

ESTIMATING THE WILLINGNESS TO PAY OF STUDENTS FOR REUSABLE BAGS – A CASE STUDY AT THAI NGUYEN UNIVERSITY OF ECONOMICS AND BUSINESS ADMINISTRATION

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ARTICLE INFO	ABSTRACT
Received: 11/10/2023	The study was conducted to determine the level of awareness, behavior and willingness to pay for reusable bags of students at Thai Nguyen University of Economics and Business Administration. We applied Contingent Valuation Method and conducted a survey of 370 students at Thai Nguyen University of Economics and Business Administration. The estimation results showed that the willingness to pay for reusable bags was 8,934 VND/bag. Besides, the study indicated that the majority of students were aware of the importance of using reusable bags. Specifically, over 80% of students surveyed responded that using reusable bags is necessary or very necessary. In addition, we investigated that the factors affecting the willingness to pay of students for reusable bags, included gender, school year, living expenses in a month, the status of part-time job, the number of times to go to the market, the awareness of reusable bags. Additionally, some recommendations on pricing policy, design and quality were given.
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ƯỚC LƯỢNG MỨC GIÁ SẴN LÒNG TRẢ CỦA SINH VIÊN CHO TÚI TÁI SỬ DỤNG – NGHIÊN CỨU TRƯỜNG HỢP SINH VIÊN TRƯỜNG ĐẠI HỌC KINH TẾ VÀ QUẢN TRỊ KINH DOANH, ĐẠI HỌC THÁI NGUYÊN

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THÔNG TIN BÀI BÁO	TÓM TẮT
Ngày nhận bài: 11/10/2023	Nghiên cứu được tiến hành nhằm xác định mức độ nhận thức, hành vi và mức giá sẵn lòng chi trả cho việc sử dụng túi tái sử dụng của sinh viên trường Đại học Kinh tế và Quản trị kinh doanh, Đại học Thái Nguyên. Chúng tôi đã sử dụng phương pháp định giá ngẫu nhiên (Contingent Valuation Method) và tiến hành khảo sát 370 sinh viên của trường Đại học Kinh tế và Quản trị kinh doanh. Kết quả ước lượng cho thấy mức giá sẵn lòng chi trả cho túi tái sử dụng là 8.934 đồng/chiếc. Bên cạnh đó, nghiên cứu cũng chỉ ra rằng phần lớn sinh viên đều nhận thức được tầm quan trọng của việc sử dụng túi tái sử dụng. Cụ thể là trên 80% sinh viên được khảo sát cho rằng sử dụng túi tái sử dụng là cần thiết hay rất cần thiết. Ngoài ra, chúng tôi cũng tìm thấy các yếu tố ảnh hưởng đến mức giá sẵn lòng trả cho việc sử dụng túi tái sử dụng của sinh viên, gồm: giới tính, sinh viên đang theo học năm thứ mấy, tiền sinh hoạt phí trong một tháng, tình trạng đi làm thêm, số lần đi chợ, mức độ nhận thức về túi tái sử dụng. Trên cơ sở đó, nghiên cứu đưa ra một số giải pháp và khuyến nghị về chính sách giá, thiết kế mẫu mã, chất lượng túi.
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1. Introduction

The most commonly seen everyday item is a plastic bag, which has become familiar in daily life, associated with the inherent habits of many people. With advantages like durability, strength, convenience, and low cost, plastic bags are extensively used and are available almost everywhere — from small shops and street markets to supermarkets and commercial centers. However, the most significant environmental harm posed by plastic bags is their difficulty to decompose in natural conditions; the decomposition process requires many years. To limit and gradually eliminate the habit of using plastic bags and single-use plastic products, people must have a sense of responsibility, actively participate in and organize anti-waste activities, and change habits. Saying no to single-use plastic products is a crucial step in this endeavor.

A reusable shopping bag, sometimes called a lifetime bag in the UK, is a type of shopping bag that can be reused repeatedly. This kind of bag serves as an alternative to single-use paper or plastic bags. It is usually made from materials like canvas, natural fibers such as jute, woven synthetics, or thick plastic that is more durable than a disposable plastic bag, enabling it to be used over and over again. Reusable bags can be utilized for trips to the market, school, carrying office lunch boxes, and holding fruits.

