The Political Economy of Major Water Infrastructure Investments in the Western United States and the Impact on Agriculture: An Historical Analysis

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Abstract:
Greater historical perspective is needed to enlighten current debate about future human responses to higher temperatures and increased variation in precipitation. Our goal is to identify the major players in the water infrastructure projects and analyze the site location decision and the factors (political, economic, and geographic) that influence the location decisions. We assembled data on dams and other major water infrastructure and congressional committee memberships (committees for water resources, agriculture and appropriations). Using this state-level data set, we examine the importance of political influence in dam construction. Specifically, we are interested in the long-run impact of Congressional influence on the location of major water infrastructure projects. Our preliminary results indicate that House committee session-seat representation generally has a positive and significant impact on the number of dams and the proportion of dams constructed in a state. Moreover, the magnitudes of the coefficient estimates in the western 13 states are in almost all cases larger than those in the all-state sample.

#I. Introduction

Climate change has been analyzed and discussed in a variety of academic disciplines and much of this academic (as well as policy) focus has been on the mitigation of potential climate change through international efforts to control greenhouse gas emissions (e.g. Stern, 2007; Nordhaus, 2007; Weitzman, 2007 and references therein). Adaptation, thus far, has received relatively less attention, but as climate change mitigation policies continue to flounder, the academic and policy discussion has been shifting more towards adaptation.

Adaptation, specifically planned adaptation that involves deliberate policy decisions, is the main focus of our research. We examine adaptation decisions in agriculture, the investment in water infrastructure, the timing and location decisions of water infrastructure, as well as the impact of the water infrastructure on mitigating the effects of more variable precipitation levels and periods of drought on agricultural production. It is widely accepted that climate is variable over time—due to natural variations in hydrological cycles and because of disturbances in these cycles. These variations and uncertainties result in potential problems in water resource management. Agriculture is particularly vulnerable to climate variation, and agricultural productivity is very sensitive to changes in water supplies in some regions. For instance, the land in the west of the 100th meridian is North America's driest and has its most variable climate; the western portion of North America is also where the duration and severity of drought is suggested to be increasing (Lettenmaier, et al., 2008, Andreadis and Lettenmaier, 2006). The variability of water supplies in the West has been known for a while, and thus much of the present water supply infrastructure was constructed in the late 19th and early to mid 20th centuries due to historical demand for agricultural irrigation, flood protection, drinking water, and hydroelectric power.

In this paper, we focus on the factors that explain the timing and location of major water infrastructure. Our goal is to identify the major players in the water infrastructure projects and analyze the site location decision and the factors (political, economic, and geographic) that influenced the observed historical patterns of investments in water supply projects. Although a key motivation of our study is understanding adaptation to climate change, we expect that politics might mold or shift the nature and eventual location of major water infrastructure projects away from what otherwise might have been the optimal location. As part of this analysis, we seek to investigate the potential links between climate variability (changes in annual precipitation totals and mean monthly temperatures), political factors (political party, membership on key congressional committees, congressional voting records), economic and demographic variables (past agricultural output, population), and natural conditions (soil quality, topography, location of natural water sources) in explaining the construction of water infrastructure, thus answer questions such as: given a cohort of prospective dam locations, why was one site chosen over another, and what were the factors that influenced this decision? For example, what was the influence of periods of climatic variability on the construction of water infrastructure relative to other factors such as available arable land, terrain, past population growth, and agricultural prices? In addition, we are interested in explaining the timing and the distribution of projects authorized by the Reclamation Act of 1902.

In this preliminary version of our study, we only analyze the impact of political representation on the location decisions for major water infrastructure projects. We assembled an extensive dataset on major water supply and water infrastructure, including all major infrastructure projects implemented during 1880 – 2000 in the United States, and we linked this dataset with historical federal congressional committee assignments. We focused on memberships at committees for water resources, agriculture and appropriations. Using this state-level data set, we examine the importance of political influence in dam construction. Specifically, we are interested in the long-run impact of Congressional influence on the location of major water infrastructure projects. Our preliminary results indicate that House committee session-seat representation generally has a positive and significant impact on the number of dams and the proportion of dams constructed in a state. Moreover, the magnitudes of the coefficient estimates in the western 13 states are in almost all cases larger than those in the all-state sample.

