New results on spillover theory

Feb 06, 2023

1 Data

- Sample consists of a "time independent" clean control group
- Number of offers received is also winsorized.

2 Idea

Delay = Actual Completion - Projected Completion. Thus, to observe delay, there must be a change in the *difference* between "actual" and "projected" completion times. This suggests that there are two groups of projects:

- Projects that start *before* QuickPay. For these projects, QuickPay does not affect the projected completion. It only affects the actual completion, if at all.
- Projects that start *after* QuickPay. For these projects, QuickPay affects both the projected and actual completion (wrt to control).
  - Specifically, QuickPay may affect the projected time of competitively awarded imporportionally more, which is our aggressive bidding theory.
  - In general, in projects that start after QuickPay, one might expect that because the contractor already accounts for QuickPay when it projects the completion time, once the project starts, it will go as planned so one would not observe delays.

Proposal: I think when we do the baseline analysis, i.e., not testing theories and hypothesis, we should use all projects. This is because QuickPay can affect projects that start both before and after it, according to our theory. But when we test different theories, we need to restrict our attention to either projects that start before or after QuickPay.

3 Results

Table 1: Baseline regression: Projects that start BEFORE QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-1.76^{***}	-1.36^{***}	-1.40^{***}	-1.15^{***}	-0.76^{***}
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
$Post_t$	-4.39^{***}	-25.57^{***}			
	(0.11)	(1.00)			
$Treat_i \times Post_t$	1.53^{***}	1.01^{***}	0.95^{***}	0.41^{***}	0.77^{***}
	(0.13)	(0.14)	(0.14)	(0.14)	(0.14)
Constant	5.27^{***}	43.03^{***}			
	(0.10)	(0.61)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project stage	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	128,396	114,009	114,009	114,009	114,009
R^2	0.02	0.20	0.20	0.23	0.25
Adjusted R^2	0.02	0.20	0.20	0.23	0.25

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.

Table 2: Baseline regression: Projects that start AFTER QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	−0.43	−0.45	−0.89	−0.45	−1.50
	(2.41)	(4.25)	(4.10)	(3.96)	(4.26)
$Post_t$	3.32*	39.51***			
	(2.00)	(11.91)			
$Treat_i \times Post_t$	−0.32	0.07	0.67	0.26	1.59
	(2.41)	(4.25)	(4.10)	(3.96)	(4.26)
Constant	3.61*	2.40			
	(2.00)	(11.89)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project stage	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	94,848	87,729	87,729	87,729	87,729
R^2	0.001	0.18	0.20	0.22	0.24
Adjusted R^2	0.0005	0.18	0.20	0.22	0.22

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.

Table 3: Project portfolio: Projects that start BEFORE QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-0.79^{***}	-0.54^{***}	-0.59^{***}	-0.72^{***}	-0.48^{***}
	(0.13)	(0.12)	(0.12)	(0.12)	(0.12)
$Treat_{i,l}$	-2.74^{***}	-2.43^{***}	-2.39^{***}	-1.28^{***}	-0.81^{***}
	(0.11)	(0.10)	(0.10)	(0.10)	(0.10)
$Post_t$	-4.39^{***}	-25.84^{***}			
	(0.11)	(1.01)			
$Treat_i \times Post_t$	0.80^{***}	0.49^{***}	0.43^{***}	-0.04	0.31^{**}
	(0.14)	(0.15)	(0.15)	(0.15)	(0.16)
$Treat_{i,l} \times Post_t$	2.10^{***}	1.62^{***}	1.61^{***}	1.37^{***}	1.31^{***}
	(0.12)	(0.13)	(0.13)	(0.13)	(0.14)
Constant	5.27^{***}	43.62^{***}			
	(0.10)	(0.61)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project stage	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	128,396	114,009	114,009	114,009	114,009
R^2	0.03	0.20	0.21	0.23	0.25
Adjusted R^2	0.03	0.20	0.21	0.23	0.25

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.
Large projects whose contractor holds small projects are removed.

Table 4: Project Portfolio: Projects that start AFTER QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	0.21	−0.09	−0.54	−0.07	−0.75
	(2.58)	(4.49)	(4.37)	(4.23)	(4.59)
$Treat_{i,l}$	−3.82**	−1.71	−1.44	−1.62	−3.04
	(1.63)	(3.55)	(3.65)	(3.58)	(3.56)
$Post_t$	3.32*	39.98***			
	(2.00)	(12.03)			
$Treat_i \times Post_t$	0.38	0.66	1.22	0.38	1.19
	(2.58)	(4.49)	(4.37)	(4.23)	(4.59)
$Treat_{i,l} \times Post_t$	−0.32	−1.41	−1.52	−0.11	1.78
	(1.63)	(3.55)	(3.65)	(3.58)	(3.56)
Constant	3.61*	2.74			
	(2.00)	(12.02)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t\times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project stage	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	94,848	87,729	87,729	87,729	87,729
R^2	0.01	0.18	0.20	0.22	0.24
Adjusted R^2	0.01	0.18	0.20	0.22	0.23

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.
Large projects whose contractor holds small projects are removed.

