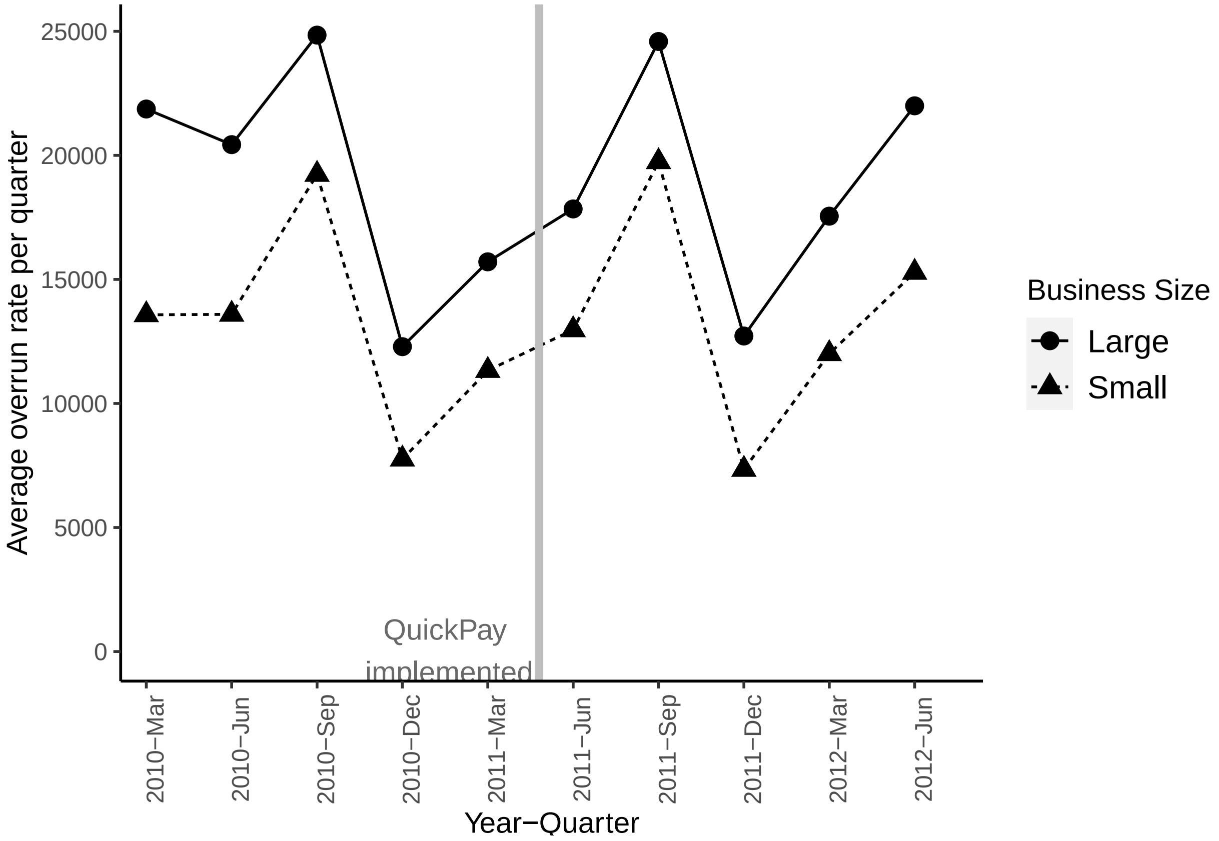
Budget Overruns: First Implementation of QuickPay (2009-2012)

