Planned Impulse Consumption in Live Streaming E-commerce

——Evidence from Tiktok

Abigail Xi Chen

Nanjing Foreign Language School, Nanjing, China

Email:2259238730@qq.com

Abstract. Due to the epidemic, many brands began to sell goods live on platforms such as Tiktok, Kwai and Taobao. Based on the sales data of Tiktok in the second quarter of 2022 collected by Huitun network, this paper made regression analysis to exam the relationship between consumers' behaviors, their plans and their emotions in live E-commerce. We found that the consumers' behaviors are semi-rational and semi-impulsive.

Keywords: live streaming; impulse consumption; planned consumption

1 Introduction

1.1 Background

The most popular mean for brands to attract customers is live streaming. Until 2021, China's live streaming users reached 464 million, accounting for 44.9% of the total number of Internet users.

According to research, 46.1% of people experienced impulsive consumption. Plus, 93.5% of women did impulsive shopping. Female consumers are the protagonists in the live shopping market. Statistics shows the number of female consumers aged 20-60 in China reached 530 million, leading the consumption wave of "womenomics". [1] Businesses used all kinds of tricks to encourage customers to upgrade their life quality by spending. However, too much led boredom. Those strategies have also caused discomfort. Many women object to excessive materialism. [2]

1.2 Research Contribution

The world economy fell into recession after epidemic, thereby largely influencing consumption.

Consumption behavior is divided into rational and irrational two kinds. Rational consumption meets necessary needs, has effective functions, and reasonable price. Buyers had an initial plan before the purchase. However, irrational consumption is

H. Mallick et al. (Eds.): ICEMCI 2022, AEBMR 231, pp. 1490–1500, 2023.
https://doi.org/10.2991/978-94-6463-098-5_169

influenced by marketing strategies and others' choices without considering its cost effectiveness. [3]

The live broadcast scenario is the most conducive shopping environment to amplify consumer psychology. [4] Because customers' decision-making relies heavily on the anchor's description, atmosphere and the popularity of the goods. [5]

This paper conducted a cross-sectional analysis of three different types of goods, and identify the different results based on price-sensitive. This paper speculated that all consumption behavior is a combination of impulse and planning psychology. Even with the incendiary sales pitch of the anchor, the customer holds a sliver of sanity, and the behavior of the seller and the buyer is influenced by each other to great extent.

2 Research Design

We assumed that price is an index of consumer rationality and that the data from" huitun data" can reflect the real live streaming popularity and the ability to generate impulsive consumption. [6]

We recover the consumption process: before entering the live broadcast room, consumers have their own consumption plan; then enter the room to look for cost-effective products. They prefer to certain anchors and live broadcast rooms where they plan to buy "cost-effective" goods. In the process of price comparison, they receive hints from certain anchors, and impulsively place orders under the atmosphere of "cheapness" or "identity recognition". [7,8] We provide the initial regression model of the influence of planning and impulse factors on purchasing behavior as follows.

$$Ysale = \alpha + \beta 1 price + \varepsilon \quad (1)$$

$$Ysale = \alpha + \beta 1 emotion + \varepsilon \quad (2)$$

The dependent variable *Ysale* represents sales; *price* is an independent variable that represents the influence of price on planned consumption behavior. *emotion* represents the impact of the live room, which is the impulse index that leads to order; the factor of price inducement is included in the *emotion* variable; ε is the factor of other combined factors on purchase behavior. The equation (1) and (2) will be used to exam consumer behavior changes in two ends of the price spectrum, and extended to new equations (3) to (6) measuring link between sale and emotion or rationality among different category good.

The empirical framework is organized in three steps.

Step 1: Classify data into different categories. In the live streaming, price, goods, and guests are all sources of impulse. According to experience, the impulsive behavior of a buyer will change when facing different goods and different price range. Meanwhile we need to investigate the effectiveness of the rational performance of buyer in front of different goods and price in a virtual space under impulsive atmosphere. We also include the factor of goods entering the live room and satisfaction of consumers to robustness test. formula (1) and (2) is extended to a multiple regression model, as in equations (3) and (4).

$$Ysale = \alpha + \beta 1price + \beta 2popularity + \beta 3rank + \beta 4commission + \varepsilon \quad (3)$$

$$Ysale = \alpha + \beta 1emotion + \beta 2popularity + \beta 3rank + \beta 4commission + \varepsilon \quad (4)$$

Step 2: All samples are integrated and coded for robustness testing, and a new explanatory variable "*type*" was constructed. the *type* variable was then combined with the price and the live impulse index to form two interaction terms *price*type* and emotion*type, respectively. We attempted to identify differences in consumer's responses to luxury and affordable items, which could be useful in determining consumption upgrade or downgrade. The regression model is as follows.