Turner et al. [1] suggest that willingness to pay (WTP) measures the intensity of an individual's or society's preference for a particular good. It serves as a measure of satisfaction when using certain goods in the market, as indicated by their WTP for that specific good. The foundational theory of the Contingent Valuation Method (CVM) approach was proposed by Hanemann & Kanninen [2]. This method involves answering an open-ended question, namely whether the respondent is willing to pay a certain amount to bring about a specific change to their status quo.

Afroz et al. [3] utilize the CVM to estimate WTP of households in Kuala Lumpur, Malaysia, for the improvement of garbage collection services. The study applies a binary choice model to examine the factors affecting households' WTP toward enhancing solid waste management. The independent variables included in the model are age, number of family members, education, income, and awareness of solid waste management. The study's results indicate that households in Kuala Lumpur are willing to pay MYR22 for the monthly solid waste collection service. Similarly, Kayamo [4] applied CVM and found that the citizen's WTP for improved solid waste management in Hawassa city, Ethiopia was \$ 0.62 per month.

The widespread consumption of single-use plastic shopping bags is a prominent factor contributing to both environmental and socio-economic challenges on a global scale, prompting worldwide calls for intervention strategies to cut down their usage [5]. O'Brien [5] investigated that gender, age, education and environmental awareness are factors affecting people's willingness to pay for plastic bags. Shen et al. [6] found that young consumers' waste sorting experience and perceived social worth have positive effect on young consumers' intention to pay for shared express packaging in China. Besides, the Arriagada et al. [7] showed that avoidance of plastic consumption is influenced by gender, age, environmental awareness, environmental involvement, participation in environmental causes, and pro-environmental behaviors.

The Dunn's study [8] employs a conventional dichotomous choice contingent valuation or stated preference technique to assess two key aspects. Firstly, it aims to gauge the average household's WTP for persisting with plastic bags instead of opting for reusable bags. Secondly, the study aims to ascertain the Willingness to Accept (WTA) values of consumers who already occasionally use reusable bags for certain shopping trips. The study reveals that individuals who currently utilize reusable bags for a portion of their shopping outings would be inclined to adopt reusable bags for all their shopping trips if they are compensated with \$0.12 for each reusable bag they personally brought along. Furthermore, the study's findings underscore the impact of a modest tax on plastic bags. The implementation of this tax demonstrates a substantial reduction in the consumption of plastic bags.

Similarly, Madigele et al. [9] conduct a study utilizing a double-bound CVM to assess consumers' preferences regarding plastic bag usage and their willingness to consider more environmentally-friendly alternatives [9]. The study shows a significant relationship emerged between the respondents' level of education and gender with their WTP for ongoing plastic bag usage. Furthermore, the research indicates significant variations in income and education levels with respect to environmental awareness. Importantly, the study also reveals a crucial quantitative aspect: the average estimated price for a single 25-liter plastic bag is determined to be BWP0.44.

In Vietnam, Nguyen Van Song et al. [10] use the CVM method to determine the WTP of the farmer households for the service of collection, management and treatment of domestic solid waste in Gia Lam district, Hanoi. The research results show that the variables that have a positive impact on WTP are income, age, education level, occupation, and gender. The variable that has a negative effect on WTP is the number of people in the household. By the weighted average method, this study has determined the average WTP of the farmer household as WTP = 6,000 VND/month.

Similarly, Nguyen Van Ngai et al. [11] utilize the CVM method to determine the WTP of individuals in Cao Lanh city, Dong Thap province, for clean water supply services. The authors surveyed 172 randomly selected households without access to clean water from the city's water supply system. They employ a linear regression model using the least squares method to identify the factors influencing a household's WTP. The research findings reveal that seven independent variables affect WTP: education level, household size, total income, address of the household head, number of employed people, water source, and environmental awareness. The calculated average WTP of the surveyed households for 1 cubic meter of clean water is VND 4,956.

