

# Logistic regression: Positive Delay Rate – QuickPay (2009-2012)

Apr 15, 2022

## 1 Logistic Regressions (Positive Delay)

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## NOTE: 242,688 observations removed because of NA values (LHS: 242,688).  
## NOTE: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
## NOTE: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
## NOTES: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
##         442/0 fixed-effects (2,333 observations) removed because of only 0 (or only 1) outcomes.  
## NOTES: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
##         11/442/0 fixed-effects (2,377 observations) removed because of only 0 (or only 1) outcomes.
```

## 2 Contract Financing

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

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## NOTE: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
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## NOTES: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
##         11/442/0 fixed-effects (2,377 observations) removed because of only 0 (or only 1) outcomes.
```

## 3 Competition

### 3.1 Impact on delays

Define

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

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

#### 3.1.1 Subsample model

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## NOTE: 202,813 observations removed because of NA values (LHS: 202,813).  
## NOTE: 224,438 observations removed because of NA values (LHS: 202,813, RHS: 224,438).  
## NOTE: 224,438 observations removed because of NA values (LHS: 202,813, RHS: 224,438).
```

Table 1: Logit model: Effect of QuickPay

Dependent Variable: Model:	$I(Delay > 0)$				
	(1)	(2)	(3)	(4)	(5)
<i>Variables</i>					
(Intercept)	-2.04*** (0.02)	2.97*** (0.12)			
$Treat_i$	-0.60*** (0.03)	-0.21*** (0.03)	-0.22*** (0.03)	-0.22*** (0.03)	-0.23*** (0.03)
$Post_t$	0.02 (0.02)	-1.41*** (0.13)			
$CF_i$	0.45*** (0.04)	0.61*** (0.05)	0.59*** (0.05)	0.07 (0.05)	0.06 (0.05)
$Treat_i \times Post_t$	0.31*** (0.03)	0.28*** (0.04)	0.29*** (0.04)	0.28*** (0.04)	0.29*** (0.04)
$Treat_i \times CF_i$	0.69*** (0.06)	0.22*** (0.07)	0.22*** (0.07)	0.15** (0.07)	0.14** (0.07)
$Post_t \times CF_i$	0.36*** (0.05)	0.04 (0.06)	0.05 (0.06)	0.10* (0.06)	0.11** (0.06)
$Treat_i \times Post_t \times CF_i$	-0.39*** (0.07)	-0.34*** (0.08)	-0.33*** (0.08)	-0.25*** (0.08)	-0.27*** (0.08)
<i>Fixed-effects</i>					
Time			Yes	Yes	Yes
Task code				Yes	Yes
NAICS code					Yes
<i>Fit statistics</i>					
Observations	260,211	236,115	236,115	233,782	233,738
Squared Correlation	0.02	0.27	0.27	0.31	0.31
Pseudo R <sup>2</sup>	0.02	0.27	0.27	0.32	0.32
BIC	177,520.7	128,498.6	128,442.2	130,820.3	130,991.5

*Clustered (Project ID) standard-errors in parentheses*

*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*

## NOTES: 224,438 observations removed because of NA values (LHS: 202,813, RHS: 224,438).  
## 417/0 fixed-effects (2,096 observations) removed because of only 0 (or only 1) outcomes.  
## NOTES: 224,438 observations removed because of NA values (LHS: 202,813, RHS: 224,438).  
## 11/417/0 fixed-effects (2,133 observations) removed because of only 0 (or only 1) outcomes.

Table 2: Logit model: Effect of QuickPay on Competitive Projects

Dependent Variable: Model:	$I(Delay > 0)$				
	(1)	(2)	(3)	(4)	(5)
<i>Variables</i>					
(Intercept)	-1.90*** (0.02)	2.73*** (0.13)			
$Treat_i$	-0.60*** (0.03)	-0.16*** (0.03)	-0.18*** (0.03)	-0.16*** (0.03)	-0.18*** (0.03)
$SA_i$	-0.53*** (0.03)	0.00 (0.03)	-0.10*** (0.04)	-0.13*** (0.04)	-0.12*** (0.04)
$Post_t$	0.41*** (0.02)	-1.50*** (0.15)			
$Treat_i \times Post_t \times SB_i$	0.07* (0.03)	0.16*** (0.04)	0.18*** (0.04)	0.22*** (0.04)	0.23*** (0.04)
$Treat_i \times SA_i \times Post_t$	0.30*** (0.04)	0.16*** (0.04)	0.17*** (0.04)	0.26*** (0.04)	0.25*** (0.04)
<i>Fixed-effects</i>					
Time			Yes	Yes	Yes
Task code				Yes	Yes
NAICS code					Yes
<i>Fit statistics</i>					
Observations	214,460	192,835	192,835	190,739	190,702
Squared Correlation	0.01	0.27	0.27	0.32	0.32
Pseudo R <sup>2</sup>	0.01	0.27	0.27	0.32	0.33
BIC	148,987.7	106,925.0	106,818.7	107,652.4	107,950.7

*Clustered (Project ID) standard-errors in parentheses*  
Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1

## NOTE: 39,875 observations removed because of NA values (LHS: 39,875).  
## NOTE: 42,346 observations removed because of NA values (LHS: 39,875, RHS: 42,346).  
## NOTE: 42,346 observations removed because of NA values (LHS: 39,875, RHS: 42,346).  
## NOTES: 42,346 observations removed because of NA values (LHS: 39,875, RHS: 42,346).  
## 361/0 fixed-effects (1,668 observations) removed because of only 0 (or only 1) outcomes.  
## NOTES: 42,346 observations removed because of NA values (LHS: 39,875, RHS: 42,346).  
## 9/361/0 fixed-effects (1,680 observations) removed because of only 0 (or only 1) outcomes.

### 3.1.2 Four-way interaction

## NOTE: 242,744 observations removed because of NA values (LHS: 242,688, RHS: 242,744).  
## NOTE: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
## NOTE: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
## NOTES: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).

Table 3: Logit model: Effect of QuickPay on Non-Competitive Projects

Dependent Variable:	$I(Delay > 0)$				
Model:	(1)	(2)	(3)	(4)	(5)
<i>Variables</i>					
(Intercept)	-2.29*** (0.04)	3.17*** (0.31)			
$Treat_i$	0.28*** (0.06)	0.13** (0.06)	0.12** (0.06)	-0.14** (0.07)	-0.14** (0.07)
$SA_i$	-0.25*** (0.06)	0.05 (0.06)	-0.02 (0.08)	-0.09 (0.08)	-0.06 (0.08)
$Post_t$	0.02 (0.05)	-0.54 (0.37)			
$Treat_i \times Post_t \times SB_i$	0.42*** (0.08)	0.28*** (0.08)	0.30*** (0.08)	0.31*** (0.09)	0.31*** (0.09)
$Treat_i \times SA_i \times Post_t$	0.14* (0.08)	0.05 (0.09)	0.06 (0.09)	0.02 (0.09)	-0.01 (0.09)
<i>Fixed-effects</i>					
Time			Yes	Yes	Yes
Task code				Yes	Yes
NAICS code					Yes
<i>Fit statistics</i>					
Observations	45,751	43,280	43,280	41,612	41,600
Squared Correlation	0.009	0.25	0.25	0.29	0.29
Pseudo R <sup>2</sup>	0.01	0.25	0.25	0.30	0.30
BIC	30,320.7	22,645.7	22,706.9	25,805.5	26,177.3
<i>Clustered (Project ID) standard-errors in parentheses</i>					
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>					

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##          0/442 fixed-effects (2,333 observations) removed because of only 0 (or only 1) outcomes.  
## NOTES: 266,784 observations removed because of NA values (LHS: 242,688, RHS: 266,784).  
##          0/442/11 fixed-effects (2,377 observations) removed because of only 0 (or only 1) outcomes.
```