$$Ysale = \alpha + \beta 1price + \beta 2type + \beta 3\ price*type + \varepsilon \quad (5)$$

$$Ysale = \alpha + \beta 1emotion + \beta 2type + \beta 3emotion*type + \varepsilon \quad (6)$$

Step 3: In response to the weak domestic consumption, we designed a hierarchical model using OLS (Ordinary Least Squares) i.e. equations (1) and (2) to compare the change in two ends of the price spectrum in terms of sales and the link between planned and impulsive shopping behavior, from which we were able to infer consumption tendency.

3 Data

3.1 Data Source

Data used in this paper is collected from the sales data of Tiktok in the second quarter of 2022. "China Mobile Internet Spring Report in 2022" shows that the number of users watching live broadcasts in Tiktok grew to 87.3% in the first three months of 2022 from 85.9% in the same period of 2021. According to the "China Mobile Internet Spring Report in 2020 " released by Tiktok QuestMobile, female users account for 57% of the total number of Tiktok users. [9]

Huntui database covers Tiktok live streaming data involving traffic, fans, product prices and sales. Among, Daren index is important indicator for us to analyze the impulsive consumption of live broadcasters. According to the database's GMV Index, the sales share in the second quarter of 2022, (figure 1) shows fashion, electronics and food & beverage occupy the top three.

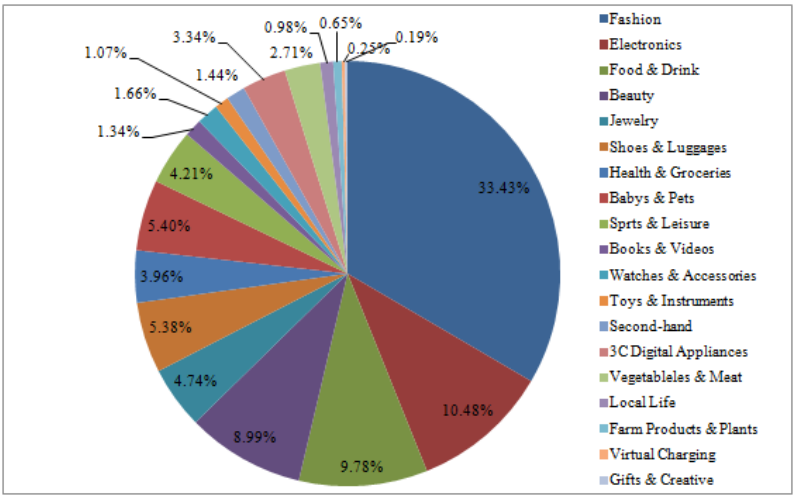

Fig. 1. Tiktok GMV for Q2 of year 2022 [self-generated]

3.2 Descriptive Statistics

The sample selection criteria are as follows: first, we select the top eight products from Figure 1. Then, we construct four dimensions from the perspective of female consumers, and score each criterion on a scale of 1 to 5 as shown in Table 1, with the highest and lowest scores for fashion and jewelry, respectively. In order to avoid bias, we select three categories with the highest, lowest and median scores, which represent people's needs and wants.

Table 1. Criterion for Samples [self-generated]

Item	Consumption. Exp.	Fashionable	Affordable	Usability	**Total**
Fashion	4	2	4	5	**15**
Electronic	2	1	5	4	**12**
Food & Drink	1	5	5	5	**16**
Beauty	3	3	5	3	**14**
Jewelry	5	1	1	2	**8**
Shoes& Lugg。	3	1	4	3	**11**
Health & Groc.	1	4	5	5	**15**
Baby & Pets	1	4	5	2	**12**

Criteria

Value	Con. Exp.	Fashionable	Affordable	Usability
	Emotion obtained	*Replacement frequency*	*Ave. Price/Mon. Wage*	*Times/week*
5	Self-realization	One week	<1%	>15
4	Confidence	One month	>2% <25%	10-14
3	Social need	One season	>25% <40%	6-9
2	Security need	One year	>40% <80%	1-5

1	Physiological need	> one year	>80%	0

	Ave.Price/Mon.Wage 8545 yuan
Electronic	*0.41%*
Food & Drink	*0.37%*
Beauty	*1.31%*
Jewelry	*339.89%*
Shoes&Luggages	*15.87%*
Health & Groceries	*0.37%*
Fashion	*0.54%*

Note: Women's average monthly salary from "report of Chinese women salary survey in 2022", zhaoping.com

