

Buying Reputation as a Signal of Quality: Evidence from an Online Marketplace

ONLINE APPENDIX

Lingfang (Ivy) Li* Steven Tadelis[†] Xiaolan Zhou[‡]

March 10, 2020

1 Extra Details of RFF and Seller Grades

As explained in Section 2 of the paper, on March 1, 2012, Taobao launched a “Rebate-for-Feedback” (RFF) feature for sellers. Figure A-1 provides a translation of Taobao’s announcement of the new online service. One of the announced goals was to “increase the ratio of non-automatic ratings for sellers.” Another was “increasing the quality of buyers’ comments” using Taobao’s machine learning algorithm to judge feedback quality.

The RFF feature offered sellers the option of selecting items for which they set a rebate value, in the form of cash-back or a store (seller-specific) coupon, which is rewarded to buyer’s who leave informative feedback. Taobao guarantees that the rebate will be transferred from the seller’s account to a buyer who leaves informative feedback. Taobao measures the informativeness of feedback using a Natural Language Processing (machine learning) algorithm that examines the comment’s content and length and detects whether key features of the item are mentioned. Importantly, informativeness does not depend on the sentiment, that is, on whether the feedback was positive or negative. Any rating that earned its buyer a rebate will be identified on the item’s rating page as one for which a RFF was granted, so that future buyers can know this rating was rewarded.

*School of Management, Fudan University. e-mail: lingfangivy.li@gmail.com

[†]UC Berkeley, NBER CEPR, and Cesifo. e-mail: stadelis@berkeley.edu

[‡]Faculty of Economics and Management, East China Normal University. e-mail: xiaolan.z.zhou@gmail.com

Figure A-1: Taobao’s announcement of a new feedback reward system (translation)

The purpose of the “rebate for feedback” scheme is to:

- Increase the ratio of non-automatic to automatic seller ratings.
- Increase the quality of buyers’ comments.
- Increase feedback for new products and thus reduce buyers’ hesitation to purchase.

Benefits for buyers:

- Receive cash or a coupon as a reward for feedback.
- Become opinion leader as the display of their feedback is prioritized over others’ feedback.

Benefits for sellers:

- Increase ratio of non-automatic to automatic ratings, thus attracting more future buyers.
- Increase buyer incentives to write detailed comments, thus increasing word-of-mouth marketing power.

Sellers can set:

- Reward for 1st high-quality feedback on newly listed products.
- Reward for any products, conditional on feedback being of high quality (and regardless of whether it is positive or negative).

Alternative form of rewards:

- Cash rewards.
- Discount coupon.

Reviews on Taobao can take one of three forms: first, sentiment only (positive, negative, or neutral) without any description, resulting in feedback with zero Chinese characters; second, sentiment with some description, resulting in feedback with a positive number of Chinese characters; and third, an automatic positive review with 18 Chinese characters. Figure A-2 provides an example of three ratings on a page, one being effective (with 28 Chinese characters), another being an automatic rating (with 18 Chinese characters), and the third a zero-character rating. We refer to the first case of sentiment with some description as an “effective” review because the buyer clearly wrote something about the product or the experience. We refer to the other forms of reviews as ineffective.

As explained in Section 4 of the paper, each seller has one of 21 possible seller rating grades, where a higher grade is identified with a higher interval of rating scores, and where scores are the number of positive ratings minus the number of negative ratings. Grades are highly correlated with the number of sales because of Taobao’s automatic positive ratings and the low number of negative

Figure A-2: An example of automatic/ zero-word/effective feedback



and neutral ratings overall. Hence, a seller’s grade is a useful measure of how experienced the seller is on Taobao. Table A-1 shows the relationship between scores and rating grades.

