Online Appendix to Certification, Reputation and Entry: An Empirical Analysis

Xiang Hui   Maryam Saeedi   Giancarlo Spagnolo   Steve Tadelis

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1 Robustness of First Stage Estimation

1.1 Event study: +/- 6 Months

In the appendix, we repeat the difference-in-difference analyses using a different first-stage estimation method. Instead of simulating the change in the share of badged sellers across different subcategories, we estimate the change in the share of badged sellers in different subcategories using the following event study approach:

$$Share\_Badged_{ct} = \beta_c Policy + \eta_c + \alpha_c t + \epsilon_{ct}, \tag{1}$$

where $Share\_Badged_{ct}$ is the share of badged sellers in subcategory c in month t; $Policy$ is a dummy variable which equals 1 after the policy change; η_c are subcategory fixed effects; α_c is a subcategory-specific linear time trend; and ϵ_{ct} are error terms. In the appendix, we report full results on the case where we use data from six months before and six months after the policy change to estimate the first stage policy exposure. However, we have also replicated our results on the average change in entry rate and entry quality using 1) estimate the first stage with three months before and three months after the policy change, 2) estimate the first stage with one month before and after the policy change, 3) use number of badged sellers as the dependent variable in the first stage estimation, and 4) directly compute the percentage drop in average share of badged seller in different markets using data from one week before and one week after the policy change, and 5) use the number of entrants as the dependent variable in the second stage estimation (instead of using entrant ratio. For these first stage specifications, we only performed analyses for changes in the average entry rate and entry quality, since the results are not very different from the first case.

The first stage estimates of changes in the share of badged sellers are reported in Figure 1. The correlation between these estimates and those in Figure 3 in the paper (using the simulation approach) is 0.863, and therefore the two measures mostly agree with each other on the estimated policy exposure. Similar as before, we see that the decrease in the share of badged sellers after the policy change is very different across different markets and for some subcategories.

Table 1 reports the difference-in-difference estimation on average changes in our variables of interest, which is analogous to Table 1 in the paper. We see consistent results that average entry rate and EPP increases in markets with higher policy exposure. Also, total sales from entrants

increase in markets with larger drop in share of badged sellers, although the result is statistically significant only for the case when we use data from six months before and after the policy change for estimation.

To understand the distributional impacts of the policy change, we also plot average monthly variables of interest before and after the policy change for markets that are the most exposed to the market and for markets that are the least exposed, which is analogous to Figure 5 in the paper. The difference between Figure 2 and Figure 5 in the paper is that policy exposure estimates are based on the event study approach. Instead of looking at top and bottom 20 percentile market exposure, we also look at top and botton 10 percentiles. The results are ploted in Figure 3, which corresponds to Figure 11 in the paper. The qualitative results still hold, i.e., most responses in entrant ratios and EPP come from subcategories that are most affected.

Subsequently, we estimate how quality changes for different quality deciles of entrants. In particular, Figure 4 repeats the DiD analyses on EPP for entrants of different quality deciles, similar to the right graph in Figure 7 in the paper. Again, our results are consistent with fatter tails on both ends of distribution of entrants' quality.

In Table 2, we repeat the DiD analyses for incumbents to study their response to the policy change. We see little change in incumbents' average EPP, similar to results in Table 2 in the paper.

In Table 3, we repeat the placebo test to provide evidence for the assumption of exclusion assumption our two-stage empirical strategy. Similar to the results in panel A1 of Table 5 in the paper, the estimates here show that policy exposures estimated from the policy year cannot explain changes in entry patterns across markets in the previous year.

To study whether our results hold for the two types of entrants, namely new entrants on the platform and exisiting sellers starting to sell in new markets, we separately perform the DiD analyses for the two types of entrants in Table 4. The results are similar to those in Table 6 in the paper. In Figure 5, we repeat the DiD analyses for different quality deciles for the two types of entrants. The results are similar to those in Figure 10 in the paper. These two exercises suggest that our results are not driven by a particular type of entrants.

