

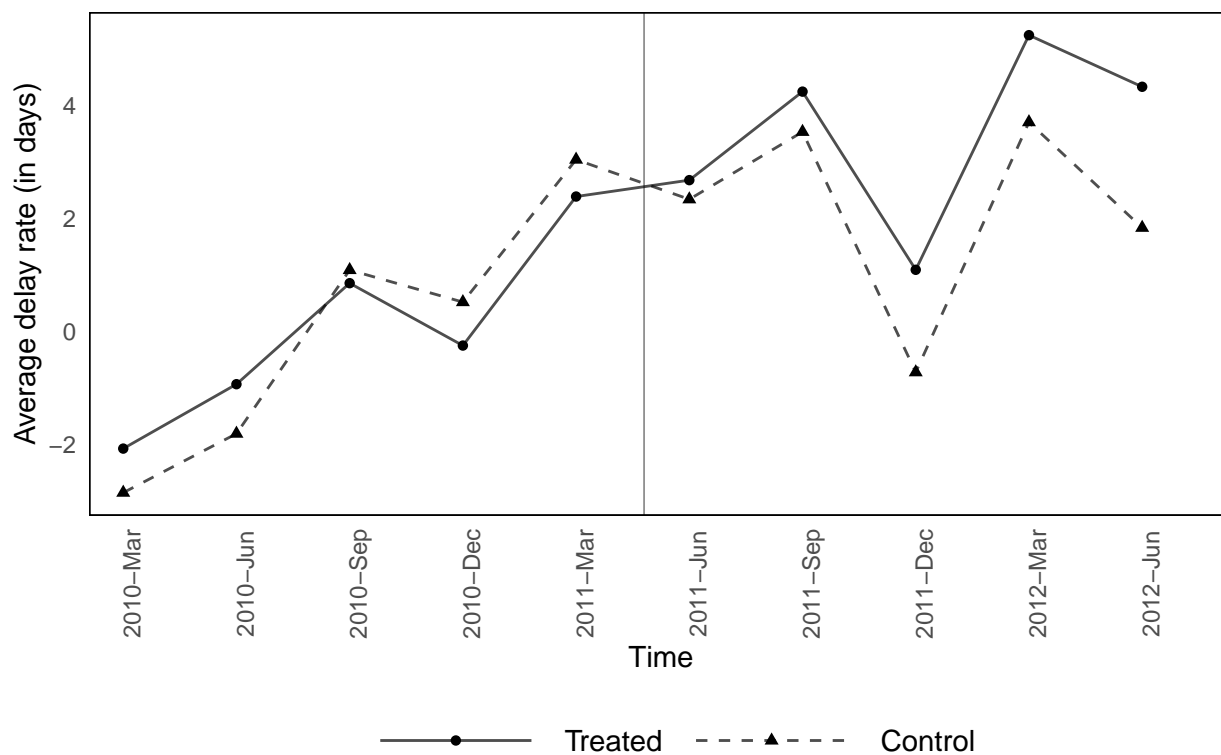
Percentage Delay Rate: QuickPay (2009-2012)

Jul 16, 2022

1 Delay days over time

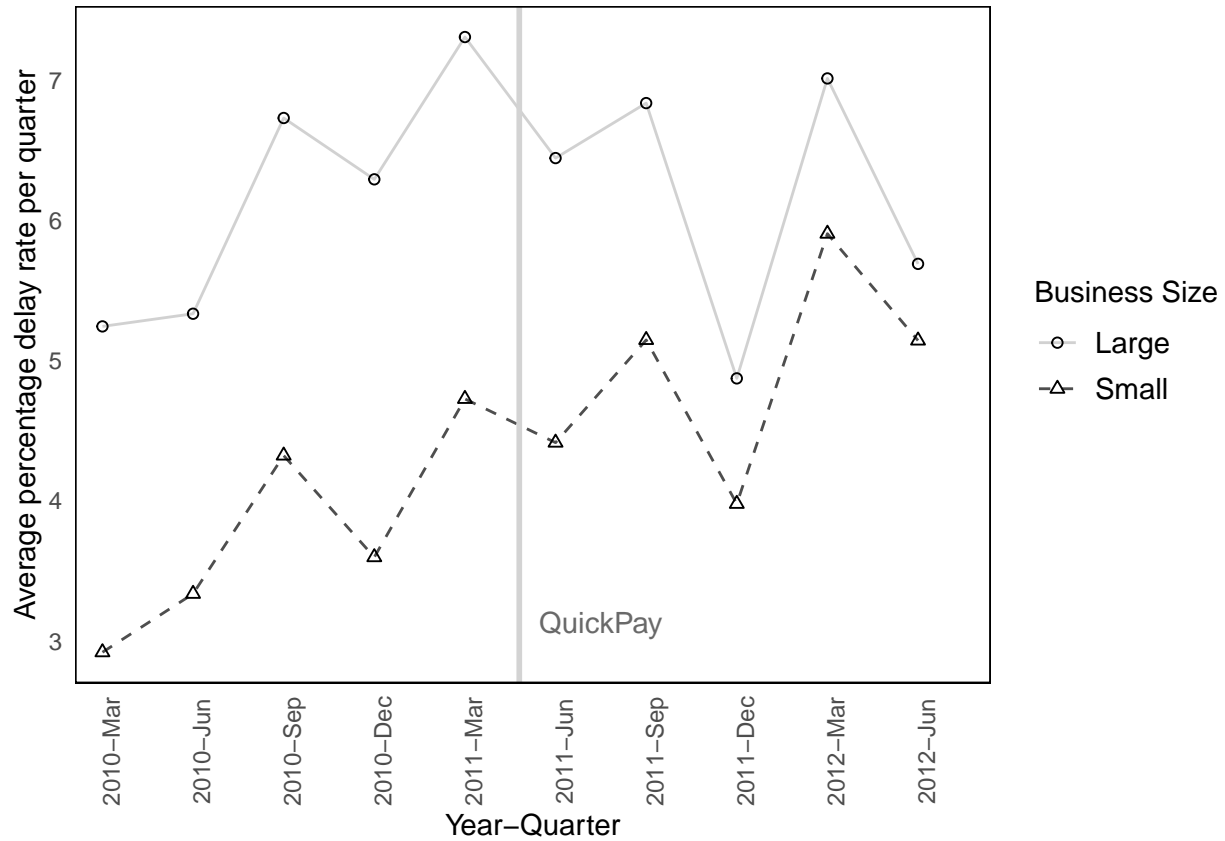


2 Delay days over time (de-meanned)



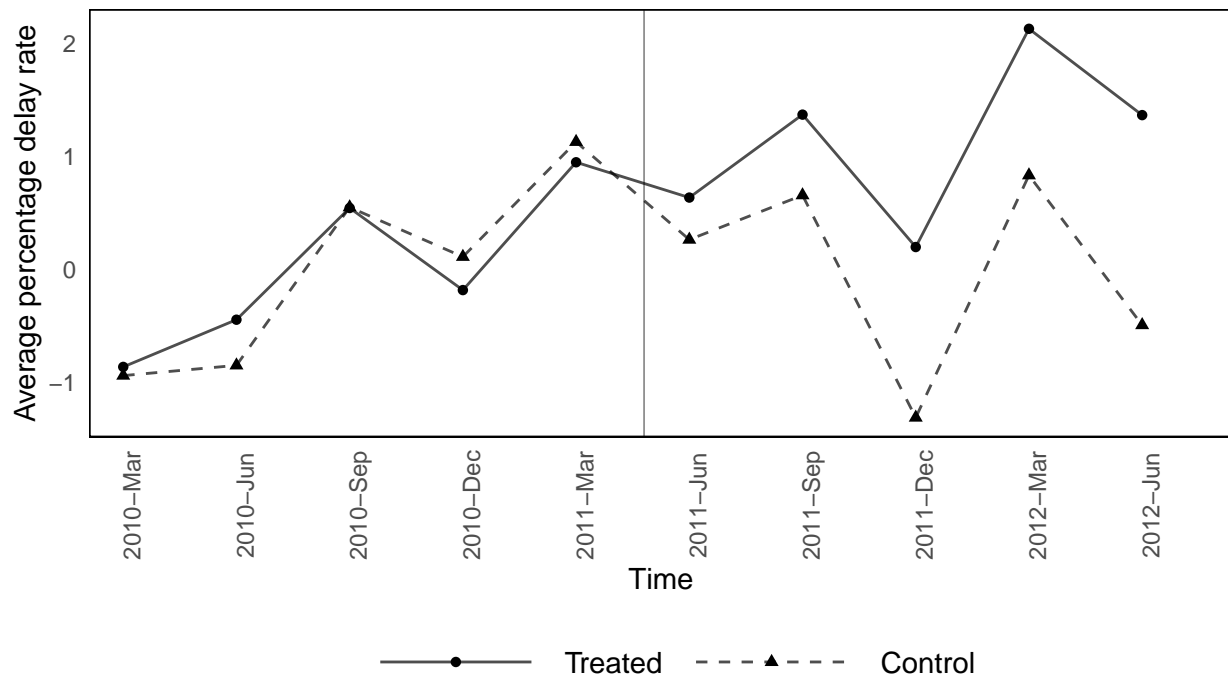
3 Percentage delays over time

- 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”
- $PercentDelay_{it} = 100 \times Delay_{it} / Duration_{i,t-1}$
 - $Duration_{i,t-1} = Deadline_{i,t-1} - StartDate_i$



4 Demeaned delay rate (in percentage)

- Subtract the average pre-quickpay delay rate from each observation



4.1 Normalized delay rate (in percentage)



5 Baseline Regressions

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

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

Table 1: Effect of QuickPay on project delay rates

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -2.48*** (0.12) | -1.59*** (0.10) | -1.62*** (0.10) | -1.31*** (0.10) | -1.33*** (0.10) |
| <i>Post_t</i> | -0.32*** (0.12) | -8.32*** (0.81) | | | |
| <i>Treat_i × Post_t</i> | 1.27*** (0.14) | 1.10*** (0.13) | 1.13*** (0.13) | 1.18*** (0.13) | 1.23*** (0.13) |
| Constant | 6.44*** (0.10) | 53.81*** (0.61) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 260,056 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.003 | 0.22 | 0.22 | 0.25 | 0.26 |
| Adjusted R ² | 0.003 | 0.22 | 0.22 | 0.25 | 0.25 |

Note:

*p<0.1; **p<0.05; ***p<0.01

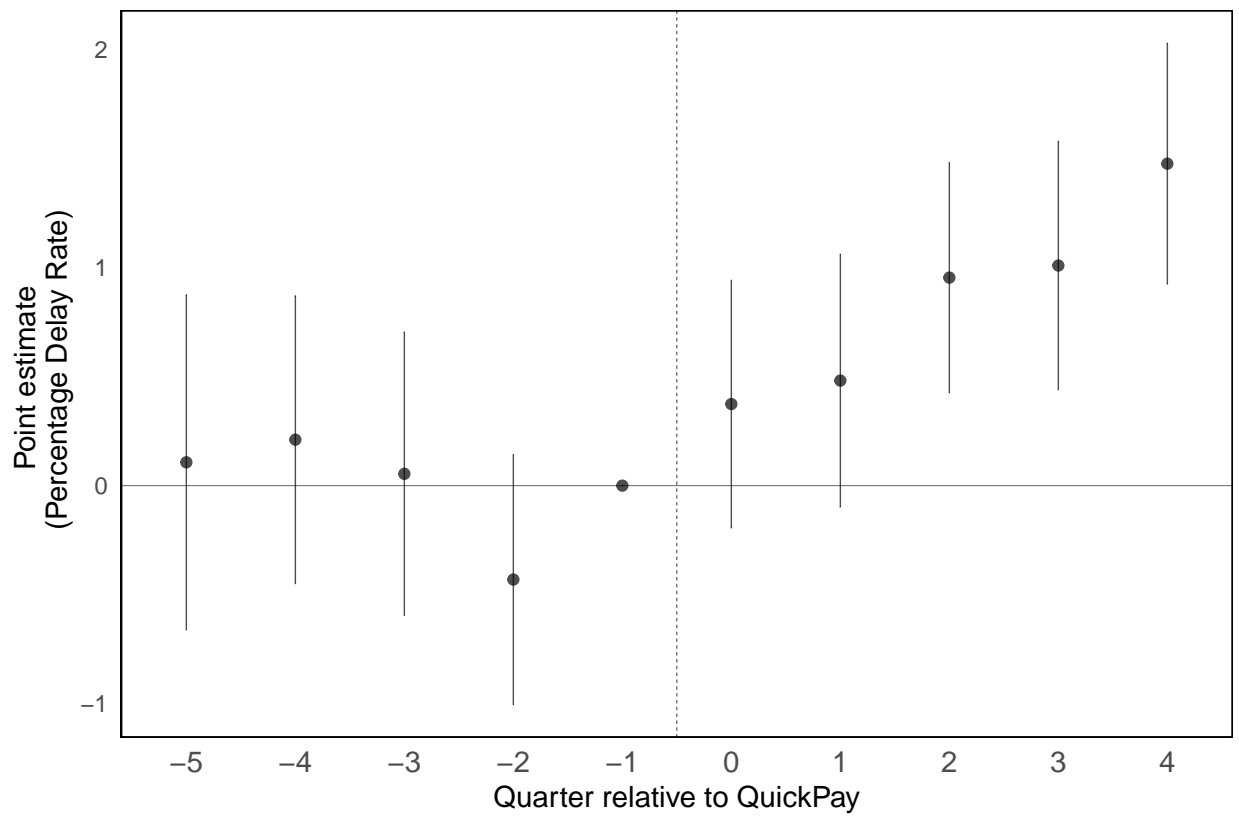
Each observation is a project-quarter.