2 Additional Summary Statistics of Rebate Adoption

As we explain in Section 4 of the paper, we focus on sellers who sell in four selected categories that we chose to represent cheap and expensive, search and experience goods. These sellers usually offer items that span more than the four categories we selected and they adopt RFFs for products in those other categories as well. For example, a seller of cellphones usually also offers portable E-pads or earphones, for which she may also adopt RFFs at the same time.

Table A-2 presents summary statistics of rebates for items of all categories. Table A-3 presents summary statistics of rebates for items in only the four categories we use for our analysis. At the rebate level, we focus on all initiated RFFs, where a rebate refers to an event in which a RFF was

Table A-1: Seller rating grade

Seller rating score	Seller rating grade	Seller rating category
Below 4 points	0	none
4-10	1	1 heart
11-41	2	2 hearts
41-90	3	3 hearts
91-150	4	4 hearts
151-250	5	5 hearts
251-5000	6	1 diamond
501-1,000	7	2 diamonds
1,001-2,000	8	3 diamonds
2,001-5,000	9	4 diamonds
5,001-10,000	10	5 diamonds
10,001-20,000	11	1 crown
20,001-50,000	12	2 crowns
50,001-100,000	13	3 crowns
100,001-200,000	14	4 crowns
200,001-500,000	15	5 crowns
500,001-1,000,000	16	1 gold crown
1,000,001-2,000,000	17	2 gold crowns
2,000,000-5,000,000	18	3 gold crowns
5,000,001-10,000,000	19	4 gold crowns
Above 10,000,000	20	5 gold crowns

initiated. It is possible that a seller initiated RFFs for the same item twice within a month, which are counted as two rebates in that month. Both the type (cash or coupon) and amount of the rebates vary across items. The proportion of cash rebates is 30.86% for all categories and 29.8% for the four categories we selected. The average number of buyers rewarded is 1.074 for all categories and 4.904 for the four categories we selected. The proportion of RFFs rewarded to at least one buyer is 11.80% for all categories and 29.28% for the four categories we selected. For each rebate, we know the total number of buyers who actually received a rebate reward for their feedback, but we only know the total amount paid if it is a cash rebate because our data do not include the value of a coupon rebate. Therefore, the average value of a rebate is known only when it is a cash rebate and is rewarded to at least one buyer, which is 1.26RMB for all categories and 1.54RMB for the

Table A-2: Summary statistics of rebates for items of all categories

	Obs.	Mean	Std.	25%	Median	75%
At rebate level (all categories)						
Dummy if a cash rebate	1,481,533	0.309	0.462	0	0	1
Number of buyers rewarded	1,481,533	1.074	41.82	0	0	0
Dummy if ≥ 1 buyer is rewarded	1,481,533	0.1180	0.3226	0	0	0
Total amount (RMB) cash rebate if ≥ 1 buyer is rewarded	33,959	7.42	54.68	0.5	1.5	3.5
Average amount (RMB) cash rebate if ≥ 1 buyer is rewarded	33,959	1.26	1.71	0.5	1	1
At item level (items with at least one rebate)						
Proportion of a cash rebate	1,071,645	0.313	0.458	0	0	1
At item level (items with at least two known cash rebate values)						
Dummy if cash rebates with constant values	4,396	0.861	0.346	1	1	1
At seller-month level (all categories)						
Ratio of items with rebates of a seller	148,170	0.0426	0.133	0	0	0
Number of items with rebates of a seller	148,170	6.540	47.36	0	0	0
Number of items of a seller	148,170	94.38	213.8	14	41	96

Notes: The sample includes items of all categories.