Table 1: Policy Impact on Rate and Quality of Entrants

Panel A. Entrant Ratio			
	(1)	(2)	(3)
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	0.299***	0.204***	0.047
	(0.041)	(0.027)	(0.051)
R^2	0.913	0.889	0.691

Panel B. EPP Conditional on Survival in the Second Year			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	0.102***	0.066***	0.062**
	(0.034)	(0.023)	(0.026)
R^2	0.758	0.717	0.690

Panel C. Sales Quantity Conditional on Survival in the Second Year			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	-15.082***	-2.867	-2.560
	(4.455)	(2.877)	(3.533)
R^2	0.605	0.549	0.505

Panel D. Total Sales			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	6883	9895***	4737
	(6611)	(4025)	(3678)
R^2	0.930	0.930	0.942

Panel E. 2nd-yr Sales Quantity/ # Entrants			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	-5.573**	-2.002	-3.046
	(0.039)	(2.042)	(2.121)
R^2	0.496	0.404	0.381

Panel F. 2nd-yr Sales Quantity			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	-1098	3015	-11644
	(10375)	(6801)	(7477)
R^2	0.745	0.736	0.723

Notes: The regressions are at the subcategory-month levels. An entrant survives the second year if she sells at least one item in the second year after entry.

*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

Table 2: Policy Impact on Quality of Incumbents

Panel A. EPP from Incumbents			
	(1)	(2)	(3)
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	-0.044*	0.020	-0.021
	(0.025)	(0.018)	(0.021)
R^2	0.887	0.853	0.823

Panel B. Sellers who Entered n Months before the Policy		
	n=3	n=6
Estimate	-0.068	0.027
	(0.054)	(0.053)
R^2	0.459	0.415

Notes: The regressions are at the subcategory-month levels. An incumbent is defined as a seller who has listed at least one item before and one item after the policy change in the specified time windows.

*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

Table 3: Placebo Test on the Exclusion Restriction

|	Entrant Ratio		EPP		Total Sales	
	(1)	(2)	(3)	(4)	(5)	(6)
	+/- 3 Mths	+/- 6 Mths	+/- 3 Mths	+/- 6 Mths	+/- 3 Mths	+/- 6 Mths
Estimate	-0.606	-0.365	0.021	-0.008	-1.619	-4.072
	(2.802)	(1.585)	(0.024)	(0.018)	(4.725)	(3.180)
R^2	0.117	0.068	0.832	0.793	0.618	0.536

Notes: We use the $\widehat{\beta}$ estimated from the year of the policy change, and re-perform the second-stage regression using data from both three months and six months before and after September in the previous year.

*** indicates significance at p = 0.01; ** indicates p = 0.05; * indicates p = 0.1.

Table 4: Two Types of Entry

	New Sellers		Existing Sellers	
Panel A. Entrant Ratio				
	(1)	(2)	(3)	(4)
	+/- 3 Months	+/- 6 Months	+/- 3 Months	+/- 6 Months
Estimate	0.057***	0.041***	0.295***	0.215***
	(0.012)	(0.007)	(0.042)	(0.028)
R^2	0.887	0.898	0.890	0.912

Panel B. EPP				
	(1)	(2)	(3)	(4)
	+/- 3 Months	+/- 6 Months	+/- 3 Months	+/- 6 Months
Estimate	0.559***	0.123*	0.144***	0.093***
	(0.123)	(0.074)	(0.037)	(0.024)
R^2	0.309	0.418	0.706	0.733

Figure 1: Heterogeneous Impact of Policy Change on Different Subcategories

Distribution of β_c
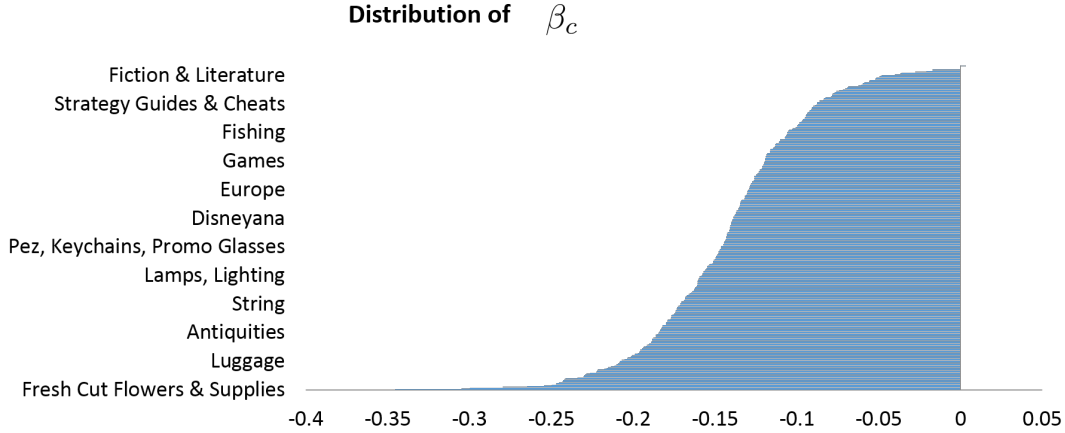
Notes: The estimates are based on data from six months before and six months after the policy change. There are about 400 subcategories, and the labels on the left are just some examples.

