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Herd behavior in investment and consumption

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by

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Table of Contents

Page Number

8. APPENDIX

Abstract

Herd behavior is one of the common phenomena in economics and is frequently used to predict individual's follow-up behavior. Herd behavior usually appears in investment and consumption, both investors and consumers are easily to be influenced by the group and change their point of view. Therefore, it is necessary to analyze herd behavior in the forecasting of demand management. This paper mainly focuses on the analysis of consumption behavior and proposes a survey derived from Wenzhou Kean University students to analyze whether herd behavior exist in students' online purchasing behavior and the factors that contribute to it. Multiple regression model will examine how living expense, online reviews, brand and sales promotion affect the amount of money students spent on online shopping every month. Difference in means test will examine whether there was a significant gender and major difference in online shopping behaviors and whether there was a significant relationship between market information and amount of money spent on online shopping every month. This paper finds that living expenses have a significant effect on the amount of money spent on online shopping every month. Attitude towards online reviews and brand had no significant. Sales promotion has effect on students' online purchasing behavior to some extent, especially resulting in buying the unneeded products. There is a relationship between market information which is divided into seller's information and product information, and monthly online shopping expense. A good command of product information can make a difference in the monthly online shopping expense while seller's information does not affect.

1. Introduction

Herd behavior is a common phenomenon in the management of the market behavior. In economics, herd behavior is usually used to describe individual's follow-up behavior. Flock is a quite scattered organization, which usually moves randomly and blindly. However, once a head moves, the other sheep will follow it without thinking and ignoring the possibility of the existence of wolves or better grass ahead. In real life, people behave similarly to the flock. Individual is easily affected by the group, once a group of people make the same decision or do the same things, he would gradually change his point of view, judgment and behavior to the group, without taking into account whether the group decision is right or not.

Herd behavior often occurs in investment and consumption. For investors, individual is likely to invest according to other investors, buying stocks when others buy and selling stocks when others sell. For consumers, their consuming behavior is likely to be influenced by the surrounding people, buying commodities when others buy. Both investors and consumers play a significant role in the analysis of herd behavior. Therefore, it is useful to analyze herd behavior in the forecasting of demand management, which can be used to predict people's investing and consuming behaviors.

Understanding the main factors that lead to herd behavior in investment and consumption is a key point. Those factors drive people to confirm with others in the group. For example, consumer rating is one of the factors that lead to herd behavior in consumption. High consumer rating of a restaurant shows high popularity with many customers, which signals that the restaurant may have a good and delicious taste, inexpensive and appropriate price, and thoughtful service. Taking consumer rating into consideration, customers are more inclined to choose high consumer rating restaurant.

Based on the different command of market information, individual will make different choices on whether to conform with others or not. Market information helps individual analyze the advantages and disadvantages of the current investment portfolios or current circulation commodities. Sufficient and credible market information contributes to making a wise investment strategy and satisfying purchase decision. Nevertheless, individual cannot always get sufficient market information and commonly gets limited market information, which affects his understanding of the market. Individual is easily affected by others, giving up his independent critical thinking, especially when he is in an uncertain state. At this stage, individual tends to imitate others and make decisions according to what others are doing.

Besides, the volatility of market is related to the presence of herd behavior in investment. Volatility means uncertainty, high market volatility means high price changes in the market. Financial crisis is a typical aspect of market volatility, which results in deflation, falling prices, rising interest rates and so on. Under this circumstance, individual would likely to use herd behavior to avoid great loss before the financial crisis. In other words, individual prefers to herd when the market is volatile.

Herd behavior also occurs in the life of university students, their consumption behavior can be influenced by others. University students play a prominent role in consumption. For example, online shopping is popular with young people, especially those university students. They are good at using smartphones and benefit from the convenience of online shopping. When they are recommended something useful by friends or classmates, based on the trust, they would like to purchase it and behave similarly.

In this paper, I plan to investigate the factors that lead to herd behavior in investment and consumption. I will focus on the correlation between herd behavior and market information as well as market volatility, including how it works among university students. The remainder of this paper is organized as follows. Section 2 is about the aforementioned previous literatures which gives us a basic frame of herd behavior. Section 3 shows the methodology that is used in this research. Section 4 analyzes the specific data in more detail and the main findings in this research. Finally, section 5 concludes.

2. Literature Review

Previous literature gives us a basic frame of how herd behavior works in investment and consumption in different areas, which also help us to analyze the consumption behavior of the university students. In this section, relative previous findings will be summarized to provide a better understanding of herd behavior.

2.1. Main factors that lead to herd behavior in investment and consumption

2.1.1 Psychological factors

Liao et al. (2011) pointed out that investor sentiment played a significant role in analyzing fund manager's herd behavior, which also had an important effect on the herd behavior in the subsequent mutual fund investment, and this kind of impact commonly occurred on the sell-side. When the stocks had a previously highly optimistic sentiment, it would be more likely that the fund manager would have a risk aversion and tried to avoid herding. Fund managers were more likely to herd when they found the same sentiment-related stocks. In addition, consensus of fund managers generates herd behavior in investment. (Zuo & Chen, 2011) Fund managers had rich experience in collecting market information and managing portfolio, this gained the investors' recognition and approval of the fund manager, resulting in the consensus of fund managers.

