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# Exploration of the Mechanism of Marketing Strategy Heterogeneity on College Students' Consumption Desire—Based on DID Model Empirical Analysis under the 'Double Eleven, Shopping Festival'

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***Abstract:*** *The purpose of this study is to explore the impact of e-commerce platform marketing strategies on college students' consumption desire on Double 11. Through regression analysis and difference-in-difference method, the research results show that the marketing strategy of Double 11 significantly improves the consumption desire of college students. Specifically, after the implementation of the Double 11 activity, the shopping desire of college students increased significantly, indicating that the marketing strategy has a positive effect on promoting consumption, in addition, the store size and debt level in the control variables have a negative impact on consumption desire, and the effect of the Double 11 marketing strategy on the promotion of consumption desire has been verified by the placebo test to be real and effective. These findings provide empirical support for e-commerce platforms in formulating marketing strategies, and also provide an in-depth understanding and reference for the consumption behavior of college students and the development of the digital economy.*

***Keywords:*** *Double 11 e-commerce platform, college students' consumption desire, marketing strategy*

## 1. Introduction

In today's era of vigorous e-commerce, Singles' Day has become a shopping event of global concern, especially for Chinese college students, this day is an important node to release the desire for consumption. With the popularization of Internet technology and the change of consumption concepts, college students have shown unique consumption characteristics and psychological tendencies in their shopping behavior, which has attracted the attention of many e-commerce platforms [1]. The purpose of this paper is to explore how e-commerce platforms can mobilize college students' consumption desire through precise marketing strategies to improve sales performance under the specific consumption node of Singles' Day. Specifically, through theoretical research, questionnaires, and empirical analysis, this paper explores the reasons why the marketing strategy of online shopping platform affects college students' shopping desire, and how to promote the promotion model of college students' shopping desire. Therefore, it is hoped that part of the 14th Five-Year Plan for the digital economy can be promoted and the green and healthy development of China's digital economy can be promoted [2].

When contemporary college students enter the "quasi-adult period", it is a period of vigorous online shopping. Based on the 14th Five-Year Plan, the digital business model will continue to develop rapidly, so the investigation of college students' online shopping practice and experience is helpful to understand the individual experience and values of college students in the mobile Internet era from the perspective of consumption [3].Based on this perspective, this project explores the reasons why the marketing strategy of online shopping platforms affects college students' shopping desire through theoretical research, research questionnaires, and empirical analysis, and how to promote the promotion model of college students' shopping desire. Therefore, it is hoped that part of the 14th Five-Year Plan for the digital economy can be promoted, new marketing space for the platform can be expanded, and the green and healthy development of China's digital economy can be promoted [4].

## 2. Establishment and analysis of regression equations

The regression equation $Yit = \alpha o + \alpha didit + \beta jcontrolit + Eit$. This equation describes the relationship between the explanatory variable (desire to consume) and the explanatory variable (Singles' Day

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marketing strategy) and the controlling variable.where αo is a constant term, which represents the expected value of the explanatory variable when all explanatory and control variables are 0.αdidit is the regression coefficient of the explanatory variable "Double 11 Marketing Strategy", which measures the degree of influence of "Double 11 Marketing Strategy" on the explanatory variable "Consumption Desire".βjcontrolit represents the regression coefficients of each control variable, and they measure the degree to which each control variable affects the explanatory variable.The presence of these control variables helps us to more accurately estimate the impact of explanatory variables on the explanatory variables, helping us to eliminate or mitigate the effects of other potential factors.

Finally, Eit is a residual term, which represents all factors that affect the explanatory variable except for the explanatory variable and the control variable. The residual term is very important in statistical modeling, as it helps us to evaluate the goodness-of-fit of the model and detect problems such as model setup errors or missing variables.