Sep 19, 2021

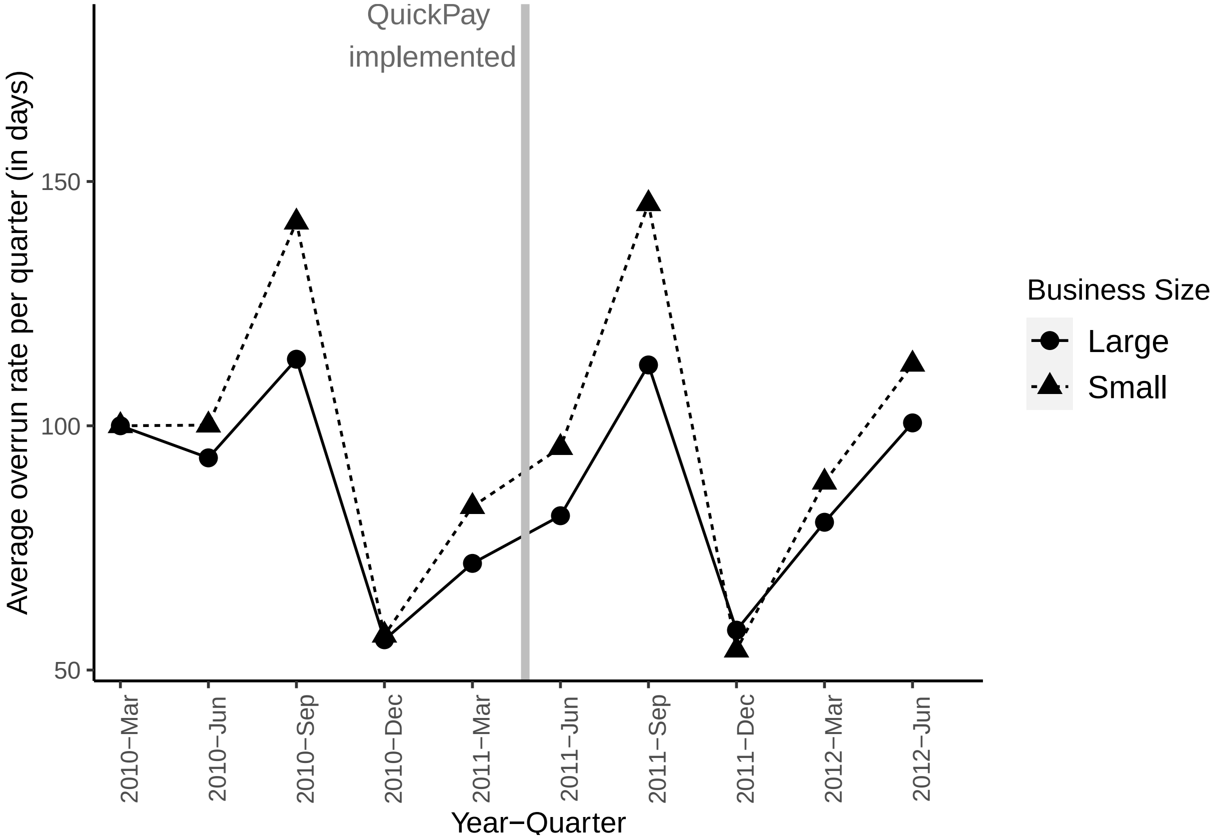
1 Note

- Below is the definition of `base_and_all_options_value` from the data dictionary:
  - The change (from this transaction only) to the potential contract value (i.e., the base contract and any exercised or unexercised options).
- This means that every observation in raw data shows incremental change from previous budget. So some of the values can be zero.
- We, therefore, need to calculate the new budget at each point in time (by adding all previous values). We did this in the resampling step, but mentioning here for reference.
- This is different from calculation of delays, where `period_of_performance_current_end_date` indicated the new deadline of the project.

2 Budget Overrun over Time



2.1 Normalized Overrun



3 Notation

- Project i, Year-Quarter t
- X_i denotes project level controls: initial duration, initial budget, number of offers received
- $\mu_t, \theta_{firm}, \lambda_{task}$: Year-Quarter, Firm, and Product/Service code Fixed effects
- All continuous variables are winsorized at the 5% level

$$Treat_i = \begin{cases} 1, & \text{if project } i \text{ is a small business} \\ 0, & \text{otherwise} \end{cases}$$

$$Post_t = \begin{cases} 1, & \text{if year-quarter } t > \text{ April 27, 2011} \\ 0, & \text{otherwise} \end{cases}$$

4 Baseline Regressions

$$Overrun_{it} = \alpha + \beta_0 Treat_i + \beta_1 Post_t + \beta_2 (Treat_i \times Post_t) + \epsilon_{it}$$