SEs are robust and clustered at the project level.

6 Event study

$$PercentDelay_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 Treat_i \times Quarter_t + \gamma_{task} + \theta_{naics} + \lambda_{quarter} + \nu_{sub-agency} + \epsilon_{it}$$

NOTE: 242,843 observations removed because of NA values (LHS: 242,843, RHS: 9,862).



7 Parallel Trends Test

Table 2: Linear Time Trend Before QuickPay

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -1.85*** (0.42) | -1.18*** (0.38) | -1.19*** (0.38) | -1.14*** (0.37) | -1.27*** (0.37) |
| <i>QuarterNum</i> | 0.51*** (0.07) | -1.49*** (0.49) | | | |
| <i>Treat_i × QuarterNum</i> | -0.14 (0.09) | -0.11 (0.08) | -0.11 (0.08) | 0.04 (0.08) | 0.05 (0.08) |
| Constant | 4.15*** (0.35) | 60.96*** (2.30) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t</i> × (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 | 97,705 | 90,650 | 90,650 | 90,650 | 90,650 |
| R ² | 0.01 | 0.26 | 0.26 | 0.32 | 0.32 |
| Adjusted R ² | 0.01 | 0.26 | 0.26 | 0.31 | 0.31 |

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.

Observations are for quarters before quickpay.

8 Placebo Test

8.1 Placebo Regression Tables

[1] 3

Table 3: Placebo test: Treatment Time 2010-06-30

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|---------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -4.50*** (0.78) | -4.12*** (0.70) | -4.13*** (0.70) | -2.77*** (0.67) | -2.99*** (0.67) |
| <i>Post</i> | 2.49*** (0.67) | -8.64* (4.70) | | | |
| <i>Treat_i × Post</i> | -1.25 (0.81) | 0.64 (0.73) | 0.62 (0.73) | 0.83 (0.71) | 0.91 (0.70) |
| Constant | 10.33*** (0.65) | 122.58*** (4.49) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 97,705 | 90,650 | 90,650 | 90,650 | 90,650 |
| R ² | 0.01 | 0.32 | 0.32 | 0.37 | 0.37 |
| Adjusted R ² | 0.01 | 0.32 | 0.32 | 0.36 | 0.36 |

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.

Observations are for quarters before quickpay.

Table 4: Placebo test: Treatment Time 2010-09-30

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|---------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -4.58*** (0.49) | -3.43*** (0.42) | -3.43*** (0.42) | -2.21*** (0.42) | -2.45*** (0.41) |
| <i>Post</i> | 2.52*** (0.47) | -12.11*** (3.07) | | | |
| <i>Treat_i × Post</i> | -1.40** (0.56) | -0.20 (0.49) | -0.19 (0.49) | 0.26 (0.48) | 0.38 (0.48) |
| Constant | 10.68*** (0.41) | 124.33*** (2.70) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 97,705 | 90,650 | 90,650 | 90,650 | 90,650 |
| R ² | 0.01 | 0.32 | 0.32 | 0.37 | 0.37 |
| Adjusted R ² | 0.01 | 0.32 | 0.32 | 0.36 | 0.36 |

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.

Observations are for quarters before quickpay.

9 Summary statistics

10 Number of projects per contractor

10.1 Contractors holding only small or only large projects

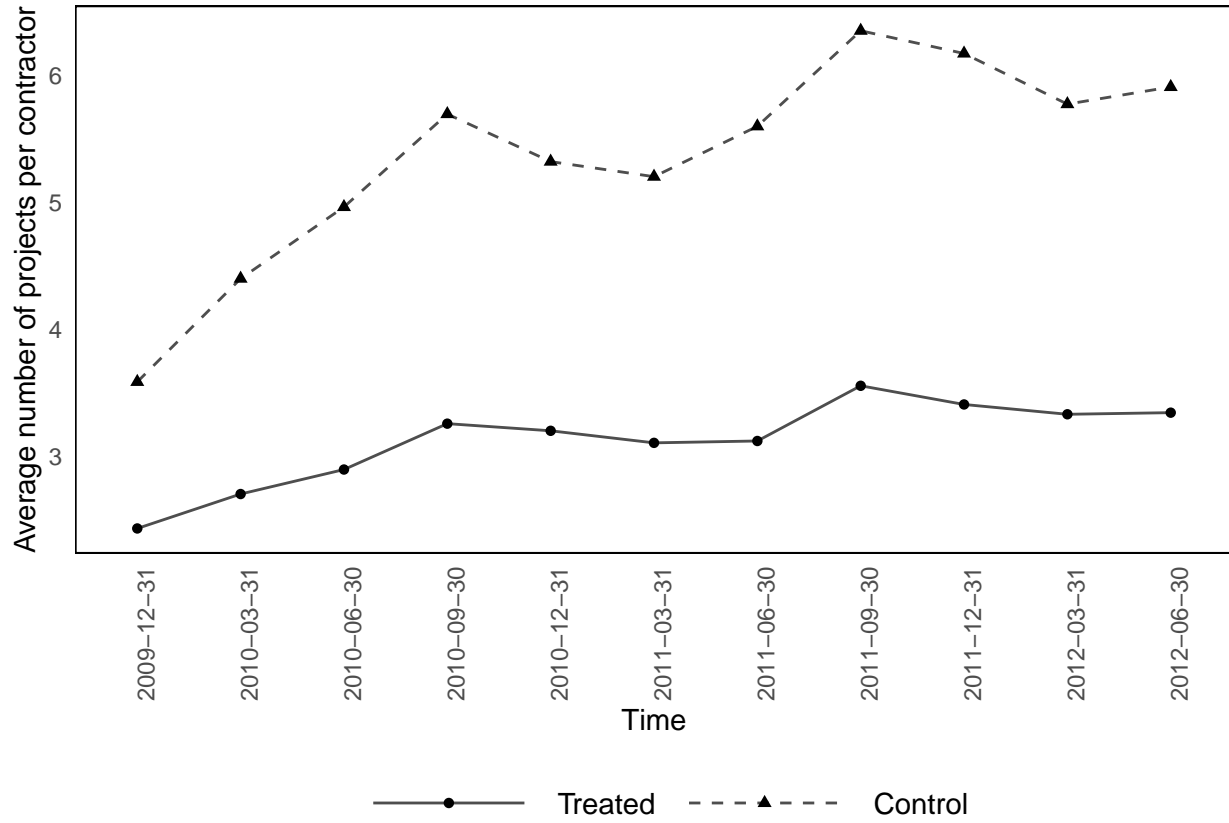


Table 5: Num Contractor Projects and QuickPay reform

| Number of projects | | |
|-------------------------|--------------------|--------------------|
| | (1) | (2) |
| $Treat_i$ | -2.03*** (0.39) | -2.03*** (0.39) |
| $Post_t$ | 0.94** (0.41) | |
| $Treat_i \times Post_t$ | -0.58 (0.41) | -0.58 (0.41) |
| Constant | 5.03*** (0.38) | |
| Time fixed effects | No | Yes |
| Observations | 84,391 | 84,391 |
| R^2 | 0.005 | 0.01 |
| Adjusted R^2 | 0.005 | 0.01 |

Note:

*p<0.1; **p<0.05; ***p<0.01

Each observation is a contractor-quarter.

SEs are robust and clustered at the contractor level.

Sample restricted to contractors performing only one type of project.

10.2 Contractors holding at least one small project are “treated”

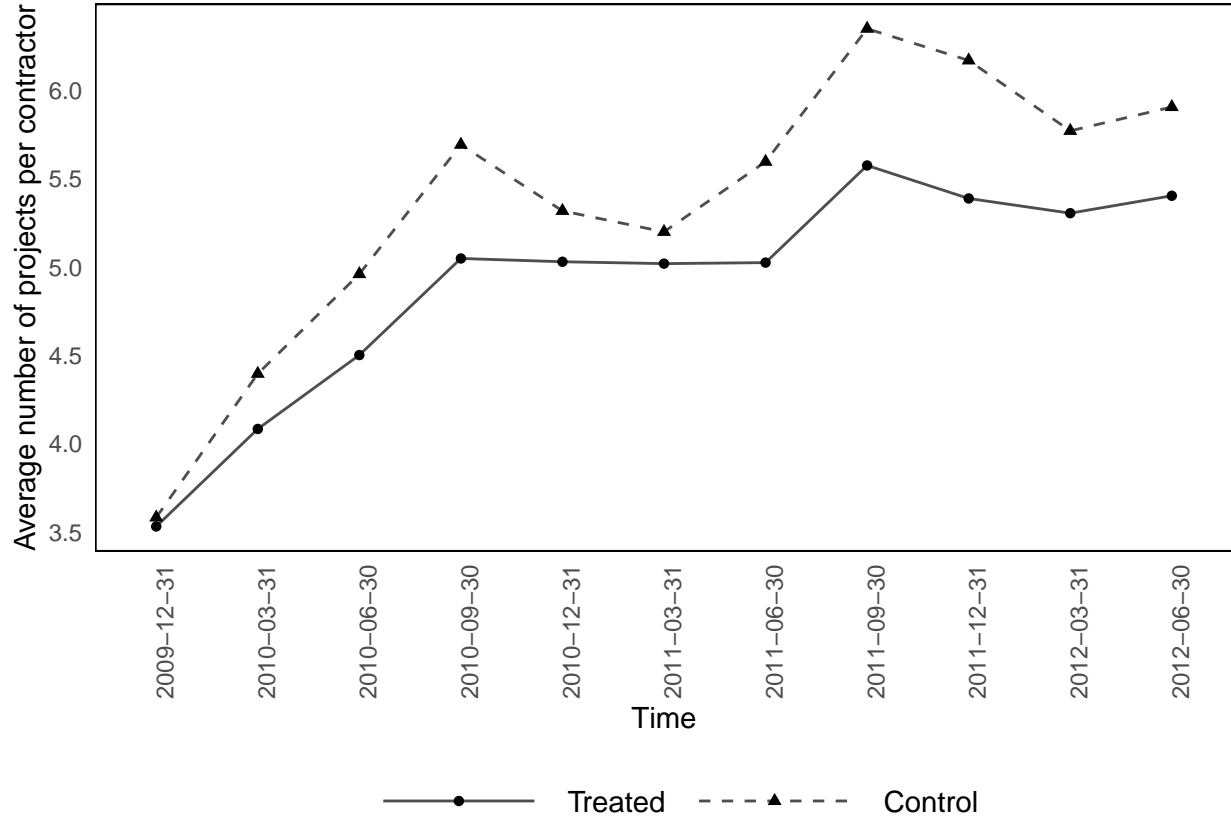


Table 6: Num Contractor Projects and QuickPay reform

| | Number of projects | |
|-------------------------|--------------------|-----------------|
| | (1) | (2) |
| $Treat_i$ | -0.37 (0.43) | -0.35 (0.43) |
| $Post_t$ | 0.94** (0.41) | |
| $Treat_i \times Post_t$ | -0.25 (0.42) | -0.27 (0.42) |
| Constant | 5.03*** (0.38) | |
| Time fixed effects | No | Yes |
| Observations | 97,640 | 97,640 |
| R ² | 0.0004 | 0.001 |
| Adjusted R ² | 0.0003 | 0.001 |

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

11 Total budget

11.1 Contractors holding only small or only large projects

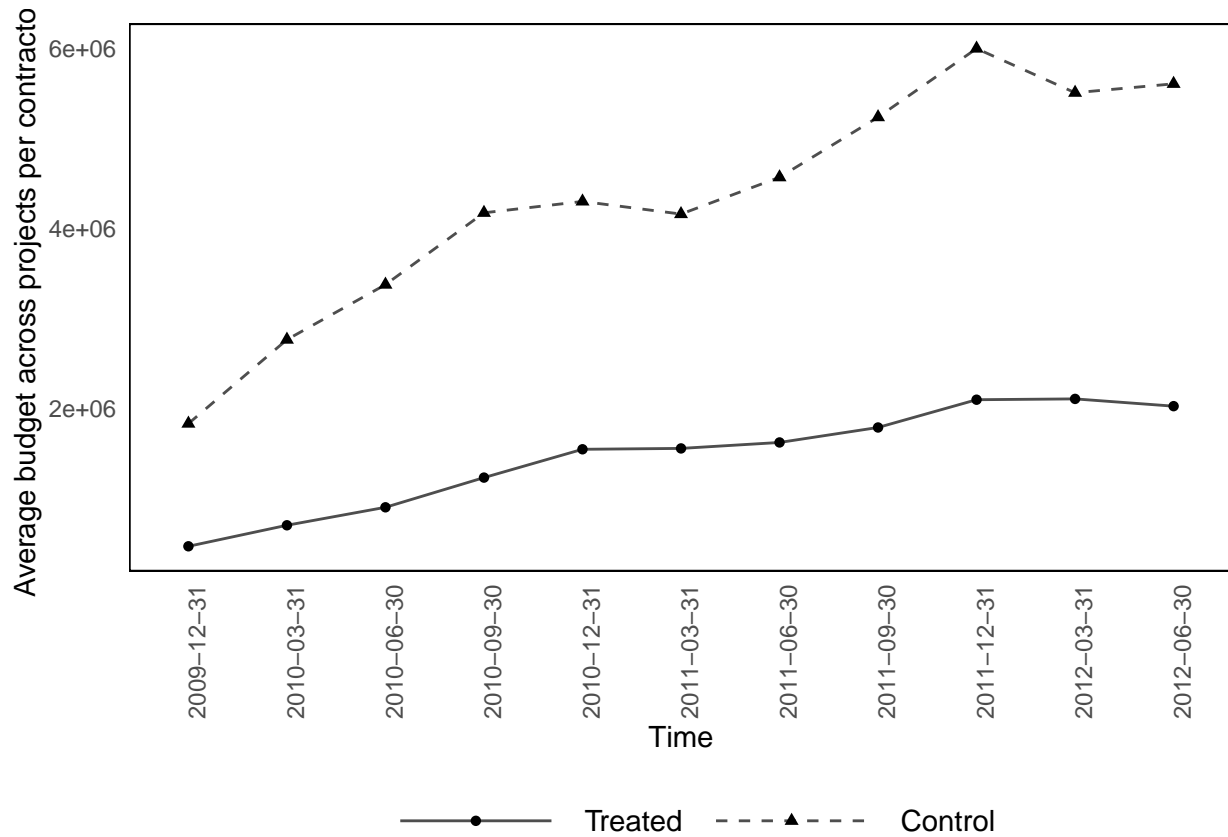


Table 7: Contractor Project Budget and QuickPay reform

| | Total budget | |
|-------------------------|---------------------------------------|---------------------------------------|
| | (1) | (2) |
| $Treat_i$ | $-2,503,033.00^{***}$ (454,885.70) | $-2,497,737.00^{***}$ (456,972.80) |
| $Post_t$ | $1,715,503.00^{***}$ (229,333.50) | |
| $Treat_i \times Post_t$ | $-953,041.30^{***}$ (231,908.60) | $-955,237.70^{***}$ (233,131.80) |
| Constant | $3,666,740.00^{***}$ (453,287.80) | |
| Time fixed effects | No | Yes |
| Observations | 84,391 | 84,391 |
| R ² | 0.01 | 0.02 |
| Adjusted R ² | 0.01 | 0.01 |

Note:

*p<0.1; **p<0.05; ***p<0.01

Each observation is a contractor-quarter.