### *2.1 Regression Equations and Analysis*

#### *2.1.1 Establishment of regression equations*

Let's analyze the regression results as follows:

$$Y_{it} = \alpha_0 + \alpha_1 did_{it} + \sum_{j=1}^{n} \beta_j control_{it} + \varepsilon_{it} \quad (1)$$

The left side of the equation is the explanatory variable, and the right side of the equation is the explanatory variable and the control variable, where αo is the constant term, α1 is the regression coefficient of the explanatory variable, βn is the regression coefficient of each control variable, and $\varepsilon_{it}$ is the residual value.

#### *2.1.2 Result analysis of regression equations*

Regression analysis will help us estimate the values of αO, αdid, and βJ and can assess the statistical significance of these coefficients. From these estimated coefficients, we conclude the following:

If the estimated value of αdid is positive and significant, it indicates that the marketing strategy of Double 11 has a positive impact on consumer desire, that is, the implementation of this strategy will increase consumer desire. If the estimate is negative and significant, it indicates that the Singles' Day marketing strategy may have suppressed the desire to consume.

The coefficients (βj) of the control variables will help us understand how these variables affect the desire to consume, and can make further policy adjustments or analyses based on this.

### *2.2 Variable Interpretation and Variable Types*

#### *2.2.1 Explanation of variables*

Explanatory variable: Desire to consume (Yit) - This is the variable we want to predict or explain, representing some kind of outcome or phenomenon.

Explanatory Variable: Singles' Day Marketing Strategy (Did) - This is the variable we focus on and is expected to have an impact on the explanatory variable (desire to consume).

Control variables: divided into store size (Size), debt level (Lev), yield level (Roa), store age (Age), sales growth rate (Growth), whether Tm (Tm)

#### *2.2.2 Variable Types*

Yit: Represents the desire to consume in the ith sample in period t.

αo: is a constant term, representing the level of basic consumption desire without any explanatory and control variables.

αdidit: is the regression coefficient of the explanatory variable "Double 11 marketing strategy", which represents the degree of influence of the strategy on consumer desire. The α before αdidit is the regression coefficient identifier of the explanatory variable, while didit represents the 11.11 marketing strategy of the ith sample in period t (usually a dummy variable, e.g. 1 for implementation and 0 for non-implementation).

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βjcontrolit: represents the regression coefficient of the control variable, where j represents the different control variables (Size, Lev, Roa, Age, Growth, Tm). controlit indicates the value of the control variable of the ith sample in the t period. The coefficients of these control variables are used to eliminate the influence of other potential factors, allowing us to estimate the effects of the explanatory variables more accurately.

EIT: is the residual term, which represents the influence of all other factors not taken into account on the explanatory variable except for the explanatory variable and the control variable. It reflects the prediction error of the model.

The variables explained in Table 1 below are shown in the following table:

*Table 1: Explanation of variables*

| Variable nature | The name of the variable | Variable code |
|---|---|---|
| Explanatory variables | Desire to consume | Y |
| Explanatory variables | Singles' Day marketing strategy | Did |
| Control variables | The size of the store | Size |
| | Debt level | Lev |
| | Yield level | Roa |
| | The age of the store | Age |
| | Sales growth rate | Growth |
| | Whether it's Tmall or not | Tm |

## 3. Regression analysis and empirical analysis

### *3.1 Descriptive statistics*

Firstly, descriptive statistics were carried out on the data, and descriptive statistics were carried out on the sample size, mean, standard deviation, minimum and maximum values of each variable, and the test results are shown in the descriptive statistics table in Table 2 below:

*Table 2: Descriptive statistical tables*

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Y | 12840 | .053 | .053 | 0 | .454 |
| did | 12840 | .201 | .401 | 0 | 1 |
| size | 12840 | 12.622 | 1.424 | 6.758 | 18.637 |
| lev | 12840 | .47 | .209 | .056 | .94 |
| roa | 12840 | .033 | .061 | -.273 | .204 |
| age | 12840 | 10.639 | 2.762 | 5 | 27 |
| growth | 12840 | .368 | 1.056 | -.689 | 7.666 |
| tm | 12840 | .536 | .499 | 0 | 1 |
| | | | | | |

#### *3.1.1 Analysis of descriptive statistical results*

Sample size (Obs):

The sample size for all variables was 12840.

