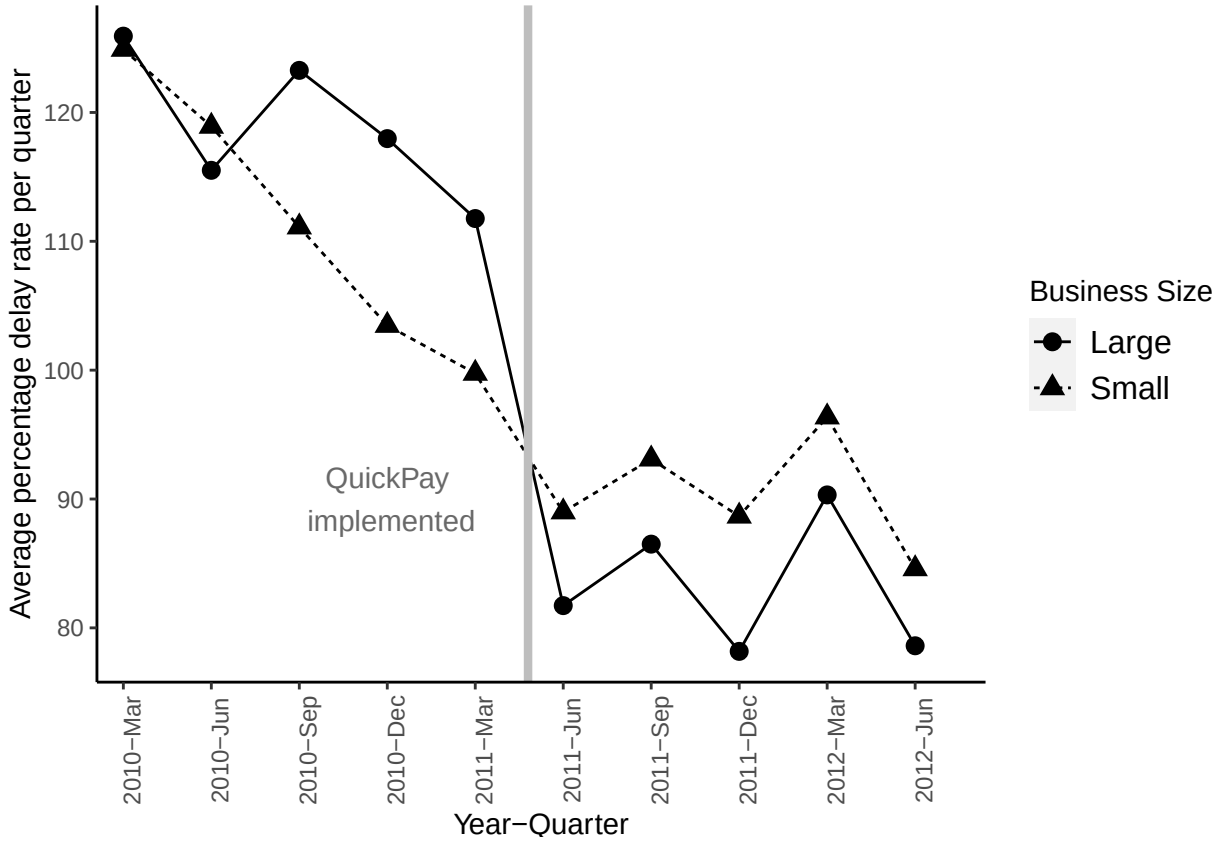
Percentage Delay Rate (Non-Zero Sample): QuickPay (2009-2012)