SEs are robust and clustered at the contractor level.

Sample restricted to contractors performing only one type of project.

12 Number of tasks

12.1 Contractors holding only small or only large projects

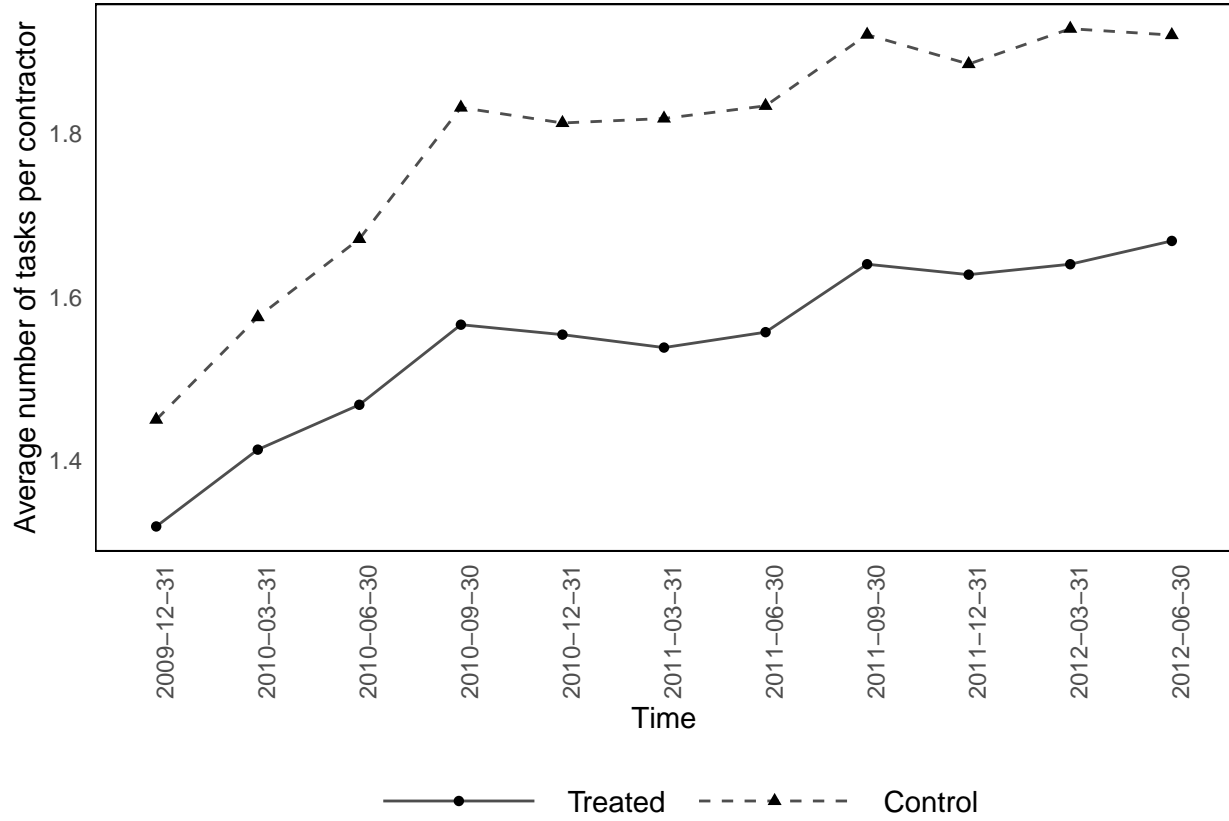


Table 8: Contractor Project Tasks and QuickPay reform

| Number of tasks | | |
|-------------------------|--------------------|--------------------|
| | (1) | (2) |
| $Treat_i$ | -0.23*** (0.04) | -0.23*** (0.04) |
| $Post_t$ | 0.17*** (0.02) | |
| $Treat_i \times Post_t$ | -0.04 (0.03) | -0.04 (0.03) |
| Constant | 1.73*** (0.04) | |
| Time fixed effects | No | Yes |
| Observations | 84,391 | 84,391 |
| R ² | 0.01 | 0.01 |
| Adjusted R ² | 0.01 | 0.01 |

Note:

*p<0.1; **p<0.05; ***p<0.01

Each observation is a contractor-quarter.

SEs are robust and clustered at the contractor level.

Sample restricted to contractors performing only one type of project.

13 Project portfolio: Num Large Projects/Total Projects

13.1 Continuous

Table 9: Project Portfolio and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | 0.89 (0.61) | 0.36 (0.54) | 0.36 (0.54) | -0.36 (0.49) | -0.40 (0.49) |
| $Post_t$ | 0.26 (0.75) | -7.39*** (1.05) | | | |
| Proportion Large Projects | 3.43*** (0.63) | 1.97*** (0.55) | 1.99*** (0.55) | 0.96* (0.51) | 0.93* (0.51) |
| $Treat_i \times Post_t$ | 0.68 (0.75) | 0.12 (0.70) | 0.13 (0.69) | 0.73 (0.66) | 0.74 (0.66) |
| $Post_t \times$ Proportion Large Projects | -0.61 (0.77) | -1.01 (0.71) | -1.02 (0.71) | -0.48 (0.68) | -0.53 (0.68) |
| $Treat_i \times$ Proportion Large Projects | -5.41*** (0.85) | -3.71*** (0.79) | -3.80*** (0.79) | -1.91*** (0.74) | -1.81** (0.74) |
| $Treat_i \times Post_t \times$ Proportion Large Projects | 0.55 (1.08) | 1.00 (1.05) | 1.07 (1.04) | -0.29 (1.01) | -0.34 (1.01) |
| Constant | 3.11*** (0.61) | 51.93*** (0.80) | | | |
| 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 | 260,056 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.003 | 0.22 | 0.22 | 0.25 | 0.26 |
| Adjusted R ² | 0.003 | 0.22 | 0.22 | 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 10: Project Portfolio and QuickPay reform: Restricted Sample

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|---------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | 3.26*** (0.71) | 0.66 (0.61) | 0.54 (0.61) | 0.43 (0.55) | 0.40 (0.55) |
| $Post_t$ | 2.04** (0.82) | -13.50*** (1.83) | | | |
| Proportion Large Projects | 13.82*** (0.91) | 4.32*** (0.68) | 4.21*** (0.68) | 2.31*** (0.62) | 2.00*** (0.62) |
| $Treat_i \times Post_t$ | -1.73** (0.84) | -1.09 (0.76) | -1.06 (0.76) | -0.12 (0.73) | 0.01 (0.73) |
| $Post_t \times$ Proportion Large Projects | -4.18*** (1.06) | -1.57* (0.86) | -1.58* (0.86) | -0.94 (0.83) | -0.92 (0.83) |
| $Treat_i \times$ Proportion Large Projects | -10.70*** (1.10) | -4.19*** (0.94) | -4.05*** (0.94) | -3.78*** (0.89) | -4.05*** (0.90) |
| $Treat_i \times Post_t \times$ Proportion Large Projects | 5.89*** (1.34) | 3.66*** (1.22) | 3.70*** (1.21) | 2.12* (1.21) | 1.98 (1.21) |
| Constant | -1.72** (0.70) | 57.32*** (1.36) | | | |
| 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 | 49,222 | 45,643 | 45,643 | 45,643 | 45,643 |
| R ² | 0.05 | 0.38 | 0.38 | 0.43 | 0.43 |
| Adjusted R ² | 0.05 | 0.37 | 0.38 | 0.42 | 0.43 |

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 observations with at least one small and one large project

Table 11: Project Portfolio and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -0.76*** (0.13) | -1.15*** (0.11) | -1.17*** (0.11) | -0.63*** (0.11) | -0.62*** (0.11) |
| <i>Post_t</i> | 1.05*** (0.13) | -8.12*** (0.80) | | | |
| Num large projects | 0.01*** (0.001) | 0.003*** (0.0004) | 0.004*** (0.0004) | 0.01*** (0.0004) | 0.01*** (0.0004) |
| <i>Treat_i × Post_t</i> | -0.09 (0.16) | 1.08*** (0.14) | 1.09*** (0.14) | 0.71*** (0.14) | 0.77*** (0.14) |
| <i>Post_t × Num large projects</i> | -0.01*** (0.001) | -0.002*** (0.0004) | -0.002*** (0.0004) | -0.005*** (0.0004) | -0.005*** (0.0004) |
| <i>Treat_i × Num large projects</i> | -0.01*** (0.003) | -0.002 (0.003) | -0.002 (0.003) | -0.01** (0.003) | -0.01*** (0.003) |
| <i>Treat_i × Post_t × Num large projects</i> | 0.003 (0.01) | -0.0002 (0.003) | -0.0000 (0.003) | 0.003 (0.003) | 0.003 (0.003) |
| Constant | 4.70*** (0.11) | 52.99*** (0.61) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 260,056 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.01 | 0.22 | 0.22 | 0.25 | 0.26 |
| Adjusted R ² | 0.01 | 0.22 | 0.22 | 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 12: Project Portfolio and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|---|----------------------------------|---------------------|---------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | -0.55** (0.26) | -0.40* (0.23) | -0.43* (0.23) | -0.24 (0.22) | -0.15 (0.22) |
| $Post_t$ | 1.23*** (0.28) | -12.73*** (1.62) | | | |
| Num large projects | 0.03*** (0.001) | 0.01*** (0.001) | 0.01*** (0.001) | 0.01*** (0.001) | 0.01*** (0.001) |
| $Treat_i \times Post_t$ | -0.77** (0.31) | -0.40 (0.29) | -0.35 (0.29) | -0.16 (0.29) | -0.0004 (0.29) |
| $Post_t \times$ Num large projects | -0.01*** (0.001) | -0.01*** (0.001) | -0.01*** (0.001) | -0.005*** (0.001) | -0.005*** (0.001) |
| $Treat_i \times$ Num large projects | -0.02*** (0.003) | -0.01** (0.003) | -0.01** (0.003) | -0.01*** (0.003) | -0.01*** (0.003) |
| $Treat_i \times Post_t \times$ Num large projects | 0.01*** (0.004) | 0.01*** (0.003) | 0.01*** (0.003) | 0.01** (0.003) | 0.01** (0.003) |
| Constant | 2.41*** (0.23) | 55.04*** (1.20) | | | |
| 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 | 49,222 | 45,643 | 45,643 | 45,643 | 45,643 |
| R ² | 0.14 | 0.39 | 0.39 | 0.43 | 0.44 |
| Adjusted R ² | 0.14 | 0.39 | 0.39 | 0.42 | 0.43 |

Note:

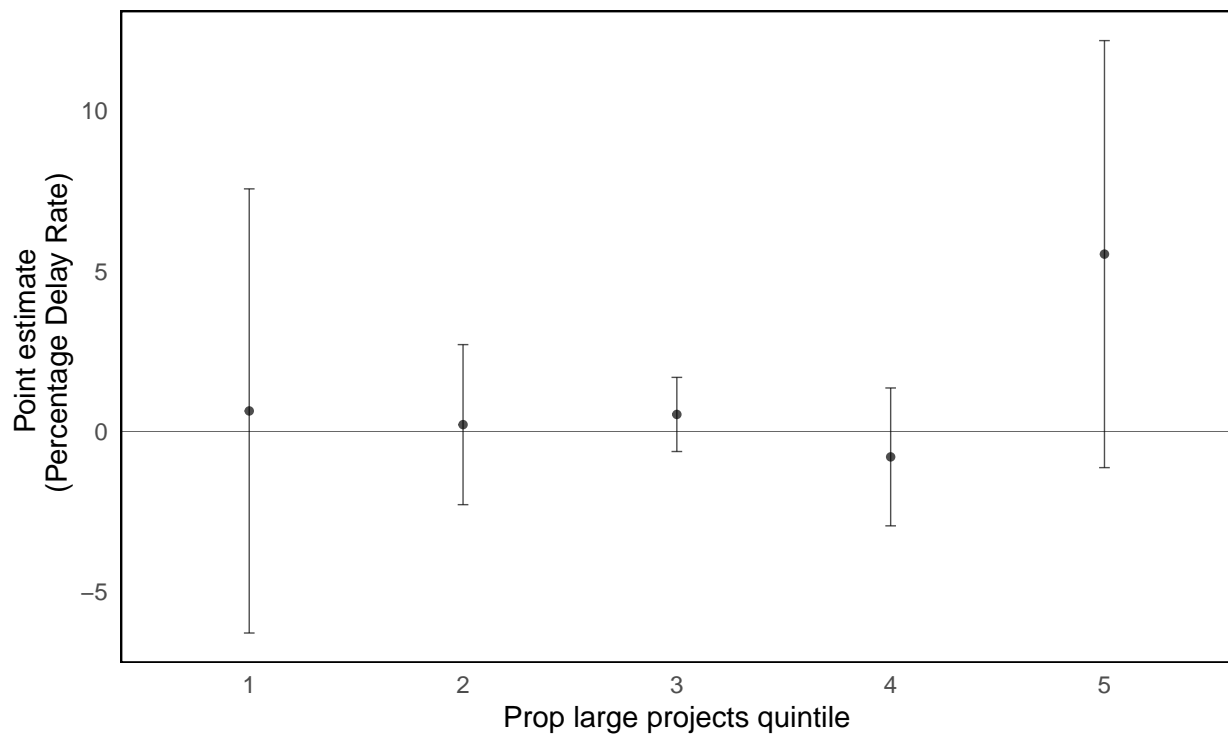
*p<0.1; **p<0.05; ***p<0.01

Each observation is a project-quarter.