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

Table 1: Quickpay 2009-2011

	$Overrun_{it}$ (in days)				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	$-5{,}606.99^{***}$	$-4{,}860.95^{***}$	$-4{,}580.56^{***}$	$-4{,}247.65^{***}$	$-4{,}727.72^{***}$
	(442.41)	(467.78)	(463.49)	(485.36)	(1,267.62)
$Post_t$	600.14	$-5{,}515.13^{***}$			
	(373.36)	(479.98)			
$Treat_i \times Post_t$	114.97	841.83	685.19	843.73^{*}	404.57
	(484.85)	(512.87)	(510.36)	(507.59)	(532.11)
Constant	$18{,}064.32^{***}$	$6{,}930.79^{***}$			
	(348.01)	(439.67)			
Duration, Budget, Bids	No	Yes	Yes	Yes	Yes
$Post_t\times$ (Duration, Budget, Bids)	No	Yes	Yes	Yes	Yes
Project Age Tercile	No	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	No	No	Yes	Yes	Yes
Task Fixed Effects	No	No	No	Yes	Yes
Firm Fixed Effects	No	No	No	No	Yes
Observations	189,371	168,851	168,851	168,851	168,851
R^2	0.003	0.03	0.04	0.09	0.23
Adjusted R^2	0.003	0.03	0.04	0.08	0.17

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.

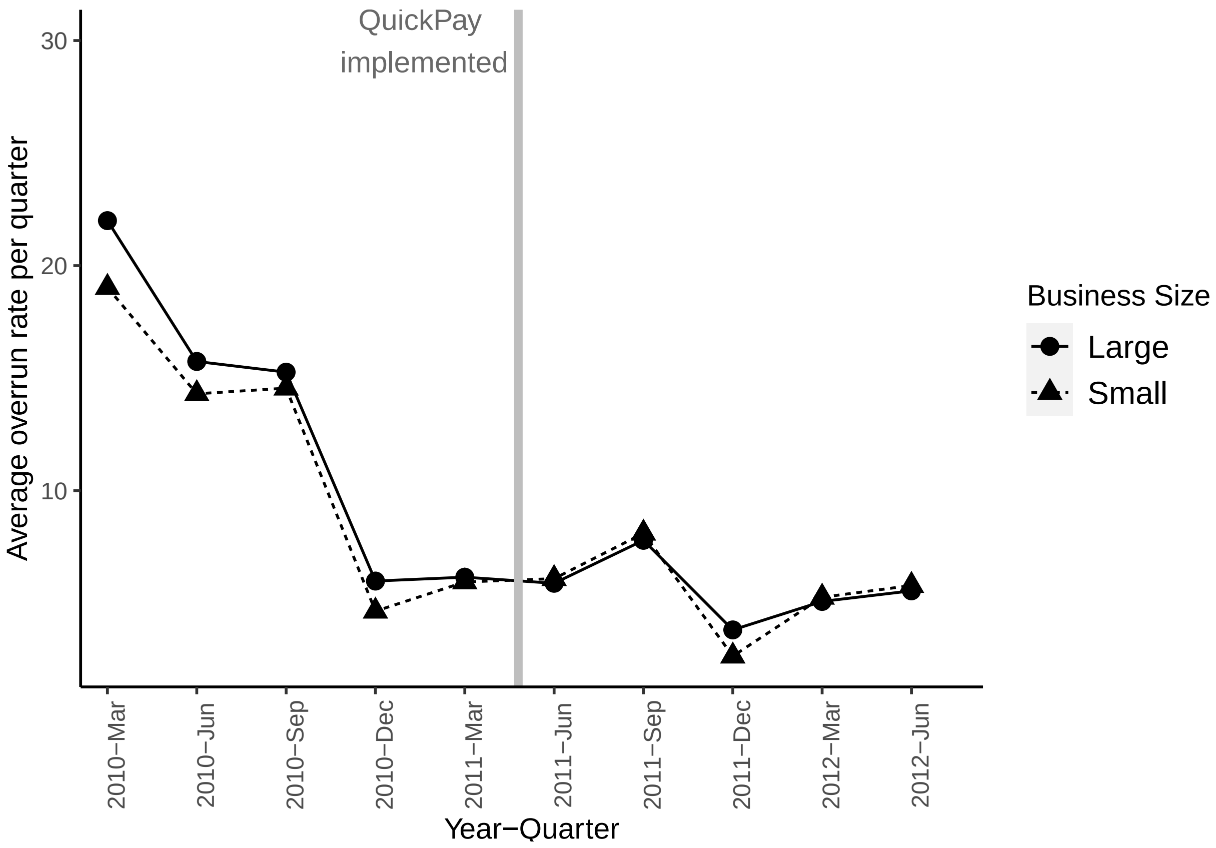
5 Percentage Overrun

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

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

5.1 Percentage Overrun over time

- Sample restricted to projects with modification zero when they first appeared in our sample.
- $PercentOverrun_{it} = 100 \times Overrun_{it}/Budget_{i,t-1}$