Statistical description as followed:

Table 2. Summary Statistics- price [self-generated]

	N	Mean	Median	Std. Dev.	Min.	Max.
Food & Drink	1000	31.71	10	317	0.01	9999
Beauty	1000	112.3	29.9	525.4	0.01	9999
Jewelry	1000	29043	39.9	455461	0.01	9999999

Table 3. Summary Statistics – emotion [self-generated]

	N	Mean	Median	Std. Dev.	Min.	Max.
Food &Drink	1000	227374	161934	189471	128.71	522801
Beauty	1000	34467	10988.1	41807	312.93	114836
Jewelry	1000	79934	19658.9	97713	1616.7	205264

To cater more customers, price gap here is large. The traffic between live broadcast rooms also divided into many levels. This wide-ranging sample is conducive to study consumer behavior. From table 2 and table 3, we can see that food & drink has the characteristics of low price, low PED, but the widest audience, so its live streaming index is the highest. Although the price of jewelry is expensive, the live streaming index is higher than affordable beauty goods, which indicate that in addition to the decorative role, high-end jewelry and the social value behind them are full of people's yearning. [10, 11]

3.3 Variable Definition

Dependent Variables.

In this paper, we directly use the sales of Tiktok from "Huitun" to determine the dependent variable. This data is the trace of consumers placing orders after the anchor's guide and price comparison.

Independent Variables.

The impendent variables focuses on prices and consumption experience in the live streaming room. Due to the different brand or materials, the prices vary greatly from one thing to another. We selected food & beverage, beauty and jewelry to observe consumption behavior affected by the live broadcast atmosphere in term of different social connotations, so that we can study the interaction between consumers' impulse and plan. As for the impulsive mood of consumers, it is controlled by the live broadcast index and price temptation. The independent variable price and the independent variable emotion respectively represent rational and irrational.

Consideration of robustness, I combine the three types of commodity and codes, and the explanatory variable type is a dummy variable, as shown in Table 4. Because different types of commodities will inevitably affect prices and impulse indices, type generates the interaction terms price * type and emotion * type, thereby generating the new model:

$$Y_{sale} = \alpha + \beta 1 type1 + \beta 2 type2 + \beta 3 price * type1 + \beta 4 price * type2 + \varepsilon \quad (7)$$

$$Y_{sale} = \alpha + \beta 1 type1 + \beta 2 type2 + \beta 3 emotion * type1 + \beta 4 emotion * type2 + \varepsilon \quad (8)$$

Table 4. Category Code [self-generated]

Code	Item	Note	Code1	Code2
1	Food & Drink	Necessities, Price elasticity	1	0
2	Beauty	Between necessities and luxuries	0	1
3	Jewelry	Planned, Luxury	0	0

Control Variables.

Control variable popularity need be considered when anchors select products. popularity is a dummy variable. popular goods is 1, and the other is 0. The control variable rank is the score of consumer satisfaction, scale from 0 to 5. The control variable commission is a means for the manufacturer to motivate the anchor, dummy variable. Although control variables are not the main research target, they have reference for us to measure the impulse and planned behavior. In the following empirical results, we will have a simple analysis.

In addition, variables in this study also include other factors of socio-economic conditions, including fashion trends, network hotspots, seasonal changes, wage payment days and festival celebrations. However, because these variables are difficult to obtain, they are omitted from the regression analysis.

4 Empirical findings

4.1 Classification Test

Table 5. Food & Drink[self-generated]

	Food &Drink		Beauty		Jewelry	
	price	motion	price	motion	price	motion
	(1)	(2)	(3)	(4)	(5)	(6)
	Y_{sale}	Y_{sale}	Y_{sale}	Y_{sale}	Y_{sale}	Y_{sale}
price	-0.106***		-0.080***		-0.080***	
	(-7.450)		(-7.343)		(-7.343)	
emotion		0.012***		0.010***		0.010***
		(33.31)		(19.30)		(19.30)
popularity	0.552***	0.295***	0.181***	0.143***	0.181***	0.143***
	(12.32)	(9.25)	(3.69)	(3.31)	(3.69)	(3.31)
rank	-0.047	-0.128***	-0.016	-0.058	-0.016	-0.058
	(-0.682)	(-2.626)	(-2.224)	(-0.945)	(-2.224)	(-0.945)
commission	0.006	-0.023	-0.054	-0.088**	-0.054	-0.088**
	(0.14)	(-0.755)	(-1.076)	(-2.044)	(-1.076)	(-2.044)
Constant	11.812***	11.819***	11.053***	10.983***	11.053***	10.983***
	(37.25)	(52.75)	(33.72)	(38.46)	(33.72)	(38.46)
N	1000	1000	1000	1000	1000	1000
R. sq	0.156	0.578	0.076	0.291	0.076	0.291