SEs are robust and clustered at the project level.

Sample restricted to contractors holding at least one large and one small project.

13.2 Discrete



14 Project portfolio: Budget Large Projects/Total Budget Across Projects

Table 13: Project Portfolio and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|---|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | -0.69 (0.59) | -0.02 (0.50) | 0.05 (0.50) | -0.36 (0.46) | -0.41 (0.46) |
| $Post_t$ | -0.66 (0.73) | -7.79*** (1.01) | | | |
| Proportion Large Projects Budget | 1.79*** (0.60) | 1.55*** (0.51) | 1.65*** (0.51) | 0.95** (0.48) | 0.91* (0.48) |
| $Treat_i \times Post_t$ | 1.61** (0.74) | 0.47 (0.65) | 0.42 (0.65) | 0.78 (0.62) | 0.79 (0.61) |
| $Post_t \times$ Proportion Large Projects Budget | 0.34 (0.75) | -0.63 (0.66) | -0.71 (0.66) | -0.43 (0.63) | -0.47 (0.63) |
| $Treat_i \times$ Proportion Large Projects Budget | -3.99*** (0.75) | -4.00*** (0.69) | -4.18*** (0.69) | -2.28*** (0.64) | -2.21*** (0.64) |
| $Treat_i \times Post_t \times$ Proportion Large Projects Budget | -0.55 (0.98) | 1.28 (0.91) | 1.41 (0.91) | -0.11 (0.87) | -0.09 (0.87) |
| Constant | 4.70*** (0.59) | 52.38*** (0.76) | | | |
| 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 | 260,056 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.003 | 0.22 | 0.22 | 0.25 | 0.26 |
| Adjusted R ² | 0.003 | 0.22 | 0.22 | 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 14: Project Portfolio and QuickPay reform: Restricted Sample

| | <i>PercentDelay_{it}</i> | | | | |
|---|----------------------------------|---------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | 0.24 (0.62) | 0.21 (0.55) | 0.18 (0.55) | 0.95* (0.52) | 0.95* (0.52) |
| $Post_t$ | 0.56 (0.76) | -14.02*** (1.75) | | | |
| Proportion Large Projects Budget | 10.03*** (0.78) | 3.53*** (0.62) | 3.54*** (0.62) | 2.84*** (0.58) | 2.58*** (0.58) |
| $Treat_i \times Post_t$ | -0.28 (0.77) | -0.94 (0.69) | -0.97 (0.69) | -0.57 (0.67) | -0.50 (0.67) |
| $Post_t \times$ Proportion Large Projects Budget | -2.43*** (0.94) | -1.23 (0.77) | -1.30* (0.77) | -1.48** (0.75) | -1.53** (0.75) |
| $Treat_i \times$ Proportion Large Projects Budget | -8.43*** (0.92) | -4.80*** (0.81) | -4.81*** (0.81) | -4.65*** (0.77) | -4.78*** (0.77) |
| $Treat_i \times Post_t \times$ Proportion Large Projects Budget | 3.95*** (1.17) | 3.92*** (1.04) | 4.04*** (1.04) | 2.45** (1.03) | 2.38** (1.03) |
| Constant | 1.48** (0.61) | 58.36*** (1.29) | | | |
| 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 | 49,222 | 45,643 | 45,643 | 45,643 | 45,643 |
| R ² | 0.05 | 0.38 | 0.38 | 0.43 | 0.43 |
| Adjusted R ² | 0.05 | 0.37 | 0.38 | 0.42 | 0.43 |

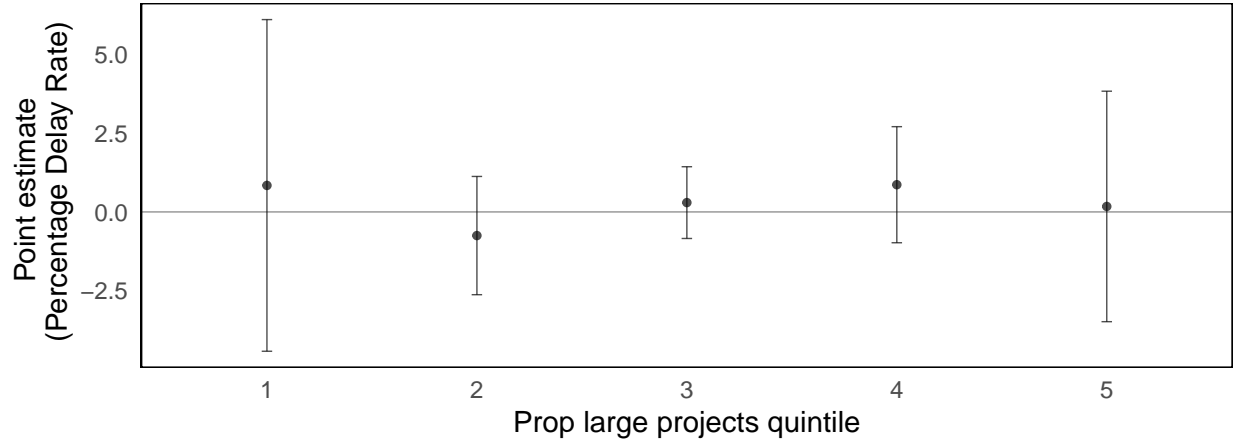
Note:

*p<0.1; **p<0.05; ***p<0.01

Each observation is a project-quarter.

SEs are robust and clustered at the project level.

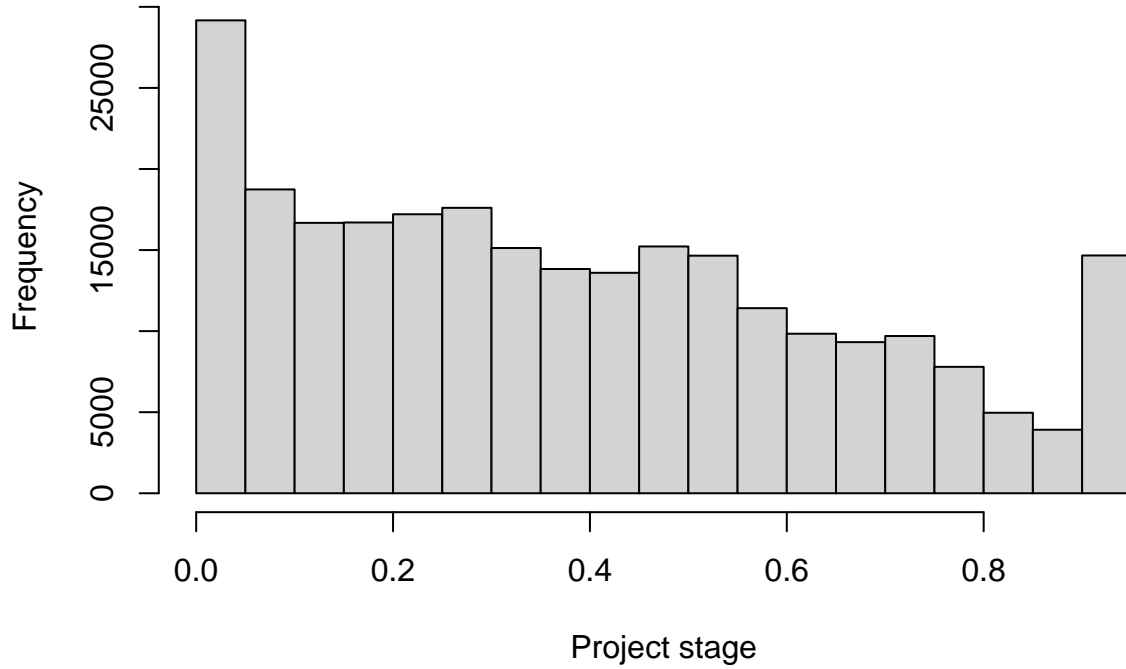
Sample restricted to observations with at least one small and one large project

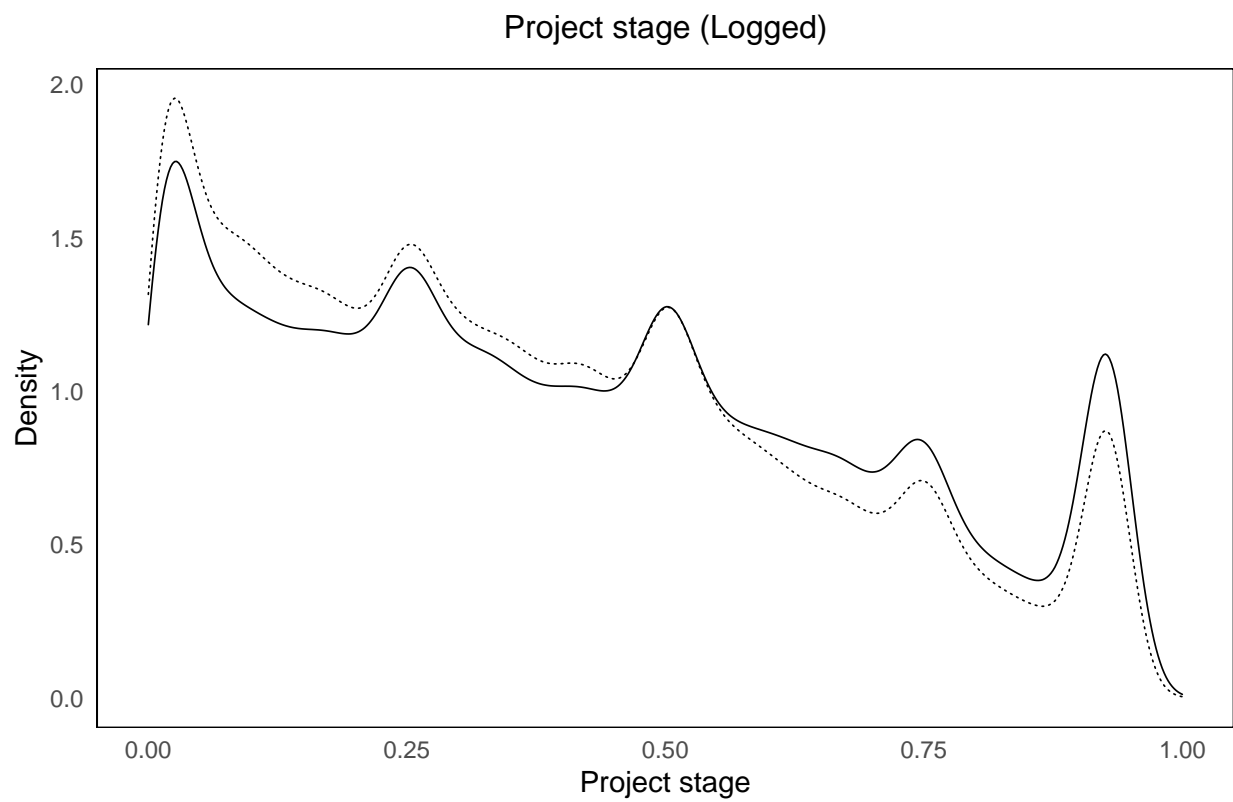
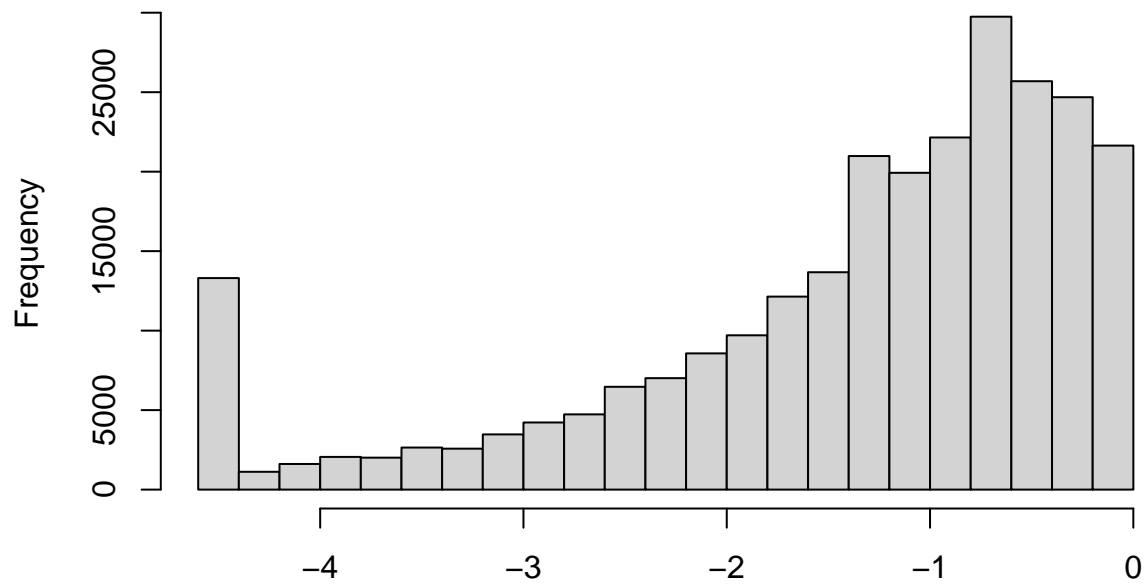