We further linked our county-level water infrastructure dataset to topographic characteristics, historical political data, historical climate data, and historical agricultural data. In our companion paper, we analyzed the impact of the water infrastructure on agricultural production, especially during times of drought or excessive precipitation (Hansen, Libecap, and Lowe, 2011). Focusing on five western states in the U.S. (Idaho, Montana, Wyoming, North Dakota and South Dakota), we find that farmers in counties that had major water storage and distribution facilities were more likely to adjust their agricultural production (crop mix and yields) and had a higher likelihood of successful harvest, especially during periods of severe droughts and/or excessive precipitation. Thus, our results indicate that the presence of major water infrastructure has helped to mitigate the damages of periodic droughts and excessive precipitation, and will likely continue to do so in the future.

II. Data and Empirical Model

In order to analyze the impact of political representation on the location decisions for major water infrastructure projects, we have compiled the most detailed data available on major water infrastructure and federal congressional committee assignments. The dataset covers all states, former territories, and current organized and unorganized territories with congressional representation, for the years between 1880 and 2000.

The following sections describe the sources of our data, discuss the mechanisms that were used to assign Congressional representatives to the major water infrastructure projects, and present summary statistics on trends in major water infrastructure and political representation.

Congress Sessions and Decades

We are interested in the long-run impact of Congressional influence on the location of major water infrastructure projects. We therefore need to develop methods to generalize our data from the single year that a dam is completed and the span of multi-year Congress periods, into decades. Although our major water infrastructure dataset, which is organized by year of completion, presents a conversion into a dataset of decadal dam counts which is relatively straightforward, the temporal scale of our Congressional data makes it difficult to assign Congress periods to decades. The reason for this difficulty is because different Congressional periods can occur during the same calendar year. For example, the 51st Congress had two separate sessions – spanning from December 2nd, 1889 until March 3rd, 1891.[1] In those cases in which a Congress period spanned more than a single decade, we assigned it to the decade that had the largest number of days that it was in session. In the case of the 51st Congress period presented above, this Congress was assigned to the 1890-1899 decade, acknowledging that the

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[1] This doesn't account for those "special sessions" convened by the President.

30 days that it was in session during the 1880s decade would be misattributed to the 1890s (within which it was in session for a total of 367 days). Fortunately, this overlap only was problematic for 12 of the 60 Congresses (between 1880 and 2000) in our analysis, and only for a small fraction of the total days in the analysis. We will revisit this overlap assumption in our sensitivity analysis.

Since we have converted the data into decadal totals, our measures of Congressional committee representation can no longer be defined in terms of Congresses, but rather in terms of "session-assignments" over the 10 year period. If there were five Congressional periods held over a decade and a single representative was assigned to the same committee seat for all five of them, then we define this as five session-assignments in that decade. The use of decades will allow us to correct, to some degree, for the uncertainty surrounding the lag between dam approval and completion, which is discussed in the subsequent sections.

Major Water Infrastructure

Our primary source for the major water infrastructure is U.S. Army Corps of Engineers' National Inventory of Dams (NID). The data include information on the location, owner, year of completion, the primary purpose for the dam, capacity and height characteristics for major dams in the U.S. There are approximately 80,000 dams in the Army Corps of Engineers database, 8,121 of which are considered to be "major". A major dam is 50 feet or more in height, or with a normal storage capacity of 5,000 acre-feet or more, or with a maximum storage capacity of 25,000 acre-feet or more. Of these 8,121 major dams 2,166 are located west of the 100th meridian. The primary purposes of construction include flood control, debris control, fish and wildlife protection, hydroelectric generation, irrigation, navigation, fire protection, recreation, water supply enhancement, and tailings control. Unlike many dams in the eastern US, a majority of the dams in the western US have irrigation as one of their primary purposes. Although we are less concerned with the primary purpose of the dam, it is worth noting that this purpose can dramatically impact the number of political constituents that may benefit from it.