QuickPay implemented
30
20
10
Average overrun rate per quarter
2010−Mar
2010−Jun
2010−Sep
2010−Dec
2011−Mar
2011−Jun
2011−Sep
2011−Dec
2012−Mar
2012−Jun
Year−Quarter
Business Size
Large
Small

5.1.1 Normalized Overrun

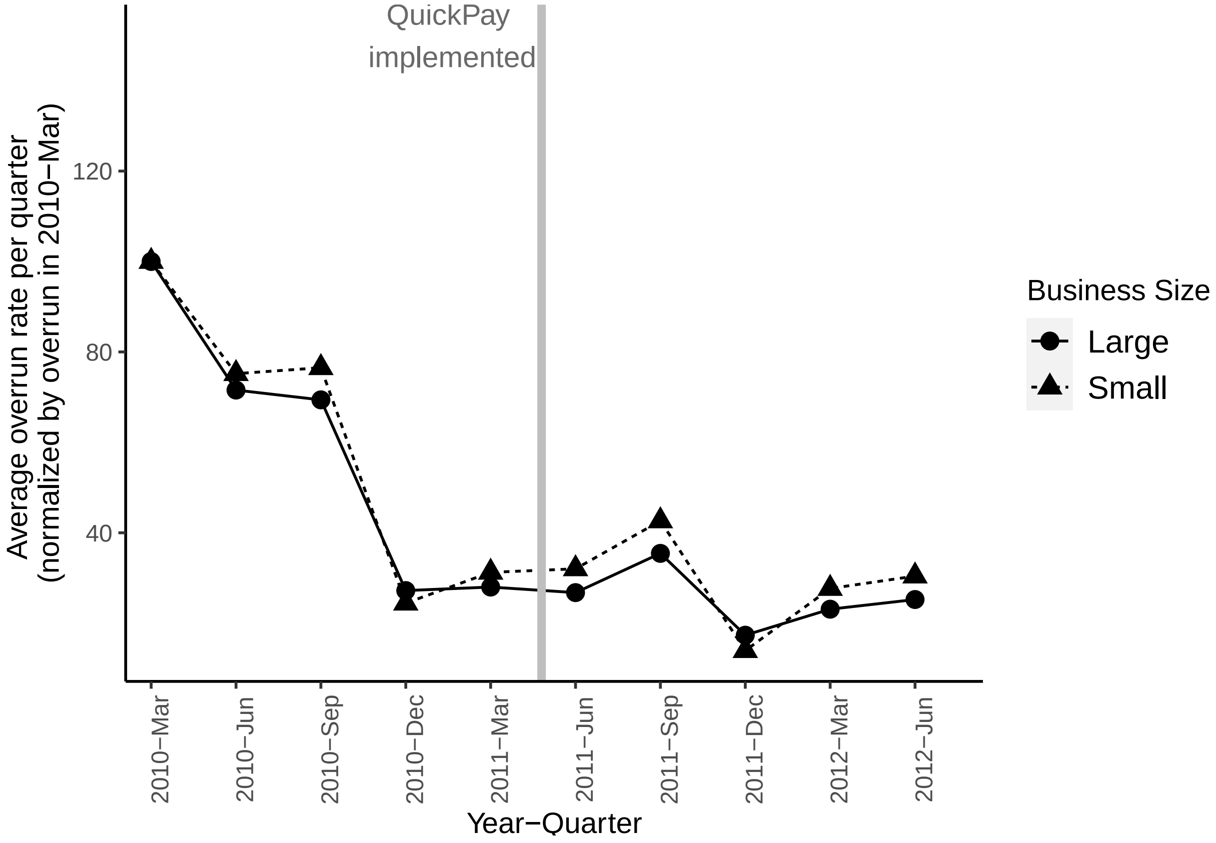


Table 2: Effect of QuickPay on project overrun rates

	$PercentOverrun_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-1.26^{***}	-1.59^{***}	-1.32^{***}	-0.94^{***}	-0.72
	(0.25)	(0.25)	(0.25)	(0.25)	(0.65)
$Post_t$	-5.23^{***}	-6.24^{***}			
	(0.19)	(0.31)			
$Treat_i \times Post_t$	1.13^{***}	1.18^{***}	0.96^{***}	1.05^{***}	1.00^{***}
	(0.27)	(0.28)	(0.28)	(0.28)	(0.29)
Constant	10.79^{***}	14.22^{***}			
	(0.18)	(0.29)			
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
Contractor fixed effects	No	No	No	No	Yes
Observations	160,810	150,245	150,245	150,245	150,245
R^2	0.01	0.03	0.05	0.08	0.19
Adjusted R^2	0.01	0.03	0.05	0.07	0.13