Thai Nguyen University of Economics and Business Administration is a school with a large number of students from many different provinces of the Northern Midlands and Mountains region of Vietnam. The university also has many years of experience in training human resources in the fields of Economics, Development Economics, and Investment Economics. Students are not only potential consumers but also play an important role in spreading environmentally protective behavior to those around them. Our research results can help shape investment projects and develop production and business plans for manufacturers to market reusable bags that are accessible to a wide range of consumers, thereby reducing the amount of plastic bags released into the environment. Despite the growing popularity of these reusable bags, options designed for students at an affordable price are not yet available on the market. Therefore, this study was conducted to determine the willingness of students to pay for the use of reusable bags.

2. Research Methodology

In this study, the CVM method was used to determine the willingness to pay of students for reusable bags. The approach involved applying a logit model with the following form:

$$Y = \text{Ln} \left[\frac{P_i}{1-P_i} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + e \quad (1)$$

Where, P_i is the probability of paying for reusable bags and $1 - P_i$ is the student's probability of not agreeing to use reusable bags. $\beta_1, \beta_2, \dots, \beta_k$ are the coefficients of the model; X_1 - Bid price for 1 reusable bag; X_2 - student's gender; X_3 - student's age; X_4 - student' academic year; X_5 - monthly living expenses; X_6 - student's part-time employment status; X_7 - number of times students go to the market per month; X_8 - students' awareness of reusable bags.

From the regression results, the average willingness to pay for reusable bags is estimated as follows [2], [12], [13]:

$$\text{WTP} = - \frac{(\hat{\beta}_0 + \sum_{k=2}^7 \hat{\beta}_k \cdot \bar{X}_k)}{\hat{\beta}_1} \quad (2)$$

The variables used in the model are described in Table 1.

Table 1. Definition of variables in the logit model

Variables	Description	Measurement
P	Probability to pay for using reusable begs	The dependent variable takes the value 0 if the respondent disagrees and the value 1 if he or she agrees.
Bid	Bid price for 1 reusable bag	The variable gets the values of 3000, 6000, 9000, and 12000 VND/bag
Gender	Dummy variable representing the gender of the student.	The variable takes the value 1 if the student is male and the value 0 if the student is female
Age	It is a continuous variable, representing the age of the student.	The number of years
Academic year	It represents the educational level of the students participating in the survey.	Get value 1 if students are the first-year, 2 - second-year student, 3 - third-year student, 4 - fourth-year student
Living expenses for a month	It is the total living allowance in a month that the student receives from the family.	Million VND/month
Part-time employment status	This variable indicates the student's part-time employment status, and whether the students have a part-time job or not.	This variable takes the value 1 if the student has a part-time job, 0 otherwise
Number of times to go to the market per month	Number of times that students go shopping at supermarkets, markets, stores...	times/month
Awareness of reusable bags	This variable expressing the level of awareness among students regarding the importance of using reusable bags as an alternative to single-use plastic bags	The variable takes the value 0 if a student thinks that conversion toward reusable bag is not necessary, 2 - quite necessary, 3 - necessary, 4 - very necessary

The survey respondents are students studying at Thai Nguyen University of Economics and Business Administration. In 2022, the total number of students at the University was 4810 students. The study sample size was calculated based on Slovin's formula as follows:

$$n = \frac{N}{1+e^2.N} \quad (3)$$

Where N is the total number of students at the school (N = 4810), n is the number of samples to be collected, and e is the error. Most of the studies use an error rate of 5%. Applying the above formula, the number of samples to be surveyed is n = 370 students.

Sampling Method: The study employed a random sampling method. We conducted face-to-face surveys with students in lecture halls and online surveys via Google Forms. The survey was conducted for one month, from February 2022 to March 2022. The total number of survey forms distributed was 389, and the number of survey forms received was 370.

3. Results and discussion

3.1. Characteristics of respondents

Females accounted for 58% (213 students), while males accounted for 42% (157 students) of the total 370 students participating in the survey. We can observe that fourth-year students constituted the largest group among the participants, with 144 students, making up 39%. They were followed by third-year students, totaling 102 students, which accounted for 28%. Second-year students comprised 73 students out of the 370, constituting 20%. Lastly, first-year students represented 13% (Figure 1).

