

Institutional and Political Determinants of Private Participation in Infrastructure

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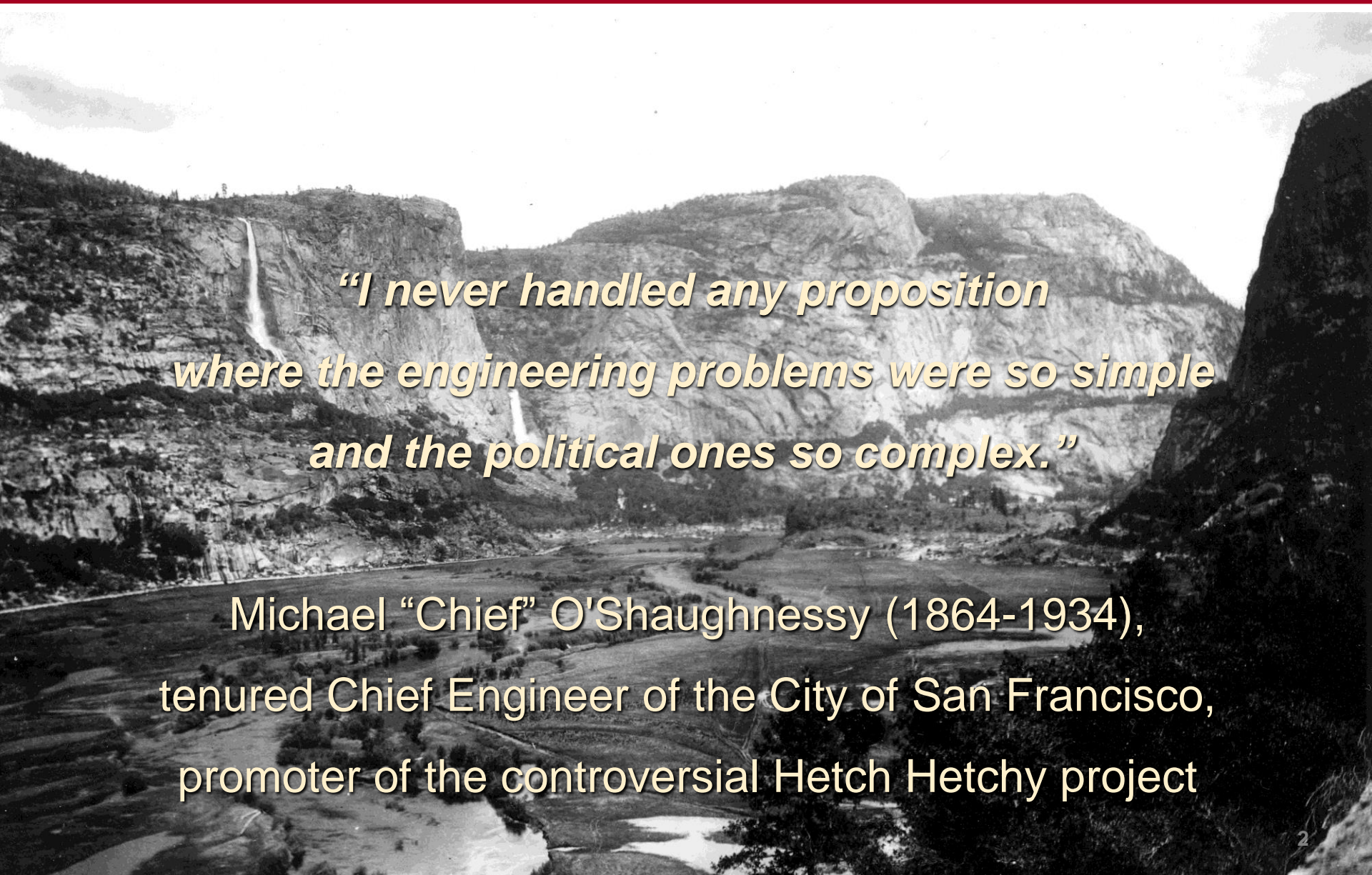
[with Gonzalo Araya, Fernanda Ruiz-Nuñez, and Jordan Schwartz]