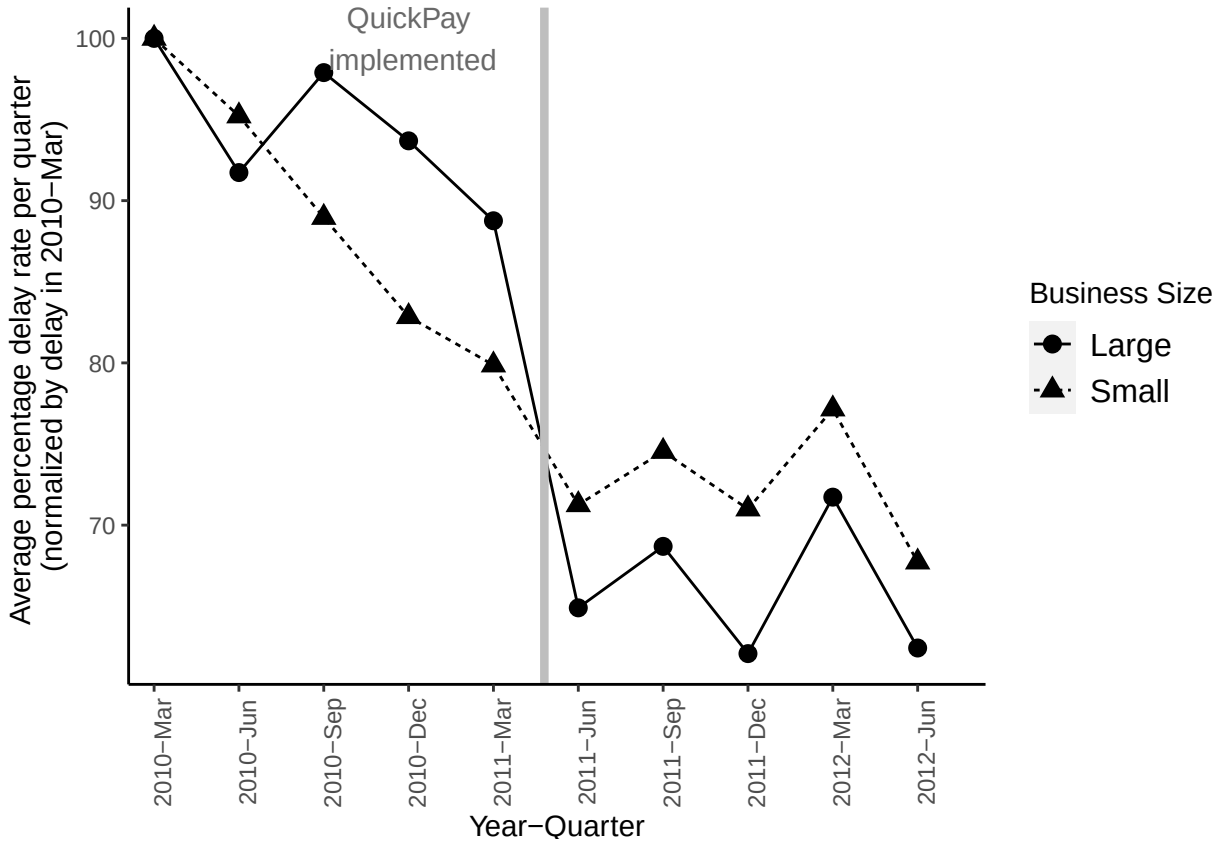
Jan 14, 2022

1 Percentage delays over time

- Sample restricted to projects for which start dates matches the one in API
  - This is done by using first reported "action_date" and "date_signed"
- $PercentDelay_{it} = 100 \times Delay_{it}/Duration_{i,t-1}$
  - $Duration_{i,t-1} = Deadline_{i,t-1} - StartDate_i$



1.1 Normalized delay rate (in percentage)



2 Baseline Regressions

$$PercentDelay_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 (Treat_i \times Post_t) + e_{it}$$

$$\begin{aligned} PercentDelay_{it} = \quad & \alpha + \beta_0 Treat_i + \beta_1 Post_t + \beta_2 (Treat_i \times Post_t) \\ + \quad & X_i + (Post_t \times X_i) + \mu_t + \theta_{firm} + \lambda_{task} + \epsilon_{it} \end{aligned}$$

Table 1: Effect of QuickPay on project delay rates

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-10.15^{***}	-16.10^{***}	-16.12^{***}	-15.04^{***}	-16.15^{***}
	(3.05)	(2.72)	(2.73)	(2.84)	(2.85)
$Post_t$	-33.82^{***}	-39.28^{***}			
	(2.49)	(4.12)			
$Treat_i \times Post_t$	17.32^{***}	20.72^{***}	20.68^{***}	22.66^{***}	24.54^{***}
	(3.51)	(3.18)	(3.18)	(3.16)	(3.14)
Constant	117.17^{***}	196.71^{***}			
	(2.19)	(3.31)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project age	No	Yes	Yes	Yes	Yes
Year-Quarter fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	31,025	31,017	31,017	31,017	31,017
R^2	0.01	0.19	0.19	0.28	0.29
Adjusted R^2	0.01	0.19	0.19	0.26	0.27

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.