Note: *p<0.1; **p<0.05; ***p<0.01

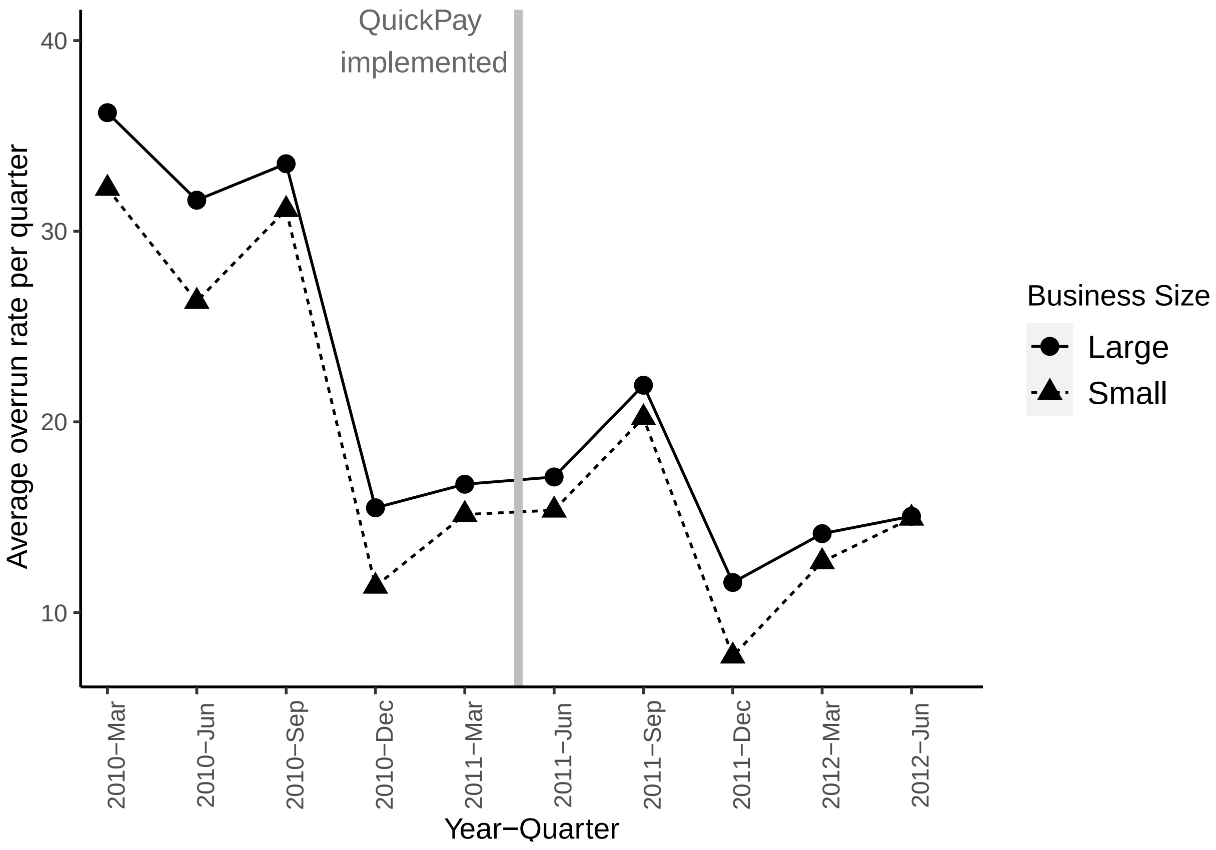
Each observation is a project-quarter.

SEs are robust and clustered at the project level.