1.2   Event study: +/- 3 Months

In this section, we repeat the difference-in-difference analyses using an event study approach for our first-stage estimation. In particular, we use data from three months before and three months after the policy change for the estimation of the first stage.

Table 5: Policy Impact on Number and Quality of Entrants

	+/- 3 Months	+/- 6 Months	Month 7 to 12
Panel A. Entrant Ratio			
Estimate	0.299***	0.154***	-0.003
	(0.041)	(0.032)	(0.057)
R^2	0.914	0.888	0.691
Panel B. EPP Conditional on Survival in the Second Year			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	0.102***	0.093***	0.005
	(0.034)	(0.025)	(0.028)
R^2	0.758	0.717	0.670

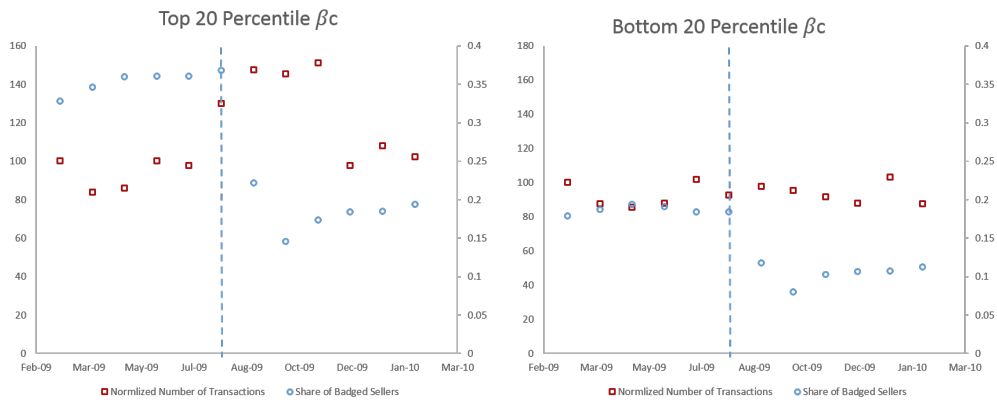*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

Figure 2: Distributional Policy Impact on Entrants
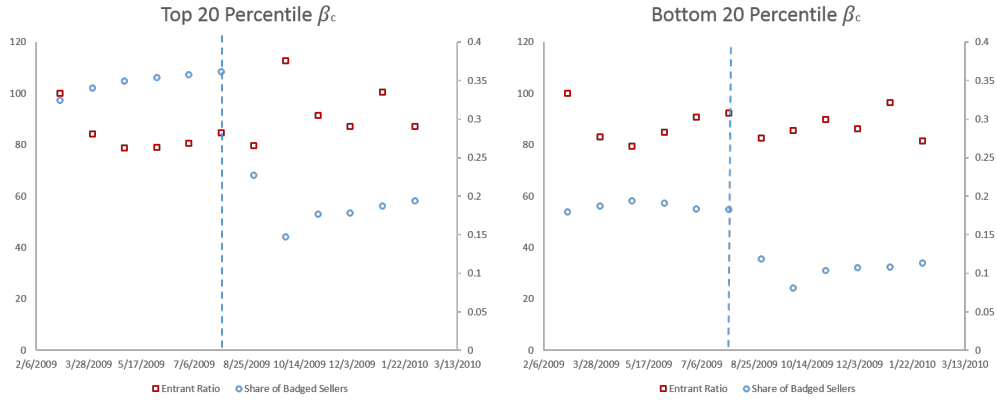
(a) Distributional Policy Impact on Number of Entrants
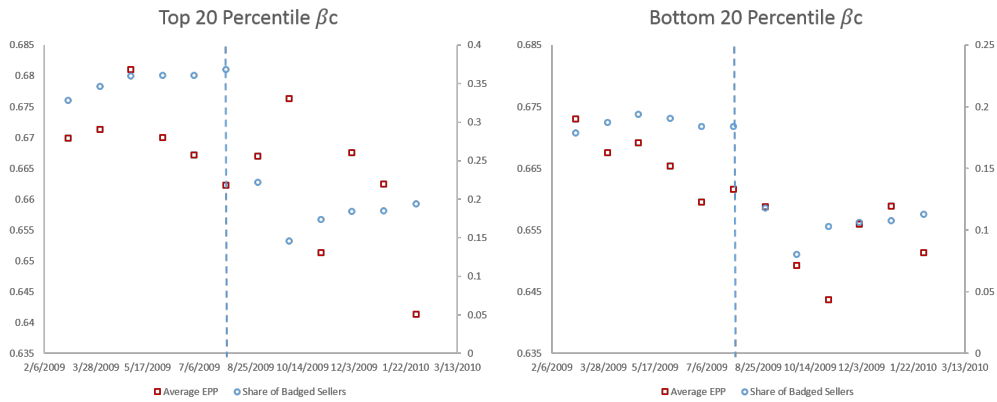