Zhang and Zheng (2015) also found the similar cognitive issues and concluded that investors were not always rational, and they would like to imitate others based on individual cognitive and prejudices. In other words, psychological bias led to the herd behavior in investment, including conservative bias, overconfidence, self-attribution bias and loss aversion. However, this kind of psychological bias could cause irrational decisions. Education can help reduce the mistakes. (Nguyen & Schuessler, 2012) With a high level of education, investors can avoid the bias and use herd behavior more efficiently.

2.1.2 Market factors

Anastasia and Suwitro (2015) asserted that financial factor had a significant impact on buyer's decisions. When a consumer was considering buying a product, market search and associated information are required. Consumers preferred to conduct a behavior research focusing on the surrounding people, analyzing their consumption behavior and compared to the market search and price-setting processes, and then made the choice.

Personal information credibility was related to consumer's herd behavior. (Jiang & Du, 2016) With sufficient market information, consumers were inclined to make their own rational choice and ignore others' consumption behaviors. While once the information was

limited and insufficient, individual would adopt the public point of view, which led to the herd behavior.

Park et al. (2017) also found the similar market information factors. Consumers usually made the consumption choices based on consumer ratings and popularity of the store. Those ratings represented other consumers' evaluations of the store, generally, a high consumer rating showed a high popularity among the consumers, which may meet the new consumer's satisfaction. Nevertheless, this kind of rating effect often occurred when there were available choices for the consumers. If the choice is limited to only 1 store, consumer could either buy or not buy. Zhang et al. (2013) also pointed out that the popularity of the restaurant was a factor that led to group buying. Furthermore, discount depth of a deal as well as the service quality could cause consumer's herd behavior. When the store offered a great discount of a deal, it would attract plenty of customers, then group buying arose. Similarly, when the store was well known for its high service quality, it would also increase the group buying effectiveness and causing herd behavior.

Demirer et al. (2015) argued that market volatility transmission showed a crucial effect on herd behavior. The volatility in the energy and agriculture markets could be transmitted to the grain market, resulting in the herd behavior in the market for grains. High volatility caused more emergence of the herding strategies.

2.2. The relationship between market information and herd behavior in investment and consumption

2.2.1 Relationship in investment

As mentioned above, market information is a crucial factor of herd behavior in investment and consumption. Not only market information has an effect on herd behavior, but herd behavior has an effect on market information. Jiang and Du (2016) asserted self-decision was related to personal information credibility, which meant the believability or credibleness of the sources and accuracy of the personal information. Given sufficiently large and highly credible personal information, individual tended to make rational decisions according to his own point of view. In addition, public information credibility was also related to self-decision. With poor understanding and judgment of information, individual was more likely to find the public behavior, change his mind and follow it when the public information was credible. Lin et al. (2013) concluded that institutional investors were more likely to have superior market information. When the future market return was high and positive, investors would herd buy. When the future market return was low even negative, investors would herd sell, showing a negatively correlation between future market return and herd behavior in investment.

Cipriani and Guarino (2014) also had the similar findings, they mentioned that herd behavior generated important informational inefficiencies. During the periods of herd behavior, asset price showed a less efficient aggregation effect of information, which led to the information inefficiency in the market. In general, with sufficient market information, traders would buy when receiving a good signal and sell when receiving a bad signal. However, during the periods of herd behavior, this general rule was broken, traders may buy even when they receive a bad signal or sell when they receive a good signal. In other words, traders seldom or even never herd when they had a good command of market information.

Han et al. (2011) came up with a different idea that herd behavior had a positive effect on the spread of information. It contributed to the level of information disclosure and the increase in society efficiency, which was opposite to the standpoint of Cipriani and Guarino. Herd behavior had inertia, it made individual used to follow others without self-thinking and attracted more people with limited market information, which in turn motivates more people with sufficient market information to choose persuasion strategy. To some extent, this kind of attraction and motivation help the spread of information.

2.2.2 Relationship in consumption

Market information not only affects investors but also has a crucial impact on consumers. Shen et al. (2014) contended that individual's purchasing decision had been affected by online consumer reviews. Individual preferred to look through the online consumer reviews which are part of market information before he made a decision. Similar to the investors, argument quality and source credibility were included in the market information that affected the extent to which individual adopted the online consumer reviews. High argument quality and source credibility led to more often herd behaviors in the market. On the other hand, Shen et al. (2014) claimed that herd behavior which meant information discounting and imitation in turn determined the level of the adoption of online reviews. If the individual would like to herd and discount own information, he would be more likely to engage in the adoption of online reviews.

