an interview in Dushanbe, an expert discussed the implications of this: “One of the big problems of course is to really work on the irrigation efficiency, you have to work on your land. And that means you have to make certain investments and you only want to do that if you have some sort of guarantee that that land is either for longer-term under your use, or that if you have improved it, you can trade it.”

In this way, unsettled property rights have a negative effect on country development.

31 Interview conducted by the author with two foreign employees of an international organization involved in
However, they have the advantage of being a much more flexible form of goods provision than settled property rights. Nondemocratic leaders may strategically keep property rights unsettled so that land can be reallocated as their incentives for goods provision change.

This implication also applies to the international level, where we would expect autocracies to adopt more flexible forms of cooperation. As previously mentioned, work by Rosendorff and Milner (2001) and Koremenos (2005) suggests this is the case. However, such studies do not account for the possibility of informal flexibility. Agreements between the Central Asian countries do not appear particularly flexible on their face, but the informal norm of flexibility is strong. A measure of both formal and informal flexibility would be necessary to fully test the difference between democracies and nondemocracies when it comes to international policy flexibility.

In general, the theory and empirical findings have significant implications for how we think about policy choice. Temporal targeting is an important consideration, especially in nondemocracies where leaders are particularly inclined towards private or targeted goods, rather than public ones. Leaders will consider both the spatial and temporal scope when evaluating policies. In Central Asia, recognizing this fact allows us to account for significant temporal variation in cooperation over resource management. However, a similar analysis could be performed on other policies, at the national as well as international levels. The framework presented here is thus a powerful tool for thinking about how and why leaders select particular goods provision policies at particular times.

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References


URL: http://dlib.eastview.com/browse/doc/13250295