The level of concern about using reusable bags may depend on the monthly subsistence the family provides for each student. On average, the family provides students with 0.5-1.5 million VND per month, accounting for 20%. About 35% of students participating in the survey received

living allowance of 1.5-2.5 million VND per month. Next is the family's provision of 2.5-3.5 million VND/month, accounting for 31% of respondents. The lowest percentage is observed among families offering more than 3.5 million VND per month for their children, accounting for 14%. This is equivalent to 51 out of the 370 students participating in the survey.

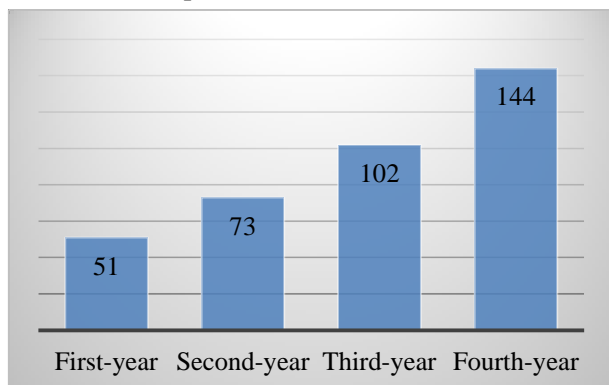


Figure 1. Student's academic year

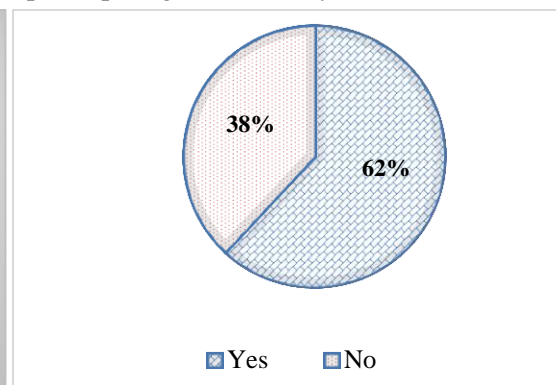


Figure 2. Percentage of students with part-time jobs

It's quite common for students to explore part-time job opportunities. The survey reveals that 62% of the participating students, corresponding to 229 out of 370 students, were currently engaged in part-time work. In contrast, the remaining 38% of students, totaling 141 out of 370, were not pursuing part-time employment (Figure 2). These part-time jobs expose students to new environments, allowing them to gain both additional income and valuable life experiences.

The survey results indicate that the highest frequency category comprised students who visited the market, supermarket, or store 5-7 times a month. This group consisted of 158 students, making up the largest proportion among all the categories. The next highest frequency category included students who went to markets or supermarkets 7-9 times per month. This group encompassed 89 students, accounting for 24% of the surveyed students. The third frequency category involved students who visited these places 3-5 times per month. Among the surveyed students, 66 students fell into this category, making up 18% of the total. The lowest frequency category consisted of students who visited markets, supermarkets, or shops 9-11 times per month (Figure 3).

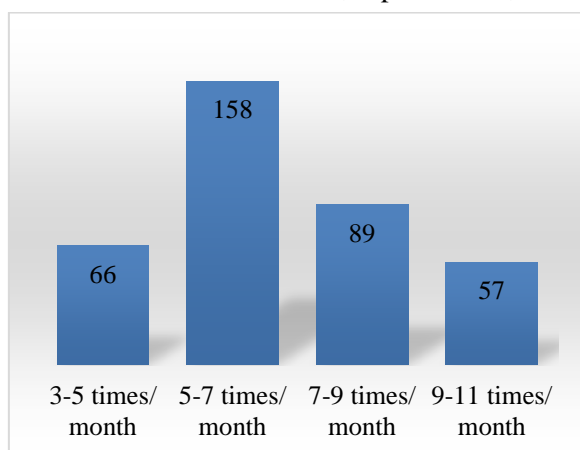


Figure 3. The frequency of students' visits to markets, supermarkets, and shops every month

