

# Public-Private Partnerships under Fiscal Distress and Political Contestability

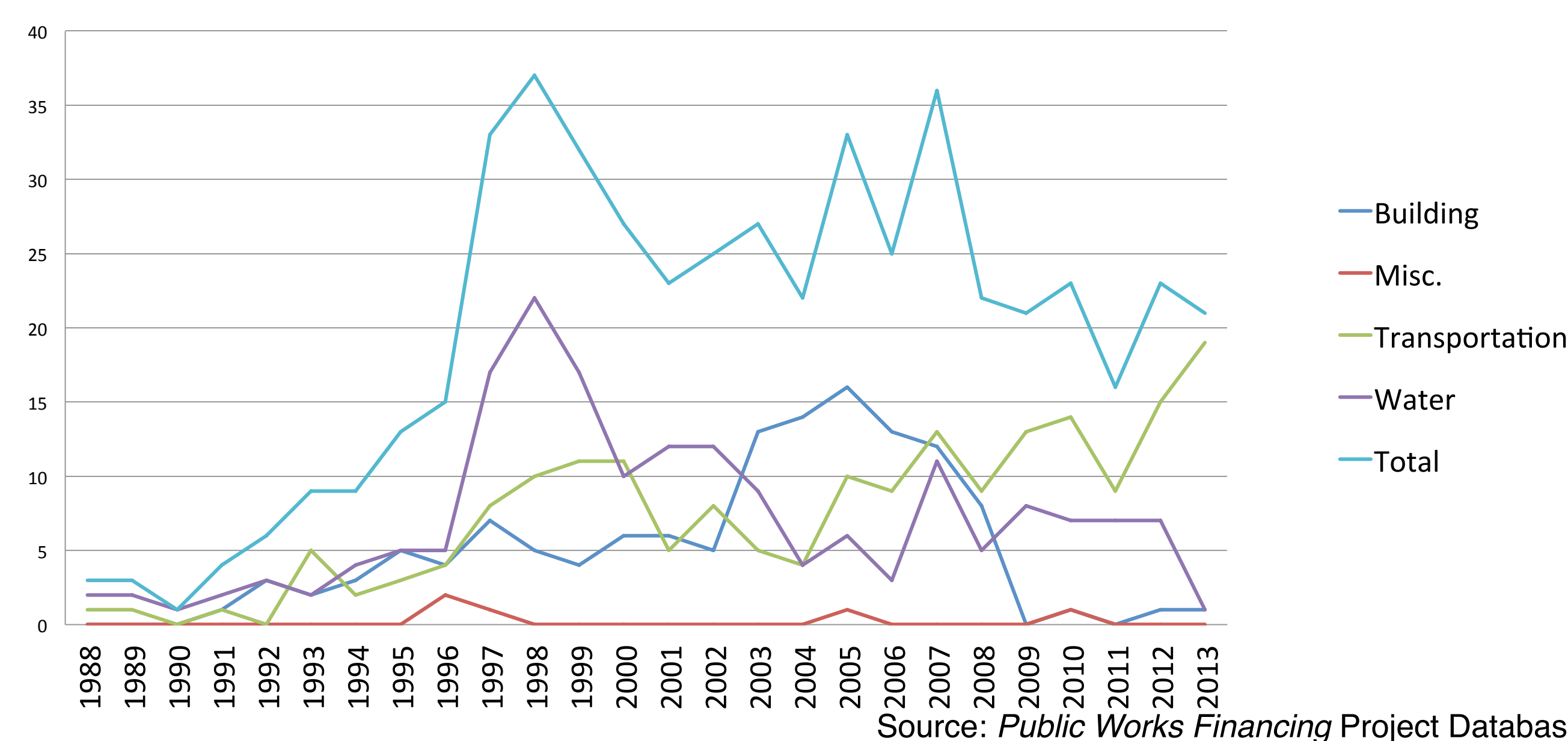
## ABSTRACT

Public-private partnerships (“P3s”) have gained considerable recognition as useful tools for state and local governments in the U.S. to improve efficiency in delivering critical infrastructure projects. It is still unclear, however, why P3s are adopted differently across states and what are the fundamental attributes that either facilitate or hinder the process of P3 adoption in infrastructure development. We investigate the influence of political contestability on the implementation of transportation P3s by U.S. states, using a panel data of 50 states for the period of 1998-2013. After accounting for fiscal constraints, political environment of states and P3 enabling legislation, our empirical results will help decision makers to improve their understanding and the process of P3 implementation.