Liu (2015) similarly stated that consuming behavior was influenced by the information sources. Moreover, he went into detail and proposed that recommendation from experts was related to consumption choices. Experts were more influential and well-informed, their recommendations could be a useful tool to distinguish among the various products and make a satisfying decision. In addition, potential customers would be more likely to be influenced by the collective intelligence.

2.3. Relationship between the market volatility and presence of herd behavior in investment

2.3.1 Financial crisis

As Zhang and Zheng (2016) mentioned in their research, financial crisis was closely related to the prevalence of herd behavior in the market. Financial crisis was manifested in a sharp fall in the price of financial assets or the collapse or near collapse of a financial institution or a financial market such as a stock or bond market. Herd behavior in investment had a close relationship with financial crisis, which even resulted in financial crisis to some extent.

Nevertheless, Lan (2014) proposed a more specific argument and found that herd behavior existed in China residential housing market before the global financial crisis, which predicted a negative correlation. While there was not a significant relationship between the herd behavior and the periods of global financial crisis due to the cause of structural break. Investors would take rationality, stay away from the high probability of loss, and ignore the market signal of trading under the bad situation. There was a significant relationship between the herd behavior and pre-financial crisis period, which was resulted from the effectiveness of government system and efficiency of the policy measurement. He

concluded that herd behavior was not apparent during and after crisis period, however, herding was more likely to occur in pre-financial crisis period.

2.3.2 Market stability

Demirer (2015) and Zhang and Zheng (2016) noted that herd behavior was connected to the low and high market volatility states. The volatility in one yield could be transmitted to other yields, causing a larger volatility. During the examination of energy, grains, livestock and metals futures market, he discovered that the volatility in energy and agricultural market contributed to the herd behavior in grains market.

Similarly, Balcilar and Demirer (2015) investigated the effect of level of market volatility and found that herd behavior was shown in both high market volatility and extreme market volatility. Not only the market volatility could affect herd behavior in investment, but herd behavior contributed to the fluctuations in stock price. There was a positive relationship between the existence of herd behavior and the stability of the stock price.

Li and Wu (2009) and Jing (2013) asserted that herd behavior in mutual funds was more pronounced during the periods of bull periods than bear periods, because it was much easier to earn profit during the bear periods, the fund manager would positively participate in the herd behavior. However, the probability of earning profit was constrained and the domestic legal person had limitations in bear periods, so the fund manager would be conservative and less likely to engage in the herd behavior.

2.3.3 Market return

When the aggregation of market return was increasing, herd behavior appeared stronger in the market, while when the aggregation of market return was decreasing, herd behavior would appear only in the periods of market turbulent. (Lan, 2014) However, Jing (2013) proposed a different argument based on an empirical research in bull market and bear market in Shanghai Stock Market and concluded that when the market return had a huge downturn, it was more likely to have a significant intentional herd behavior, and when the market return had a huge upswing, the intentional herd behavior did not exist significantly. Moreover, herd behavior was not obvious when the market return was extreme increasing or decreasing.

2.4. Existence of herd behavior in university students' consumption behavior

2.4.1 Reasons for the existence of herd behavior in university students' purchasing decision

University students account for a large proportion of consumers nowadays. (Peng & Song, 2015) As most consumers did, university students would make rational choices according to other customers' purchasing behavior or the sales of stores, so that they could distinguish whether the credibility and product quality were good or not. Shen (2016) also found that high argument quality and source credibility contributed to the adoption of online products. When students did not have full information about the purchasing items, they would prefer to extract information from others' purchasing behavior or the online

reviews. Under this circumstance, they employed imitation and discounted own information, which resulted in university students' purchasing herd behavior.

Moreover, Peng and Song (2015) and Li et al. (2010) noted that sales information of a store had a more direct effect on students rather than the credibility or quality in C2C market. Because the sales information first came into the students' line of light. Shen (2016) asserted that discounting own information had a more significant impact on online reviews adoption than imitation.

Li et al. (2010) contended that ratings were also related to students' purchasing decision. There would be an increasing instant sales volume with a positive rating, as well as a decreasing instant sales volume with negative and neutral rating.

2.4.2 Positive effect of herd behavior in university students' purchasing decision

Xu et al. (2017) argued that herd behavior had a positive effect on university students' consumption behavior. Imitating others saved students time when they had time constraints to make choice, students could use limited time and bought satisfied products by adopting others' opinions and follow them.

Qian (2012) proposed that students were not good at distinguishing various information, and it was difficult for them to find out the optimal choice. Herd behavior gave them the opportunity by observing others' behaviors. When many people made the same decision, we can reasonably expect that their respective private information points to the same conclusion, that was, the probability that the decision was optimal was relatively large. In this way, students could avoid the risk of making incorrect purchasing decision.

2.4.3 Negative effect of herd behavior in university students' purchasing decision

While the e-commerce market was booming, there was also a serious information asymmetry problem when consumers adopted herd behavior in their purchasing decisions. In particular, online transactions in the consumer to consumer (C2C) market between consumers and consumers brought serious shopping risks to consumers. (Peng & Song, 2015) Information asymmetry was embodied in store information asymmetry and product quality information asymmetry, which may lead to the inconsistency between the products students received and their expectations.