Congressional Representation

Committee participation was taken from Canon et al. (1998), Nelson (2005), and Stewart et al. (2011), and includes the Congressional session and committee assignment for both the House committees and Senate committees, from the first Congress through the 112th Congress. Our analysis focuses on three specific types of committees – each directly connected to the primary purposes of the dams: water provision, agriculture and appropriations. Over time, committees were subsumed, merged, renamed and in some cases became defunct. Table (1) presents the committee assignments that we focus on, their years of operation, and to some degree the natural merging and renaming sequences. For example, the House Irrigation of Arid Lands committee was renamed Irrigation and Reclamation in 1924, and was moved to the Public Lands committee from 1947-1951. The Public Lands committee was renamed Interior and Insular Affairs in 1951, and in 1993 the Interior and Insular Affairs became the Natural Resources committee. In order to control for some of the overlap, late startup, and expiration of these committees, we generate a composite committee that sums the water resources, appropriations and agriculture session-seats into a decadal aggregate committee variable.

We are only able to observe the parent committee assignment, so for example, if a congressman is on the Natural Resources committee, we won't observe if they are on the Water and Power subcommittee or one of the other subcommittees. We assume that the power or influence occurs due to participation on the parent committee as opposed to the subcommittee status.

Concerns

Given our master dataset, there are a number of concerns that we must address, in turn. First, the number of House of Representatives seats, per capita, are generally consistent across all of the United States. According to the year 2000 Census, there were approximately 650,000 residents per house seat. Small states such as Vermont and Wyoming, with total populations of less than 610,000, only have a single House of Representatives seat; larger states, such as California and Texas, have 55 and 32 House of Representative seats, respectively. It is therefore easy to understand why there is a strong correlation between the population of a state and the number of representatives that it has on any given committee. This correlation complicates our analysis – if there are a large number of dams built in a state with a large population, then we may be misattributing the influence of the legislator: the committee assignment may have been due more to population pressures and random committee assignments than the actual interest of the legislator.

However, this influence is exactly what we are interested in measuring. If there are a larger number of representatives on a committee, all else equal, we would expect those representatives to attempt to create and support water infrastructure projects that benefit their constituents. Because a state has a larger population, and thus more representatives on a committee, this should result in more dams being built, regardless of the underlying reason for assignment to the committee.[2] However, the more disadvantaged states, in terms of total

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[2] This assumes that there are enough potential dam sites in the state. We address this constraint with our survival model discussed in the empirical section.

population, should maneuver to place more of their representatives on these key committees, eschewing the committee assignments that are less beneficial to their constituents.

We see these trends in the data. Table (2) presents the total number of dams constructed and congressional committee seats by decade, for the entire United States, and for those 13 contiguous states west of the 100th meridian. These totals are further disaggregated for the Irrigation and Public Works committees, by state, in Tables (3). Although there is a strong correlation between population and the number of committee seats, the relationship is by no means uniform. For example, Kentucky and Montana had the same number of session-assignments on the Water Resources Committees throughout the 1990s, yet Kentucky had over 4 times the population (and thus 4 times the number of all session-assignments,) as Montana. Wyoming, per capita, has 4 times as many session-assignments on the Water Resources Committees as California, although in total magnitude, their total populations are on different ends of the spectrum. Although the single House of Representatives member from Vermont sat on the Water Resources committees zero times throughout the 1990s, the representative from Wyoming sat on it in every single session – five times in total. Similarly, the two senators from Wyoming sat on the Senate counterpart to the House committee all five times as well. Of the top ten states in Water Resources committee session-seats per capita, eight are in the arid western United States.

Our second concern relates to the timing of the approval of the dam, and the role that the Senator or House of Representatives committee member plays in its approval. Obviously the Congressional approval of the dam occurs at some point before the dam is completed. Unfortunately, we don't observe the approval date, just the completion date. Anecdotal evidence points to major dam construction as either a stand-alone construction project or a process of

"Projects" that often include multiple dams over many years. For example, the Bureau of Reclamation Boise Project in Idaho encompasses five storage dams that were constructed over a 35 year period for multiple purposes – flood protection, irrigation, hydroelectric power, etc.. Similarly, dams have historically been updated, expanded and enlarged many years after they were first built. Some private dams became public, and some state-funded dams were subsumed by the federal government, thus becoming federally-funded dams. These project-level approvals and improvements to existing structures complicate our analysis. Even with this uncertainty, the time of construction can vary quite dramatically – Hoover Dam, one of the largest construction projects in the history of the United States, only took five years to complete, most of which included the pouring of concrete (U.S. Bureau of Reclamation)

As mentioned earlier, the aggregation process that we use to construct our data can potentially remove some of this uncertainty – particularly for those dams that were approved and constructed within the decadal time scale of the observations in our analysis. However, we are unable to account for those dams that have approval and construction periods that span multiple decades. To the best of our knowledge there have been no dams with construction periods that have spanned more than two decades from start to finish. We attempt to address this uncertainty by including decadal lags of the representative variables. The correlation between the current decade committee representation variables and their lagged counterparts is strong and positive, but by no means perfect: the pairwise Pearson correlation coefficients range from 0.67 to 0.86 across decades. The impacts of the lagged committee representation variables, and their significance, are discussed in the results section.