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Institutions, Politics, and Projects



*“I never handled any proposition
where the engineering problems were so simple
and the political ones so complex.”*

Michael “Chief” O'Shaughnessy (1864-1934),
tenured Chief Engineer of the City of San Francisco,
promoter of the controversial Hetch Hetchy project

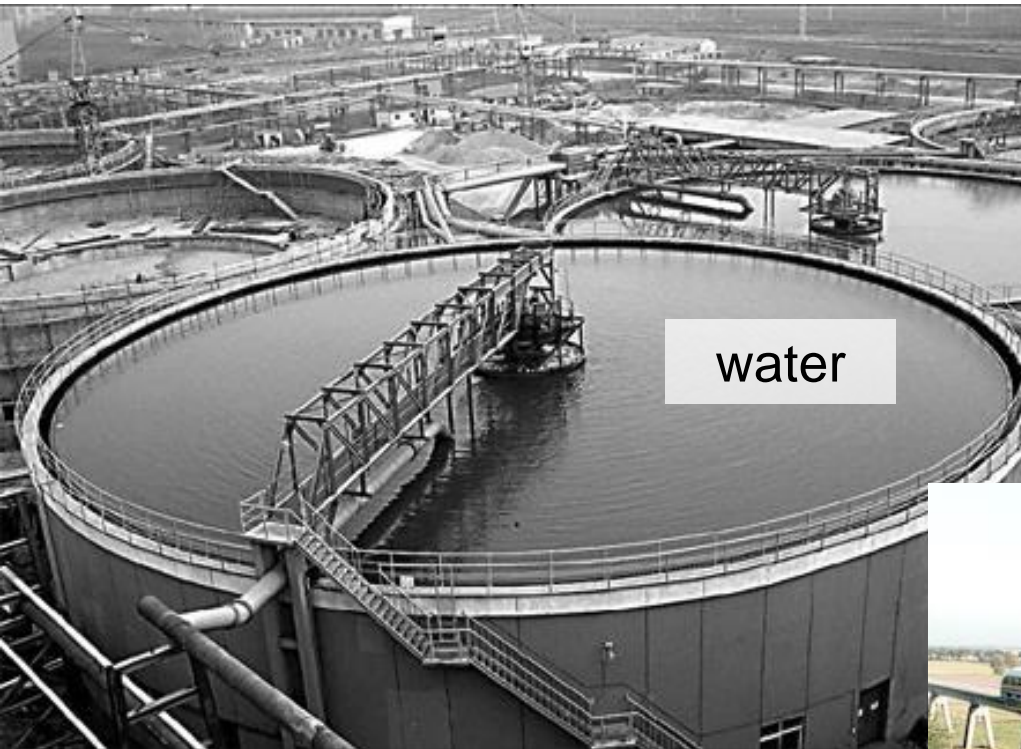
What Is a Public-Private Partnership?

The hen “cooperates”...



... but the pig is committed! I.e., long-term sharing of investments, profit, and risks

The Story: Large Infrastructure Projects



water



energy



transport

sunk investments, natural monopolies,
public interest, non-relational contracting,
informational asymmetries,
double-sided hold-up...