Table 4: Logit model: Effect of QuickPay on Non-Competitive Projects

Dependent Variable: Model:	$I(Delay > 0)$				
	(1)	(2)	(3)	(4)	(5)
<i>Variables</i>					
(Intercept)	-0.54*** (0.04)	2.73*** (0.12)			
$Treat_i$	0.23*** (0.06)	0.11* (0.06)	0.10 (0.06)	-0.23*** (0.07)	-0.24*** (0.07)
$SA_i$	0.49*** (0.05)	0.11** (0.06)	0.01 (0.06)	-0.01 (0.06)	0.00 (0.06)
$Competitive_i$	0.32*** (0.04)	0.03 (0.05)	0.04 (0.05)	-0.20*** (0.05)	-0.16*** (0.05)
$Post_t$	-0.61*** (0.05)	-1.58*** (0.15)			
$Treat_i \times Competitive_i$	-0.68*** (0.06)	-0.28*** (0.07)	-0.29*** (0.07)	0.06 (0.07)	0.06 (0.07)
$Competitive_i \times Post_t$	0.31*** (0.06)	0.27*** (0.07)	0.26*** (0.07)	0.13* (0.07)	0.12* (0.07)
$SA_i \times Competitive_i$	-0.18*** (0.06)	-0.13** (0.06)	-0.12* (0.06)	-0.13* (0.07)	-0.13** (0.07)
$Treat_i \times Post_t$	0.32*** (0.08)	0.30*** (0.08)	0.32*** (0.08)	0.28*** (0.09)	0.29*** (0.09)
$Treat_i \times Competitive_i \times Post_t$	-0.27*** (0.08)	-0.13 (0.09)	-0.13 (0.09)	-0.06 (0.10)	-0.06 (0.10)
$Treat_i \times SA_i \times Post_t$	-0.21*** (0.08)	-0.23*** (0.08)	-0.23*** (0.08)	-0.28*** (0.09)	-0.31*** (0.09)
$Treat_i \times SA_i \times Competitive_i \times Post_t$	0.37*** (0.09)	0.22** (0.09)	0.21** (0.09)	0.31*** (0.10)	0.32*** (0.10)
<i>Fixed-effects</i>					
Time			Yes	Yes	Yes
Task code				Yes	Yes
NAICS code					Yes
<i>Fit statistics</i>					
Observations	260,155	236,115	236,115	233,782	233,738
Squared Correlation	0.21	0.27	0.27	0.31	0.31
Pseudo R <sup>2</sup>	0.16	0.26	0.26	0.32	0.32
BIC	152,425.5	129,642.1	129,534.9	130,853.8	131,028.1

*Clustered (Project ID) standard-errors in parentheses*  
*Signif. Codes: \*\*\*: 0.01, \*\*: 0.05, \*: 0.1*