



UNIVERSITY OF
GOTHENBURG

The Innovative Swap System

*A contingent valuation study on joining a swap system
with sustainable cups*

Pontus Meier & Fanny Thulin

Abstract

Although awareness of the problems caused by disposables is increasing, it is not well known that recycling of paper cups is difficult. Consequently, billions of cups end up in landfills every year. In light of this, our study aims to investigate the attitudes and specifically willingness to pay for joining a cup-swap system that could be a sustainable alternative to paper cups. Furthermore, the willingness to pay for sustainable cups made from 50% coffee waste is studied. This was done using the Contingent Valuation Method. The results show that people are willing to pay 69 SEK to join the swap system, and additionally 24 SEK if the cups are made from a sustainable resource. The attitude factors that impact the willingness to pay are the following: importance of reducing disposable cups and greenhouse gases, importance of convenience and whether they dislike the cup having been used by someone else. Furthermore, women are generally found to have a higher willingness to pay. Our results also show that non-Swedes are more favourable towards sustainable cups, but their willingness to pay is lower for the swap system compared to Swedes.

Keywords

Sustainability, Contingent Valuation Method, Willingness to Pay, Theory of Planned Behaviour, Circular Economy, Disposable Cups, Reusable Cups

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Supervisor: Zihan Nie

Department of Economics

School of Business, Economics and Law

University of Gothenburg

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1. Introduction

The amount of waste in the environment is increasing at an alarming rate. This is probably one of the most frequently discussed topics right now. According to Earth Day Network (2018), there will be more plastic in the sea than fish (by weight) in 50 years. There are also five great patches of garbage that are caused by the five gyres on earth. Most notably, the largest one between Hawaii and California: The Great Pacific Garbage Patch, which is estimated to be the size of Texas. This results in a devastating impact on our environment, and according to Frias, Sobral and Ferreira (2010), marine debris cause injury to both marine animals and birds. It is because they are either entangled in drift nets, other debris, or mistake plastic for food. Evidence like this shows that the amount of waste we already have in our environment is causing significant damage. If anything, we need to reverse this trend.

Forests are crucial for biodiversity and 30% of all wood harvested by cutting down forests are used to produce pulp and paper (Moore, 2000). Paper is one of the main materials used to manufacture the billions of paper cups produced each year. Although logging can be sustainable, deforestation is an increasing problem. Our ecosystems are dependent on a fine balance between logging and the growth of forests, but today the net gain of forests per year is negative. Therefore, any solution that can both help industries become sustainable and use our resources more effectively should be applied. This includes the paper industry and the vast amount of paper mass needed to meet the global demand of take-away paper cups.

One of several causes for the issues discussed above is disposable articles, such as food containers or coffee cups. While these cups are mainly made from paper, they are often lined with plastic to prevent leakage, making recycling very difficult (Ertz, Huang, Jo, Karakas & Sarigöllü, 2017). For this reason the majority end up in landfills. Seas at risk (2017) estimates that the average Swedish person uses 47 disposable coffee cups each year. Paper cups usually come with a plastic lid made from polystyrene, which is listed by CLP as one of the problematic plastics that contains hazardous monomers (Klar, Gunnarsson, Prevodnik, Hedfors & Dahl, 2014; Ljungkvist Nordin et al., 2019).

For this reason, it is important to find alternatives to the disposable cup. Reusable cups are increasing in popularity, although disposable cups are still used extensively because they are more convenient. The question is whether it is possible to include reusable cups in a system based on exchange and reuse, rather than having to take full responsibility for the reusable cup. In addition, reusable cups are often made from stainless steel, which is resource

demanding, and perhaps there are other materials that are more sustainable. Therefore, we would like to study the willingness to pay for a system that involves people exchanging cups, thus promoting reuse instead of single use. It is also of interest to study the willingness to pay for cups that are made from a sustainable resource such as waste and are easy to recycle.

An example of this has been brought forth by a company called Huskee. Their idea is to produce cups that are made from 50% husk, a by-product from coffee production, and use these cups in a swap system where people are actively exchanging cups with each other.

The swap system works in the following way:

Step 1) Purchase a cup and automatically join the swap system.

Step 2) Drop in your cup at a café.

Step 3) Order your coffee as usual.

Step 4) Collect your coffee in a fresh cup you know is sustainable.

The cup is available to purchase as a standalone product, and some selected cafés around the world participate in the HuskeeSwap system¹. This system is working, but so far only in small-scale city environments. For this reason, it is interesting to study how much people are willing to pay to participate in similar swap system on a larger scale. If our results indicate that people are positive towards the implementation of a swap system, then it is more likely that this concept could work on a bigger scale. However, if the outcome is the opposite, then the concept needs to be improved upon before it can be regarded as a viable large-scale solution. Ertz et al. (2017) state that reusing is better for the environment compared to recycling, which is why we want to study the willingness to pay for reusability.