15 Project Stage

- t indicates the end of the quarter
- We want to get stage of the project at the beginning of a given quarter (before any delays materialize)

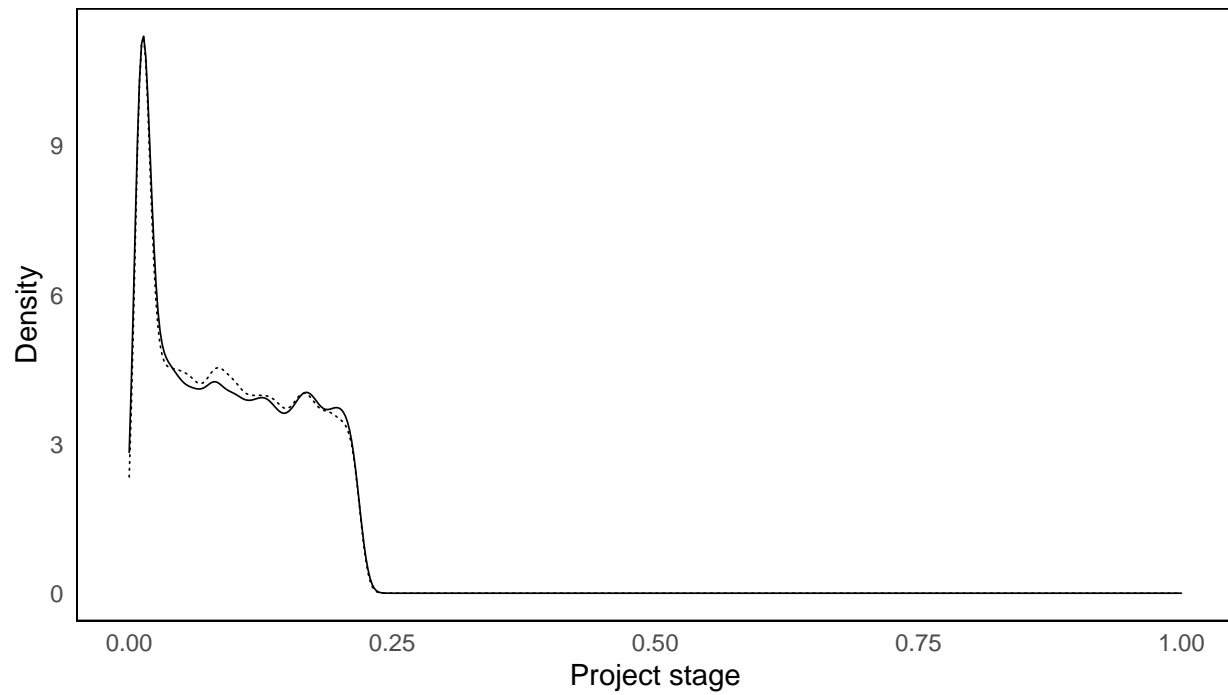
$$Stage_{it} = \frac{ActionDate_{t-1} - StartDate_i}{Duration_{i,t-1}} \quad Stage_{it} = \frac{(t-1) - StartDate_i}{Duration_{i,t-1}}$$





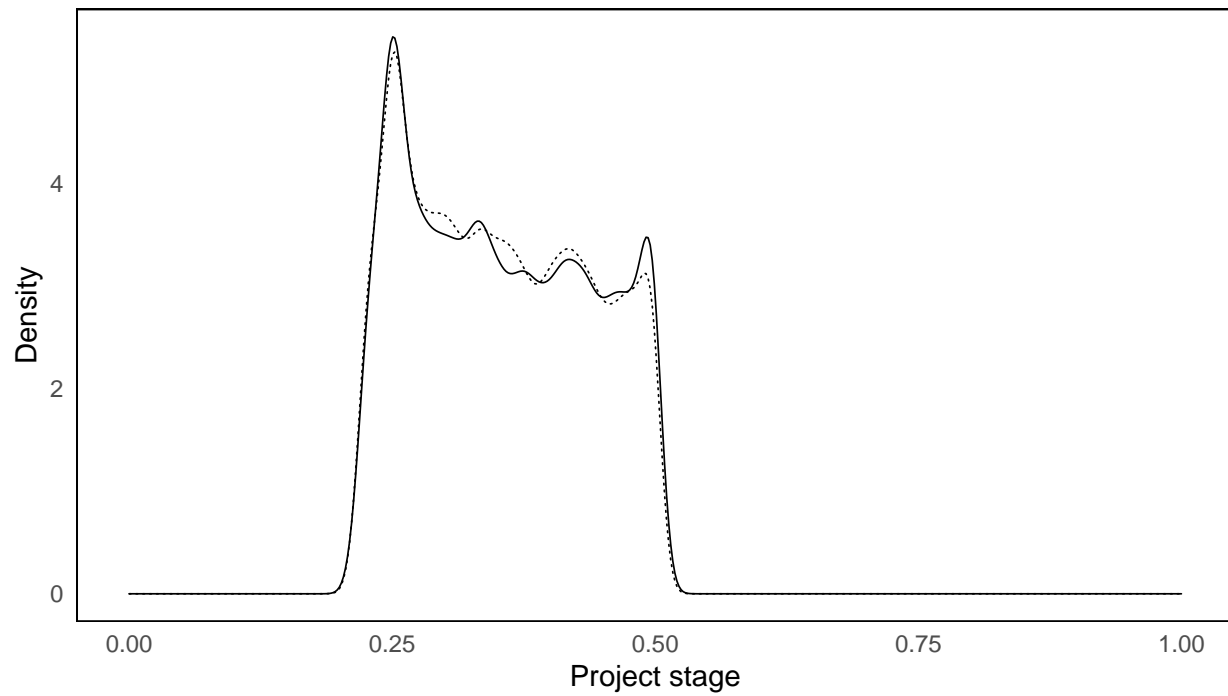
Business Type ☐ o ☐ s

Early stage projects



Business Type ☐ o ☐ s

Medium stage projects



Business Type ☐ o ☐ s

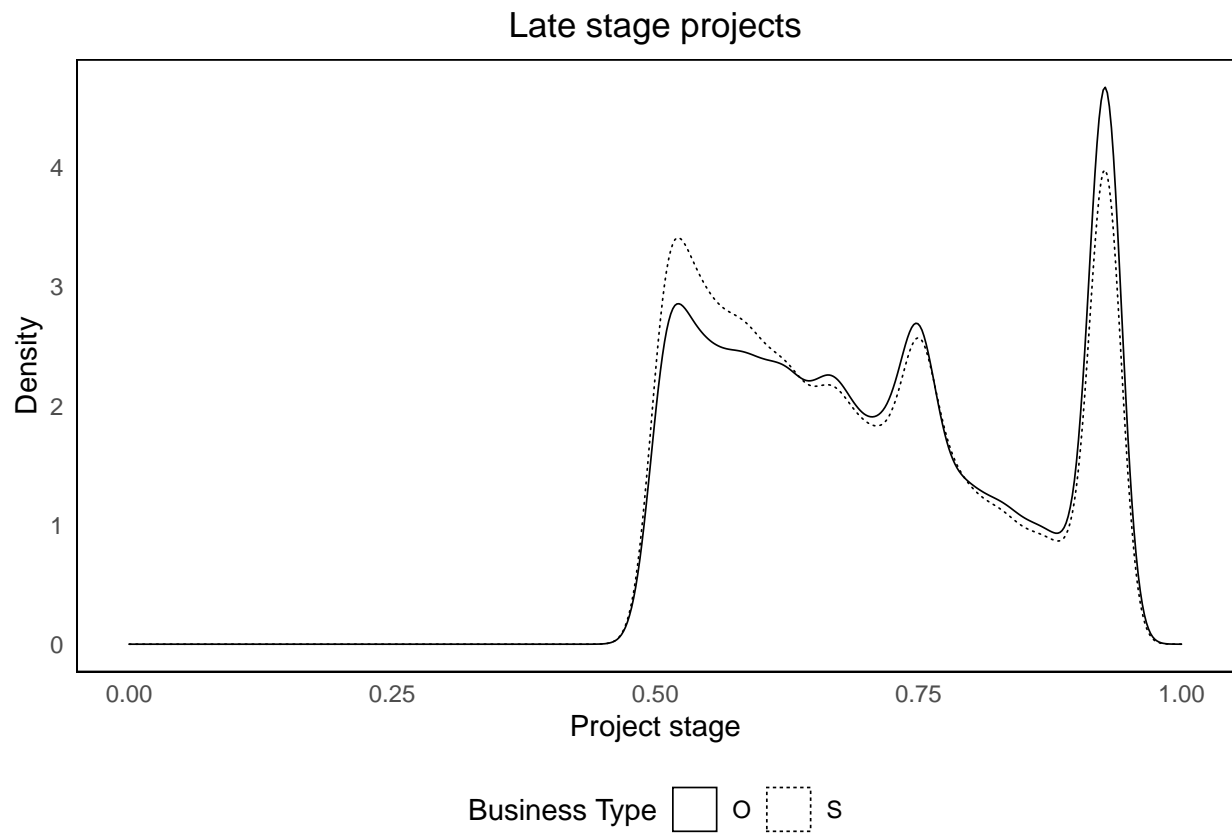


Table 15: Project Stage and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | −0.40*** (0.09) | −1.21*** (0.11) | −1.18*** (0.11) | −0.89*** (0.12) | −0.88*** (0.12) |
| Medium Stage | 0.93*** (0.12) | 0.51*** (0.13) | 0.37*** (0.13) | 0.69*** (0.13) | 0.68*** (0.13) |
| Late Stage | 16.99*** (0.28) | 11.96*** (0.23) | 11.81*** (0.23) | 11.46*** (0.23) | 11.45*** (0.23) |
| <i>Post_t</i> | −0.15 (0.09) | −6.51*** (0.79) | | | |
| <i>Treat_i × Post_t</i> | 0.19* (0.12) | 0.11 (0.15) | 0.09 (0.15) | 0.08 (0.15) | 0.13 (0.15) |
| <i>Treat_i × Medium Stage</i> | −0.46*** (0.15) | 0.33** (0.16) | 0.31* (0.16) | 0.25 (0.16) | 0.25 (0.16) |
| <i>Treat_i × Late Stage</i> | −4.98*** (0.36) | −1.64*** (0.31) | −1.71*** (0.31) | −1.84*** (0.30) | −1.93*** (0.30) |
| <i>Post_t × Medium Stage</i> | −0.81*** (0.15) | 0.38** (0.16) | 0.26 (0.16) | −0.04 (0.16) | −0.05 (0.16) |
| <i>Post_t × Late Stage</i> | −5.58*** (0.32) | −2.00*** (0.27) | −2.07*** (0.27) | −2.51*** (0.27) | −2.52*** (0.27) |
| <i>Treat_i × Post_t × Medium Stage</i> | 0.36** (0.18) | −0.03 (0.21) | −0.03 (0.21) | 0.14 (0.20) | 0.14 (0.20) |
| <i>Treat_i × Post_t × Late Stage</i> | 3.77*** (0.41) | 2.76*** (0.37) | 2.81*** (0.37) | 3.00*** (0.36) | 3.05*** (0.36) |
| Constant | 1.51*** (0.07) | 44.19*** (0.59) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 260,000 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.11 | 0.24 | 0.24 | 0.27 | 0.27 |
| Adjusted R ² | 0.11 | 0.24 | 0.24 | 0.27 | 0.27 |