Explanatory variable "Desire to Consume" (Yit):

Mean: 0.053, relatively low, the overall desire to consume is not high.

Standard deviation (Std. Dev.): 0.053, which is small, and the distribution of consumption desire in the sample is relatively concentrated.

Explanatory variable "Singles' Day Marketing Strategy" (Did):

Mean: 0.201, about 20% of the sample implemented the 11.11 marketing strategy.

Standard deviation (Std. Dev.): 0.401, which is relatively large, and the sample distribution of the implementation and non-implementation of the Double 11 marketing strategy is relatively scattered.

Control Variables:

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Store size: The mean value is 12.622, the standard deviation is 1.424, and there is little difference in store size.

Debt level (Lev): The mean value is 0.47, and the standard deviation is large (209), and the sample has a significant difference in debt level.

Yield level (Roa): The mean value is 0.033, the standard deviation is 0.061, and the sample is relatively concentrated in terms of return.

Store Age: The mean value is 10.639, the standard deviation is 2.762, and the age distribution of stores is relatively even.

Growth: The mean value is 0.368, the standard deviation is 1.056, and the sample has a large difference in sales growth rate.

Whether it is Tmall: Whether the store belongs to the Tmall platform.

#### *3.1.2 Descriptive statistical conclusion analysis*

Consumption desire (Yit) was at a low level in the overall sample, and the distribution was relatively concentrated.

The 11.11 marketing strategy (DID) was implemented in about 20% of the sample, and the sample was relatively dispersed across this variable.

Among the control variables, the distribution of store size (Size) and profitability level (Roa) is relatively concentrated, while the distribution of debt level (Lev) and sales growth rate (Growth) is more scattered. These scattered variables provide important information in regression analysis to help explain changes in desire to consume (Yit).

### *3.2 Correlation coefficient test*

From the results of the following table 3, there is a significant positive correlation between did and Y, and then the correlation coefficient between other variables is better, indicating that the data quality is better.

*Table 3: Coefficient test table*

| | Y | did | size | lev | roa |
|---|---|---|---|---|---|
| Y | 1 | | | | |
| did | 0.201*** | 1 | | | |
| size | -0.124*** | 0.023*** | 1 | | |
| lev | 0.087*** | 0.046*** | 0.405*** | 1 | |
| roa | -0.185*** | -0.107*** | 0.068*** | -0.364*** | 1 |
| age | -0.023*** | -0.015* | 0.211*** | 0.129*** | -0.041*** |
| growth | 0.107*** | 0.089*** | -0.00800 | 0.086*** | 0.00200 |
| tm | -0.042*** | -0.065*** | 0.270*** | 0.230*** | -0.055*** |

The numeric values in each cell represent the correlation coefficients between the corresponding row and column variables, while the asterisks indicate the significance level of these correlation coefficients.

There was a significant positive correlation between 'did' (Double 11 marketing strategy) and 'Y' (consumption desire) ('0.201***'), indicating that the Double 11 marketing strategy is an effective means to enhance consumer desire. There are also negative correlations, for example, the correlation coefficient between 'size' and 'Y' is negative (-'0.124***'), suggesting that larger stores may not always have a higher desire to spend. Similarly, 'lev' (debt level) is also negatively correlated with 'Y' ('0.087***'), suggesting that high debt levels may have a negative impact on consumption desires.

There is a negative correlation between store size ('size') and debt level ('lev') and consumer desire, suggesting that we need to further explore the relationship between these variables to understand how they affect consumer desire.

### *3.3 Collinearity test*

The collinearity test is further developed, and the VIF values of all variables are less than 10 from the collinearity test table in Table 4 below, which means that no serious collinearity problems are found in the model. This is a positive finding, as it suggests that the explanatory variables in the model can be

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considered relatively independent, allowing for further regression analysis.