**Keywords:** political contestability, public-private partnerships, public finance, transportation infrastructure

## BACKGROUND

**Figure 1. Number of P3 Financial Closes in the U.S. 1988-2013, by Sector**



### INFRASTRUCTURE P3S IN U.S.

P3s have become popular for state and local governments in the U.S. to deliver infrastructure services (e.g., transportation, water, correction facilities, service buildings) over the last two decades. Factors that motivate the use of P3s include:

- Tight fiscal condition of public agencies
- Demand for infrastructure investment/renewal
- Efficient innovation that private firms are presumed to provide

### RESEARCH OBJECTIVE:

- To understand conditions of successful P3 implementation

### RESEARCH QUESTION:

- How do political, institutional, and fiscal conditions affect the implementation of P3s?

### RESEARCH FOCUS:

- Transportation P3s in 50 U.S. states, 1998-2013

## POLITICAL CONTESTABILITY

Moszoro and Spiller (2012), analyzed the nature of contracts by public sector with relational private contractors. Public agencies are more likely to use rigid contracts (e.g., lengthier and more rigid, rule-based, clauses, and formalized renegotiations), attempting to lower opportunistic challenges by third party.

Assuming the rigidity of contracts by agencies of each state did not change dramatically, higher political contestability (e.g., smaller margin of election victories) would have been associated with lower number of P3 contracts, *ceteris paribus*. Below is the expected signs of coefficients to be empirically estimated.

- $H_1$ : Presence of institutional framework P3s +
- $H_2$ : Tight fiscal conditions +
- $H_3$ : High political contestability -

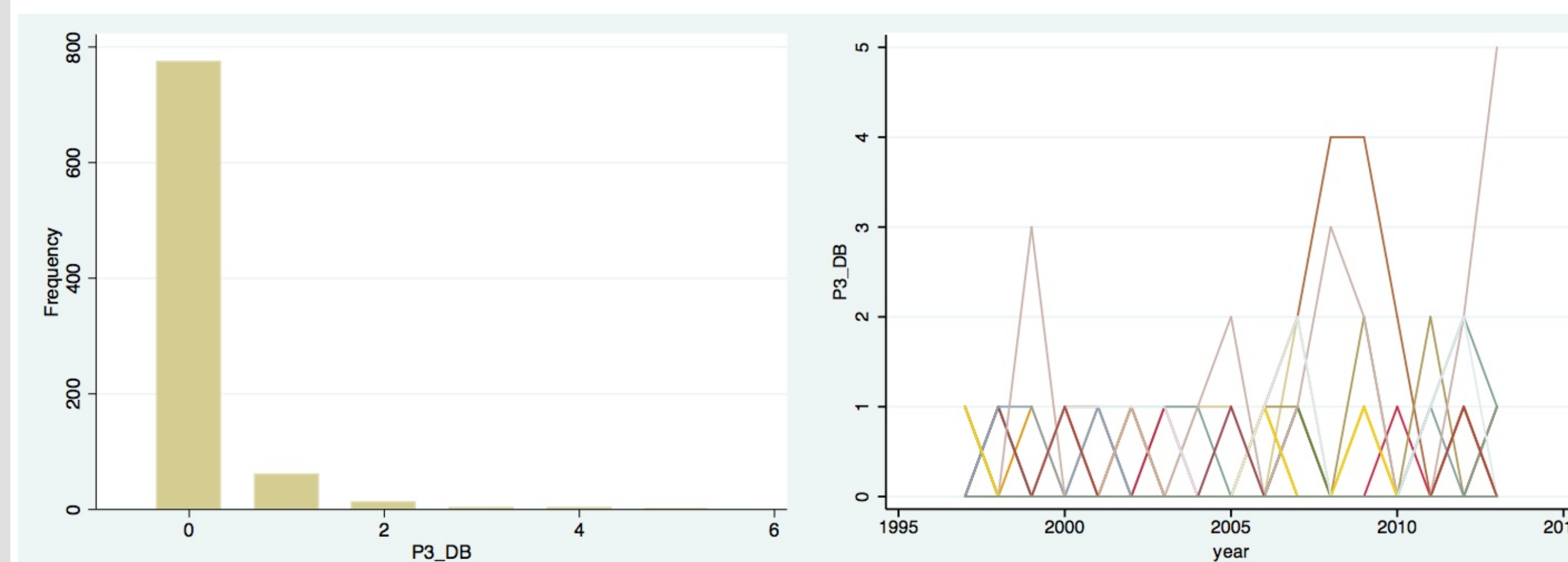
## ANALYTICAL FRAMEWORK

We empirically model the number of contracts closed for each state in each year (i.e., nonnegative discrete variable, panel data). Count panel data models were employed for our analysis, following Cameron and Trivedi (2009).