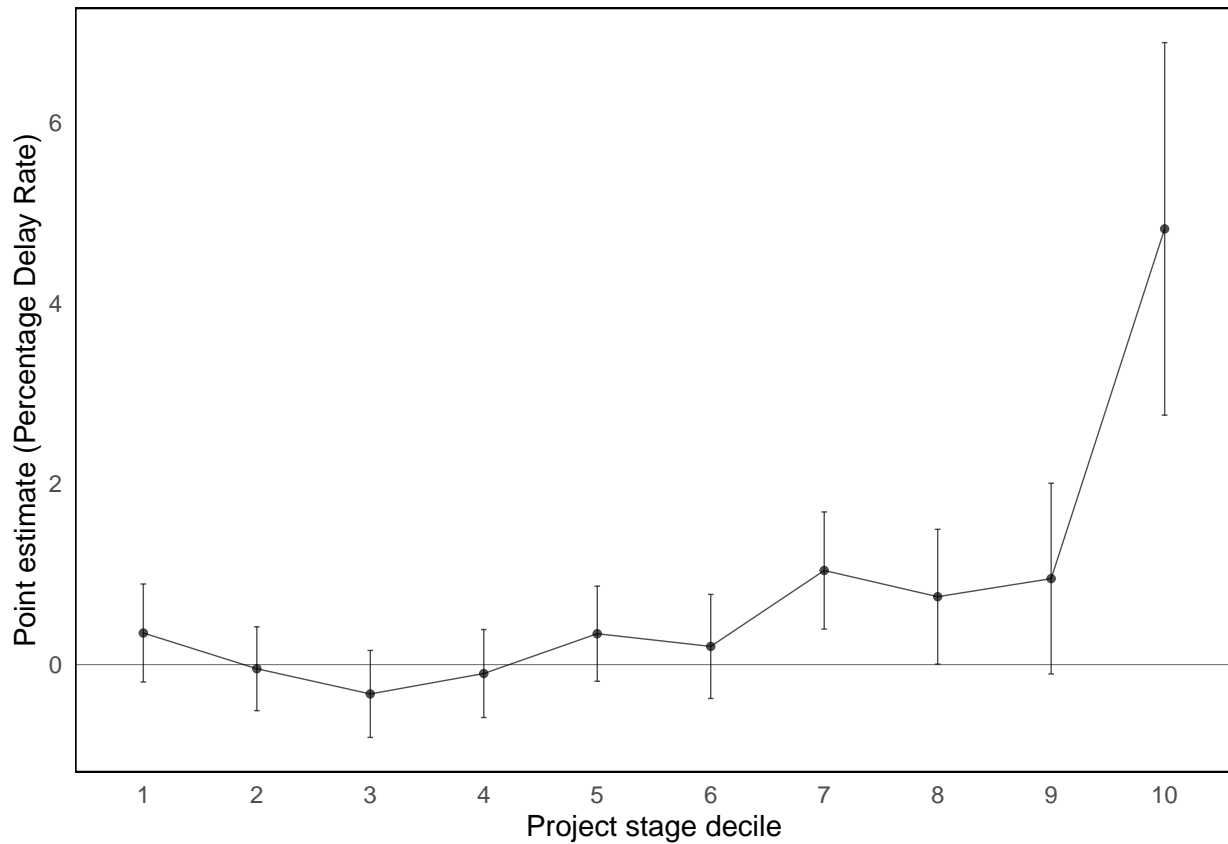
Note:

*p<0.1; **p<0.05; ***p<0.01

Each observation is a project-quarter.

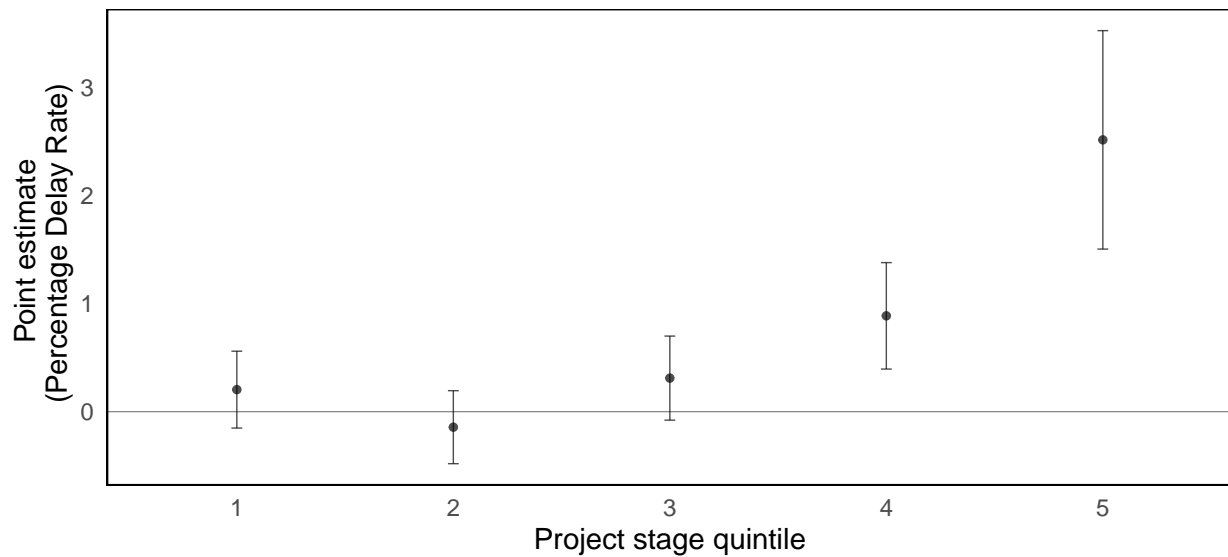
SEs are robust and clustered at the project level.

15.1 Stage decile Regression Plots



stage_decile Min stage Max stage 1: 1 0.00 0.04 2: 2 0.04 0.11 3: 3 0.11 0.19 4: 4 0.19 0.26 5: 5 0.26 0.35 6: 6 0.35 0.44 7: 7 0.44 0.52 8: 8 0.52 0.64 9: 9 0.64 0.78 10: 10 0.78 1.00

15.2 Stage Quintile



stage_quintile Min stage Max stage 1: 1 0.00 0.11 2: 2 0.11 0.26 3: 3 0.26 0.44 4: 4 0.44 0.64 5: 5 0.64 1.00

15.3 Logged Stage Regressions

Table 16: Project Stage and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|---|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -4.72*** (0.25) | -2.45*** (0.21) | -2.50*** (0.21) | -2.14*** (0.20) | -2.19*** (0.20) |
| Log(Stage) | 4.50*** (0.08) | 3.17*** (0.07) | 3.12*** (0.07) | 3.14*** (0.07) | 3.14*** (0.07) |
| <i>Post_t</i> | -2.20*** (0.23) | -7.92*** (0.83) | | | |
| <i>Treat_i</i> × <i>Post_t</i> | 2.88*** (0.30) | 2.10*** (0.26) | 2.14*** (0.26) | 2.25*** (0.25) | 2.33*** (0.25) |
| <i>Treat_i</i> × Log(Stage) | -1.65*** (0.11) | -0.54*** (0.09) | -0.55*** (0.09) | -0.52*** (0.09) | -0.55*** (0.09) |
| <i>Post_t</i> × Log(Stage) | -0.36*** (0.10) | 0.53*** (0.09) | 0.53*** (0.09) | 0.23*** (0.09) | 0.22** (0.09) |
| <i>Treat_i</i> × <i>Post_t</i> × Log(Stage) | 0.93*** (0.13) | 0.64*** (0.12) | 0.65*** (0.12) | 0.71*** (0.12) | 0.73*** (0.12) |
| Constant | 13.35*** (0.20) | 53.91*** (0.62) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t</i> × (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 | 260,000 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.06 | 0.22 | 0.22 | 0.25 | 0.26 |
| Adjusted R ² | 0.06 | 0.22 | 0.22 | 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.

15.4 Aliter: Stage definition

- *t* indicates the end of the quarter

$$Stage_{it} = \frac{ActionDate_i - StartDate_i}{Duration_{i,t}} \quad Stage_{it} = \frac{t - StartDate_i}{Duration_{i,t}}$$

Table 17: Project Stage and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|---------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -1.34*** (0.17) | -0.64*** (0.23) | -0.48** (0.24) | -0.60** (0.24) | -0.62*** (0.24) |
| Medium Stage | 3.01*** (0.20) | -2.26*** (0.22) | -2.66*** (0.22) | -1.80*** (0.22) | -1.79*** (0.22) |
| Late Stage | 6.37*** (0.24) | -7.43*** (0.27) | -8.25*** (0.28) | -6.77*** (0.27) | -6.70*** (0.27) |
| <i>Post_t</i> | -0.93*** (0.18) | -25.05*** (1.09) | | | |
| <i>Treat_i × Post_t</i> | 1.17*** (0.22) | 1.04*** (0.30) | 0.97*** (0.30) | 0.79*** (0.30) | 0.85*** (0.30) |
| <i>Treat_i × Medium Stage</i> | -0.89*** (0.24) | -1.05*** (0.28) | -1.26*** (0.28) | -0.76*** (0.28) | -0.74*** (0.28) |
| <i>Treat_i × Late Stage</i> | -2.19*** (0.28) | -1.40*** (0.29) | -1.43*** (0.29) | -0.76*** (0.29) | -0.81*** (0.29) |
| <i>Post_t × Medium Stage</i> | 0.78*** (0.24) | 3.54*** (0.26) | 3.52*** (0.27) | 2.86*** (0.27) | 2.83*** (0.27) |
| <i>Post_t × Late Stage</i> | 0.26 (0.29) | 6.38*** (0.31) | 6.81*** (0.32) | 5.47*** (0.32) | 5.38*** (0.32) |
| <i>Treat_i × Post_t × Medium Stage</i> | 0.08 (0.30) | 0.37 (0.36) | 0.51 (0.36) | 0.61* (0.35) | 0.59* (0.35) |
| <i>Treat_i × Post_t × Late Stage</i> | 0.19 (0.35) | -0.21 (0.37) | -0.28 (0.37) | -0.03 (0.37) | -0.01 (0.37) |
| Constant | 2.81*** (0.15) | 68.49*** (0.93) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 260,056 | 236,016 | 236,016 | 236,016 | 236,016 |
| R ² | 0.02 | 0.18 | 0.19 | 0.23 | 0.23 |
| Adjusted R ² | 0.02 | 0.18 | 0.19 | 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.

16 Contract Financing

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

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

Table 18: Financial constraints and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -2.45*** (0.12) | -1.64*** (0.10) | -1.67*** (0.10) | -1.30*** (0.10) | -1.31*** (0.10) |
| <i>Post_t</i> | -0.36*** (0.12) | -8.19*** (0.82) | | | |
| <i>Treat_i × Post_t</i> | 1.08*** (0.15) | 0.98*** (0.13) | 0.99*** (0.13) | 1.09*** (0.13) | 1.15*** (0.13) |
| <i>CF_i</i> | 2.59*** (0.19) | 2.08*** (0.17) | 1.97*** (0.17) | -0.59*** (0.17) | -0.68*** (0.17) |
| <i>Post_t × CF_i</i> | 0.12 (0.28) | -0.63** (0.25) | -0.53** (0.25) | 0.07 (0.25) | 0.08 (0.25) |
| <i>Post_t × CF_i × Treat_i</i> | 1.95*** (0.30) | 1.05*** (0.24) | 1.09*** (0.24) | 0.55** (0.25) | 0.49* (0.26) |
| Constant | 6.09*** (0.10) | 54.48*** (0.62) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 260,056 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.01 | 0.22 | 0.22 | 0.25 | 0.26 |
| Adjusted R ² | 0.01 | 0.22 | 0.22 | 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.

16.1 With Treat x CF term

Table 19: Financial constraints and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | −2.83*** (0.13) | −1.86*** (0.11) | −1.88*** (0.11) | −1.43*** (0.11) | −1.44*** (0.11) |
| <i>Post_t</i> | −0.57*** (0.13) | −8.35*** (0.82) | | | |
| <i>CF_i</i> | 1.01*** (0.28) | 1.26*** (0.24) | 1.16*** (0.24) | −1.08*** (0.25) | −1.16*** (0.25) |
| <i>Treat_i × Post_t</i> | 1.45*** (0.15) | 1.19*** (0.14) | 1.21*** (0.14) | 1.21*** (0.14) | 1.27*** (0.14) |
| <i>Post_t × CF_i</i> | 1.70*** (0.34) | 0.19 (0.31) | 0.27 (0.31) | 0.54* (0.31) | 0.54* (0.31) |
| <i>Treat_i × CF_i</i> | 2.90*** (0.38) | 1.53*** (0.31) | 1.52*** (0.31) | 0.92*** (0.31) | 0.90*** (0.31) |
| <i>Treat_i × Post_t × CF_i</i> | −0.96** (0.47) | −0.48 (0.41) | −0.43 (0.41) | −0.34 (0.41) | −0.37 (0.41) |
| Constant | 6.30*** (0.11) | 54.65*** (0.62) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 260,056 | 235,960 | 235,960 | 235,960 | 235,960 |
| R ² | 0.01 | 0.22 | 0.22 | 0.25 | 0.26 |
| Adjusted R ² | 0.01 | 0.22 | 0.22 | 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.

16.2 Projects active on/before June 2010

- *CF* = 1 if project was receiving contract financing
- Sample restricted to projects that started on or before June 2010
- Jobs act was launched in Sept 2010

Table 20: Financial constraints and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|---------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -3.07*** (0.17) | -1.52*** (0.15) | -1.59*** (0.14) | -1.01*** (0.15) | -1.08*** (0.15) |
| <i>Post_t</i> | 1.43*** (0.28) | -19.81*** (2.41) | | | |
| <i>CF_i</i> | 0.52 (0.38) | 1.19*** (0.33) | 1.00*** (0.32) | -1.35*** (0.35) | -1.48*** (0.35) |
| <i>Treat_i × Post_t</i> | -0.05 (0.34) | 2.64*** (0.45) | 2.68*** (0.45) | 2.74*** (0.47) | 2.75*** (0.47) |
| <i>Post_t × CF_i</i> | 0.28 (0.68) | -1.15* (0.69) | -0.97 (0.68) | 0.67 (0.71) | 0.73 (0.71) |
| <i>Treat_i × CF_i</i> | 2.96*** (0.51) | 1.41*** (0.44) | 1.39*** (0.43) | 1.08** (0.45) | 1.07** (0.45) |
| <i>Treat_i × Post_t × CF_i</i> | 0.79 (0.97) | -1.55 (0.98) | -1.50 (0.97) | -1.04 (1.00) | -1.12 (1.00) |
| Constant | 6.74*** (0.14) | 58.27*** (0.85) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 75,119 | 64,292 | 64,292 | 64,292 | 64,292 |
| R ² | 0.01 | 0.23 | 0.23 | 0.27 | 0.28 |
| Adjusted R ² | 0.01 | 0.23 | 0.23 | 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.