Our third concern relates to the motivation of the Congressional committee members. For the most part we assume that the benefactors from the dam are accounted for in our representative system. In this phase of the analysis we assume that it is only the representatives of the state that receives the dam that are influential in its siting. However, we know that of the ~ 230 Bureau of Reclamation multi-dam projects in the Western United States, at least 18 of these have beneficiaries that are multiple states. For example, Hoover Dam provides water and firm power contracts to California, Arizona and Nevada, even though the dam is located on the Arizona-Nevada state line. It may be the case that the water, power, flood protection, recreation or transportation provided by the dam may be of benefit to multiple states, but the tax revenue, employment opportunities, and other economic stimulus is likely to fall in a majority sense, on the home state. As mentioned, for the time being we assume that only the state within which the dam is located has an influence on its approval, however we will relax this assumption with additional data in our sensitivity analysis.

Econometric Model

In this section we describe the econometric strategy used to estimate the impact of Congressional committee representation on the location decision for major water infrastructure projects, using the data sources outlined in the previous sections. Our empirical strategy presents a dependent variable with two permutations: First, we regress the number of dams constructed in the state, over the decade, on our panel of covariates; second, we regress the percentage of dams constructed in the state, over the decade – in other words, the total dams in the state *divided* by the total dams constructed over that decade in all states. We include decadal (time) fixed effects to account for unobservable effects that are consistent within decades across our sample. We anticipate that these fixed effects will capture federal mandates, such as the Legislative Reorganization Act of 1946, which was aimed at reducing the number of “bloated, fragmented” committees (Smith, et al. 2011). We also include a scale variable that represents spatial groupings of states according to the Office of Management and Budget (OMB) "Standard Federal Regions".[3] These groups are logical geographic regions, and are very similar in scope to other federally defined regions, such as those of the Environmental Protection Agency, the Census, etc. To some degree the OMB regions reflect similar general climates, topographies and geographic latitudes, which may be of the most concern—as population patterns in the US developed from east to west.[4]

We estimate these models for both the entire panel of US states, as well as subsections of the 13 states west of the 100th meridian, and a subsection of five northwestern states (Idaho, Montana, Wyoming, South Dakota and North Dakota) to align with our previous work on the agricultural impacts of major water infrastructure projects in the arid western United States (Hansen et al 2011). We let $DAMS_{it}$ denote the total count, or proportion of dams constructed, in state *i*, in decade *t*. Our basic econometric model is equation (1) below:

$$DAMS_{it} = \alpha HouseCommittee_{it} + \beta SenateCommittee_{it} + \theta_t + \delta_j + \eta_{it} \tag{1}$$

where α and β are our parameters of interest, which measure the influence that having House or Senate committee representation on the construction of dams. θ_t is a decadal fixed effect, δ_j is a multi-state regional effect, and η_{it} is the unobserved error component.

III. Results

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[3] State fixed effects would be the obvious choice here, but we are interested in the influence of Congressional committee representation across states, and the inclusion of state fixed effects removes the significance across states.

[4] For example, OMB region 1 includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; OMB region 7 includes Iowa, Kansas, Missouri and Nebraska; etc.

The results of the OLS estimation of equation (1) are presented in Table (4). For simplicity, and because we conducted a large number of models, we present only the coefficient estimates with our abbreviated indication of their significance. The full results are available by request from the authors.