Table A-3: Summary statistics of rebates for items of four categories only

	Obs.	Mean	Std.	25%	Median	75%
At rebate level (four categories)						
Dummy if a cash rebate	56,793	0.298	0.457	0	0	1
Number of buyers rewarded	56,793	4.904	170.2	0	0	1
Dummy if ≥ 1 buyer is rewarded	56,793	0.2928	0.4550	0	0	1
Total amount (RMB) cash rebate if ≥ 1 buyer is rewarded	3,980	10.14	42.8	1	2	5
Average amount (RMB) cash rebate if ≥ 1 buyer is rewarded	3,980	1.54	2.62	0.5	1	2
At item level (items with at least one rebate)						
Proportion of a cash rebate	34,387	0.304	0.452	0	0	0
At item level (items with at least two known cash rebate values)						
Dummy if cash rebates with constant values	597	0.807	0.395	1	1	1

Notes: The sample includes items of the four selected categories only.

four categories we selected for our analysis. The average cash expenditure of a rebate is 7.42RMB for all categories and 10.14RMB for our selected four categories.

Both the type and the amount of RFFs might change for the same item over time. Focusing first on items with rebates, we compute the proportion of cash rebates for each item, which is the ratio of the number of cash rebates to the total number of cash and coupon rebates. The average proportion of cash rebates is 31.3% for all categories and 30.4% for our four categories. Focus only on cash rebates with at least two known values, the proportion of items with a fixed cash rebate value over time is 86.1% for all categories and 80.7% for our four categories.

Naturally, sellers do choose RFF for some products but not for others. For a given seller in a given month, the proportion of products for which RFF is adopted is 4.26% with a standard deviation of 13.3%. The number of items per seller in a given month varies from 1 to 7,422 with a mean of 94.38 and standard deviation of 213.8. The number of items with RFFs per seller varies from 0 to 4,059 with a mean of 6.54 and standard deviation of 47.36.

3 Robustness Checks: the Impact of RFF on Sales and Ratings

In Table A-4, we use the “ratio of item positive long ratings” as an alternative measure of item quality. The corresponding coefficients on this ratio are positive and significant, just as the “ratio of item positive effective ratings” in Table 2 in the paper.

In Table A-5 we reproduce the first two specifications of Table 3 in the paper (columns 1 and 2) and add a third specification that includes the impact of the cash amount of rebates on sales. As column 3 shows, conditional on offering a cash rebate, a higher cash amount does increase sales. However, the impact of having a cash rebate is highly significant suggesting that just offering the rebate itself has a strong impact on sales regardless of the amount.

Table A-6 reports robustness checks for the impact of rebates on item sales and ratings using a propensity score matching model. As we explain in the paper, the endogenous choice of which items a seller will promote with RFF is at the heart of the signaling model we aim to test, however, to convincingly argue that buyers respond to the signal and not to some other endogenous factor requires some assumptions. Our use of item fixed effects should, in our view, alleviate most of these concerns. What we can do to alleviate some of the remaining concerns is to employ a propensity score matching model that addresses the endogeneity of rebate adoption. We also discuss the issue of choosing the right time period for the analysis, and Table A-7 reports robustness checks for the

impact of rebates on item sales and ratings using different period windows. The coefficients on rebates in Tables 3 to 7 in the paper are listed in the first row in Table A-7.

To perform the propensity score matching analysis, we adopt the following procedure: First, we define the treatment indicator equal to 1 if an item was adopted for RFF during month 2-6; we define the logarithm value of item sales (plus 1) from month 2 to month 6 as the outcome; we define all the control variables in Table A-5 and brand fixed effects as the covariates. Second, we use `psmatch2` in Stata to find matched items. Third, we restrict the panel data (item-month) to the pairs of matched items. Last, we use the matched panel data to run OLS regressions with brand and month fixed effect.

The coefficients on rebates in column 1 in Table A-6 and Table A-7 are all large and significant, showing that a rebate increases the quantity sold of an item by at least 36% on average. Furthermore, all the coefficients on rebate in column 6 in Table A-6 and in columns 6 & 7 in Table A-7 are small and insignificant, showing that offering a rebate does not raise the likelihood of positive ratings.

Tables A-8 to A-12 report robustness checks for the impact of rebates on item sales and ratings for each category using data at the item-month level. Table A-8 shows that a rebate has the largest effect on cellphones and jeans, which is similar to Table 3 in the paper. Table A-11 shows that offering a rebate does not raise the likelihood of positive ratings for any category.