(b) Distributional Policy Impact on EPP

(c) Distributional Policy Impact on Sales

Notes: The vertical axis on the right shows the average monthly share of badged sellers, and the one on the left shows the average monthly normalized number of entrants, average monthly EPP, and average normalized number of transactions. The numbers of entrants in the six-month period before the policy change are normalized to 100. The numbers of transactions in the six month months before the policy change are normalized to 100.
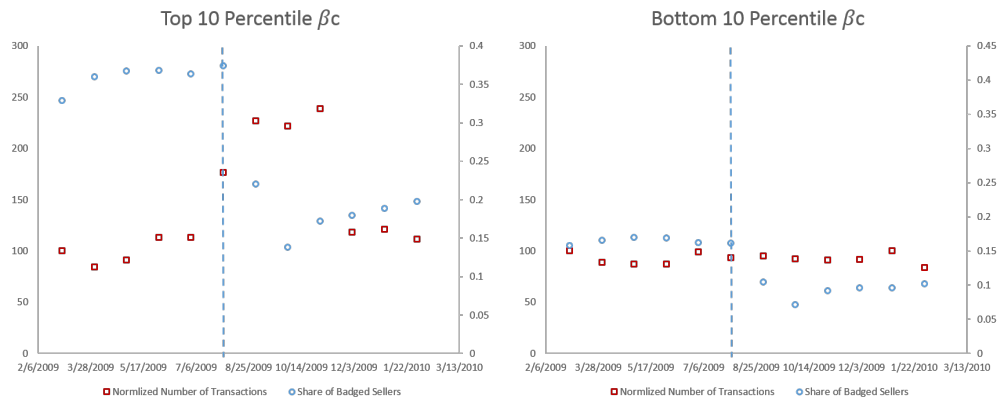
Figure 3: Robustness: Policy Impact on Entrants, Top and Bottom 10 Percentiles
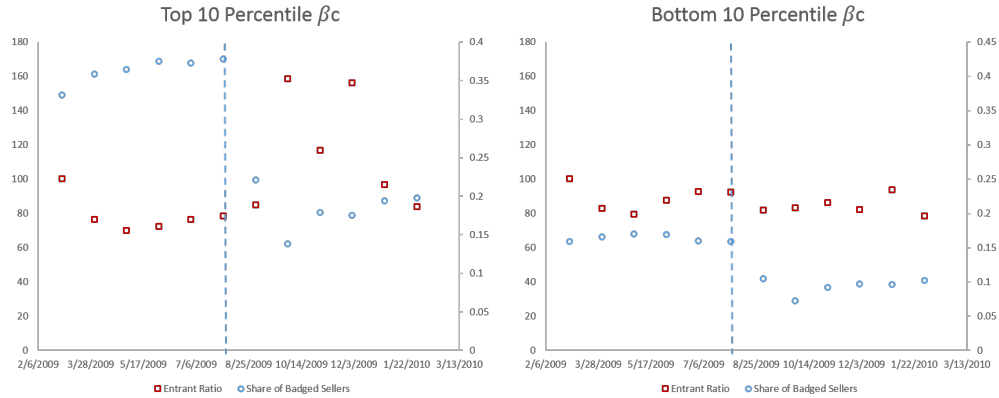
(a) Policy Impact on Number of Entrants
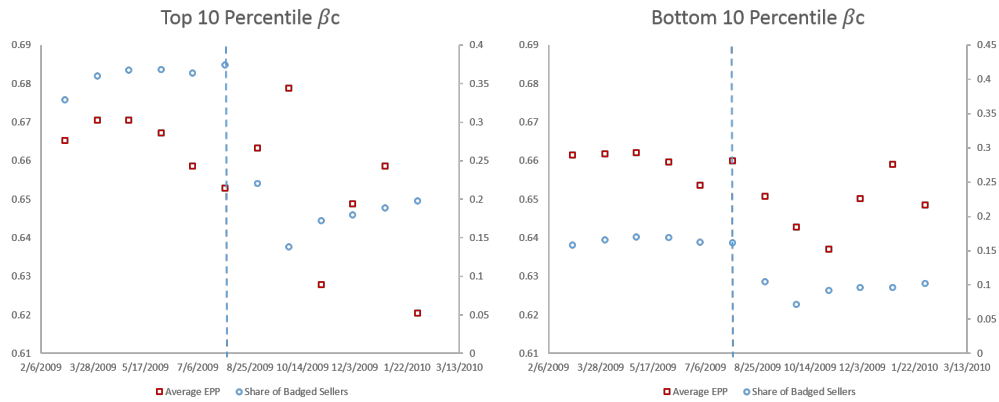
(b) Policy Impact on EPP