Several outcomes are worth noting. First, in virtually all of the models that we estimate, the trend is for the House committee session-seat representation to have a positive and significant impact on the number of dams and the proportion of dams constructed in a state. The coefficient estimates are to be interpreted as the impact of a single Congressional session-seat on the number of dams constructed or the proportion of the total dams constructed in any decade. Looking at the first model group (1) for the Water Resources Committees, a single session-seat on that House committee over a decade results in 0.623 more dams for a state, or an increase of 0.088% of the total dams constructed in that decade. If 1,000 dams were constructed across the US over this period, the single Congressional committee session-seat would likely induce 0.88 dams (or 0.088% of the total) for their state. The exceptions to this trend are for the House Agriculture committees in the ID/MT/WY/SD/ND subgroup in which the influence is large and negative. Generally, the Senate committees are not significant. Those that are, are for the Agriculture and Appropriation committees, and they are generally negative.

Second, the “western 13” state subgroup of observations in our sample results seems to drive the results in all states – both in sign and significance. The magnitudes of the coefficient estimates in the western 13 states are in almost all cases larger than those in the all-state sample. Similarly, the ID/MT/WY/SD/ND sample results in coefficient magnitudes that are generally larger than those in the entire sample and the western 13 subsample, but fewer of the models result in coefficient predictions that are significant.

Including the Composite Committee representative variables results in coefficients are generally weaker in magnitude than those of the individual committees, but they are generally significant. Like the Irrigation and Public Works, Agriculture and Appropriations committees, the Composite Committee coefficients are larger in the western 13 states than they are in the all-state sample, and the coefficients are insignificant in the ID/MT/WY/SD/ND sample.

Third, the lagged results are similar in magnitude to the unlagged. Of the 19 lagged House committee coefficients that are significant, only three are larger than their unlagged counterparts. However, only a few of the coefficients for the lagged are significantly different from the unlagged: of those that are significantly different, only one coefficient is than its unlagged coefficient counterpart.

IV. Next Steps

Undoubtedly there are exogenous pressures that aided the location decisions of the major water infrastructure projects. For example, a burgeoning population, with growing demands for water and power, could have influenced legislators to build more water infrastructure. Similarly, the threat or actual experience of floods and flood damage could have influenced the decision to build a dam and its location. To address these concerns, the next phase of our models will include population trends and historical experiences with flooding (and flood damage measures).

The potential menu of available dam locations is constrained by geography, topography, and the availability of a suitable site for the dam. Although we will be unable to account for all of the potential (but unconstructed) dam locations in a state, we can control for the characteristics that are likely to make for a suitable location for the dam. For example, the number of river miles in a state, the topography or average slope.

Similarly, climate trends (such as flooding or drought) and agricultural demands for water and power may influence the locations that are chosen for major water infrastructure projects. We can account for historical climate trends as well as the historical agricultural productivity of a state.

As it stands, we currently use a panel of all major dams constructed in the United States from 1880-2000. However, it is quite possible that not all of these dams were the result of federal funding – some are private, some state-funded, etc. There are two strategies for improving the dam dataset that we use. First, the Army Corps of Engineers data provides information on the owner type of the dam. We can use this data to exclude those dams that are owned by a county, city, regional authority, or some other similar government or government agency. Similarly, we can exclude those dams that are privately held, or for which the owner is unknown. Second, we can restrict our sample to Bureau of Reclamation dams only. The Bureau of Reclamation provides information on those dams under its purview, and this modification to the data will be fairly straightforward.

We assumed that the state in which a dam is constructed is its primary benefactor. However, anecdotal evidence points towards some major dams benefitting multiple states. Although we are unable to determine the recipients of the benefits of the dams for all dams, we are able to do so for the Bureau of Reclamation dams. The Bureau of Reclamation monitors the water, power, irrigation and other benefits that accrue to each of their water infrastructure projects. The inclusion of this data, and the mapping of it to those states that benefit (and who could have potentially seated Congressional reps to the committees that oversee the approval of these projects,) will improve our dataset.

Last, for the time being, we assume that political representation on a particular committee is indicative of the political influence of a particular state for infrastructure projects. What we haven't addressed are the specific bills that may have led to water infrastructure projects being built, and the voting outcomes on these bills. With this goal in mind, we are beginning to collect information on those historical bills that led to major water infrastructure projects, and the specific voting behaviors of Congressional representatives. We won't be able to observe witin-committee voting trends, but we can observe the voting behaviors once the bill moves to the House or Senate for a full vote.