3 Contract Financing

$$CF_i = \begin{cases} 1, & \text{if project } i \text{ receives contract financing} \\ 0, & \text{otherwise} \end{cases}$$

$$\begin{aligned} PercentDelay_{it} = \quad & \beta_0 + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 (Treat_i \times Post_t) \\ + \quad & \beta_4 CF_i + \beta_5 (CF_i \times Post_t) + \beta_6 (Treat_i \times Post_t \times CF_i) \\ + \quad & X_i + (Post_t \times X_i) + \mu_t + \theta_{firm} + \lambda_{task} + \epsilon_{it} \end{aligned}$$

Table 2: Financial constraints and QuickPay reform

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-6.76^{**}	-13.58^{***}	-13.62^{***}	-14.47^{***}	-15.65^{***}
	(3.04)	(2.72)	(2.72)	(2.84)	(2.84)
$Post_t$	-37.14^{***}	-42.23^{***}			
	(2.77)	(4.21)			
$Treat_i \times Post_t$	15.88^{***}	21.86^{***}	21.92^{***}	25.95^{***}	27.27^{***}
	(3.71)	(3.37)	(3.37)	(3.40)	(3.37)
CF_i	-47.41^{***}	-32.18^{***}	-32.06^{***}	-9.02^{***}	-7.69^{***}
	(3.03)	(2.86)	(2.86)	(2.99)	(2.98)
$Post_t \times CF_i$	21.67^{***}	21.09^{***}	21.15^{***}	18.14^{***}	15.98^{***}
	(3.95)	(3.71)	(3.71)	(3.77)	(3.74)
$Post_t \times CF_i \times Treat_i$	-7.16^{*}	-13.23^{***}	-13.48^{***}	-14.92^{***}	-12.54^{***}
	(3.67)	(3.37)	(3.37)	(3.53)	(3.49)
Constant	127.13^{***}	201.01^{***}			
	(2.36)	(3.37)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project age	No	Yes	Yes	Yes	Yes
Year-Quarter fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	31,025	31,017	31,017	31,017	31,017
R^2	0.02	0.20	0.20	0.28	0.29
Adjusted R^2	0.02	0.20	0.20	0.26	0.27

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.

4 Competition

4.1 Impact on delays

Define

$$SA_i = \begin{cases} 1, & \text{if project was signed after QuickPay} \\ 0, & \text{otherwise} \end{cases}$$

$$SB_i = \begin{cases} 1, & \text{if project was signed before QuickPay} \\ 0, & \text{otherwise} \end{cases}$$

4.1.1 Subsample model

For a subsample of competitive or noncompetitive projects:

$$PercentDelay_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 SA_i + \beta_3 Post_t + \beta_4(Treat_i \times Post_t \times SA_i) + \beta_5(Treat_i \times Post_t \times SB_i) + e_{it}$$

- According to our hypothesis, β_4 should be positive and significant for competitive projects, and insignificant for non-competitive projects.
- In the following regressions, we also control for the project's age. Project's age is defined as the number of quarters since it first showed up in the sample. We include the terciles of project's age as a control variable.

Table 3: Effect of QuickPay on competitively awarded projects

	$PercentDelay_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-10.88^{***}	-15.34^{***}	-15.45^{***}	-15.54^{***}	-17.67^{***}
	(3.36)	(3.01)	(3.01)	(3.16)	(3.15)
SA_i	25.33^{***}	-0.78	-6.10^{**}	1.55	0.50
	(2.86)	(2.74)	(3.08)	(3.13)	(3.11)
$Post_t$	-45.96^{***}	-35.76^{***}			
	(2.80)	(4.89)			
$Treat_i \times SB_i \times Post_t$	24.76^{***}	32.22^{***}	32.11^{***}	34.60^{***}	35.44^{***}
	(4.08)	(3.75)	(3.75)	(3.73)	(3.68)
$Treat_i \times SA_i \times Post_t$	12.14^{***}	11.00^{***}	11.18^{***}	10.34^{**}	13.93^{***}
	(4.68)	(4.20)	(4.20)	(4.16)	(4.12)
Constant	115.74^{***}	194.81^{***}			
	(2.39)	(3.59)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project age	No	Yes	Yes	Yes	Yes
Year-Quarter fixed effects	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	Yes
Observations	25,770	25,762	25,762	25,762	25,762
R^2	0.01	0.19	0.19	0.29	0.30
Adjusted R^2	0.01	0.19	0.19	0.26	0.28

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.
Sample restricted to fully competed projects.

Table 4: Non-competitive projects and QuickPay law

	$PercentDelay_{it}$			
	(1)	(2)	(3)	(4)
$Treat_i$	−7.89	-23.58^{***}	-22.32^{***}	-12.55^{*}
	(7.32)	(6.41)	(6.41)	(7.20)
SA_i	7.26	-13.32^{**}	-18.44^{**}	-18.13^{**}
	(6.51)	(6.29)	(7.42)	(8.03)
$Post_t$	-25.35^{***}	−14.26		
	(6.89)	(17.45)		
$Treat_i \times SB_i \times Post_t$	−0.18	15.94^{*}	15.34^{*}	13.01
	(9.32)	(8.41)	(8.45)	(8.84)
$Treat_i \times SA_i \times Post_t$	3.86	14.67	13.20	12.28
	(10.12)	(9.08)	(9.09)	(9.64)
Constant	124.78^{***}	198.65^{***}		
	(5.48)	(14.97)		
Duration, Budget, Bids	No	Yes	Yes	Yes
$Post_t\times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes
Project age	No	Yes	Yes	Yes
Year-Quarter fixed effects	No	No	Yes	Yes
Task fixed effects	No	No	No	Yes
Observations	5,255	5,255	5,255	5,255
R^2	0.01	0.22	0.22	0.36
Adjusted R^2	0.01	0.22	0.22	0.28

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.
Sample restricted to non-competed projects.