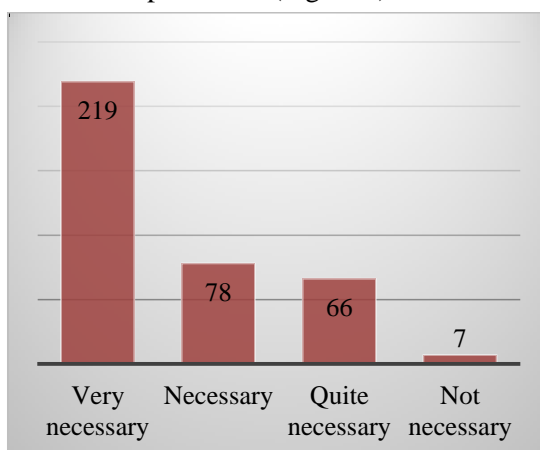


Figure 4. Students' awareness of reusable bags

When surveying the level of awareness among students regarding the use of reusable bags as an alternative to single-use plastic bags, the majority of students (219 out of 370) stated that it is very necessary. Additionally, 78 students indicated that transitioning to using reusable bags is

necessary, while 66 students considered it quite necessary for environmental protection. Only a small portion of the total number of participating students was unaware that the aforementioned change is beneficial for the environment. The number of students who believe that there is no effect on protecting the environment is 7 out of 370 students, accounting for 2% (Figure 4).

3.2. The willingness to pay of students for reusable bags

During the student interviews, the interviewer first collected information related to the students' use of reusable bags while simultaneously presenting the problems of environmental pollution due to excessive use of single-use plastic bags. Then, reusable bags were introduced, and students were asked if they would agree to pay for these bags at the initial bid. The results are shown in Table 2. There was a total of 370 observations divided into four groups, with approximately an equal number of students interviewed in each group.

Table 2. Distribution of initial bid

Initial bid (bid1), VND	Frequency	Percentage	Cumulative percentage
3.000	89	24.05	24.05
6.000	93	25.14	49.19
9.000	98	26.49	75.68
12.000	90	24.32	100.00
Total	370	100.00	

The outcomes concerning the rate of agreement for the prices offered were illustrated in Figure 5. The results reveal that the majority of students were willing to pay for the reusable bags.

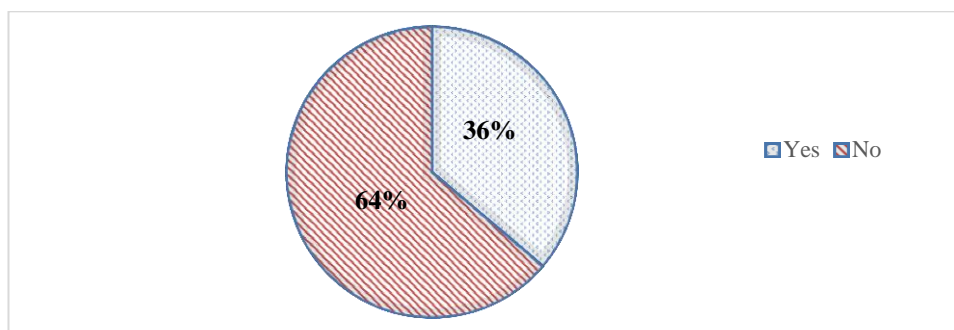


Figure 5. Student's willingness to pay for reusable bags

Table 3 presents the results of the Logit regression for CVM. The Pseudo R^2 coefficient in the model is 0.548, indicating that the independent variables in the model account for 54.8% of the variation in the decision of whether to pay for reusable bags. With a relatively high Pseudo R^2 value, this model is considered to be robust. However, the Pseudo R^2 coefficient alone does not provide a complete explanation of the model's goodness of fit. Hence, it is essential to assess the model's interpretability by considering the accuracy of its predictions. The analysis results reveal that the model accurately predicts outcomes with a percentage accuracy of 93.7%. Therefore, this model is considered to be effective for estimating the factors influencing the willingness to pay for reusable bags, as indicated by both the Pseudo R^2 value and the accuracy percentage of the model's predictions.

The model incorporates both the socioeconomic characteristics of students and other factors that affect WTP for reusable bags. The regression results indicate that there were 6 variables that had a statistically significant impact on the probability of WTP for reusable bags, with a significance level of $P < 0.1$. These variables included gender, the student's academic year, monthly living expenses, part-time employment status, the number of shopping trips per month, and students' awareness of reusable bags.