Ha et al. (2016) stated that herd behavior had a negative effect on university students' consumption behavior. Students made irrational purchasing choices by following others and imitation, it would make them purchase the products that they do not actually need. What's worse, irrational consumption behavior would make students develop a bad money attitude, increasing the living expenses and the burden of parents.

In section 3, I will discuss the methodology and data that are used in this research.

3. Methodology & Data

3.1 Discussion of Data and Sample

Considered the previous literatures, this paper collected data from the survey derived from Wenzhou Kean University students. Data collected would be discussed in this section to investigate the relationship between herd behavior and university students'

consumption behavior in online shopping and the factors that contribute to the herd behavior.

3.1.1 Discussion and Explanation of Dataset

Original data would be collected from a survey of WKU students, which would be used to reflect the various factors such as living expenses, online reviews, brand and sales promotion that may contribute to the herding in university students' online purchasing behavior. Questionnaire is attached in the Appendix. Herd behavior is measured in the way of amount of money spent on online shopping every month so that it can be expressed by numbers for easier calculation. The existence of herd behavior and WKU students' online consumption behavior would be investigated in this paper. Based on the gender difference, purchasing choices made by male and female are discussed separately according to their monthly expense on online shopping, top 3 products they bought. Whether there is a difference between male and female, business and non-business students would be tested. The relationship of brand and consumption behavior would also be discussed in this paper. For the analysis of the relationship between market information and herd behavior in consumption, market information would be measured in the way of seller's information and product information, which could have some relationship with the online purchasing choice.

3.1.2 Discussion of Sample

My sample is based on Wenzhou Kean University students, who are the most convenience sample to me. Online shopping takes a large proportion and is popular in WKU students' daily purchasing behavior due to the inconvenience of transportation and the convenience of the delivery service. Therefore, WKU students are a good and typical representative of university students. Online purchasing behavior is also an effective reflection of their consumption behavior.

3.2 Discussion of Methodology & Model

This paper uses a multiple regression model to investigate the factors that contribute to the herd behavior in online shopping. Multiple factors would be analyzed based on the data collected from the survey of online purchasing behavior of WKU students. Meanwhile, Difference in means test would also be used to investigate whether there is a relationship between gender, major, market information and herd behavior.

3.2.1 Discussion and Explanation of Methodology

In my sample, I am using multiple regression method as I want to analyze the impact of living expenses, online reviews, brand and sales promotion on the amount of money students spent on online shopping every month. Using the regression model, the existence of the relationship between these independent variables and dependent variable would be discussed. On the other hand, "Difference in means test" would be conducted to analyze whether there is a difference in the mean amount of money spent on online shopping every month between male and female students, business and non-business students, as well as

students who think market information is important and students who think market information is not important.

3.2.2 Discussion and Explanation of Model and Hypotheses

Using the regression model, equation $Y= aX_1 + bX_2 + cX_3 + d$ would be used in the analysis. Y represents the dependent variable which is the amount of money WKU students spent on online shopping every month. X_1, X_2, X_3 and so on are the independent variables which include living expenses, online reviews, brand and sales promotion.
The first null hypothesis H_0 is that living expenses, attitude towards online reviews, and attitude towards brand have no significant effect on the amount of money spent on online shopping every month. The second null hypothesis H_0 was that the degree of recognition of buying even without the need, the degree of recognition of buying with a similar or even lower price, and the degree of recognition of buying what others recommend and choose to buy had no significant effect on the amount of money spent on online shopping every month. The third null Hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between male and female students. The fourth null Hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between business and non-business students. The fifth null Hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between students who thought seller's information was important and students who thought seller's information was not important. The sixth null Hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between students who thought product information was important and students who thought product information was not important.

In section 4, I will discuss the analysis and findings derived using the aforementioned methodology.

4. Analysis & Findings

As I mentioned above, it was found by previous studies that herd behavior often occurred in consumption and can affect people's consumption choices. Based on the analysis of previous studies, this paper conducts a regression and t-test model to investigate the factors that contribute to herd behavior in online shopping behaviors and the impact of herd behavior on university students' online purchasing decisions. Original data was collected from a survey of 50 WKU students, and the sample was based on Wenzhou Kean University students, where online shopping took a great proportion of students' daily life. This paper used a multiple regression model to analyze the factors such as living expenses, online reviews, brand effect and sales promotion, as well as how these factors affect students' online purchasing behaviors which were analyzed in the amount of money spent on online shopping every month. Equation $Y= aX_1 + bX_2 + cX_3 + d$ would be used in the analysis. T-test model was used to analyze whether there was a significant gender and major difference in online shopping behaviors and whether there was a significant relationship between market information and amount of money spent on online shopping every month.