Table 5: Project Stage: Projects that start BEFORE QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-2.65^{***}	-1.67^{***}	-1.75^{***}	-1.10^{***}	-1.15^{***}
	(0.23)	(0.21)	(0.21)	(0.21)	(0.21)
Log(Stage)	3.17^{***}	2.49^{***}	2.44^{***}	2.44^{***}	2.44^{***}
	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)
$Post_t$	-8.68^{***}	-28.44^{***}			
	(0.23)	(1.05)			
$Treat_i \times Post_t$	2.50^{***}	1.64^{***}	1.64^{***}	1.32^{***}	1.37^{***}
	(0.27)	(0.26)	(0.26)	(0.26)	(0.26)
$Treat_i \times$ Log(Stage)	-0.70^{***}	-0.22^{**}	-0.24^{***}	-0.24^{***}	-0.25^{***}
	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)
$Post_t \times$ Log(Stage)	-2.50^{***}	-1.79^{***}	-1.46^{***}	-1.70^{***}	-1.71^{***}
	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)
$Treat_i \times Post_t \times$ Log(Stage)	0.74^{***}	0.51^{***}	0.53^{***}	0.44^{***}	0.45^{***}
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Constant	10.21^{***}	43.33^{***}			
	(0.19)	(0.62)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	128,377	114,009	114,009	114,009	114,009
R^2	0.07	0.20	0.21	0.25	0.26
Adjusted R^2	0.07	0.20	0.20	0.25	0.25

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.

Table 6: Project Stage: Projects that start AFTER QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	5.26	11.18	12.35	11.45	12.02
	(9.27)	(12.47)	(12.94)	(13.17)	(13.14)
Log(Stage)	1.98	4.65**	4.52**	4.04*	3.96
	(1.38)	(2.16)	(2.13)	(2.44)	(2.45)
$Post_t$	2.73	33.95***			
	(5.87)	(9.53)			
$Treat_i \times Post_t$	−5.74	−11.13	−12.08	−10.85	−11.39
	(9.27)	(12.47)	(12.95)	(13.17)	(13.14)
$Treat_i \times$ Log(Stage)	1.34	3.56	3.87	3.78	3.97
	(2.13)	(2.93)	(3.04)	(3.22)	(3.21)
$Post_t \times$ Log(Stage)	2.19	−0.82	−0.76	−0.46	−0.38
	(1.38)	(2.16)	(2.13)	(2.44)	(2.45)
$Treat_i \times Post_t \times$ Log(Stage)	−1.39	−3.21	−3.48	−3.36	−3.57
	(2.13)	(2.93)	(3.04)	(3.22)	(3.21)
Constant	9.80*	7.72			
	(5.87)	(9.51)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	94,836	87,729	87,729	87,729	87,729
R^2	0.09	0.18	0.20	0.23	0.24
Adjusted R^2	0.09	0.18	0.20	0.22	0.23

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.

Table 7: Contract Financing: Projects that start BEFORE QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-1.99^{***}	-1.70^{***}	-1.74^{***}	-0.92^{***}	-0.92^{***}
	(0.12)	(0.11)	(0.11)	(0.12)	(0.12)
$Post_t$	-4.29^{***}	-25.60^{***}			
	(0.12)	(1.02)			
CF_i	1.33^{***}	1.22^{***}	1.09^{***}	-0.60^{**}	-0.60^{**}
	(0.27)	(0.23)	(0.23)	(0.24)	(0.25)
$Treat_i \times Post_t$	1.72^{***}	1.20^{***}	1.11^{***}	0.82^{***}	0.85^{***}
	(0.13)	(0.14)	(0.14)	(0.14)	(0.15)
$Post_t \times CF_i$	-0.32	-0.79^{**}	-0.83^{**}	-1.02^{***}	-1.01^{***}
	(0.35)	(0.34)	(0.33)	(0.35)	(0.35)
$Treat_i \times CF_i$	2.30^{***}	1.47^{***}	1.50^{***}	0.90^{***}	0.81^{***}
	(0.35)	(0.29)	(0.29)	(0.30)	(0.30)
$Treat_i \times Post_t \times CF_i$	-1.57^{***}	-0.42	-0.31	0.16	0.10
	(0.46)	(0.43)	(0.43)	(0.45)	(0.45)
Constant	5.06^{***}	43.72^{***}			
	(0.11)	(0.62)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project stage	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	128,396	114,009	114,009	114,009	114,009
R^2	0.03	0.20	0.21	0.25	0.25
Adjusted R^2	0.03	0.20	0.21	0.25	0.25

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.

Table 8: Contract Financing: Projects that start AFTER QuickPay

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	−0.03	0.96	1.07	1.96	1.80
	(1.69)	(4.13)	(4.27)	(4.38)	(4.38)
$Post_t$	4.99***	41.60***			
	(1.39)	(13.10)			
CF_i	14.18*	11.51	11.91*	14.94**	14.69**
	(8.30)	(7.05)	(6.82)	(6.87)	(6.90)
$Treat_i \times Post_t$	−0.75	−1.53	−1.48	−2.01	−1.78
	(1.70)	(4.14)	(4.28)	(4.38)	(4.38)
$Post_t \times CF_i$	−11.45	−10.23	−10.89	−15.06**	−14.74**
	(8.31)	(7.05)	(6.83)	(6.87)	(6.90)
$Treat_i \times CF_i$	7.78	4.10	3.33	−2.16	−1.98
	(13.38)	(11.09)	(10.87)	(10.55)	(10.48)
$Treat_i \times Post_t \times CF_i$	−5.98	−2.93	−2.21	2.67	2.31
	(13.38)	(11.09)	(10.87)	(10.55)	(10.48)
Constant	1.38	0.94			
	(1.39)	(13.08)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t\times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project stage	No	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	94,848	87,729	87,729	87,729	87,729
R^2	0.01	0.18	0.20	0.23	0.24
Adjusted R^2	0.01	0.18	0.20	0.22	0.23

Note: *p<0.1; **p<0.05; ***p<0.01
Each observation is a project-quarter.
SEs are robust and clustered at the project level.