renegotiations

10–95 years

Literature Taxonomy and Mapping

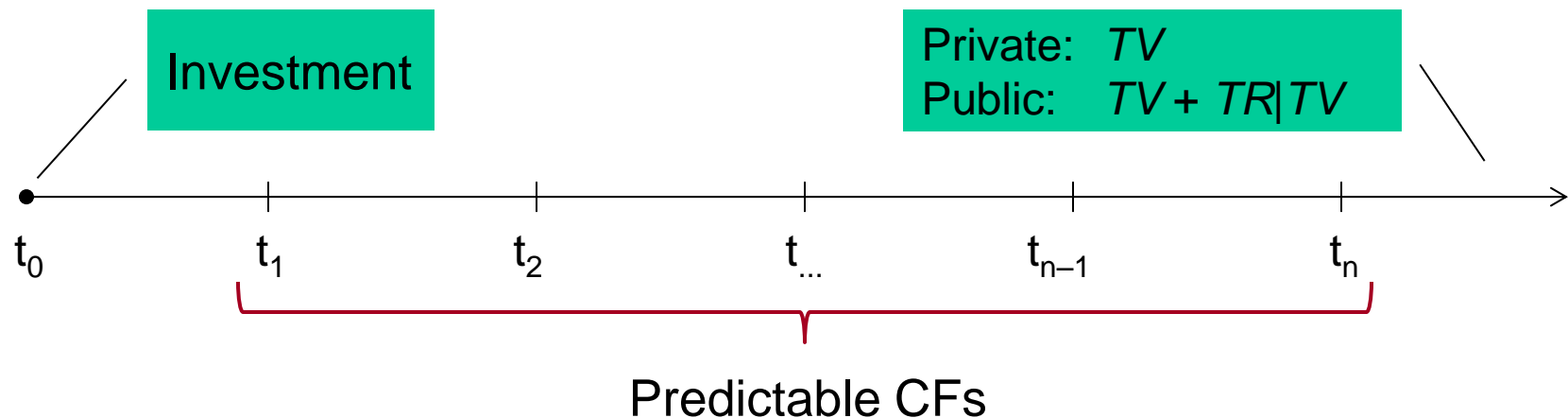
		Theoretical Framework			Empirical Studies
		Economics/Finance	Political Economy	Institutional Analysis	
Variables	Discount rate	Social discount rate (Arrow & Lind 1970); interest rate differential (Moszoro 2014a)	Lower government beta and access to capital vs. investment efficiency and productivity differential (Grout 2003)	Our contribution	
	Access to capital	Access to external financing (Esty 2011)			
	Investment efficiency	Lower investment outlays and shorter investment period (Moszoro 2014a)			
	Productivity differential	Lower operational costs (Moszoro 2014b)			
	Bundling	Incentive theory and economies of scope (Iossa & Martimort 2013)	Expropriation risk and LPVR (Engel, Fischer & Galetovic 2001)	Incomplete contract theory: bundling of investment and operations (Hart 2003; Hart, Shleifer & Vishny 1997); governance of hybrids and boundaries of bureaucracy (Williamson 1979, 1999)	
	Risk allocation	Post-tender renegotiations (Iossa & Martimort 2011)			
	Contracting flexibility & regulation				Regulatory and institutional framework (Pragal 2003; Kirpatrick et al. 2006; Basilio 2011); property right and quality of the bureaucracy (Jensen et al. 2005).; corruption and rule of law (Hammami et. al., 2006); bureaucratic quality (Barnejee et al. 2006; Gasmi et al. 2010; Tewodaj 2013)
	Corruption, political stability & rule of law				
	Bureaucracy				
		Low third-party opportunism risk (Moszoro & Spiller 2014)			

Our contribution

Assumptions

Three-stage model: investment, predictable cash flows, and terminal value:

1. In t_0 , public agent and private investor invest I with certainty
2. In $t_{1,2,\dots,n}$, predictable cash flows CF are realized
3. In $t_{n+1,\dots,\infty}$, the terminal value (TV) is realized with uncertainty
4. Public agent can receive transfers TR conditional on states of TV
5. $E(TR) = 0$, so that $E(TV+TR) = E(TV)$ and $SD(TV+TR) < SD(TV)$



Toy Model

Preference for private participation in infrastructure will be given by:

$$\frac{\sum_{j=1}^n \frac{CF_{pr,j}}{(1+r_{pu})^j} - I_{pr}}{\sum_{j=1}^n \frac{CF_{pu,j}}{(1+r_{pu})^j} - I_{pu}} + \left(\frac{1+r_{pu}}{1+r_{pr}} \right)^n > 0$$

Comparative statics:

Variable	Meaning	Preference for PPI Pr[NPV _{pr} > NPV _{pu}]	Captured econometrically by
$1 - I_{pr}/I_{pu}$	Investment efficiency	+	Country dummies and subsample sector regressions; GDP per capita controls
CF_{pr}/CF_{pu}	Productivity differential	+	Country dummies and subsample sector regressions; GDP growth control
n	Industry stability (inverse of industry risk)	+	Subsample sector regressions; regulatory quality
r_{pu}/r_{pr}	Political stability (inverse of political risk)	+	Political variables: rule of law, corruption perception, regulatory quality, and number of disputes; corporate taxation and country exchange rate volatility controls

Predictions

Controlling for economic and industry factors:

Prediction 1: An increase in the rule of law will be associated with lower differential in the public and private discount rates and thus higher PPI.

Prediction 2: An increase in regulatory quality will be associated with higher predictability of cash flows and thus higher PPI.

Prediction 3: An increase in freedom from corruption will be associated with lower political risk premium and thus higher PPI.

Prediction 4: An increase in the number of disputes will be associated with higher political risk premium and thus lower PPI.

Data: Rich Country-level Panel

1. World Bank's Private Participation in Infrastructure dataset
<http://ppi.worldbank.org/>
 2. Quality of Governance Standard Database
<http://www.qog.pol.gu.se>
 3. UNCTAD Database of Treaty-based Investor-State Dispute Settlement Cases
 4. Country-level economic variables from the World Development Indicators Database
- **2.5K+ observations, 80+ countries, 100+ variables, ~30 years;
by sectors, focus on EMDEs**

Institutional and Political Variables

Quality of Government is the mean value of “Corruption,” “Law and Order,” and “Bureaucracy Quality”

Freedom from Corruption relies on Transparency International’s Corruption Perceptions Index (CPI) for 152 countries

Government Effectiveness combines the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government’s commitment to policies

Rule of Law includes perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts

Regulatory Quality measures the incidence of market-unfriendly policies such as price controls, inadequate bank supervision, and excessive regulation

Identification Strategy

Sector-specific moving average

$$\begin{aligned} \log PPI_{it} = & \alpha_i + \beta_1 \log GDP_{it-1} + \beta_2 \log POP_{it} + \beta_3 \log GROWTH_{it-1} \\ & + \beta_4 \log INFLATION_{it-1} + \beta_5 \log OPENNESS_{it-1} \\ & + \beta_6 \log DEBT_{it-1} + \beta_7 \log ACCESSTOFINANCE_{it-1} \\ & + \sum \beta_j \log X_{itj} + \varepsilon_{it} \end{aligned}$$

Controls

Political and institutional variables:

- a) freedom from corruption
- b) government effectiveness
- c) rule of law
- d) quality of regulations
- e) number of court disputes

Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ln GDP_1	7,388	22.76985	2.411881	15.99307	30.33849
ln Inflation_1	6,588	1.95406	1.402989	-13.4379	10.19474
ln Trade_1	6,938	4.141784	0.638758	-1.17505	6.13225
Debt_1	4,242	4.927175	6.766934	0	208.0971
Growth_1	7,140	2.05112	6.012271	-50.2904	92.58597
ln Population	8,178	15.33762	2.106291	8.982059	21.01901
Access to finance	2,291	7.47474	17.92406	0	150
Free of corruption	2,987	40.07265	23.22481	0	100
Government effectiveness	2,437	-0.05928	0.997779	-2.45416	2.407654
Rule of law	2,492	-0.06741	0.993558	-2.67015	2.001923
Regulatory quality	2,438	-0.06711	0.991987	-2.67544	2.247345
Gini coefficient	2,710	41.53993	9.80825	20.96	74.33
Disputes	4,780	0.687657	3.303972	0	65