**Table 1. Panel Summary of P3&DB Contracts**

Variable	Mean	Std. Dev.	Min	Max	Observations
P3_DB overall	0.1188235	0.4435094	0	5	5N = 850
between	0.2330293	0.2330293	0	1.176471	n = 50
within	0.3787101	0.3787101	-1.057647	3.942353	T = 17

**Figure 2. Freq. Distribution and Temporal Variation P3&DB Contracts**



Source: Public Works Financing Project Database

**Table 2. Descriptive Statistics of Variables**

Variable	Mean	Std. Dev.	Min	Max
Lag.fc: State highway account net balance	66788.6	356113.1	-1800000	3400000
Lag.debtpc: State debt outstanding	2919.325	1912.74	534	11403
Lag.hwyndebt: Highway indebtedness	2578422	4009423	145	3.00E+07
Lag.cappc: Highway capital outlay per capita	236.1094	109.5603	72	826
Lag.gspcc: Gross state product	44689.34	8420.56	28449	72281
gvmtpc: Growth of VMT per capita	0.003193	0.0786588	-0.423123	0.924423
p3law: 1 if state has a P3 enabling legislation	0.3541176	0.4785266	0	1
ccod: 1 if state has deficit carry over rule	0.74	0.438972	0	1
repshare: share of republican votes, governor election	0.4915449	0.1136835	0.1113322	0.7916777
margin: margin of victory, governor election	16.24108	13.55153	0.0045907	58.33553
margin2: margin squared	447.2007	658.5691	0.0000211	3403.035
margindummy (if margin< $\lambda$ where $\lambda=10\%$ in US)	0.4270588	0.4949422	0	1
residual	0.4409465	0.0759723	0.2083223	0.6463404
residualstrength	0.3719125	0.0786418	0.1386502	0.4977636
swing: 1 if margin>10	1.074118	0.749032	0	3

Sources: Public Works Financing Project Database, Moszoro et al. (2014), Chen et al. (2014)

**Table 3. P3+Design Count Regression Models Estimation Results**

VARIABLES	Poisson Cluster		Random Effects	
	Robust Std.Er.	Panel Poisson	Cluster Robust Std.Er.	Panel Negative Binomial
L.fc	-3.56e-07(2.85e-07)	-2.30e-07(2.91e-07)	-4.61e-07(2.91e-07)	-2.46e-07(2.37e-07)
L.debtpc	-2.58e-04(1.78e-04)	-3.18e-04*(1.67e-04)	-2.91e-04*(1.57e-04)	-3.19e-04*(1.68e-04)
L.hwyndebt	1.55e-07***(3.39e-08)	1.04e-07***(2.95e-08)	1.70e-07***(3.63e-08)	1.05e-07***(3.0e-08)
L.cappc	2.74e-04(0.00180)	9.61e-04(0.00201)	-8.10e-05(0.00204)	8.90e-04(0.00203)
L.gspcc	1.32e-05(3.18e-05)	2.92e-05(3.29e-05)	1.91e-05(2.82e-05)	2.94e-05(3.29e-05)
gvmtpc	-4.591(4.578)	-3.596(3.349)	-4.076(3.858)	-3.602(3.420)
p3law	2.074***(0.434)	1.966***(0.455)	2.029***(0.408)	1.940***(0.459)
ccod	0.790*(0.461)	0.428(0.489)	0.720**(0.361)	0.464(0.500)
YR0	-1.141***(0.377)		-0.954***(0.371)	
YR1	0.297*(0.156)		0.328*(0.174)	
YRLAST	-0.166(0.224)		-0.201(0.244)	
repshare	0.955(1.732)	0.323(1.579)	1.002(1.868)	0.174(1.656)
residualstrength	3.867*(2.039)	2.084(2.092)	4.041***(1.962)	2.090(2.116)
Cluster	State	State	State	State
Constant P3_DB		-5.993***(1.908)		
Constant lnalpha		-0.959(0.905)		
Constant	-6.627***(1.744)		-6.839***(1.879)	-2.513(3.536)
Observations	600	600	600	600
Likelihood Ratio	-156.8	-162.0	-155.7	-162.0
AIC	341.6447	348.0218	341.3977	349.9109
BIC	403.2017	400.785	407.3517	407.071
Correlation Coeff.	0.5275	0.3676	0.4324	0.3676

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. FE Poisson model estimation dropped 360 observations due to zero values of the dependent variable, and FE NB model did not converge, thus ruled out, hence not shown.