3.1 Rebate rewards and repeat purchasing

We now turn to examine the impact of adopting a rebate on repeat purchases in the next three months. We divide buyers into two groups: those who purchased an item when a rebate was offered but who were not rewarded, and those who purchased and were rewarded with a rebate. We define an “order” as a seller-buyer-date observation, assuming that a buyer places only one order from a seller. Our samples are selected as follows. We first find the orders when there was a rebate. These orders included at least one item with a RFF and this item had some ratings. Then, we see if a buyer returned to the same seller in the following three months.

First, we focus on buyers who purchased an item from a seller when a RFF was adopted, but who were not rewarded for feedback. Table A-13 shows that these buyers are more likely to return to a seller than buyers who purchased when no RFF was adopted by 1.01%. This number is small but significant. There are two possible reasons. First, items adopting a RFF are of higher quality,

Table A-4: Adoption of a rebate for an item using different measure of item quality

Dependent variable	Indicator = 1 if a rebate is adopted for an item in t				
	Logit	Logit	Linear	Linear	Linear
	(1)	Marginal effects (1')	(2)	(3)	(4)
Seller characteristics in $t - 1$					
Diamond grade	0.3257*** (0.0208)	0.0424*** (0.0027)	0.0369*** (0.0025)	-0.0638*** (0.0046)	
Crown grade	0.4616*** (0.0213)	0.0601*** (0.0028)	0.0561*** (0.0026)	-0.0956*** (0.0074)	
Gold crown grade	0.3907*** (0.0327)	0.0509*** (0.0042)	0.0462*** (0.0044)	-0.2831*** (0.0170)	
Ratio of seller positive ratings	5.3992*** (0.5090)	0.7031*** (0.0662)	0.4260*** (0.0487)	0.2333** (0.0968)	
Item characteristics in $t - 1$					
ln(sales +1)	0.3503*** (0.0041)	0.0456*** (0.0005)	0.0530*** (0.0006)	0.0426*** (0.0005)	0.0423*** (0.0005)
Never received ratings (cold start)	0.4690*** (0.0174)	0.0611*** (0.0023)	0.0595*** (0.0022)	0.0456*** (0.0020)	0.0463*** (0.0020)
Ratio of item pstv-long ratings	0.8620*** (0.0290)	0.1122*** (0.0038)	0.1192*** (0.0041)	0.0319*** (0.0036)	0.0326*** (0.0036)
Ratio of item neg/neu-long ratings	-0.1484 (0.2606)	-0.0193 (0.0339)	-0.0270 (0.0304)	-0.0167 (0.0259)	-0.0200 (0.0259)
Item category					
cellphone	-0.6276*** (0.0212)	-0.0817*** (0.0028)	-0.0828*** (0.0026)	-0.0706 (0.0531)	-0.0681 (0.0532)
memory card	-1.4318*** (0.0592)	-0.1864*** (0.0076)	-0.1306*** (0.0049)	-0.1691*** (0.0536)	-0.1666*** (0.0536)
Mask	-0.5360*** (0.0132)	-0.0698*** (0.0017)	-0.0713*** (0.0017)	-0.0757*** (0.0280)	-0.0758*** (0.0281)
Constant	-8.5742*** (0.5061)		-0.3785*** (0.0483)	-0.1038 (0.0975)	0.0433*** (0.0151)
Seller fixed effects	No	No	No	Yes	Yes
Item fixed effect	No	No	No	No	No
Month fixed effect	Yes	Yes	Yes	Yes	Yes
Observations (item-month)	230,365	230,365	230,365	230,365	230,365
R2			0.092	0.086	0.084

Notes: Regressions are at the item-month level and standard errors are in parentheses. The dependent variable is an indicator of whether RFF was adopted for an item in month t . Seller and item characteristics are measured in month $t - 1$, where ratios of ratings are calculated for cumulative values of ratings up until month $t - 1$ inclusive. Asterisks indicate significance at 10% (*), 5% (**) and 1% (***).