(c) Policy Impact on Sales

Notes: The axis for the average monthly share of badged sellers is on the right, and the axis for the average monthly normalized number of entrants, EPP, and the average monthly normalized number of transactions is on the left. The numbers of entrants in the six months before the policy change are normalized to 100. The numbers of transactions in the six months before the policy change are normalized to 100.

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Figure 4: Change in EPP for Entrants in Different Quality Deciles

Change in EPP of Entrants as a Function of Policy Impact
by Deciles of Entrants' Quality (EPP)
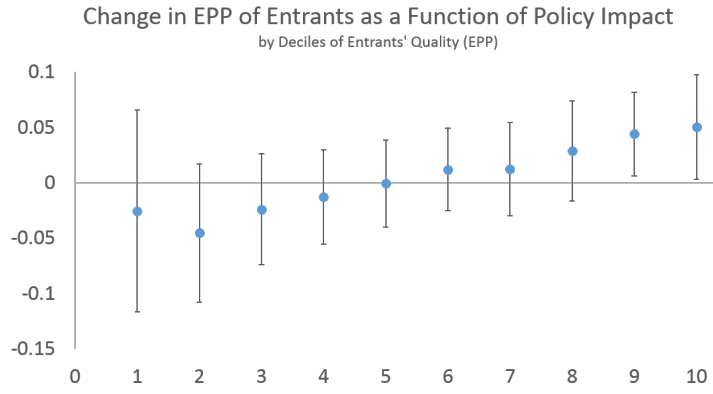
Notes: Bars indicate 95% confidence intervals.

Figure 5: Change in EPP for Two Types of Entrants in Different Quality Deciles

New Sellers

Existing Sellers

Notes: Bars indicate 95% confidence intervals.

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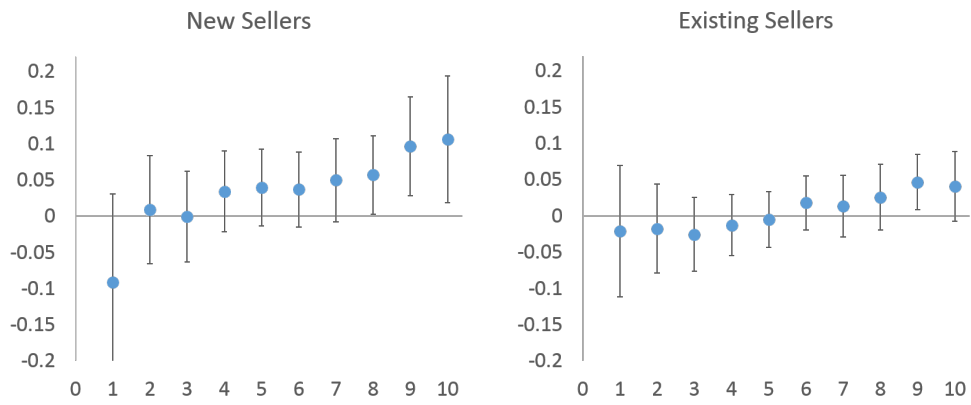
1.3 Event study: +/- 4 Weeks

In this section, we repeat the difference-in-difference analyses using an event study approach for our first-stage estimation. In particular, we use data from four weeks before and four weeks after the policy change for the estimation of the first stage.