## ESTIMATION RESULTS

The data is characterized with high frequency of zeros, and is slightly over-dispersed (mean-variance), violating the assumption of Poisson models. Thus, Negative Binomial (NB) Model were found to be preferable. Random effects (RE) NB models were also estimated. RE models assumes the intercept is gamma distributed with mean 1. Further, the explanatory power was not better than other models. Therefore, pooled average negative binomial model with robust standard error was found to be preferable. In this analysis, we used states and election cycle years (e.g., election year (YR0), a year after the election (YR1), and the year before the election year (YRLAST)).

**Table 4. Political Contestability Measures**

VARIABLES	Margin	Margin+Margin2	Margin Dummy	Residual Strength	Residual
repshare	2.321(2.344)	2.226(2.325)	2.573(2.786)	1.002(1.868)	1.590(2.029)
margin	-0.0263*(0.014)	-0.0403(0.032)			
margin2		0.000341(0.0006)			
margindummy			0.770(0.469)		
residualstrength				4.041***(1.962)	
residual					2.052(1.675)
Constant	-5.238***(1.7)	-5.044***(1.7)	-5.619***(1.7)	-6.839***(1.9)	-6.10***(1.9)
Likelihood Ratio	-155.9	-155.9	-154.8	-155.7	-157.2
alpha	0.393(0.26)	0.374(0.26)	0.190(0.31)	0.435(0.26)	0.480(0.27)
AIC	341.8882	343.71	339.634	341.3977	344.4997
BIC	407.8422	414.0609	405.588	407.3517	410.4536

Results of control variables (L.fc, L.debtpc, L.cappc, L.gspcc, gvmtpc, p3law, ccod, YR0, YR1, & YRLAST) omitted, but results are equivalent. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Next, various measures of political contestability were examined. Residual strength is the Herfindahl-Hirschman Index (HHI) of non-winning parties' vote share weighted by the overall non-winning vote share. Based on the model fit and ease of interpretation, the Margin was preferred over other political contestability measures.

**Table 5. Interaction of Political Contestability and Election Cycle**

Models	Base Model	Margin*YR0	Margin*YR1	Margin*YRLAST	Margin*LASTF
YR0	-0.965***(0.358)	-1.068***(0.329)	-0.996***(0.368)	-0.966***(0.358)	-0.984***(0.373)
YR1	0.304*(0.180)	0.306*(0.183)	-0.192(0.433)	0.304*(0.179)	0.285(0.179)
YRLAST	-0.216(0.243)	-0.216(0.244)	-0.200(0.245)	-0.240(0.360)	0.588*(0.345)
Margin*YR0		0.0096(0.027)			
margin	-0.0263*(0.014)	-0.0274*(0.014)	-0.0452***(0.017)	-0.0268*(0.016)	
repshare	2.321(2.344)	2.312(2.357)	2.215(2.335)	2.324(2.344)	2.307(2.014)
Margin*YR1			0.040(0.0245)		
Margin*YRLAST				0.0021(0.021)	
F.Margin*YRLAST					-0.119***(0.025)
F.margin					-0.0277*(0.016)
Constant	-5.238***(1.697)	-5.196***(1.738)	-5.057***(1.717)	-5.230***(1.695)	-5.271***(1.591)
Likelihood Ratio	-155.9	-155.9	-154.8	-155.9	-151.2
/lnalpha	-0.933	-0.905	-1.148	-0.932	-1.483
	(0.663)	(0.671)	(0.787)	(0.658)	(1.306)
AIC	341.8882	343.8318	341.561	343.884	334.3532
BIC	407.8422	414.1827	411.9118	414.2349	404.7041

Results of control variables (L.fc, L.debtpc, L.cappc, L.gspcc, gvmtpc, p3law, ccod, YR0, YR1, & YRLAST) omitted, but results are equivalent. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Margin was interacted with the election cycle year dummy variables. The estimated coefficient of 1-year future value of Margin was statistically significant, along with the interaction term and the year dummy. The election years consistently showed smaller numbers of deals to close. The year before the election, showed larger numbers of P3s&DB contracts to close. When the executive branch faces contestable political environment, the effect of the year before the election year on the number of deal closes becomes weaker.

## DISCUSSION

Contrary to our hypothesis, political contestability was consistently associated with larger numbers of successful closes of P3&DB deals. An alternative hypothesis may be a “ribbon-cutting” effect, where the incumbent attempts to score political points through infrastructure investment, which leads to job reaction and other economic benefit. Our results of the election cycle dummy variables supports this view. The next step in this analysis is to identify ways to differentiate this effect from the political contestability effect.

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