Table A-5: Impact of rebate on sales of an item

Dependent variable	ln(item sales + 1) in month t		
	(1)	(2)	(3)
Rebate in month t	0.3077*** (0.0067)		
- Coupon rebate		0.3312*** (0.0077)	0.3318*** (0.0077)
- Cash rebate		0.2447*** (0.0121)	0.4654*** (0.0207)
- Cash amount (RMB)			0.0179** (0.0076)
Item characteristics			
ln(price, t)	-0.3811*** (0.0094)	-0.3813*** (0.0094)	-0.3820*** (0.0096)
ln(sales +1)	0.0628*** (0.0022)	0.0626*** (0.0022)	0.0644*** (0.0023)
Never received ratings (cold start)	-0.0202** (0.0093)	-0.0202** (0.0093)	-0.0126 (0.0095)
Ratio of item pstv-effective ratings	0.1386*** (0.0112)	0.1385*** (0.0112)	0.1417*** (0.0115)
Ratio of item neg/neu-effective ratings	-0.3926*** (0.0688)	-0.3927*** (0.0688)	-0.4377*** (0.0709)
Seller characteristics in $t - 1$			
Diamond grade	-0.0016 (0.0137)	-0.0037 (0.0137)	-0.0023 (0.0141)
Crown grade	-0.0596*** (0.0210)	-0.0632*** (0.0210)	-0.0587*** (0.0214)
Gold crown grade	-0.0150 (0.0448)	-0.0115 (0.0448)	-0.0067 (0.0450)
Ratio of seller positive ratings	2.3066*** (0.3091)	2.3117*** (0.3091)	2.3399*** (0.3166)
Constant	0.6362** (0.3099)	0.6342** (0.3099)	0.6066* (0.3173)
Item fixed effect	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes
Observations	230,365	230,365	225,403
R2	0.099	0.099	0.103

Notes: Regressions are at the item-month level and standard errors are in parentheses. The dependent variable is an items sales (plus 1) in month t . Ratios of ratings are calculated for cumulative values of ratings up until month $t - 1$ inclusive. Asterisks indicate significance at 10% (*), 5% (**) and 1% (***).

Table A-6: Impact of rebate on sales and ratings of an item using propensity score matching

Dependent variable	ln(item sales +1) in month t	ln(no. item ineffective ratings +1) in month t	ln(no. item ratings +1) in month t	Ratio of item effective ratings, t	Ratio of item long ratings, t	Ratio of item pstv ratings, t	ln(average number of days before leaving ratings +1) in month t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rebate in t	0.3480***	0.1389***	0.2582***	0.0753***	0.0759***	-0.0009	-0.0811***
(Propensity Score Matching)	(0.0143)	(0.0110)	(0.0116)	(0.0063)	(0.0049)	(0.0015)	(0.0098)
Brand fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Regressions are at the item-month level and standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5% (**), and 1% (***)

Table A-7: Impact of rebate on sales and ratings of an item using different period windows

Dependent variable	ln(item sales +1) in month t (1)	ln(no. item ineffective ratings +1) in month t (2)	ln(no. item ratings +1) in month t (3)	Ratio of item effective ratings, t (4)	Ratio of item long ratings, t (5)	Ratio of item pstv ratings, t (6)	ln(average number of days before leaving ratings +1) in t (8)
Rebate in t (Monthly)	0.3077*** (0.0067)	0.1273*** (0.0051)	0.2428*** (0.0056)	0.0689*** (0.0028)	0.0675*** (0.0022)	-0.0008 (0.0005)	-0.0730*** (0.0045)
Rebate in t (First half of a month)	0.3153*** (0.0085)	0.1624*** (0.0070)	0.2879*** (0.0072)	0.0748*** (0.0030)	0.0784*** (0.0023)	-0.0002 (0.0006)	-0.0682*** (0.0049)
Rebate in t (Biweekly)	0.3366*** (0.0051)	0.0921*** (0.0039)	0.2046*** (0.0042)	0.0717*** (0.0026)	0.0780*** (0.0020)	-0.0009* (0.0005)	-0.1021*** (0.0040)
Item fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Regressions are at the item-month, item-first-half-month, item-biweek level. Standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5%(**) and 1% (***)