T-statistic in parentheses * p<0.1, **p<0.05, *** p<0.01

The regression results (table 6) show that price is significantly negative, meaning the higher the price, the lower the sales. The coefficient of emotion is significantly positive, indicating that the greater the guiding power in the live broadcast room, the more it can lead to orders. Comparing the models of price regression and emotion regression, it is not difficult to find that number of R.sq for price is smaller than the emotion index's. this suggest that the latter regression model fitting better than the former. The reason may be that the price of all category samples is often not for one quantity, but discount of large packages, which reduces the correlation. The control variable popularity distinguishes popular goods from others. The results show that the popularity is significantly positively related to the sales, which indicates that the anchors considered trends. The control variable ranks' coefficient are negative, which makes people wonder whether the evaluation is related to the score brushing. From the perspective of consumers, score unable to generate purchase impulse.

4.2 Robustness Test

Table 6. Category [self-generated]

	(1)	(2)	(3)
	Y_{sale}	Y_{sale}	Y_{sale}
price		0.011	

		(1.21)	
emotion			0.013***
			(26.82)
type1	3.522***	3.736***	3.507***
	(107.69)	(66.12)	(125.74)
type2	2.710***	2.989***	2.899***
	(82.88)	(56.26)	(108.78)
price*type1		-0.087***	
		(-5.108)	
price*type2		-0.096***	
		(-7.301)	
emotion*type1			0.001
			(0.24)
emotion*type2			-0.003***
			(-4.289)
constant	8.107***	8.068***	7.843***
	(350.60)	(203.16)	(392.69)
N	3000	3000	3000
R.sq	0.809	0.816	0.893

T-statistic in parentheses * p<0.1, **p<0.05, *** p<0.01

In order to further analyze the relationship between various commodity types and sales growth, we combined the three types of commodities, coded them as shown in Table 4 in Section 3.3, and conduct robustness test. From the regression results reported in table 7, it can be found that sales of food & beverage is 3.522 units higher than that of jewelry, and the sales of beauty is 2.710 units higher than that of jewelry. For various commodities mixed, the change of *price* variables is not significant to the change of sales. However, according to the analysis of interaction term coefficient, the change of food &beverage prices to sales is 0.087 units more than that of jewelry, and the change of beauty products prices to sales is 0.096 units more than that of jewelry. The impulsive emotion induced by live broadcast has been positively correlated regardless of the type. As shown by the interaction item, the impulsive emotion of food& beverage has increased the sales by 0.001 units compared with jewelry products, and the impulsive emotion of beauty products has decreased the sales by 0.003 units compared with jewelry. These phenomena show that food & beverage, as human need, are the main destination of purchasing power, and are more sensitive to prices than jewelry. After all, as a luxury product with high quality, jewelry is expensive. Relatively, beauty products buyers are very “calm”. In general, the model reflects consumers' impulsivity and planning.

4.3 Planning or Impulse-Tests for Hypothesis.

Table 7. Cross-sectional Analysis-price (price range) [self-generated]

Food & Drink		Beauty		Jewelry		Full samples	
			Bottom		Bottom		
Top 30%	Bottom 30%	Top 30%	30%	Top 30%	30%	Top 10%	Bottom 10%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

	Ysale	Ysale	Ysale	Ysale	Ysale	Ysale	Ysale	Ysale
price	-0.179***	-0.05	-0.088*	-0.179***	0.018	0.021	-0.163***	-0.095
	(-3.585)	(-1.545)	(-1.825)	-6.14	-0.986	-1.104	(-3.973)	-1.399
Con.	12.100***	11.733***	11.112***	10.997***	8.000***	8.049***	10.236***	10.498***
	-63.623	-231.122	-43.99	-198.929	-68.348	-202.26	-36.523	-77.118
N	300	300	300	300	300	300	307	341
R.sq	0.041	0.008	0.011	0.112	0.003	0.004	0.049	0.006

Table 8. Cross-sectional Analysis-emotion (price range)[self-generated]