4.1 Descriptive findings of the dataset

In this research, there are 50 WKU students participated in this survey, and half of the students are male, and half of the students are female. 28 respondents are business major students and the rest 22 respondents are non-business major students. Gender difference can affect the products students bought online, we found that male and female showed a different preference for online products. The top 3 products male students purchased online were clothes, shoes and school supplies. Among those three products, clothes were the most preferred products by the male students. Besides, skin care products were the least preferred products by the male students. The top 3 products female students purchased online were skin care and makeup products, clothes and commodity. Among those three products, skin care and makeup products were the most preferred products by the female students. Besides, school supplies were the least preferred products by the female students.

According to the survey, when respondents are choosing the products that can be distinguished by experience, such as perfume and foods, family and friends' purchasing choice, favorable consumer ratings, try by yourself and familiar brands are likely to affect their purchasing choice. Among those factors, most of respondents agreed that favorable consumer ratings could affect their purchasing choice, trying by yourself was thought to be the least effective way.

4.2 Factors that contributed to herd behavior in online shopping behaviors

First problem was conducted to analyze the factors that may contribute to WKU students' herd behavior in online shopping using multiple regression model. Since herd behavior was hard to measure in terms of numbers, amount of money students spent on online shopping every month was used to measure the degree of herd behavior. Amount of money spent was divided into 5 categories, less than 500 was represented by 1, greater than 500 but less than 1,000 was represented by 2, greater than 1,000 but less than 1,500 was represented by 3, greater than 1,500 but less than 2,000 was represented by 4, and greater than 2,000 was represented by 5. Similarly, the factors such as living expenses, online reviews, brand effect and sales promotion were measured in the same way. For monthly living expenses, less than 1,000 was represented by 1, greater than 1,000 but less than 2,000 was represented by 2, greater than 2,000 but less than 3,000 was represented by 3, greater than 3,000 but less than 4,000 was represented by 4, greater than 4,000 but less than 5,000 was represented by 5, and greater than 5,000 was represented by 6. For attitude towards online reviews, very useless was represented by 1, useless was represented by 2, neutral was represented by 3, useful was represented by 4, and very useful was represented by 5. For the attitude towards brand, willing to choose other brands with lower price was represented by 1, only considering the performance and quality of the products not the brands was represented by 2, and choosing familiar brands was represented by 3.

Using the equation $Y= aX_1 + bX_2 + cX_3 + d$ mentioned above, Y which was the dependent variable was the amount of money students spent on online shopping. X_1, X_2 and X_3 were the independent variables. X_1 was the monthly living expense, X_2 was the attitude towards online reviews, and X_3 was the attitude towards brand. The first null hypothesis H_0 was that living expenses, attitude towards online reviews, and attitude towards brand had

no significant effect on the amount of money spent on online shopping every month. Using the multiple regression model, the following results were found.

Table 1 The effect of monthly living expense, online reviews and brand on the monthly online shopping expenses.

	Coefficients	t Stat	P-value
Intercept	–0.2139135	-0.329327	0.743403148910
X Variable 1	0.8301665	9.4585534	0.000000000002
X Variable 2	–0.0546822	-0.445787	0.657842518769
X Variable 3	0.1119759	0.9270075	0.358761115486

Table 1 showed the P-values of 3 X Variables and equation $Y= 0.83X_1 – 0.05X_2 + 0.11X_3 – 0.21$ was obtained. From the table, using the 90% confidence level, we can see that P-value for X Variable 1 is less than 0.1, and the P-values for X Variable 2 and X Variable 3 are larger than 0.1, therefore, we can reject H_0 for X Variable 1, and do not reject H_0 for X Variable 2 and X Variable 3. In conclusion, living expenses had a significant effect on the amount of money spent on online shopping every month. Attitude towards online reviews and brand had no significant effect on the amount of money spent on online shopping every month.

This result is consistent with the finding of Anastasia and Suwitro (2015) who asserted that financial factor had a significant effect on buyer's decision. In my research, financial factor is expressed by the monthly living expenses. Using the regression model, I find that living expense is one of the factors that can lead to the changes in the amount of money spent on online shopping every month. This result is different from the finding of Shen et al. (2014) who contended that individual's purchasing decision could be affected by online consumer reviews. According to the regression results, students who preferred to look through the online reviews did not tend to spend more money on online shopping. Therefore, online reviews had no effect on the monthly online shopping expenses.

For the analysis of how sales promotion such as Double Eleven affect the students' online purchasing behavior, it was divided into three dimensions: buying even without the need, buying with a similar or even lower price, and buying what others recommend or choose to buy. Those three dimensions were measured by the degree of recognition and expressed by numbers. Strongly disagree was represented by 1, disagree was represented by 2, neutral was represented by 3, agree was represented by4, and strongly agree was represented by 5.

Using the same equation $Y= aX_1 + bX_2 + cX_3 + d$, Y which was the dependent variable was the amount of money students spent on online shopping. X_1, X_2 and X_3 were the independent variables. X_1 was the degree of recognition of buying even without the need, X_2 was the degree of recognition of buying with a similar or even lower price, and X_3 was the degree of recognition of buying what others recommend and choose to buy. The second null hypothesis H_0 was that the degree of recognition of buying even without the need, the degree of recognition of buying with a similar or even lower price, and the degree of recognition of buying what others recommend and choose to buy had no significant effect on the amount of money spent on online shopping every month. Using the multiple regression model, the following results were found.