Table A-8: Impact of rebate on time of sales of an item for the four categories

Dependent variable	ln(item sales +1) in month t			
	Cellphone (1)	Memory card (2)	Mask (3)	Jeans (4)
Rebate in t (Monthly)	0.3569*** (0.0233)	0.2289*** (0.0600)	0.2196*** (0.0106)	0.3170*** (0.0093)
Brand fixed effect	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes

Notes: Regressions are at the item-month level and standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5% (**) and 1% (***).

Table A-9: Impact of rebate on the number of ineffective and total ratings of an item for the four categories

Dependent variable	ln(no. item ineffective ratings +1) in month t				ln(no. item ratings +1) in month t			
	Cellphone (1)	Memory card (2)	Mask (3)	Jeans (4)	Cellphone (5)	Memory card (6)	Mask (7)	Jeans (8)
Rebate in t (Monthly)	0.1392*** (0.0183)	0.1100** (0.0472)	0.0837*** (0.0077)	0.1307*** (0.0072)	0.2816*** (0.0211)	0.1792*** (0.0505)	0.1637*** (0.0081)	0.2577*** (0.0082)
Brand fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Regressions are at the item-month level and standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5% (**) and 1% (***).

Table A-10: Impact of rebate on informativeness of item ratings for the four categories

Dependent variable	Ratio of item effective ratings, t				Ratio of item long ratings, t			
	Cellphone (1)	Memory card (2)	Mask (3)	Jeans (4)	Cellphone (5)	Memory card (6)	Mask (7)	Jeans (8)
Rebate in t (Monthly)	0.0698*** (0.0097)	0.0592* (0.0315)	0.0556*** (0.0044)	0.0684*** (0.0039)	0.0690*** (0.0090)	0.0346* (0.0198)	0.0604*** (0.0033)	0.0704*** (0.0033)
Brand fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Regressions are at the item-month level and standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5% (**) and 1% (***).

Table A-11: Impact of rebate on bias of item ratings for the four categories

Dependent variable	Ratio of item positive ratings, t							
	Cellphone (1)	Memory card (2)	Mask (3)	Jeans (4)	Cellphone (5)	Memory card (6)	Mask (7)	Jeans (8)
Rebate in t (Monthly)	-0.0040 (0.0024)	-0.0019 (0.0062)	-0.0003 (0.0005)	-0.0012 (0.0009)	0.0011 (0.0019)	0.0006 (0.0046)	0.0000 (0.0004)	0.0001 (0.0007)
Brand fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Regressions are at the item-month level and standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5% (**) and 1% (***) .

Table A-12: Impact of rebate on time of item ratings for the four categories

Dependent variable	ln(average number of days before leaving ratings +1) in month t			
	Cellphone (1)	Memory card (2)	Mask (3)	Jeans (4)
Rebate in t (Monthly)	-0.0584*** (0.0159)	-0.0971* (0.0545)	-0.0572*** (0.0074)	-0.0764*** (0.0061)
Brand fixed effect	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes

Notes: Regressions are at the item-month level and standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5% (**) and 1% (***) .

causing a good buyer experience and an increased tendency to trust the seller in the future if she is selling items that the buyer is interested in, very much in the spirit of Nelson (1970). Second, though less obvious, a RFF may generate a salience effect and therefore help a buyer remember this seller.