Besides improving the data for our models, we have a second empirical strategy that may improve our analysis: a duration model analysis. In this case, we will perform a Cox (1972) maximum likelihood estimation of a parametric proportional hazards model with time-varying covariates. To some degree, the Cox Proportional-Hazards model requires the modification of the existing dataset such that each dam observation in our model has 0-12 additional decadal observations surrounding it – one for each decade that the site was available, but wasn't utilized. For each of these decadal observations, the normal cohort of Congressional committee session-seats applies. Given a refined starting dataset of 7,330 dams constructed in the 50 United States between 1880 and 2000, and 0-13 decadal observations for each dam, depending on the year that it was completed, we are left with a hazards model with 59,637 treatment observations.

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Table 1:

Water Resources

House		Senate	
1893-1924	Irrigation of Arid Lands	1891-1946	Irrigation and Reclamation
1924-1946	Irrigation and Reclamation	1947-1977	Public Works
1947-1951	Public Lands	1907-2000	Environment and Public Works
1951-1992	Interior and Insular Affairs	1907-1921	Expenditures in Interior
1947-1974	Public Works	1921-1947	Public Lands and Surveys
1975-2000	Public Works & Transportation and Infrastructure	1948-1977	Interior and Insular Affairs
1993-2000	Natural Resources: Water and Power	1977-2000	Energy and Natural Resources: Public Lands and Forests, and Water and Power
1981-2000	Energy and Commerce: Energy and Power, Environment and the Economy		

Appropriations

House		Senate	
1895-2000	Appropriations: Energy and Water Development and Interior, Environment and Related Agencies	1885-2000	Appropriations: Energy and Water Development and Interior, Environment and Related Agencies

Agriculture

House		Senate	
1880-2000	Agriculture	1885-1977	Agriculture and Forestry
		1977-2000	Agriculture, Nutrition and Forestry: Conservation, Forestry and Natural Resources
1889-1927	Expenditures in Agriculture	1909-1921	Expenditures in Agriculture

Table 2:

					Water Resources				Appropriations				Agriculture			
	# Dams		Committee Seat		Senate		House		Senate		House		Senate		House	
Decade	Total	West	House	Senate	Total	West	Total	West	Total	West	Total	West	Total	West	Total	West
1880s	45	17	2,866	639	0	0	23	2	19	0	76	0	18	1	79	1
1890s	86	44	3,439	2,090	36	25	57	25	55	8	83	2	48	13	120	5
1900s	273	110	3,887	2,840	38	23	61	22	69	17	180	7	58	17	123	6
1910s	401	179	4,183	4,032	188	113	74	38	95	26	213	13	114	33	143	15
1920s	445	190	4,330	2,632	96	71	81	51	98	34	294	28	94	28	135	7
1930s	584	199	4,453	2,495	88	64	102	53	124	47	301	32	96	38	124	10
1940s	414	145	4,334	2,307	104	72	169	85	128	38	321	44	99	26	136	16
1950s	923	343	2,747	1,169	156	86	307	95	117	39	254	34	74	14	159	20
1960s	1,716	442	3,152	1,262	185	93	349	105	138	47	264	46	86	16	179	32
1970s	1,387	305	3,736	1,404	192	91	400	124	133	37	282	55	93	15	198	38
1980s	699	212	4,056	1,368	176	73	642	153	144	43	286	46	91	18	216	63
1990s	340	93	4,453	1,702	189	76	807	198	145	41	299	57	93	21	247	66
	7,346	2,285	45,636	23,940	1,655	876	3,640	1,116	1,407	426	3,044	397	1,065	265	2,016	318

Note: A large number of committees were eliminated in the early 1920s due to the "bloated, fragmented committee system"; later, in 1946 through the Legislative Reorganization Act, the number of standing committees was again reduced to 19 in the House and 15 in the Senate (Smith, et al. 2011)

Table 3:

	Water Resources Committee Representation																							
	1880s		1890s		1900s		1910s		1920s		1930s		1940s		1950s		1960s		1970s		1980s		1990s	
State	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H
ALABAMA	0	0	0	1	0	2	5	0	4	4	4	4	5	3	0	5	0	6	0	5	1	10	4	9
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	11	7	9	6	0	5	4	7
ARIZONA	0	0	0	0	0	0	10	4	8	5	5	4	5	5	4	7	7	6	5	11	0	8	2	9
ARKANSAS	0	1	3	0	0	0	3	0	0	3	0	3	1	4	2	3	0	1	4	5	5	5	6	9
CALIFORNIA	0	2	3	3	2	3	7	5	8	7	7	8	10	16	8	26	8	39	2	47	0	64	4	85
COLORADO	0	0	0	4	1	1	3	6	6	2	4	0	6	8	7	8	8	9	9	5	5	16	6	16
CONNECTICUT	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	2	0	5	7	3	10
DELAWARE	0	1	0	0	0	0	2	0	0	0	5	0	2	0	0	1	4	0	3	0	0	0	0	0
FLORIDA	0	0	0	0	0	0	0	0	0	0	0	2	1	2	5	9	0	10	3	6	1	12	4	25
GEORGIA	0	0	0	1	0	0	0	2	0	3	0	2	0	1	0	4	0	4	0	10	1	17	1	17
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	2	1	4	3	0	5	4
IDAHO	0	0	3	3	3	1	9	2	7	5	5	5	8	8	8	10	12	9	16	5	10	5	10	10
ILLINOIS	0	1	0	0	0	3	0	1	1	2	0	1	0	5	0	14	1	16	0	12	0	25	0	42
INDIANA	0	2	0	3	0	0	2	1	0	0	0	0	0	2	0	2	3	2	2	5	0	19	0	11
IOWA	0	0	0	1	0	0	1	1	0	0	0	0	0	3	0	4	5	9	4	4	1	7	0	11
KANSAS	0	1	2	2	2	5	4	3	0	2	0	0	0	2	1	4	4	7	2	9	0	8	0	7
KENTUCKY	0	1	0	1	0	0	2	1	0	0	0	0	2	0	6	2	5	3	3	5	5	9	7	7
LOUISIANA	0	0	0	0	0	0	0	1	0	0	3	2	5	5	3	4	0	6	5	8	6	20	6	22
MAINE	0	1	0	0	0	0	3	0	1	0	0	1	0	0	0	0	5	0	6	0	6	2	3	2
MARYLAND	0	0	1	0	2	0	6	0	1	0	0	0	0	2	1	8	3	8	2	6	1	9	0	11
MASSACHUSETTS	0	0	0	2	0	2	3	3	0	0	0	0	0	0	0	1	1	0	0	6	3	15	0	22
MICHIGAN	0	0	0	2	0	0	2	0	0	0	0	1	0	3	2	15	5	7	0	15	1	15	0	24
MINNESOTA	0	0	0	1	0	0	1	1	1	0	0	0	0	1	0	7	1	7	2	9	3	18	8	12
MISSISSIPPI	0	1	0	0	0	0	3	0	0	1	0	2	0	1	3	5	0	2	0	3	0	6	1	7
MISSOURI	0	0	0	1	0	0	0	2	0	0	0	3	0	6	3	8	0	6	2	6	1	13	4	13
MONTANA	0	0	1	2	2	0	8	2	5	3	2	5	2	9	7	6	8	5	7	5	9	7	7	7
NEBRASKA	0	0	2	2	3	6	0	6	1	4	5	2	5	5	5	6	0	4	0	3	0	3	2	0
NEVADA	0	0	4	1	5	4	15	5	10	5	9	3	7	2	11	5	5	5	5	5	4	3	5	4
NEW HAMPSHIRE	0	0	0	0	0	0	2	0	0	0	0	0	0	1	4	0	2	4	1	5	8	1	7	8
NEW JERSEY	0	1	0	1	0	0	6	1	0	0	0	3	0	1	0	5	0	5	0	14	8	28	9	26
NEW MEXICO	0	0	0	0	0	0	8	4	2	3	9	4	10	5	10	5	10	3	11	8	11	12	10	11
NEW YORK	0	2	0	5	0	7	1	3	1	2	0	1	0	8	2	34	1	35	7	25	5	41	5	59
NORTH CAROLINA	0	1	0	0	0	1	2	0	3	1	1	1	0	1	7	5	3	8	4	14	0	13	2	18
NORTH DAKOTA	0	0	5	1	1	3	8	0	2	1	1	1	3	5	0	2	5	4	6	0	6	0	8	0
OHIO	0	1	3	0	0	3	1	2	1	1	0	2	0	2	2	12	5	15	5	15	5	29	4	31
OKLAHOMA	0	0	0	0	1	0	3	0	0	2	1	1	2	7	6	8	3	10	6	13	6	5	7	12
OREGON	0	0	1	3	2	5	8	4	5	6	5	6	6	6	8	5	5	5	7	4	5	12	8	17
PENNSYLVANIA	0	3	0	0	1	4	0	1	0	0	0	2	1	7	5	17	2	17	1	19	2	46	3	40
RHODE ISLAND	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	6	0	5	2
SOUTH CAROLINA	0	1	0	1	1	1	5	1	1	0	0	4	0	0	2	0	0	3	0	4	0	1	0	5
SOUTH DAKOTA	0	0	4	4	1	0	6	2	1	1	0	3	4	1	4	4	6	5	7	5	5	1	1	4
TENNESSEE	0	1	0	1	0	0	1	0	0	0	0	2	0	1	3	6	2	9	6	5	3	6	1	13
TEXAS	0	0	0	4	3	2	5	5	5	5	5	9	6	8	1	19	0	21	5	22	4	32	1	47
UTAH	0	0	0	0	2	2	8	2	2	5	0	6	2	6	6	5	9	5	3	6	0	12	4	12
VERMONT	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	2	0	5	0	5	0	3	0
VIRGINIA	0	1	0	0	0	0	3	0	2	0	0	1	1	0	0	0	1	1	2	0	4	14	7	20
WASHINGTON	0	0	0	2	1	0	13	2	9	5	6	3	3	8	5	8	5	8	6	14	8	8	1	18
WEST VIRGINIA	0	0	0	0	0	0	5	0	0	0	0	0	1	2	2	2	5	4	6	6	4	16	1	13
WISCONSIN	0	0	0	2	2	2	0	0	2	0	0	0	0	1	0	2	4	5	2	7	0	9	0	12
WYOMING	0	0	4	2	3	3	10	0	6	3	11	5	6	6	8	4	5	2	7	9	10	5	10	5