Table 2 The effect of sales promotion on monthly online shopping expenses.

	Coefficients	t Stat	P-value
Intercept	2.4125415	2.608404	0.0122281
X Variable 1	0.3658939	1.9557601	0.0565828
X Variable 2	–0.2940096	-1.373433	0.1762750
X Variable 3	0.1187543	0.7191255	0.4757011

Table 2 showed the P-values of 3 X Variables and equation $Y= 0.37X_1 – 0.29X_2 + 0.12 X_3 + 2.41$ was obtained. From the table, using the 90% confidence level, we can see that P-value for X Variable 1 is less than 0.1, and the P-values for X Variable 2 and X Variable 3 are larger than 0.1, therefore, we can reject H_0 for X Variable 1, and do not reject H_0 for X Variable 2 and X Variable 3. In conclusion, the recognition of buying even without the need had a significant effect on the amount of money spent on online shopping every month. The recognition of buying with a similar or even lower price and buying what others recommend and choose to buy had no significant effect on the amount of money spent on online shopping every month. In conclusion, sales promotion had effect on students' online purchasing behavior to some extent, especially resulting in buying the unneeded products. This result is slightly consistent with the finding of Ha et al. (2016) who also stated that herd behavior could make students develop a bad money attitude and purchase the products that they do not actually need. In my research, herd behavior happens when students are attracted by sales promotion, which pushes them to buy the popular products, and increases the monthly expense.

4.3 The existence of significant relationship with herd behavior in online shopping behaviors

Second problem was conducted to analyze whether there was a difference in the amount of money spent on online shopping every month between male and female students, as well as business and non-business students. T-test model was used to deal with this problem and 90% confidence level was used to reject. The third null Hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between male and female students. Since the number of male respondents equaled to female respondents, Paired Two Sample For Means t-Test was conducted, and following result was found.

Table 3 Difference in mean monthly online shopping expenses between male and female.

	Variable 1	Variable 2
Mean	3.20	2.48
Variance	0.833333333	1.426666667
t Stat	2.468611733	
P(T<=t) two-tail	0.021072845	

Table 3 showed the P-value of male and female students. Since P-value for t-test was smaller than 0.1, we rejected H_0 and concluded that the mean amount of money spent on online shopping every month between male and female students was different. Gender was related to students' herd behavior in online shopping. Female students have a larger mean monthly online shopping expense, and are more likely to engage in herd behavior than male students.

The fourth null Hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between business and non-business students. Since the number of business respondents did not equal to non-business respondents, Two-Sample Assuming Unequal Variances t-Test was conducted, and following result was found.

Table 4 Difference in mean monthly online shopping expenses between business and non-business students.

	Variable 1	Variable 2
Mean	3.090909091	2.642857143
Variance	1.134199134	1.275132275
t Stat	1.43790456	
P(T<=t) two-tail	0.157229801	

Table 4 showed the P-value of business and non-business students. Since P-value for t-test was greater than 0.1, we did not reject H_0 and concluded that the mean amount of money spent on online shopping every month between business and non-business students was same. Major was not related to students' herd behavior in online shopping.

Third problem was conducted to analyze whether there was a difference in the amount of money spent on online shopping every month between students who thought market information was important and students who thought market information was not important. Due to the complexity of market information, we choose seller's information and product information as they were the most convenient and representative information students could get. Both two kinds of information were measured by the degree of magnitude and monthly online shopping consumption and students who thought market information was important were compared to monthly online shopping consumption of students who thought market information was not important. T-test model was used to deal with this problem and 90% confidence level was used to reject.

Seller's information was divided into six dimensions which were popularity, distance, sales volume, consumer ratings, attitude towards returns and refunds, and communication before trade. Each dimension was tested to see whether there was a relationship to herd behavior in online shopping. The fifth null Hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between students who thought seller's information was important and students who thought seller's information was not important. Since those two kinds of respondents did not equal, Two-Sample Assuming Unequal Variances t-Test was conducted, and following results were found.

Popularity:

Table 5 Difference in mean monthly online shopping expenses considering popularity.

	Variable 1	Variable 2
Mean	2.8717949	2.7272727
Variance	1.2726046	1.2181818
t Stat	0.3816789	
P(T<=t) two-tail	0.7077209	

Distance:

Table 6 Difference in mean monthly online shopping expenses considering distance.

	Variable 1	Variable 2

Mean	3	2.7142857
Variance	0.952381	1.4708995
t Stat	0.9229942	
P(T<=t) two-tail	0.3606268	

Sales Volume:
Table 7 Difference in mean monthly online shopping expenses considering sales volume.

	Variable 1	Variable 2
Mean	2.7857143	3.125
Variance	1.0993031	2.125
t Stat	-0.628093	
P(T<=t) two-tail	0.5474504	

Consumer Rating:
Table 8 Difference in mean monthly online shopping expenses considering consumer rating.