Next, we focus on buyers who purchased an item from a seller when a RFF was adopted, and who were rewarded for feedback. As shown in Table A-14, receiving a reward increases the probability of a repeat purchase by 6.50%, which may be explained by at least two possible reasons. First, a coupon reward can be perceived as a price discount, which affects a buyer's future purchase decisions. Because we do not know the exact amount of the value of a coupon rebate, we cannot test whether higher values increase the likelihood of a repeat purchase. Second, a cash reward may cause

reciprocity and therefore cause the buyer’s behavior to change. We cannot, however, distinguish a buyer’s reciprocal behavior to the seller from the buyer’s intrinsic tendency to come back to the seller.

Table A-13: Impact of rebate on returning purchase

Dependent variable:	Indicator = 1 if consumer i returns to seller j in t , or $t + 1$ or $t + 2$ OLS (2)
Dummy if consumer i bought from seller j with some items RFF adopted in t	0.0101*** (0.0001)
Constant	0.0760*** (0.0000)
Observations	56,457,127
R2	0.0003

Notes: The observations are at the order (seller-buyer-date) level. Sample: (1) We restrict attention to the orders when there was a rebate. These orders included at least one item with a RFF and this item had some ratings. (2) We keep orders after the RFF adoption. (3) We throw out consumers who got rewards.

Table A-14: Impact of reward on returning purchase

Dependent variable:	Indicator = 1 if consumer i returns to seller j in t , or $t + 1$ or $t + 2$ OLS
Dummy if if consumer i got RFF rewarded from seller j in t	0.0650*** (0.0002)
Constant	0.0811*** (0.0000)
Observations	59,590,291
R2	0.0026

Notes: The observations are at the order (seller-buyer-date) level. Sample: (1) We restrict attention to the orders when there was a rebate. These orders included at least one item with a RFF and this item had some ratings. (2) We keep orders after the RFF adoption.

3.2 Search pages for each category on Taobao

Figure A-3 shows the search pages for each category on Taobao. The search pages for cellphones list a lot of brands and detailed parameters, which can easily restrict the choices to a couple of models once a buyer specifies the brand and parameters of interest. However, there are no such detailed parameters for jeans and a buyer faces many choices even if she specifies the search range.

4 The Impact of RFF on the Number of Effective Ratings

As Table A-15 shows, the impact of RFF on the ratio of item positive effective ratings is approximately 7%, while the impact of RFF on the ratio of item negative and neutral effective ratings is 0.08% and insignificant.

Table A-15: Impact of rebate on the number of effective ratings

Dependent variable	Ratio of item pstv effective ratings, t			Ratio of item ngtv & ntrl effective ratings, t		
	(1)	(2)	(3)	(4)	(5)	(6)
Rebate						
Dummy if a rebate, t	0.0681*** (0.0028)			0.0008 (0.0005)		
Dummy if a coupon rebate, t		0.0736*** (0.0032)			0.0004 (0.0006)	
Dummy if a cash rebate, t		0.0530*** (0.0051)			0.0018* (0.0010)	
Dummy if a rebate for cellphone, t			0.0575*** (0.0095)			0.0018 (0.0018)
Dummy if a rebate for TF card, t			0.0452 (0.0276)			0.0010 (0.0052)
Dummy if a rebate for mask, t			0.0442*** (0.0044)			0.0016** (0.0008)
Dummy if a rebate for jeans, t			0.0877*** (0.0038)			0.0001 (0.0007)
Item fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	194,002	194,002	194,002	194,002	194,002	194,002
R2	0.203	0.203	0.204	0.163	0.163	0.163

Notes: Regressions are at the item-month level and standard errors are in parentheses. All models include product and seller characteristics (same as models in Table 3) as control variables. Asterisks indicate significance at 10%(*), 5% (**) and 1% (***).

Figure A-3: Sales and Ratings with and without a Rebate