	Food & Drink		Beauty		Jewelry		Full samples	
	Top 30% (1) Ysale	Bottom 30% (2) Ysale	Top 30% (3) Ysale	Bottom 30% (4) Ysale	Top 30% (5) Ysale	Bottom 30% (6) Ysale	Top 10% (7) Ysale	Bottom 10% (8) Ysale
emotion	0.045***	0.012***	0.068***	0.009***	0.014***	0.009***	0	0.010***
	(42.74)	(20.79)	(21.49)	(14.66)	(23.30)	(15.73)	(1.04)	(8.948)
con.	10.811***	11.394***	10.361***	10.874***	7.810***	7.892***	9.121***	10.390***
	(574.18)	(330.44)	(355.30)	(238.68)	(299.00)	(277.70)	(98.70)	(113.41)
N	300	300	300	300	300	300	307	341
R.sq	0.738	0.592	0.608	0.419	0.647	0.454	0	0.191

T-statistic in parentheses * p<0.1, **p<0.05, *** p<0.01

Two dummy variables: *top 30% price* and *bottom 30% price*, this method enables us to observe the changes of purchase behavior between high-end goods and low-end goods in planned or impulsive orders. The independent variable *price* of jewelry in table 8 shows for the first time that the sales rises with the price rise. In the food & drink category, the coefficient of variable *price* has 0.129 difference, which indicates price plays a strong rational role. It will be lured to place orders because of emotion.

5 Conclusion

There are shortcomings in this paper. First, analysis only focus on the situation in the second quarter of 2022, and the time range needs to be expanded. A problem in data collection is that some prices are not calculated by pieces, but for packages. This cause deviation in the results. Since plan and impulse are two emotions, it's difficult to measure emotional level considering buyers with different income and age. [11]

This study proves that impulse consumption does exist in the live broadcast room, but rationality is also there. Planned impulse consumption is the driving force of purchase. These two kinds of intangible emotions jointly construct the behavior of consumers. Especially when consumers are in the trend of consumption degradation, their rational shopping plans are enhanced. Any sales behavior that ignores the rational needs and only induces their irrational impulse is not smart.

The finding suggests live broadcast to build platforms for planned consumption. Although relying on celebrities can induce buyers to place orders, in the long run, brands will fall into the dilemma of high marketing costs and sales channels controlled by the anchors. At present, many cities are issuing consumption coupons.

Since non-essential goods are no longer the target for consumers to spend money, necessities and degraded products should be the main promotion direction. Income is reduced, but attractive products and discount will still generate the impulse to buy.

Acknowledgment

This research benefits from academic research project provided by Prof. Zhang Liwen. I also thank my TA Gan Guangyan for helping me on essay writing. All errors are on my own. The author chooses the topic to explore and learn about importance of the live streaming E-commerce in our current economy. I am also very grateful to my parents for supporting and encouraging me to think and explore economic issues.

References

1. China Internet Network Information Center (CNNIC), 2022, “Statistical report on the development of internet in China”.
2. Wei Wancheng, 2021, “The phenomenon of live Streaming and female identity-- Take Li Jiaqi as an example,” Journal of Radio & TV Journal, (05):143 -145
3. Gao Xiaohua, 2004, “Rationality and irrationality of female consumption behavior, “*Journal of commercial times,* (026): 14-16
4. Wei, Shoubo, Cheng Yan, 2012, “ The Impact of Virtual Atmosphere on Online Customers Impulse Buying Intention: An Empirical Study,” Journal of Systems & Management, (04):531-539.
5. Li Ting, Wang Ron, 2020, “An Empirical Study on the Influencing Factors of Consumer Satisfaction in Live Stream Marketing Mode,” Journal of Business Economic Review, (05):51-65
6. He Xuanfang and Fan Ya,. 2021, “Empirical research on the influencing factors of consumers' impulsive consumption in e-commerce shopping festival – evidence from “double 11” festivel,” Journal of Investment and Entrepreneurship, 32 (21): 79-81
7. Xu He, Qu Hongjian and Cai Jianzhong, 2020, “The impact of webcast on clothing consumers' purchase intention,” Journal of Beijing Institute of Fashion Technology (NATURAL SCIENCE EDITION), 40 (2): 88-94
8. Liu Yun, Zhang Zuochang and He Qingzhe, 2021, “Research on the relationship between marketing service contact, identity and customer impulsive consumption behavior,” Journal of Business and Economics Research, (05): 72-75
9. China's Online Performance (Live and Short Video) “Industry Annual Summit, 2021, “China video E-commerce research report in 2021”.
10. Zhou Yanli and Wang Yiqun, 2014, “Research on marketing strategies of e-commerce enterprises under lipstick effect,” Journal of Scientific Consulting, (032): 22-24
11. Chang Yunpeng, 2017, “Opportunities in Economic Crisis - The Lipstick Economy,” Journal of Economic & Trade, (18):123.