Table 6: Policy Impact on Number and Quality of Entrants

Panel A. Entrant Ratio			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	0.310***	0.176***	0.173**
	(0.033)	(0.026)	(0.074)
R^2	0.915	0.889	0.547
Panel B. EPP Conditional on Survival in the Second Year			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	0.075**	0.050***	0.049*
	(0.031)	(0.023)	(0.026)
R^2	0.759	0.716	0.691

*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

1.4 Event study: +/- 1 Week

In this section, we repeat the difference-in-difference analyses using an event study approach for our first-stage estimation. In particular, we use data from one week before and one week after the policy change for the estimation of the first stage.

Table 7: Policy Impact on Number and Quality of Entrants

	+/- 3 Months	+/- 6 Months	Month 7 to 12
Panel A. Entrant Ratio			
Estimate	0.088***	0.072***	0.081**
	(0.021)	(0.016)	(0.032)
R^2	0.910	0.889	0.691
Panel B. EPP Conditional on Survival in the Second Year			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	0.048**	0.012***	0.086***
	(0.020)	(0.014)	(0.026)
R^2	0.760	0.719	0.694

*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

1.5 Event study: Number of Badged Sellers as Dependent Variable

In this section, we repeat the difference-in-difference analyses using an event study approach for our first-stage estimation. In particular, we use number of bagded sellers as the dependent variable for the estimation of the first stage.

Table 8: Policy Impact on Number and Quality of Entrants

	+/- 3 Months	+/- 6 Months	Month 7 to 12
Panel A. Entrant Ratio			
Estimate	6E-7	2E-6**	2E-6***
	(1E-6)	(1E-6)	(8E-7)
R^2	0.911	0.888	0.872
Panel B. EPP Conditional on Survival in the Second Year			
	+/- 3 Months	+/- 6 Months	Month 7 to 12
Estimate	1E-6	9E-9	1E-6
	(1E-6)	(1E-6)	(1E-6)
R^2	0.757	0.717	0.690

*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

1.6 Use percentiles of $\widehat{\beta}_c$

We replicate the DiD estimation using percentiles of $\widehat{\beta}_c$, rather than their actual values as in Table 1. The percentiles represent the relative position of each subcategory, which is ranked by the drop in the share of badged sellers. This normalization enables scale-free comparisons across subcategories. We see that the qualitative results are the same as before, as shown in Table 9.

2 Robustness of Second Stage Estimation

2.1 Number of Entrants as Dependent Variable

As a robustness check for using entrant ratio as the dependent variable to study change in entry rate, we use number of entrants as the dependent variable in the second stage. In Table 10, we see that average entry rate in terms of increase in number of entrants is higher in markets that are more affected by the policy.

2.2 Different Window for Defining EPP

In Figure 6a, we plot the monthly EPPs for different groups of incumbents in the policy year, the year before, and the year after. Unlike Figure 13 in the paper, EPPs in this graph are computed based on sellers' transactions from six months before the focal month. The graphs look similar to the ones in Figure 13.