Table 3. *Logit regression model results on willingness to pay for reusable bags*

	Coefficients	Standard errors (S.E.)	P value
BID	-0.311	0.211	0.012**
Gender	-0.744	0.348	0.032**
Age	0.165	0.238	0.143
Academic year	0.058	0.179	0.000***
Living expenses for a month	0.134	0.140	0.02**
Part-time employment status	0.246	0.314	0.06*
Number of times to go to the market per month	0.67	0.147	0.07*
Awareness of reusable bags	1.826	0.351	0.000***
Constant	-4.041	2.735	0.097*
Log likelihood value	277.596		
Pseudo R ²	0.548		
Percentage of correct predictions	93.7%		
Mean WTP	8,935 VND/bag		

Note: ***Significant at the 99% confidence level, **Significant at the 95% confidence level, *Significant at the 90% confidence level.

The coefficient of the variable 'Bid' had a negative sign with a statistical significance level of 5%, indicating that a higher price for the proposed reusable bag is associated with a lower percentage of students who answered 'yes'. This finding is consistent with the theory of the demand curve. The variable 'Sex' is statistically significant at the 5% significance level. A regression coefficient of -0.744 indicates that, in comparison to women, men are less likely to agree to pay for reusable bags. This can be explained by the fact that women often frequent markets, supermarkets, and shops, leading to a higher demand for reusable bags.

The coefficient of the variable 'Student's academic year' had a positive sign with a statistical significance of 1%. This indicates that as students' progress to their final year, they become more likely to agree to pay for a reusable bag. This can be explained by the fact that final-year students possess a wealth of knowledge and understanding about the benefits of reusable bags and the negative impact of excessive plastic bag use on the environment. Consequently, their acceptance of the proposed reusable bag is also higher.

Similarly, the variable 'Living expenses for a month' also exhibited a positive coefficient with a significance level of 5%. This suggests that students receiving higher living expenses might show greater interest in health-related issues, making them more inclined to support and purchase reusable bags.

Furthermore, the variable 'Status of part-time work' demonstrated a positive correlation with the willingness to pay for reusable bags, with a statistical significance of 10%. This indicates that engaging in part-time work can increase students' total income, subsequently enhancing their awareness of the harmful environmental effects of domestic waste and their willingness to pay for reusable bags.

Likewise, the variable 'Number of times to go to the market per month' had a coefficient of 0.67 with statistical significance of 10%. This signifies that as students increase their frequency of visits to markets, supermarkets, and shops, their WTP for reusable bags also rises. This trend can be attributed to the growing waste production resulting from frequent market visits, thereby driving a heightened demand for reusable bags. Lastly, the variable 'Awareness of reusable bags' showed a positive coefficient with statistical significance at the 1% level. This underscores the idea that heightened awareness of reusable bags translates into a greater inclination to support and purchase them.

Equation (2) is utilized to estimate the average willingness of students to pay for reusable bags, and the corresponding results were presented in Table 3. The computed average WTP for a reusable bag was 8,935 VND.

4. Conclusions and recommendations

The study employed the CVM to estimate students' WTP for using reusable bags. The research findings indicated that over 63% of students agreed to buy reusable bags. Furthermore, the study revealed that the average price paid by students for a reusable bag was 8,935 VND per bag. Our study offered valuable insights into how various factors influence students' willingness to pay for reusable bags. It highlights that gender, student academic year, monthly living expenses, part-time job status, frequency of market visits per month, and awareness of reusable bags positively influenced WTP for this type of bag. There are some recommendations made for this study. Firstly, there is a necessity to develop bags with reasonable prices that are suitable for different student segments. Secondly, producing a variety of reusable bag types that can be used in markets, schools, supermarkets, shops, lemon tea shops, cafes, and clothing stores is advisable. Thirdly, it is important to use different materials to create bags with a range of fashion styles, colors, and designs. These bags should prioritize convenience and good quality to match students' preferences. Finally, implementing policies that encourage student startups to develop reusable bags would be beneficial. These recommendations collectively aim to enhance the adoption of reusable bags among students and promote sustainability in consumer choices.

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