6 Relative Overrun

6.1 Relative overruns over time

- Sample restricted to projects with modification zero when they first appeared in our sample.
- $RelativeOverrun_{it} = 100 \times RelativeOverrun_{it}/IntialBudget_i$


QuickPay implemented
40
30
20
10
Average overrun rate per quarter
2010−Mar
2010−Jun
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Year−Quarter
Business Size
Large
Small

6.1.1 Normalized overrun

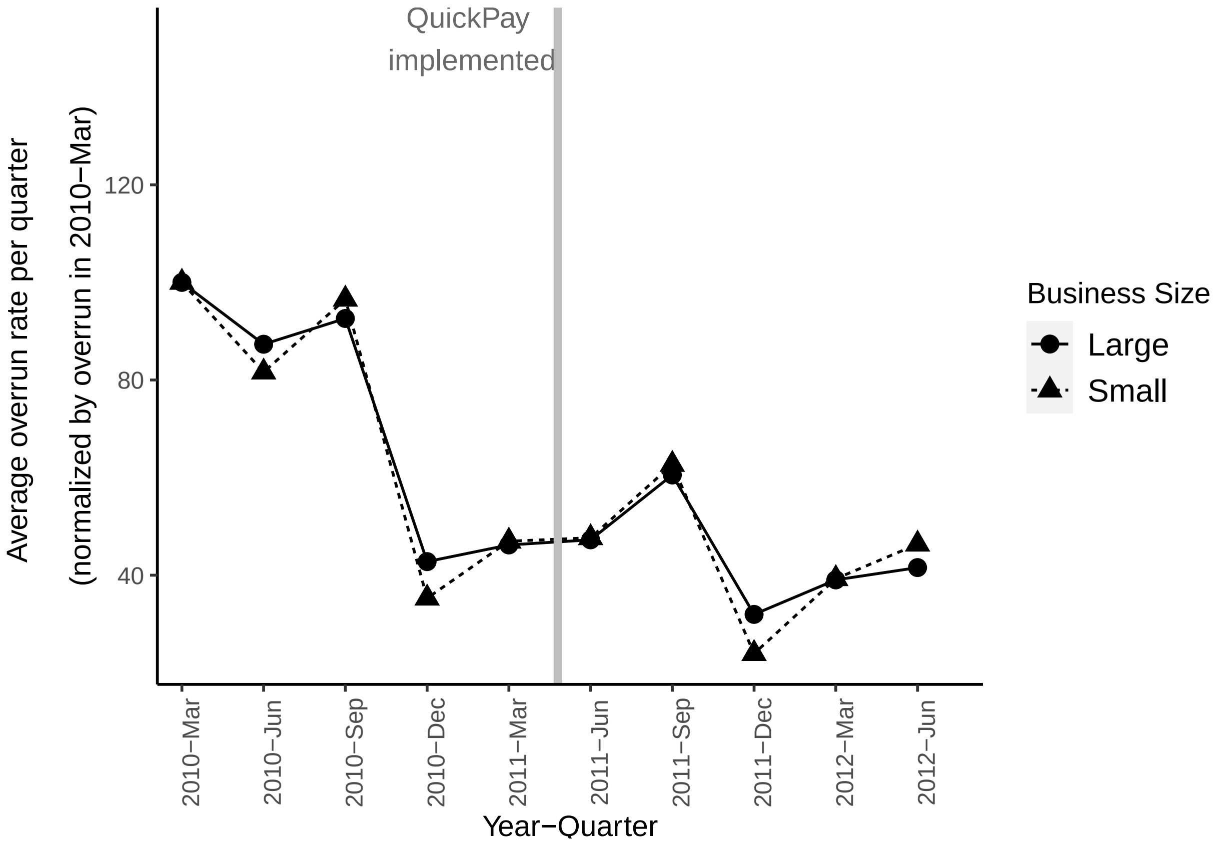

Table 3: Effect of QuickPay on project overrun rates

	$RelativeOverrun_{it}$				
	(1)	(2)	(3)	(4)	(5)
$Treat_i$	-3.63^{***}	-2.67^{***}	-2.22^{***}	-0.80	-2.46
	(0.67)	(0.72)	(0.71)	(0.74)	(1.87)
$Post_t$	-8.40^{***}	-9.57^{***}			
	(0.45)	(0.71)			
$Treat_i \times Post_t$	1.66^{***}	1.10	0.79	1.07	1.09
	(0.64)	(0.70)	(0.70)	(0.69)	(0.73)
Constant	24.28^{***}	21.00^{***}			
	(0.49)	(0.69)			
Duration, Bids	No	Yes	Yes	Yes	Yes
$Post_t \times$ (Duration, 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
Contractor fixed effects	No	No	No	No	Yes
Observations	189,365	168,845	168,845	168,845	168,845
R^2	0.004	0.01	0.02	0.06	0.21
Adjusted R^2	0.004	0.01	0.02	0.05	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.