4.1.2 Four-way interaction

We run the following model:

$$\begin{aligned} PercentDelay_{it} = \; & \beta_0 + \beta_1 Treat_i + \beta_2 StartedAfterQP_i + \beta_3 Post_t + \beta_4 Competitive_i \\ & + \beta_5(Treat_i \times Competitive_i) + \beta_6(Post_t \times Competitive_i) \\ & + \beta_7(StartedAfterQP_i \times Competitive_i) + \beta_8(Treat_i \times Post_t) \\ & + \beta_9(Treat_i \times Post_t \times Competitive_i) \\ & + \beta_{10}(Treat_i \times Post_t \times StartedAfterQP_i) \\ & + \beta_{11}(Treat_i \times Post_t \times StartedAfterQP_i \times Competitive_i) + e_{it} \end{aligned}$$

Interpretation:

- β_9 is the difference between treatment effect for competitive and non-competitive projects signed before quickpay.
- $\beta_9 + \beta_{11}$ is the difference between treatment effect for competitive and non-competitive projects signed *after* quickpay.

- β_{11} is our coefficient of interest because it tells us how much of the difference is there due to "aggressive bidding" after the policy.

Table 5: Effect of Competition After QuickPay: Quickpay 2009-2011

	$PercentDelay_{it}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$Treat_i$	−7.89	−20.93***	−21.66***	−21.31***	−13.81**	−11.49*
	(7.32)	(6.37)	(6.29)	(6.29)	(6.52)	(6.64)
$StartedAfterQP_i$	7.26	−21.57***	−14.10**	−19.53***	−16.98***	−16.11**
	(6.51)	(5.92)	(5.91)	(6.08)	(6.26)	(6.32)
$Competitive_i$	−9.04	−14.46***	−14.95***	−14.71***	−1.81	−1.19
	(5.98)	(5.12)	(5.06)	(5.06)	(5.60)	(5.71)
$Post_t$	−25.35***	−18.95***	−27.83***			
	(6.88)	(7.19)	(7.15)			
$Treat_i \times Competitive_i$	−2.99	4.83	6.31	5.81	−1.65	−5.81
	(8.05)	(7.04)	(6.96)	(6.97)	(7.20)	(7.29)
$Post_t \times Competitive_i$	−20.61***	−8.59	−8.18	−8.47	−10.86	−8.73
	(7.43)	(6.65)	(6.59)	(6.60)	(6.75)	(6.79)
$StartedAfterQP_i \times Competitive_i$	18.07**	14.64**	13.33**	13.43**	17.88***	15.78**
	(7.11)	(6.40)	(6.39)	(6.38)	(6.60)	(6.64)
$Treat_i \times Post_t$	−0.18	12.91	13.38	13.14	16.74**	17.90**
	(9.32)	(8.39)	(8.31)	(8.32)	(8.39)	(8.40)
$Treat_i \times Post_t \times Competitive_i$	24.94**	20.29**	18.83**	19.03**	17.33*	17.05*
	(10.17)	(9.20)	(9.11)	(9.13)	(9.16)	(9.15)
$Treat_i \times Post_t \times StartedAfterQP_i$	4.05	0.80	−0.07	0.03	2.01	1.98
	(9.19)	(8.34)	(8.32)	(8.32)	(8.56)	(8.57)
$Treat_i \times Post_t \times StartedAfterQP_i \times Competitive_i$	−16.67*	−23.03**	−21.26**	−21.12**	−25.80***	−23.06**
	(10.04)	(9.11)	(9.09)	(9.09)	(9.32)	(9.30)
Constant	124.78***	219.86***	210.30***			
	(5.48)	(5.39)	(5.34)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes	Yes
$Post_t\times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes	Yes
Project age	No	No	Yes	Yes	Yes	Yes
Year-Quarter fixed effects	No	No	No	Yes	Yes	Yes
Task fixed effects	No	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	No	Yes
Observations	31,025	31,017	31,017	31,017	31,017	31,017
R^2	0.01	0.19	0.20	0.20	0.28	0.29
Adjusted R^2	0.01	0.19	0.20	0.20	0.26	0.27

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.