*Table 4: Collinearity test table*

| | VIF | 1/VIF |
|---|---|---|
| lev | 1.503 | .665 |
| size | 1.371 | .729 |
| roa | 1.252 | .799 |
| tm | 1.132 | .884 |
| age | 1.072 | .933 |
| did | 1.029 | .972 |
| growth | 1.023 | .977 |
| Mean VIF | 1.197 | . |

### *3.4 Parallel trend test*

Before the appearance of Double 11, the impact coefficient was not significant, and then after the appearance of Double 11, its impact coefficient was significant, so it indicates that the parallel trend test passed. In order to test whether there is the same time trend of college students' shopping desire before and after the implementation of various marketing activities of the Double 11 shopping festival, the parallel trend test is further carried out. The results of the parallel trend test are shown in Figure 1, and the pre and post represent the number of months before and after the implementation of the platform marketing strategy. The estimation coefficients were not significant before the implementation of the platform's Double 11 marketing strategy, but were significantly significant after the implementation of the strategy, indicating that the platform had no significant relationship with the Double 11 marketing strategy before trying the marketing strategy. However, after the implementation of the Double 11 marketing strategy, it has a significant positive impact on the equalization level of the Double 11 marketing strategy, so it indicates that the parallel trend test has passed.

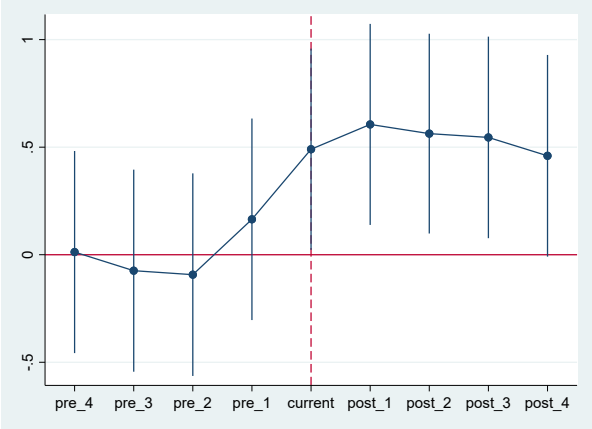


*Figure 1: Parallel trend test*

### *3.5 Regression analysis*

According to the regression results of the regression analysis table in Table 5 below, there is a significant positive correlation between DID and Y, which indicates that Double 11 has a significant positive impact on consumption desire.

According to the regression results in Table 5, there was a significant positive correlation between the Double 11 marketing strategy (Did) and college students' shopping desire (Y) ($p < 0.01$), indicating that the marketing strategy of e-commerce platforms on Double 11 could effectively enhance college students' shopping desire. However, the age of the store and whether it is a Tmall store (Tm) have no significant effect on shopping intention. There is a significant positive correlation between the debt level (Lev) and the sales growth rate (Growth) of stores and shopping desire, which may indicate that stores with high debt or high growth rate are more inclined to attract consumers through Singles' Day promotions, which in turn affects consumers' shopping desire. On the contrary, store size and yield level (Roa) are significantly negatively correlated with shopping desire, which may mean that consumers in large stores already have a higher basic shopping desire, while stores with high yields may not rely on

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Double 11 sales to attract consumers. Therefore, the marketing strategy of Double 11 has a significant positive impact on college students' shopping desire. Future research can further explore the specific mechanism of different marketing strategies on different consumer groups, and how to optimize marketing effects based on consumer characteristics. The results of this study reveal the positive impact of marketing strategies on college students' shopping desire on Double 11, and point out the complex effects of different store characteristics on shopping desire. E-commerce platforms and stores should consider control variables such as store size and profitability level to develop more precise marketing strategies to attract college students. Future research can further explore the specific mechanisms of different marketing strategies for different consumer groups [5].