	Variable 1	Variable 2
Mean	2.8444444	2.8
Variance	1.2252525	1.7
t Stat	0.0733415	
P(T<=t) two-tail	0.944378	

Attitude Towards Returns and Refund:
Table 9 Difference in mean monthly online shopping expenses considering attitude towards returns and refund.

	Variable 1	Variable 2
Mean	2.7837838	3
Variance	1.1186186	1.6666667
t Stat	–0.543198	
P(T<=t) two-tail	0.593657	

Communication Before Trade:
Table 10 Difference in mean monthly online shopping expenses considering communication before trade.

	Variable 1	Variable 2
Mean	2.72	2.96
Variance	0.96	1.54
t Stat	–0.810885	
P(T<=t) two-tail	0.4254005	

Table 5-10 showed the P-values of students who thought seller's information was important and students who thought seller's information was not important. Since P-values for t-test were all greater than 0.1, we did not reject H_0 and concluded that there was no difference in mean amount of money spent on online shopping every month between students who thought seller's information was important and students who thought seller's information was not important. Seller's information was not related to students' herd behavior in online shopping. This result is different from the finding of Park et al. (2017)

who argued that consumers usually made the consumption choices based on consumer ratings and popularity of the store, as well as the finding of Zhang et al. (2013) who pointed out that popularity was a factor that led to group buying. However, according to the t-test results, both consumer ratings and popularity were found to have no significant relationship with the online purchasing behavior. Students who attached importance to them made the same purchasing choice as the students who did not.

Product information was divided into five dimensions which were price, discount, ratings, appearance and recommendation from platform. Each dimension was tested to see whether there was a relationship to herd behavior in online shopping. The sixth null hypothesis H_0 was that there was no difference in mean amount of money spent on online shopping every month between students who thought product information was important and students who thought product information was not important. Since those two kinds of respondents did not equal, Two-Sample Assuming Unequal Variances t-Test was conducted, and following result was found.

Price:

Table 11 Difference in mean monthly online shopping expenses considering price.

	Variable 1	Variable 2
Mean	2.6585366	3.6666667
Variance	1.1304878	1
t Stat	–2.707095	
P(T<=t) two-tail	0.0190576	

Discount:

Table 12 Difference in mean monthly online shopping expenses considering discount.

	Variable 1	Variable 2
Mean	2.6904762	3.625
Variance	1.1457607	1.125
t Stat	–2.280649	
P(T<=t) two-tail	0.0457352	

Ratings:

Table 13 Difference in mean monthly online shopping expenses considering ratings.

	Variable 1	Variable 2
Mean	2.826087	3
Variance	1.3024155	0.6666667
t Stat	–0.393856	
P(T<=t) two-tail	0.7137813	

Appearance:

Table 14 Difference in mean monthly online shopping expenses considering appearance.

	Variable 1	Variable 2
Mean	2.9487179	2.4545455
Variance	1.2604588	1.0727273
t Stat	1.3714315	
P(T<=t) two-tail	0.1880724	

Recommendation from Platform

Table 15 Difference in mean monthly online shopping expenses considering recommendation from platform.

	Variable 1	Variable 2
Mean	2.8148148	2.8695652
Variance	0.9259259	1.6640316
t Stat	–0.167657	
P(T<=t) two-tail	0.8676979	

Table 11-15 showed the P-values of students who thought product information was important and students who thought product information was not important. Since P-values for Table 11 and Table 12 were smaller than 0.1, and P-values for Table 13-15 were greater than 0.1, we rejected H_0 for variable price and discount and did not reject H_0 for variable ratings, appearance and recommendation from platform. In conclusion, there was a significant difference in mean amount of money spent on online shopping every month between students who thought price and discount were important and students who thought price and discount were not important. Meanwhile, there was no difference in mean amount of money spent on online shopping every month between students who thought ratings, appearance and recommendation was important and students who thought ratings, appearance and recommendation was not important. Product information was related to students' herd behavior in online shopping to some extent, especially in the aspects of price and discount.

This result was consistent with the finding of Zhang et al. (2013) who pointed out that discount depth of a deal could cause consumer's herd behavior. Group buying occurred when consumers were offered a great discount of a deal. In this research, students who attached importance to the discount rate of the product tend to affect their online purchasing expenses. In addition, this result is different from the finding of Li et al. (2010) who proposed that ratings are related to student's purchasing decision. According to the t-test result, students who attached importance to ratings had the same amount of money spent on online shopping every month as the students who did not. Therefore, ratings are not related to students' online purchasing behavior. In section 5, I will make an overall conclusion about all the findings.