16.3 Firm level financial Constraints (on/before June 2010)

- $CF = 1$ if contractor was receiving financing on any project prior on or before June 2010
- Jobs act was launched in Sept 2010

Table 21: Financial constraints and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -0.38*** (0.14) | -0.19 (0.13) | -0.24* (0.13) | -0.74*** (0.13) | -0.75*** (0.13) |
| <i>Post_t</i> | 0.17 (0.14) | -8.13*** (0.85) | | | |
| <i>CF_i</i> | 4.74*** (0.20) | 3.57*** (0.15) | 3.47*** (0.15) | 1.07*** (0.16) | 1.07*** (0.16) |
| <i>Treat_i × Post_t</i> | 0.34* (0.18) | 0.03 (0.17) | 0.06 (0.17) | 0.60*** (0.17) | 0.70*** (0.17) |
| <i>Post_t × CF_i</i> | -1.17*** (0.24) | -1.83*** (0.20) | -1.74*** (0.20) | -1.09*** (0.20) | -1.04*** (0.20) |
| <i>Treat_i × CF_i</i> | -4.17*** (0.24) | -2.68*** (0.20) | -2.60*** (0.20) | -1.07*** (0.20) | -1.09*** (0.20) |
| <i>Treat_i × Post_t × CF_i</i> | 1.62*** (0.30) | 1.76*** (0.27) | 1.71*** (0.27) | 0.95*** (0.26) | 0.90*** (0.26) |
| Constant | 4.00*** (0.11) | 51.77*** (0.63) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 229,552 | 209,046 | 209,046 | 209,046 | 209,046 |
| R ² | 0.01 | 0.22 | 0.22 | 0.26 | 0.26 |
| Adjusted R ² | 0.01 | 0.22 | 0.22 | 0.25 | 0.26 |

Note:

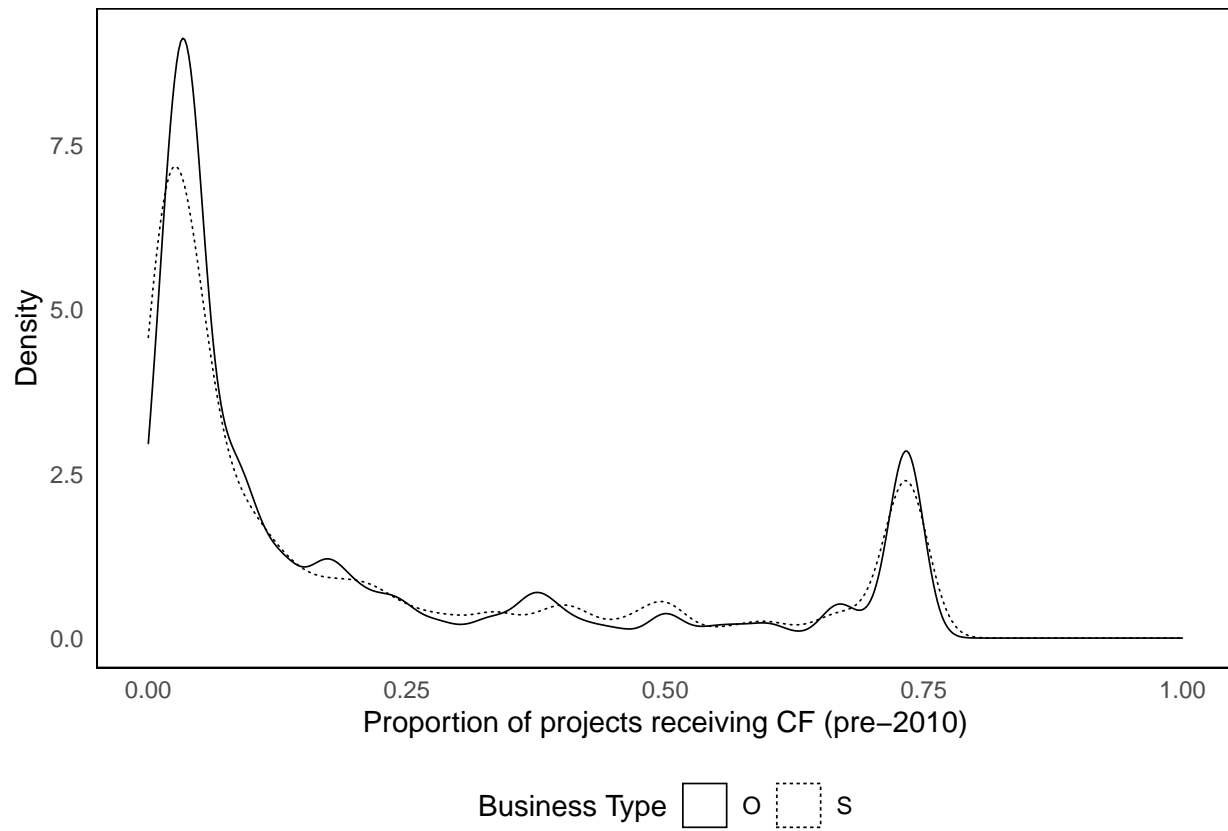
*p<0.1; **p<0.05; ***p<0.01

Each observation is a project-quarter.

SEs are robust and clustered at the project level.

16.4 Plots

```
## Warning: Removed 255008 rows containing non-finite values (stat_density).
```



17 Receives Grants/Financial Assistance

- $CF = 1$ if `receives_grants=='t'`
- The variable “receives_grants” used to be called “receives financial assistance”

17.1 All projects

Table 22: Financial constraints and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | -1.98*** (0.12) | -1.45*** (0.11) | -1.46*** (0.11) | -1.11*** (0.10) | -1.13*** (0.10) |
| $Post_t$ | -0.04 (0.12) | -8.70*** (0.85) | | | |
| CF_i | 12.86*** (0.74) | 6.26*** (0.44) | 6.16*** (0.44) | 4.84*** (0.44) | 4.86*** (0.44) |
| $Treat_i \times Post_t$ | 0.76*** (0.15) | 0.79*** (0.14) | 0.79*** (0.14) | 0.92*** (0.14) | 1.00*** (0.14) |
| $Post_t \times CF_i$ | -8.21*** (0.79) | -4.36*** (0.55) | -4.28*** (0.55) | -3.99*** (0.55) | -3.85*** (0.55) |
| $Treat_i \times CF_i$ | -9.13*** (0.90) | -2.65*** (0.63) | -2.55*** (0.63) | -2.64*** (0.64) | -2.69*** (0.64) |
| $Treat_i \times Post_t \times CF_i$ | 7.42*** (1.01) | 3.37*** (0.81) | 3.27*** (0.81) | 3.50*** (0.81) | 3.35*** (0.81) |
| Constant | 5.70*** (0.10) | 52.96*** (0.63) | | | |
| 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 | 229,552 | 209,046 | 209,046 | 209,046 | 209,046 |
| R ² | 0.01 | 0.22 | 0.22 | 0.26 | 0.26 |
| Adjusted R ² | 0.01 | 0.22 | 0.22 | 0.25 | 0.26 |

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.

17.2 Projects active on/before June 2010

Table 23: Financial constraints and QuickPay reform

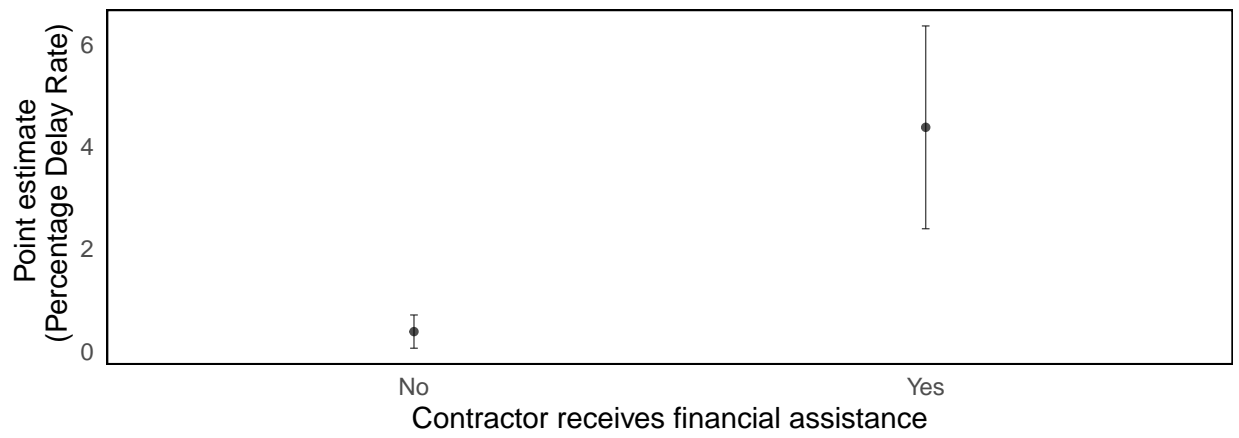
| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|---------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | -2.14*** (0.15) | -1.08*** (0.14) | -1.17*** (0.14) | -0.67*** (0.14) | -0.75*** (0.14) |
| $Post_t$ | 1.93*** (0.26) | -17.54*** (2.37) | | | |
| CF_i | 13.75*** (1.00) | 6.69*** (0.58) | 6.18*** (0.58) | 4.61*** (0.59) | 4.67*** (0.59) |
| $Treat_i \times Post_t$ | -0.30 (0.33) | 1.93*** (0.41) | 2.01*** (0.41) | 2.14*** (0.42) | 2.11*** (0.42) |
| $Post_t \times CF_i$ | -9.62*** (1.30) | -7.54*** (1.30) | -6.96*** (1.29) | -5.34*** (1.30) | -5.29*** (1.30) |
| $Treat_i \times CF_i$ | -10.12*** (1.18) | -2.92*** (0.81) | -2.53*** (0.80) | -2.86*** (0.80) | -2.95*** (0.80) |
| $Treat_i \times Post_t \times CF_i$ | 8.03*** (1.63) | 5.29*** (1.84) | 4.92*** (1.83) | 5.05*** (1.85) | 5.27*** (1.84) |
| Constant | 6.03*** (0.13) | 56.30*** (0.83) | | | |
| 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 | 74,942 | 64,129 | 64,129 | 64,129 | 64,129 |
| R ² | 0.02 | 0.23 | 0.23 | 0.27 | 0.28 |
| Adjusted R ² | 0.02 | 0.23 | 0.23 | 0.27 | 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.



Firm level financial constraints (on/before June 2010)

Table 24: Financial constraints and QuickPay reform

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -1.43*** (0.12) | -1.14*** (0.11) | -1.15*** (0.11) | -0.82*** (0.11) | -0.84*** (0.11) |
| <i>Post_t</i> | -0.13 (0.12) | -8.94*** (0.85) | | | |
| <i>CF_i</i> | 8.43*** (0.40) | 4.12*** (0.25) | 4.04*** (0.25) | 3.30*** (0.25) | 3.34*** (0.25) |
| <i>Treat_i × Post_t</i> | 0.86*** (0.15) | 0.78*** (0.14) | 0.79*** (0.14) | 0.89*** (0.14) | 0.98*** (0.14) |
| <i>Post_t × CF_i</i> | -2.79*** (0.46) | -1.85*** (0.32) | -1.77*** (0.32) | -1.90*** (0.32) | -1.77*** (0.32) |
| <i>Treat_i × CF_i</i> | -6.93*** (0.51) | -2.88*** (0.38) | -2.82*** (0.38) | -2.47*** (0.37) | -2.45*** (0.37) |
| <i>Treat_i × Post_t × CF_i</i> | 2.37*** (0.61) | 1.20** (0.50) | 1.14** (0.50) | 1.30*** (0.49) | 1.14** (0.49) |
| Constant | 5.18*** (0.10) | 52.53*** (0.63) | | | |
| Duration, Budget, Bids | No | Yes | Yes | Yes | Yes |
| <i>Post_t × (Duration, Budget, Bids)</i> | 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 | 229,552 | 209,046 | 209,046 | 209,046 | 209,046 |
| R ² | 0.01 | 0.22 | 0.22 | 0.26 | 0.26 |
| Adjusted R ² | 0.01 | 0.22 | 0.22 | 0.25 | 0.26 |

Note:

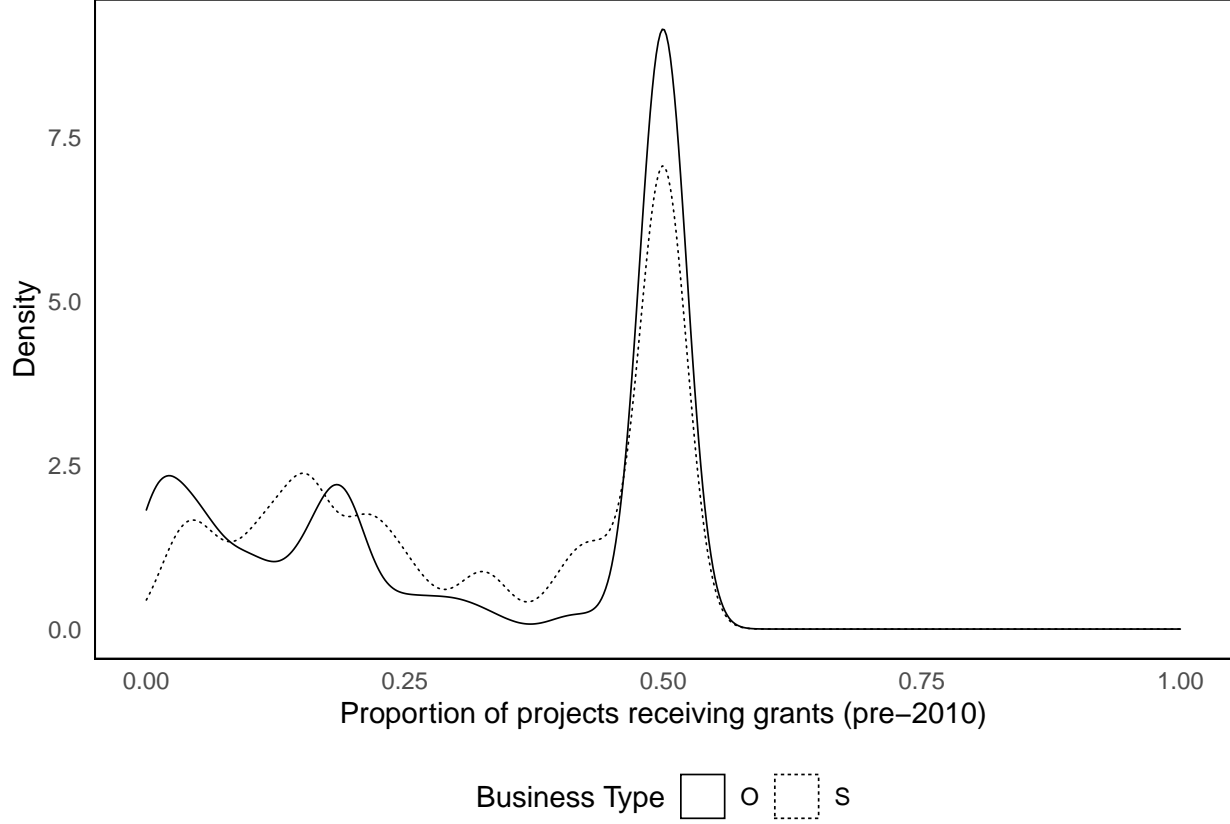
*p<0.1; **p<0.05; ***p<0.01

Each observation is a project-quarter.

SEs are robust and clustered at the project level.

17.3 Plots

```
## Warning: Removed 394825 rows containing non-finite values (stat_density).
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18 Competition

18.1 Impact on bidding metrics

Table 25: Effect of Competition After QuickPay: Quickpay 2009-2011

| | <i>NumberOfBids_{it}</i> | <i>InitialDuration_{it}</i> | <i>InitialBudget_{it}</i> |
|---|----------------------------------|-------------------------------------|-----------------------------------|
| | (1) | (2) | (3) |
| <i>Treat_i</i> | 0.88*** (0.09) | -7.27*** (0.72) | -15,055.20*** (1,586.13) |
| <i>Treat_i × Post_t</i> | 0.27** (0.12) | -3.38*** (1.00) | -29,491.30*** (2,296.49) |
| Task fixed effects | Yes | Yes | Yes |
| Time fixed effects | Yes | Yes | Yes |
| Observations | 227,609 | 220,550 | 227,732 |
| R ² | 0.25 | 0.20 | 0.24 |
| Adjusted R ² | 0.24 | 0.19 | 0.24 |

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.

18.2 Impact on delays

Define

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

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

18.2.1 Subsample model

For a subsample of competitive or noncompetitive projects:

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

- 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 26: Effect of QuickPay on competitively awarded projects

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -3.26*** (0.13) | -2.81*** (0.13) | -2.80*** (0.13) | -1.48*** (0.13) | -1.49*** (0.13) |
| <i>SA_i</i> | -2.26*** (0.18) | 1.10*** (0.17) | 1.99*** (0.19) | 2.26*** (0.18) | 2.21*** (0.18) |
| <i>Post_t</i> | 1.08*** (0.16) | -1.77*** (0.16) | | | |
| <i>Treat_i × SB_i × Post_t</i> | 0.19 (0.20) | 0.25 (0.19) | 0.26 (0.19) | 0.49*** (0.18) | 0.51*** (0.18) |
| <i>Treat_i × SA_i × Post_t</i> | 1.41*** (0.20) | 1.08*** (0.19) | 1.07*** (0.19) | 1.25*** (0.18) | 1.28*** (0.18) |
| Constant | 6.78*** (0.12) | 12.46*** (0.14) | | | |
| 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 | 189,977 | 189,933 | 189,933 | 189,933 | 189,933 |
| R ² | 0.01 | 0.07 | 0.07 | 0.14 | 0.15 |
| Adjusted R ² | 0.01 | 0.07 | 0.07 | 0.14 | 0.15 |

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 27: Effect of QuickPay on non-competitively awarded projects

| | <i>PercentDelay_{it}</i> | | | | |
|-------------------------------------|----------------------------------|--------------------|-------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) |
| $Treat_i$ | 1.40*** (0.31) | 1.16*** (0.30) | 1.09*** (0.30) | -0.39 (0.32) | -0.22 (0.31) |
| SA_i | -0.73*** (0.23) | 2.13*** (0.23) | 3.55*** (0.28) | 2.97*** (0.29) | 2.98*** (0.29) |
| $Post_t$ | -0.66*** (0.25) | -3.22*** (0.25) | | | |
| $Treat_i \times SB_i \times Post_t$ | 2.53*** (0.47) | 2.25*** (0.45) | 2.14*** (0.46) | 1.77*** (0.45) | 1.67*** (0.46) |
| $Treat_i \times SA_i \times Post_t$ | 0.51 (0.45) | 0.56 (0.42) | 0.50 (0.43) | 0.11 (0.42) | 0.09 (0.42) |
| Constant | 4.91*** (0.20) | 10.90*** (0.26) | | | |
| 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 | 39,432 | 39,424 | 39,424 | 39,424 | 39,424 |
| R ² | 0.01 | 0.07 | 0.07 | 0.14 | 0.15 |
| Adjusted R ² | 0.01 | 0.07 | 0.07 | 0.12 | 0.13 |

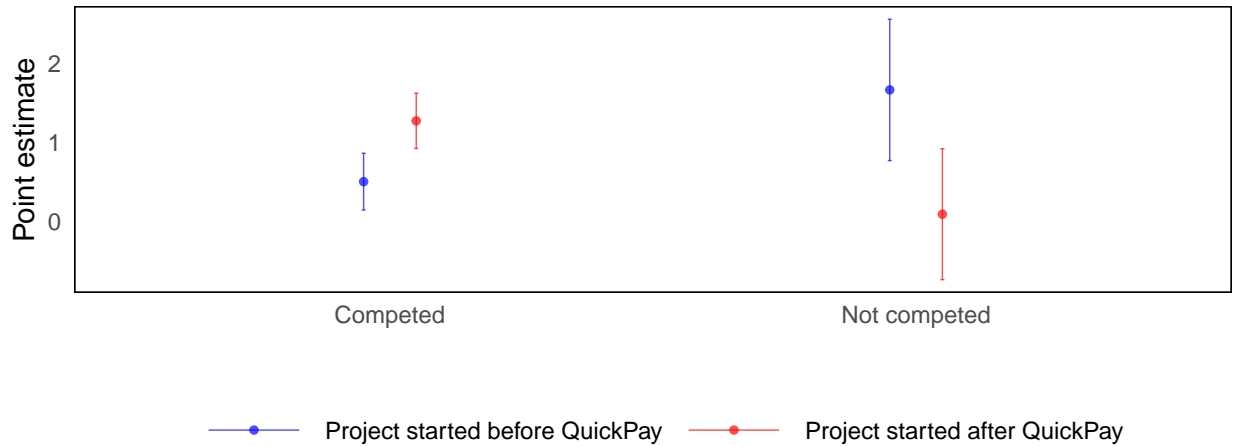
Note:

*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.



18.2.2 Subsample model II

Table 28: Effect of QuickPay on competitively awarded projects

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | -3.26*** (0.13) | -2.81*** (0.13) | -2.80*** (0.13) | -1.48*** (0.13) | -1.49*** (0.13) |
| <i>SA_i</i> | -2.26*** (0.18) | 1.10*** (0.17) | 1.99*** (0.19) | 2.26*** (0.18) | 2.21*** (0.18) |
| <i>Post_t</i> | 1.08*** (0.16) | -1.77*** (0.16) | | | |
| <i>Treat_i × Post_t</i> | 0.19 (0.20) | 0.25 (0.19) | 0.26 (0.19) | 0.49*** (0.18) | 0.51*** (0.18) |
| <i>Treat_i × Post_t × SA_i</i> | 1.22*** (0.22) | 0.83*** (0.20) | 0.82*** (0.20) | 0.76*** (0.20) | 0.77*** (0.20) |
| Constant | 6.78*** (0.12) | 12.46*** (0.14) | | | |
| 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 | 189,977 | 189,933 | 189,933 | 189,933 | 189,933 |
| R ² | 0.01 | 0.07 | 0.07 | 0.14 | 0.15 |
| Adjusted R ² | 0.01 | 0.07 | 0.07 | 0.14 | 0.15 |

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 29: Effect of QuickPay on non-competitively awarded projects

| | <i>PercentDelay_{it}</i> | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) |
| <i>Treat_i</i> | 1.40*** (0.31) | 1.16*** (0.30) | 1.09*** (0.30) | -0.39 (0.32) | -0.22 (0.31) |
| <i>SA_i</i> | -0.73*** (0.23) | 2.13*** (0.23) | 3.55*** (0.28) | 2.97*** (0.29) | 2.98*** (0.29) |
| <i>Post_t</i> | -0.66*** (0.25) | -3.22*** (0.25) | | | |
| <i>Treat_i × Post_t</i> | 2.53*** (0.47) | 2.25*** (0.45) | 2.14*** (0.46) | 1.77*** (0.45) | 1.67*** (0.46) |
| <i>Treat_i × Post_t × SA_i</i> | -2.01*** (0.49) | -1.70*** (0.46) | -1.64*** (0.46) | -1.66*** (0.46) | -1.58*** (0.46) |
| Constant | 4.91*** (0.20) | 10.90*** (0.26) | | | |
| 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 | 39,432 | 39,424 | 39,424 | 39,424 | 39,424 |
| R ² | 0.01 | 0.07 | 0.07 | 0.14 | 0.15 |
| Adjusted R ² | 0.01 | 0.07 | 0.07 | 0.12 | 0.13 |

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.

18.2.3 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 30: Effect of Competition After QuickPay: Quickpay 2009-2011

| | <i>PercentDelay_{it}</i> | | | | | |
|--|----------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Treat_i</i> | 1.40*** (0.31) | 1.40*** (0.31) | 1.16*** (0.30) | 1.09*** (0.30) | -0.63** (0.30) | -0.73** (0.30) |
| <i>SA_i</i> | -0.73*** (0.23) | -0.73*** (0.23) | 2.12*** (0.22) | 3.11*** (0.23) | 2.95*** (0.23) | 2.91*** (0.23) |
| <i>Competitive_i</i> | 1.87*** (0.23) | 1.87*** (0.23) | 1.60*** (0.21) | 1.55*** (0.21) | -0.16 (0.22) | -0.07 (0.22) |
| <i>Post_t</i> | -0.66*** (0.25) | -0.66*** (0.25) | -3.21*** (0.24) | | | |
| <i>Treat_i × Competitive_i</i> | -4.65*** (0.34) | -4.65*** (0.34) | -3.97*** (0.32) | -3.89*** (0.32) | -0.89*** (0.32) | -0.80** (0.32) |
| <i>Post_t × Competitive_i</i> | 1.74*** (0.30) | 1.74*** (0.30) | 1.43*** (0.29) | 1.40*** (0.29) | 0.28 (0.29) | 0.20 (0.29) |
| <i>SA_i × Competitive_i</i> | -1.53*** (0.29) | -1.53*** (0.29) | -1.01*** (0.27) | -1.02*** (0.27) | -0.66** (0.27) | -0.66** (0.27) |
| <i>Treat_i × Post_t</i> | 2.53*** (0.47) | 2.53*** (0.47) | 2.25*** (0.45) | 2.21*** (0.45) | 1.67*** (0.45) | 1.66*** (0.45) |
| <i>Treat_i × Post_t × Competitive_i</i> | -2.33*** (0.51) | -2.33*** (0.51) | -2.01*** (0.49) | -1.95*** (0.49) | -1.16** (0.49) | -1.13** (0.49) |
| <i>Treat_i × Post_t × SA_i</i> | -2.01*** (0.49) | -2.01*** (0.49) | -1.70*** (0.46) | -1.69*** (0.46) | -1.37*** (0.45) | -1.37*** (0.45) |
| <i>Treat_i × Post_t × SA_i × Competitive_i</i> | 3.23*** (0.53) | 3.23*** (0.53) | 2.53*** (0.50) | 2.51*** (0.50) | 2.12*** (0.49) | 2.13*** (0.49) |
| Constant | 4.91*** (0.20) | 4.91*** (0.20) | 10.87*** (0.20) | | | |
| Project stage | No | No | Yes | Yes | Yes | Yes |
| Time 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 | 229,409 | 229,409 | 229,357 | 229,357 | 229,357 | 229,357 |
| R ² | 0.01 | 0.01 | 0.07 | 0.07 | 0.14 | 0.14 |
| Adjusted R ² | 0.01 | 0.01 | 0.07 | 0.07 | 0.13 | 0.14 |

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.