*Table 5: Regression analysis table*

| | (1) | (2) |
|---|---|---|
| VARIABLES | Y | Y |
| | | |
| did | 0.0267*** | 0.0237*** |
| | (23.21) | (20.89) |
| size | | -0.00562*** |
| | | (-15.26) |
| lev | | 0.0237*** |
| | | (9.019) |
| roa | | -0.109*** |
| | | (-13.14) |
| age | | -5.35e-05 |
| | | (-0.319) |
| growth | | 0.00420*** |
| | | (9.790) |
| tm | | -0.00229** |
| | | (-2.400) |
| Constant | 0.0474*** | 0.112*** |
| | (91.89) | (26.37) |
| | | |
| Observations | 12,840 | 12,840 |
| R-squared | 0.040 | 0.095 |

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

### *3.6 Placebo test*

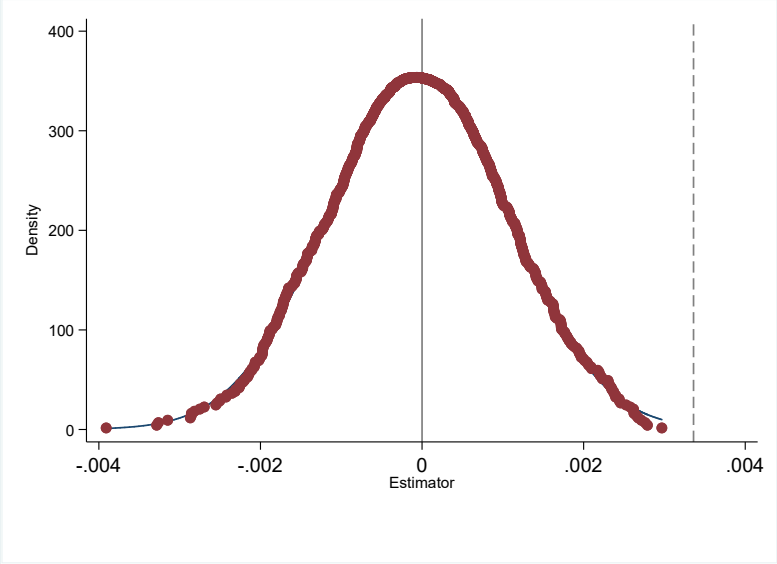


*Figure 2: The statistical distribution of the estimated coefficients*

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Figure 2 shows the statistical distribution of the estimated coefficients in the experimental group out of 1000 random generation. As shown in the figure, all distributions are close to zero, and the true estimation coefficient of the basal regression is a significant anomaly in the placebo test. Therefore, it shows that the placebo test was successful, and Double 11 played a positive role in improving consumer desire.

#### *3.6.1 Placebo experimental design – DID method variant*

When designing the experimental design of the placebo test, we drew on previous studies on the difference-in-difference approach. In this study, we used a variant of the DID method to assess the actual impact of Singles' Day by introducing a placebo variable to simulate a market environment without the Singles' Day effect.

In the process of performing the placebo test, we used a simulation method to evaluate the impact of the 11.11 shopping festival on consumers' desire to buy. However, to determine whether Singles' Day has actually had a positive impact on consumer purchasing behavior, and not just an accident, rigorous statistical testing is required.

#### *3.6.2 Experimental process*

To perform this test, we designed a simulation experiment to simulate a market environment without the Singles' Day effect by randomly generating data. In these simulations, we looked at the estimation coefficients of the experimental group to assess whether the Singles' Day campaign had a significant impact on consumers' purchasing behavior.

Figure 2 shows the statistical distribution of the estimation coefficients in the experimental group over 1000 simulations. The results show that these distributions are concentrated around the zero point, which indicates that in the absence of the "Double 11" effect, the change in consumers' desire to buy may not be significant, and in the absence of actual intervention, the change in consumers' desire to buy may not be significant. However, when we compare these simulation results with the true estimation coefficients of the underlying regression, we find that the estimation coefficients of Singles' Day are significantly far away from the zero point, indicating that Singles' Day has a significant positive impact on the increase of consumption desire.

#### *3.6.3 Placebo test conclusions*

The Singles' Day Shopping Festival has had a positive impact on the consumer market by creating a shopping atmosphere and offering a variety of promotional activities that have successfully stimulated consumers' desire to buy. In addition, Zhangyan's analysis found that during the "Double 11" shopping festival, the purchase behavior of college students was affected by the price discount and brand awareness of marketing. This test method not only helps us to verify the effectiveness of the Double 11 campaign, but also has important significance for understanding consumer behavior, optimizing marketing strategies, and predicting economic trends.