5. Conclusion

This paper aims to analyze the factors that lead to herd behavior and whether herd behavior exist in university students' online purchasing behavior. A survey based on Wenzhou Kean University students is conducted to collect the data. Regression model and difference in means test model are used in this paper to find the factors and the difference in mean amount of money spent on online shopping every month. The results of this paper demonstrate that there are several factors that can lead to university students' herd behavior in online shopping, these factors are living expenses and sales promotion. Online review and brand effect do not influence students' online purchasing choice. Gender can make a difference in the mean amount of money spent on online shopping every month, while major does not make a difference. For market information, I analyze two aspects

which are seller's information and product information, both of them are tested in the amount of money spent on online shopping every month between students who think market information is important and students who think market information is not important. The results demonstrate that product information tend to make a larger difference in the monthly online shopping expense than the seller's information. Price and discount of product information can make a significant difference and are strongly related to the herd behavior. According to the result, herd behavior exists in university students' online purchasing behavior, and it is likely to make students buy the product that is not actually needed. Besides, there are some limitations of my research. First, the sample is only based on Wenzhou Kean University students, so it cannot represent all the university students. Second, the sample size is 50 and not large, so it cannot represent most of students. Third, the research mainly focuses on WKU students' online purchasing behavior, there are other purchasing ways not included in the research, so it cannot represent the overall WKU students' consumption behavior. For future research, I will extend the sample size to include other university students and try to cover more variables in the research.

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Appendix

Appendix A: Survey of herd behavior in university students' online purchasing behavior

1. Gender:
A. Male
B. Female

2. Major:
A. Business
B. Non-business

3. Living Expenses:
A. <1,000
B. 1,000-2,000
C. 2,000-3,000
D. 3,000-4,000
E. 4,000-5,000
F: >5,000

4. How much do you usually spend on online shopping every month?
A. <500
B. 500-1,000
C. 1,000-1,500
D. 1,500-2,000
E. >2,000
(collect the answer separately based on different gender groups: male and female)

5. What are the top 3 products do you usually purchase online?
A. Skin care and makeup products
B. Foods
C. Clothes
D. Shoes
E. Commodity
F. School supplies
G. Electronic products
(collect the answer separately based on different gender groups: male and female)

6. For a product that can be distinguished by experience, such as perfume and foods, what factors will affect your purchasing choice?
A. Family and friends' purchasing choices.
B. Favorable consumer ratings.
C. Try by yourself.
D. Familiar brands.
E. Others_____

7. How do you choose your brand when buying the same products with multiple brands?
A. Choose familiar brands.
B. Only consider the performance and quality of the products not the brands.
C. Willing to choose other brands with lower price.

8. What do you think of the online reviews towards products from Blogs, Weibo, Douban and so on?
A. Very useful
B. Useful
C. Neutral
D. Useless
E. Very useless

9. How does seller's information affect your purchasing intention?

	Very important; Important; Neutral; Unimportant; Very unimportant
Popularity	
Distance	
Sales	
Consumer ratings	
Attitude towards returns and refunds	
Communication before trade	

10. How does product information affect your purchasing intention?

	Very important; Important; Neutral; Unimportant; Very unimportant
Price	
Discount	
Ratings	
Appearance	
Recommendations of the platform	

11. How does the sales promotion such as Double Eleven affect your consumption behavior?

	Strongly agree; Agree; Neutral; Disagree; Strongly disagree
Buying even without the need.	
Buying with a similar or even lower price.	
Buying what others choose to buy.	

Appendix B: Regression output

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.8150022
R Square	0.6642286
Adjusted R Square	0.6423304
Standard Error	0.6657464
Observations	50

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	40.33195893	13.443986	30.33265276	5.68812E-11
Residual	46	20.38804107	0.4432183		
Total	49	60.72			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 90.0%*	*Upper 90.0%*
Intercept	-0.2139135	0.649546742	-0.329327	0.743403148910	-1.521383276	1.093556282	-1.3042819	0.876454906
X Variable 1	0.8301665	0.08776887	9.4585534	0.000000000002	0.653496965	1.006836107	0.682832409	0.977500663
X Variable 2	-0.0546822	0.122664551	-0.445787	0.657842518769	-0.30159316	0.192228709	-0.260594351	0.1512299
X Variable 3	0.1119759	0.120792843	0.9270075	0.358761115486	-0.131167508	0.355119255	-0.09079429	0.314746037

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.3406855
R Square	0.1160666
Adjusted R Square	0.0584188
Standard Error	1.0801815
Observations	50

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	7.047563	2.3491877	2.0133729	0.1252024
Residual	46	53.672437	1.1667921		
Total	49	60.72			

	Coefficients	*tandard Erro*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 90.0%*	*Upper 90.0%*
Intercept	2.4125415	0.924911	2.608404	0.0122281	0.5507923	4.2742907	0.85993	3.9651529
X Variable 1	0.3658939	0.1870853	1.9557601	0.0565828	-0.010689	0.742477	0.0518413	0.6799465
X Variable 2	-0.2940096	0.2140691	-1.373433	0.1762750	-0.724908	0.1368891	-0.653359	0.0653397
X Variable 3	0.1187543	0.1651371	0.7191255	0.4757011	-0.213649	0.4511581	-0.158455	0.3959635