Figure 6: Change in EPP of Incumbents
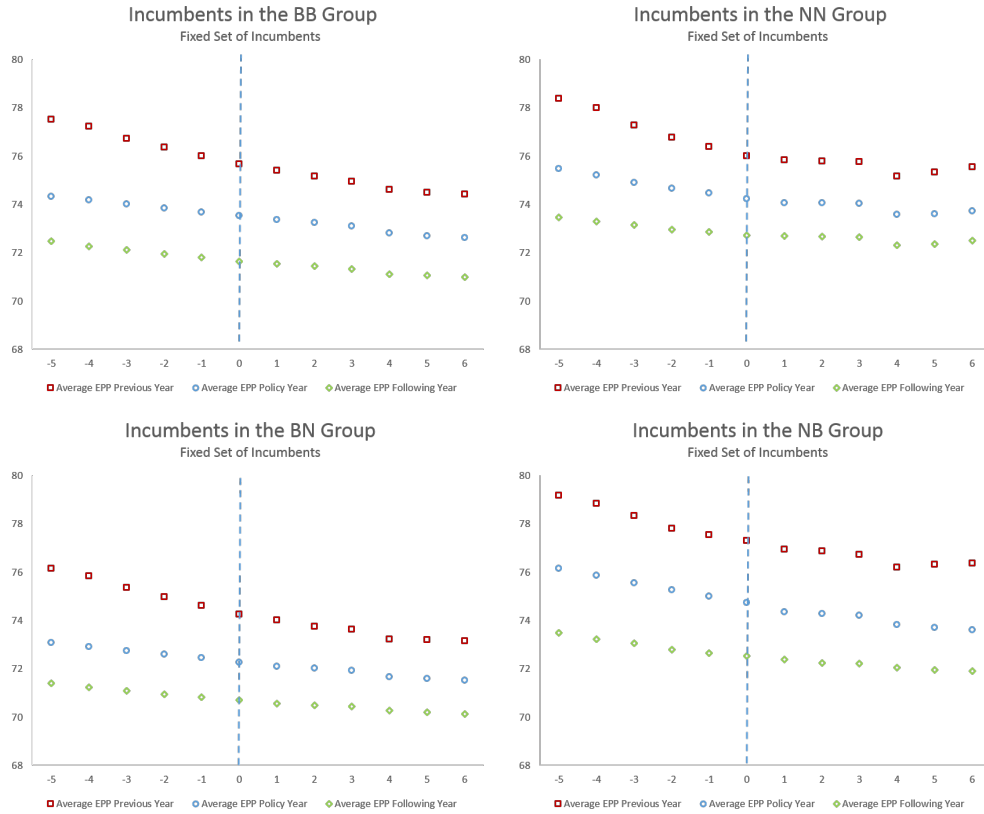
(a) Four Groups of Incumbents
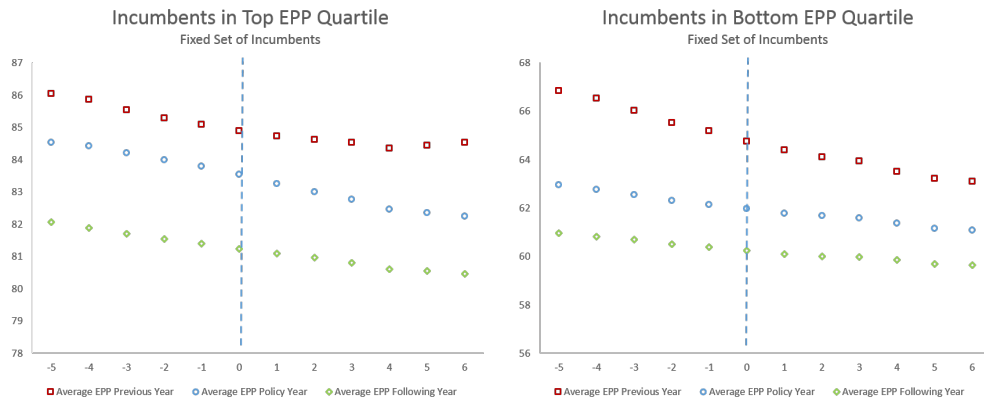
(b) Top Vs. Bottom 20 Percentile

Notes: The solid line is the average monthly EPP provided by incumbents of a particular group in the year of the policy change. The dotted line and dashed-dotted line are the average EPP provided by the same set of incumbents in the previous year and the following year, respectively. The x-axis shows normalized months, with 0 being the month where the policy change took place.

3 Changes in Price and Market Share for Incumbents

In Table 11, we repeat the analyses in Table 4 in the paper to study changes in price, sales probability, sales quantity, and market share for incumbents of different groups based on their badge status before and after the policy change. The difference is that in this table, we use real change in sellers' badge status to define groups, rather than the simulated changes. We see again that sellers in the BN group are worse off, and that BB and NN group are mostly better off after the policy change. As another robustness check, we perform the same analyses using a longer time window, namely three months before and after the policy change. Results reported in Table 12 are qualitatively similar.