### *3.7 Robustness test*

Next, the robustness test of the data is carried out, firstly, through the lag effect, there is also a significant positive correlation between the DID variable and Y in the lag period, which indicates that the robustness test is passed, and the data are shown in the robustness analysis table in Table 6 below.

Robustness testing tests the stability of the results by changing some of the model's assumptions or using different estimation methods. If the results are consistent across different settings, then we can consider them to be reliable.

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*Table 6: Robustness analysis table*

| | (1) | (2) |
|---|---|---|
| VARIABLES | Y | Y |
| | | |
| L.did | 0.0262*** | 0.0228*** |
| | (21.40) | (19.01) |
| size | | -0.00499*** |
| | | (-13.16) |
| lev | | 0.0188*** |
| | | (6.937) |
| roa | | -0.133*** |
| | | (-15.75) |
| age | | 0.000123 |
| | | (0.725) |
| growth | | 0.00466*** |
| | | (10.74) |
| tm | | -0.00285*** |
| | | (-2.933) |
| Constant | 0.0469*** | 0.104*** |
| | (89.66) | (23.87) |
| | | |
| Observations | 11,770 | 11,770 |
| R-squared | 0.037 | 0.099 |

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

### *3.7.1 Consideration of hysteresis effect based on robustness test*

In this study, the robustness test was first performed by considering the hysteresis effect. This method, known as the dynamic panel data method in economics research, involves the introduction of a difference-in-difference (DID) variable with a lag period and regression analysis with the dependent variable Y.

The results show that there is a significant positive correlation between the DID variable and Y in the lag period, indicating that the results are robust even when the time effect is considered.

### *3.7.2 Statistical indicators*

First, the coefficient of the DID variable (L.did) for the lag period was positive in both models and was very significant ($p < 0.01$), which supported the conclusion of the robustness test. Other variables, such as size, ley, and return on assets (ROA), also correlate significantly with Y, but in different directions and intensity. This is consistent with findings from previous studies on the persistence of policy effects. In this study, the significant correlation between other variables, such as firm size and leverage, and Y is also consistent with the discussion of the relationship between firm finance and market performance in the existing literature.

### *3.7.3 Impact of the rest of the results*

A passing robustness test does not mean that the model is perfect, and as Davidson and MacKinnon (2004) point out, the robustness test does not mean that the model is perfect. We will continue to explore other factors that may influence the results.

## 4. Conclusion

In the context of the rapid development of the digital economy and online shopping, this study proposes to explore the impact of the marketing strategies of e-commerce platforms on college students' consumption desire during the "Double 11" shopping festival [6]. As Singles' Day has become one of the largest shopping festivals in the world, especially among university students, it is of great significance to study this phenomenon to understand consumer behavior, optimize marketing strategies, and predict economic trends in the digital economy [7].

We construct an empirical model of DID (Difference-in-Difference) based on questionnaire data to

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evaluate the effect of the "Double 11" marketing strategy. Regression analyses were performed to estimate the effects of explanatory and control variables on consumption desire [8]. Placebo tests and robustness tests were performed to ensure the reliability and robustness of the study results. We conclude that the "Double 11" marketing strategy has a significant positive impact on college students' consumption desire, indicating that this shopping festival can effectively stimulate consumers' purchase desire by creating a shopping atmosphere and providing promotional activities. The robustness test shows that even when considering the time effect, the positive impact of the Singles' Day marketing strategy on consumer desire is still significant [9]. The placebo test further verified the positive effect of Singles' Day on the increase of consumer desire, in contrast to the situation that simulated the absence of a significant change in consumers' desire to buy in a market environment without the Singles' Day effect [10]. The results of this study provide insights into how e-commerce platforms can influence consumer behavior through marketing strategies, and provide a scientific basis for future marketing practices and policy formulation.

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