Results (1) — General Specification

VARIABLES	(1) ln_PPI (0.610)	(2) ln_PPI (0.639)	(3) ln_PPI (0.607)	(4) ln_PPI (0.692)	(5) ln_PPI (0.792)	(6) ln_PPI (0.633)
Freedom from corruption	0.00718* (0.00406)	0.0166*** (0.00420)	0.00669* (0.00402)	0.0110** (0.00459)	0.0161*** (0.00497)	0.0155*** (0.00416)
Government effectiveness	0.0587 (0.178)	-0.107 (0.180)	0.120 (0.177)	-0.109 (0.201)	0.0178 (0.215)	-0.0461 (0.179)
Rule of law	0.404** (0.180)	0.279 (0.179)	0.431** (0.178)	0.463** (0.201)	0.436** (0.219)	0.325* (0.177)
Quality of regulation	0.431*** (0.152)	0.638*** (0.150)	0.317** (0.153)	0.660*** (0.173)	0.598*** (0.185)	0.515*** (0.150)
Access to finance	0.00455** (0.00196)	0.00539*** (0.00195)	0.00355* (0.00195)	0.00205 (0.00220)	0.00251 (0.00244)	0.00405** (0.00195)
Gini coefficient		0.00318 (0.00967)			0.00757 (0.0116)	-0.000675 (0.00959)
Disputes (moving sum)			-0.0385*** (0.00908)	-0.0378*** (0.0104)	-0.0350*** (0.0105)	-0.0380*** (0.00844)
Dispute time				0.0335 (0.0223)	0.0237 (0.0227)	
Observations	1,041	867	1,041	771	651	867
R-squared	0.487	0.547	0.497	0.528	0.540	0.559
Number of countries	111	98	111	108	95	98

Controls: ln GDP_1, ln Inflation_1, ln Trade_1, Debt_1, Growth_1, ln Population;
country & year fixed effects

Results (2) — General Specification

1. **Political regimens** such as parliamentary democracy, mixed (semi-presidential) democracy, presidential democracy, civilian dictatorship, military dictatorship, and royal dictatorship do not affect significantly the level of PPI infrastructure investment
2. Countries with **large markets** and high demand for infrastructure (larger population and higher lagged GDP) tend to have more PPI
3. Governments with **less inflation** have a more stable environment fostering private sector investments in infrastructure PPIs
4. Coefficients associated with **freedom from corruption, rule of law, quality of regulations, and number of disputes** have the expected sign and are economically and statistically significant

Results (3) — General Specification

5. Decreasing corruption by 10 points can increase PPI by 6.7%
[E.g., Serbia ↔ South Africa]
6. Improving rule of law by one standard deviation (i.e., by 0.1) can increase PPI by 4.3%
[E.g., Buthan ↔ Jordan]
7. An improvement of one standard deviation (0.1) in quality of regulation produces an average increase of 3.2% in the level of infrastructure investment in PPIs
[E.g., Mexico ↔ Turkey]
8. One more project going to court decreases investments by 4%

Results — By Sector

1. Freedom from corruption is statistically significant for energy, telecom, and water sectors except for transport
 - H: Corruption affects investors' decision to enter the transport market, not subsequent level of investment (protected once they do invest?)
2. Rule of law are of the same magnitude as for all sectors, but not significant at the sector level (smaller sample?)
3. Quality of regulation is statistically significant for all sectors except water
 - H: Water is a socially sensitive and likely to be politically influenced; investors may prefer price controls and strong regulation to limit *ex ante* the risk of domestic politics
4. Coefficient on disputes is statistically significant for all sectors except for energy. Having one more dispute can decrease PPI investments in telecoms and water by approximately 12%

