The Impact of Visual Content in Reviews on Product Returns

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Motivation

- Returns for online sales are **costly** and **three times more frequent** than in a physical store (Kapner and Ziobro 2021)
- Reviews **affect customers' behaviour** through
    - trust to a product (Cheng et al. 2019)
    - being helpful (Sun et al. 2019; Ceylan et al. 2021; Wang et al. 2021)
    - prompting clients to order online (Flavian et al. 2016)
    - decreasing uncertainty (Sahoo et al. 2018)
- Sellers' photos have different effects on return rates (De et al. 2013; Hong and Pavlou 2014; Dzyabura et al. 2019)

Research question

What is the impact of photos and videos in reviews on return rates?
Why is the direction of the effect the way it is?

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Unit-level datasets

- 1.5M reviews with a timestamp of publishing, the amount of attached photos and videos, and rating
- Information about the amount of sellers' photos and videos for 323K goods
- Transaction data with a timestamp, quantity of ordered products and costs

Aggregated datasets

- Brand performance from January 1, 2021 till August 31, 2021 with total amount, sales and AIV[1] of sold and returned items
- Performance of clients who have ever bought a product of interest with total amount, sales and AIV of sold and returned items

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[1]Average Item Value (AIV) equals total Net Sales divided by total amount of items.

Summary statistics for generated dataset

Statistic	Max	Mean	Min	St. Dev.
Experience goods (# = 1,199,125):				
ReviewPh	341	14.35	0	39.42
ReviewVid	4	0.02	0	0.15
ReviewRating	5.00	4.80	1.00	0.29
ReviewNum	6, 027	186.13	1	635.54
CustAvgRetRate	1.00	0.03	0.00	0.07
BrandAvgRetRate	0.35	0.05	0.00	0.03
PhSeller	17	3.86	0	1.96
Price	9, 736.67	413.88	0.83	309.88
Qty	11	1.03	1	0.24
BasketSize	11	1.98	1	1.39
Return	1	0.04	0	0.21
Search goods (# = 361,322):				
ReviewPh	1, 281	121.02	0	252.50
ReviewVid	17	0.25	0	0.99
ReviewRating	5	4.84	1	0.18
ReviewNum	5, 660	508.23	1	965.25
CustAvgRetRate	1	0.02	0	0.06
BrandAvgRetRate	0.23	0.02	0.01	0.01
PhSeller	21	6.93	0	2.84
Price	134, 983	18, 378.26	1	17, 676.46
Qty	16	1.02	1	0.22
BasketSize	74	1.07	1	0.80
Return	1	0.02	0	0.13

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Hypothesis

The correlation between the amount of photos and videos in reviews and return probability is negative.

Model specification

$$Return_{ijt} = \beta_0 + \beta_1 ReviewPh_{jt} + \beta_{10} ReviewPh_{jt}^2 + \beta_2 ReviewVid_{jt} +$$
$$+ \beta_{11} ReviewVid_{jt}^2 + \beta_3 ReviewRating_{jt} + \beta_4 ReviewNum_{jt} +$$
$$+ \beta_5 CustAvgRetRate_i + \beta_6 BrandAvgRetRate_j +$$
$$+ \beta_7 PhSeller_j + \beta_8 Price_{jt} + \beta_9 BasketSize_{ijt} + \varepsilon_{ijt}$$

Results

Table 1: Results for experience goods

	(1)	(2)	(3)
ReviewPh	-0.0033^{***}	-0.0009^{**}	-0.0018^{***}
	(0.0002)	(0.0004)	(0.0005)
ReviewPh2			0.00001^{***}
			(0.000002)
ReviewVid	-0.0689^{*}	-0.0687	0.1913
	(0.0372)	(0.0486)	(0.1746)
ReviewVid2			-0.2280^{*}
			(0.1231)
Observations	1,199,125	1,199,125	1,199,125
Controls	No	Yes	Yes
Note:			$^{*}p<0.1;\ ^{**}p<0.05;\ ^{***}p<0.01$

Results

Table 2: Results for search goods

	(1)	(2)	(3)
ReviewPh	-0.0006^{***}	0.0001	0.0001
	(0.0001)	(0.0003)	(0.0004)
ReviewPh2			0.000001^{**}
			(0.000000)
ReviewVid	0.0392^{***}	0.0867^{***}	0.2899^{***}
	(0.0119)	(0.0124)	(0.0611)
ReviewVid2			-0.0386^{***}
			(0.0147)
Observations	361,322	361,322	361,322
Controls	*No*	*Yes*	*Yes*
Note:			$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Consistency with previous papers

Table 3: Results for experience goods

	(1)	(2)	(3)
ReviewRating		-0.2914^{***}	-0.2908^{***}
		(0.0135)	(0.0135)
ReviewNum		0.00004^{*}	0.00001
		(0.00002)	(0.00002)
CustAvgRetRate		11.6655^{***}	11.6639^{***}
		(0.0523)	(0.0523)
BrandAvgRetRate		9.6271^{***}	9.5679^{***}
		(0.1714)	(0.1721)
PhSeller		0.0045	0.0059^{**}
		(0.0028)	(0.0028)
Price		0.0003^{***}	0.0003^{***}
		(0.00002)	(0.00002)
BasketSize		0.1054^{***}	0.1055^{***}
		(0.0034)	(0.0034)
Constant	-3.0264^{***}	-3.4186^{***}	-3.4171^{***}
	(0.0047)	(0.0670)	(0.0669)
Observations	1,199,125	1,199,125	1,199,125

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

Consistency with previous papers

Table 4: Results for search goods

	(1)	(2)	(3)
	Model 1	Model 2	Model 3
ReviewRating		-0.5048^{***}	-0.4876^{***}
		(0.0470)	(0.0474)
ReviewNum		-0.0002^{**}	-0.0004^{***}
		(0.0001)	(0.0001)
CustAvgRetRate		10.0736^{***}	10.0797^{***}
		(0.1215)	(0.1217)
BrandAvgRetRate		15.0971^{***}	14.9916^{***}
		(0.6051)	(0.6064)
PhSeller		-0.0136^{**}	-0.0131^{**}
		(0.0056)	(0.0056)
Price		0.00001^{***}	0.00001^{***}
		(0.000001)	(0.000001)
BasketSize		-0.2297^{***}	-0.2307^{***}
		(0.0534)	(0.0535)
Constant	-3.9528^{***}	-2.1127^{***}	-2.1679^{***}
	(0.0138)	(0.2366)	(0.2374)
Observations	361,322	361,322	361,322

Note:	$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Robustness check

- Remove clients with unusual quantity of ordered items belonging to top and bottom 0.5% percentiles in order to get rid of outliers
- Remove transaction data before June 2021 to consider time period when videos have been available for at least 1 month

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Conclusion

- One additional **photo** in reviews is likely to decrease return probability of an experience good by 0.17%

- One additional **video** in reviews is likely to increase return probability of a search good by 9%

Further Research

- Detail reviews by
  - year of publication
  - quality of visual content
  - similarity of attached photos and videos
- Consider other types of goods besides clothes, books, TVs and smartphones
- Test the hypothesis for different online retailer

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