Table 9: Robustness Check: Policy Impact on Number and Quality of Entrants

	+/- 3 Months	+/- 6 Months	Month 7 to 12
Panel A. Entrant Ratio			
Estimate	0.046***	0.030***	0.015
	(0.006)	(0.004)	(0.009)
R^2	0.914	0.889	0.687
Panel B. EPP Conditional on Survival in the Second Year			
Estimate	0.010*	0.008**	0.007
	(0.006)	(0.004)	(0.005)
R^2	0.757	0.717	0.691
Panel C. Sales Quantity Conditional on Survival in the Second Year			
Estimate	-2.159***	-0.527	-0.411
	(0.735)	(0.512)	(0.632)
R^2	0.605	0.549	0.505
Panel D. Total Sales			
Estimate	2101*	1791***	739
	(1096)	(726)	(659)
R^2	0.927	0.928	0.942
Panel E. 2nd-yr Sales Quantity/ # Entrants			
Estimate	-0.974**	-0.511	-0.729*
	(0.499)	(0.378)	(0.390)
R^2	2.518	2.508	0.381
Panel F. 2nd-yr Sales Quantity			
Estimate	-371	422	-2973**
	(1921)	(1258)	(1374)
R^2	0.745	0.736	0.722

Notes: We use percentiles of $\widehat{\beta}_c$ for the DiD analyses, rather than their absolute values.

*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

Table 10: Policy Effect on Entry Rate

	+/- 3 Months	+/- 6 Months	Month 7 to 12
Dependent Variable: Number of Entrants			
Estimate	5203.22***	2842.83***	3701.00***
	(906.56)	(582.08)	(455.84)
R^2	0.97	0.97	0.96

*** indicates significance at p = 0.01; ** p = 0.05; * p = 0.10.

Table 11: Change in Badge Premium

	(1)	(2)	(3)	(4)
	Relative Price	Sales Probability	Sales Quantity	Market Share
Policy	-0.003	0.015***	0.009	-1.5E-07(-2%)
	(0.003)	(0.001)	(0.006)	(1.4E-06)
BB*Policy	-0.003	0.024***	0.032***	6.2E-06***(15%)
	(0.003)	(0.001)	(0.005)	(2.2E-06)
BN*Policy	-0.007***	-0.001***	-0.010***	-3.3E-06*(-6%)
	(0.002)	(4.E-04)	(0.004)	(1.8E-06)
NB*Policy	0.001	0.097***	0.221***	1.8E-06(13%)
	(0.012)	(0.003)	(0.026)	(4.1E-06)
Seller FE	✓	✓	✓	✓
Week FE	✓	✓	✓	✓
R^2	0.288	0.808	0.862	0.813

Notes: In columns 1–3, we use transaction data from one month before and one month after the policy change. In columns 2 and 3, we also control for relative price. *B* (or *N*) indicates that the seller is badged (or not badged). The first (second) letter refers to the seller's status before (after) the policy change. In column 4, we fill in zero market shares if a seller does not sell in a particular week.

*** indicates significance at p = 0.01; ** indicates p = 0.05; * indicates p = 0.1.

Table 12: Robustness: Change in Badge Premium

	(1)	(2)	(3)	(4)
	Relative Price	Sales Probability	Sales Quantity	Market Share
Policy	0.021***	0.018***	0.012**	1.3E-05***(127%)
	(0.006)	(5.E-04)	(0.005)	(2.9E-06)
BB*Policy	0.002	0.033***	0.027***	3.9E-06*(6%)
	(0.002)	(4.E-04)	(0.005)	(2.3E-06)
BN*Policy	-0.015***	0.007***	0.005	-4.5E-06**(-5%)
	(0.002)	(3.E-04)	(0.003)	(1.9E-06)
NB*Policy	0.016	0.074***	-0.021	1.8E-06(9%)
	(0.011)	(0.002)	(0.026)	(4.2E-06)
Seller FE	✓	✓	✓	✓
Week FE	✓	✓	✓	✓
R^2	0.192	0.729	0.533	0.685

Notes: In columns 1–3, we use transaction data from one month before and one month after the policy change. In columns 2 and 3, we also control for relative price in columns. B indicates that the seller is badged, and N indicates that the seller is not badged. The first letter refers to the the seller's status before the policy change, and the second letter refers to the seller's status after the policy change. In column (4), the regression is at seller–week level and we fill in zero market shares if a seller does not sell in a particular month.

*** indicates significance at p = 0.01; ** indicates p = 0.05; * indicates p = 0.1.