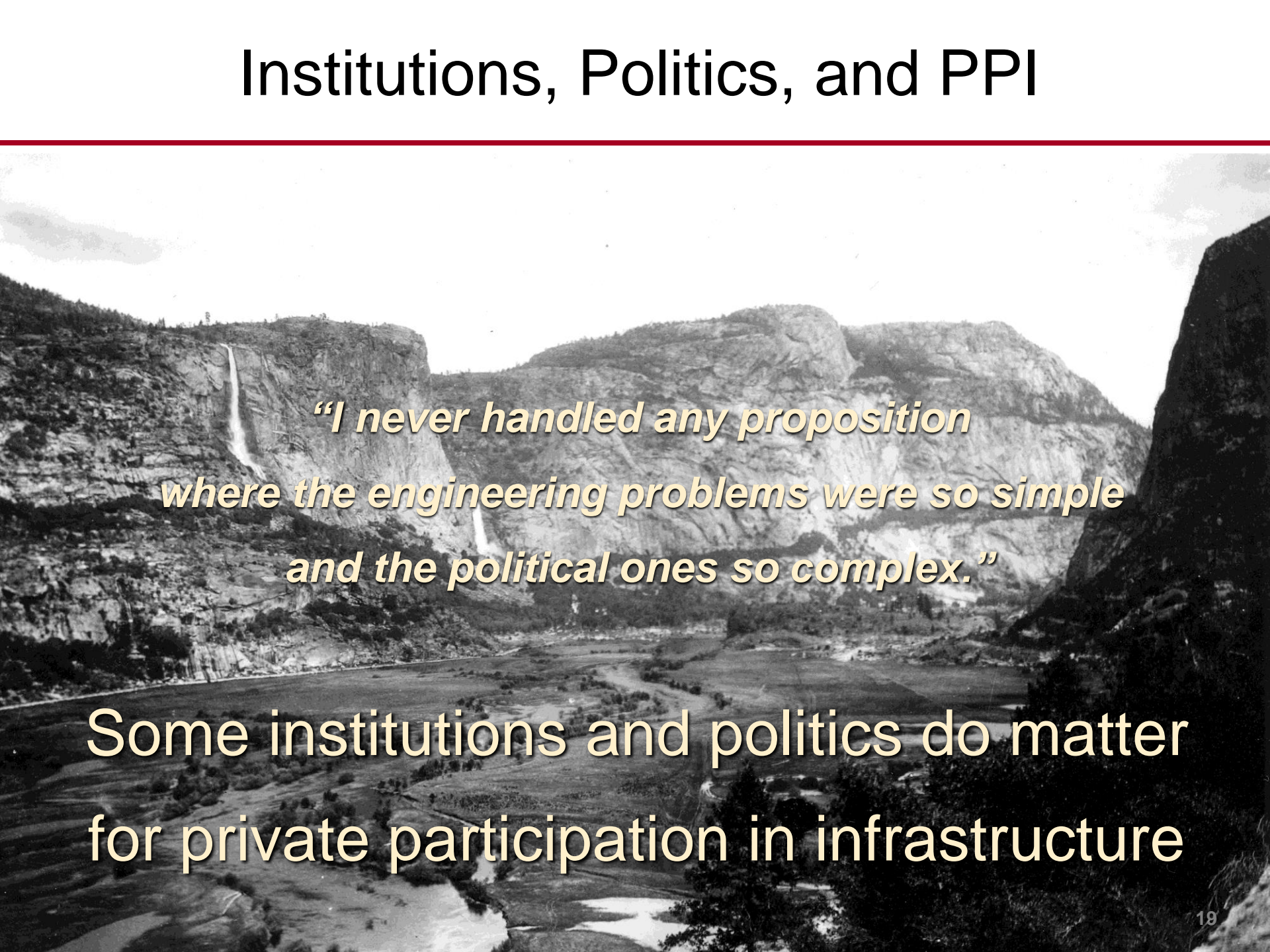
Results — Robustness Checks

1. Regressions without year dummies: insignificant changes in the main results
2. We expected that countries with more experience on PPIs and higher income would have PPI investments less sensitive to institutional and governance variables. However, results do not vary by quartile of experience, GDP, and GDP per capita
 - H: Not the quantity, but **quality** of experience matters (i.e., successful projects, for which we do not control)

Conclusions

1. Industry and political stability key to increase PPI
2. PPI highly sensitive to the quality of government variables: freedom from corruption, rule of law, quality of regulations, and disputes
3. Results hold when data is disaggregated at the sectoral level; more work needed to understand exceptions
4. No difference in the results across experience and economic level quartiles
5. Upstream “enabling” institutions, policies, and regulations and sector economics down to pipeline development need to be addressed simultaneously

Institutions, Politics, and PPI



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Some institutions and politics do matter
for private participation in infrastructure