Table 4:

		All States (N = 652)		Western States (N=143)		ID-MT-WY-SD-ND (N=55)	
	Model Group:	(1)	(2)	(3)	(4)	(5)	(6)
Committee		% of Total	Total	% of Total	Total	% of Total	Total
Irrigation and Public Works	House	0.088***	0.623***	0.416***	0.687**	3.020*	0.637
	Senate	-0.013	-0.214	0.173	0.239	1.351	0.417
Agriculture	House	0.212***	1.565***	0.940***	1.423**	-4.063**	-1.230**
	Senate	-0.054	-0.571*	-0.838***	-1.480**	-4.387**	-0.903**
Appropriations	House	0.121***	0.822***	1.011***	1.998***	2.319	0.388
	Senate	0.028	-0.156	0.080	-0.527	-3.533	-0.944
Composite Committee	House	0.059***	0.412***	0.250***	0.421**	-0.156	-0.243
	Senate	0.025	-0.039	-0.013	-0.278	-2.181	-0.504
Irrigation and Public Works lagged	House	0.082***	0.538***	0.438***	0.602**	2.886*	0.961**
	Senate	-0.008	0.138	0.154	0.526	1.550	0.14
Agriculture lagged	House	0.197***	1.368***	1.068***	1.157*	-4.640**	-0.598
	Senate	-0.063	-0.719**	-1.108***	-1.906***	-3.515	-1.113**
Appropriations lagged	House	0.113***	0.737***	0.897***	1.632**	0.785	-0.460
	Senate	-0.019	-0.196	-0.465*	-0.814	-3.046**	-0.765*
Composite Committee lagged	House	0.055***	0.372***	0.245***	0.345*	-1.806	-0.225
	Senate	0.001	0.045	-0.219	0.305	-1.990**	-0.606**
R^2 range:		0.081-0.112	0.331-0.380	0.172-0.251	0.293-0.425	0.065-0.281	0.553-0.649

Note: the coefficients presented are from 48 separate OLS regressions, one for each committee-depvar combination (4 Committees x2, with 2 different dep vars for each)
Robust standard errors removed for convenience, but presented via asterisk next to the coefficients: *** significant at 1%; ** significant at 5%; * significant at 10%
All models include decadal (year) fixed effects and multi-state regional controls per the OMB "Standard Federal Regions"
% of Total represents the number of dams constructed in a given state, relative to the total dams constructed in the larger subgrouping, per decade