Generally, awareness regarding environmental issues and disposable items in Sweden is high (Håll Sverige Rent, 2019). It is therefore evident that there is a potential market for this swap system. However, to our knowledge, there is little research on to what extent people are inclined and willing to pay to join a swap system based on sustainable cups. Research shows that people often buy coffee spontaneously, which would explain why disposable cups to a large extent are used even though people generally think it is bad (Håll Sverige Rent, 2019). We believe that people want to be part of the solution, but that it is difficult to make decisions that are beneficial for the planet, when choices that affect the environment negatively are more convenient. Convenience is growing in importance, and Ertz et al. (2017) write that

¹ According to Huskee the HuskeeSwap system is working well in cities such as Barangaroo (Australia), Mosman (Australia), Newcastle (Australia) and Budapest (Hungary). (Email conversation with Huskee on november 13 2019).

there is an increasing perception of time shortage because consumers perform shadow work. This means that services that were previously provided by businesses, such as booking flight tickets, now are carried out by consumers. That is why we need solutions that support convenience, but are also environmentally friendly. Therefore, the purpose of this study is to measure the willingness to pay for joining a swap system based on sustainable cups, as well as study how attitudes affect this willingness to pay. Specifically, this study aims to answer the following three research questions:

1. How much are people willing to pay to join a swap system with reusable cups, that they can change every time they buy coffee at a café?
2. Is their willingness to pay higher for sustainable cups that are produced from 50% coffee waste?
3. Which demographic or attitudinal factors affect the willingness to pay?

By contributing information on how much people are willing to pay for joining a swap system based on sustainable cups, this study aims to provide valuable insights for companies, governments, institutions and organizations on what they can do to minimize single use. This research can help them to better understand how joining or starting similar swap systems can reduce the amount of disposables that end up in our environment today. The focus in this study has been to mainly consider students at School of Business, Economics and Law in Gothenburg, Sweden. Students are thought to frequently buy coffee to go, which makes them ideal to study as reusable cups may be more relevant to them. There is also more to gain, environmentally, from frequent coffee drinkers switching to reusable cups. It would also have been impractical to attempt to reach respondents all over Sweden.

We conduct a contingent valuation study, where the willingness to pay for a swap system based on sustainable cups is elicited. Logit and tobit regressions are used to examine the factors that determine if there is a willingness to pay, and what level it is. The results show that the willingness to pay for a swap system is 69 SEK, and for the sustainable material 24 SEK, amounting to 93 SEK. Women have more favourable attitudes towards the environment, and consistently show a higher willingness to pay than men. The probability of having a positive willingness to pay was higher for non-Swedes compared to Swedes, although Swedes have a higher level of willingness to pay. Surprisingly, coffee consumption negatively affects the level of willingness to pay for sustainable material, and the importance of convenience has a positive impact on the probability of having a willingness to pay for a

swap system. The willingness to pay is also determined by how important respondents find reducing the use of disposable cups and greenhouse gas emissions.

The rest of the thesis is organized as follows. Section 2 discusses the background and previous research. Section 3 explains the theoretical framework. Section 4 discusses the method used in this study, and the results are presented in section 5. Lastly, the results are discussed in section 6 and the conclusion is found in section 7.

2. Background

2.1 The waste issue

2.1.1 Plastics

Plastics can be found in many products, one of which is the paper cup, which is lined with a plastic film in order to prevent leakage. Since its commercial introduction in the 1950s, production of plastic has doubled every 11th year, and the concentration of plastic in the marine environment has increased accordingly (Wilcox, Seville & Hardesty, 2015). Global production is also expected to increase as the demand for plastic products will continue to grow. With increasing demand from emerging economies, it is said to double by 2020 compared to 2017, and quadruple by 2050 (Ellen MacArthur Foundation, 2017). They argue that this is because plastics offer an effective solution to our industries' problems, with its unrivalled properties such as: low cost, versatility, durability and high strength-to-weight ratio. However, Wilcox, Seville and Hardesty (2015) show that plastics are expected to last for centuries and even fail to degrade at all, if not exposed to UV radiation and bacterial activity.

Thus, although plastics have provided much societal benefit with its unique properties, its impact on the environment is becoming a problem (Cole, Lindique & Halsband, 2011). If all plastics were recycled and reused, this multifunctional commodity would not pose the same threat as it does today. Indeed, it provides key solutions in almost every industry whether it be in the car, food or aviation industry. Therefore, it is essential to find smarter ways of utilizing plastic to society's advantage, without damaging fragile ecosystems. It is pertinent to keep it in closed loop systems, improve its recyclability, reuse it and minimize the chemical harm it causes. Today, however, due to our lack of responsibility for this commodity, 95% of plastic packaging material value, that is 80-120 billion dollars, are lost to the economy due to the single use of plastics (Ellen MacArthur Foundation, 2017). Not only are valuable resources wasted, but they also end up in our environment, resulting in substantial damage to our ecosystems.

One emerging issue is microplastics and Cole, Lindique and Halsband (2011) write that it originates from the breakdown of macroplastic such as granules used as a scrubbers in cosmetics. For this reason, the dispersion of microplastics is hard to control and within the scientific community there is a growing concern of how marine organisms tend to ingest microplastic particles. Cole, Lindique and Halsband (2011) also find evidence that lower-

trophic level organism (organisms that are low on the food chain) ingest microplastics since they cannot differentiate between plastic particles and food. Blight and Burger (1997) write that microplastics are prevalent throughout the food chain, and that they are ingested by many animals in the marine biota, including seabirds, crustaceans and fish. Scientists are only now beginning to scratch the surface of this issue, and the real consequences of our plastic pollution are still unknown.

2.1.2 Paper

Society is currently undergoing a shift from plastic to paper, since the latter is believed to be more environmentally friendly. This is because paper decomposes faster in the environment, and it is likely that it causes less damage to nature compared to plastics (Save On Energy, 2018). Paper is currently produced in great quantities in order to meet growing global demand, however, it is a highly polluting as well as water-exhaustive industry (Mandeep, Gupta, Liu & Shukla, 2019). For instance, 100 000 tonnes of harmful contaminants are released from paper mills in India, every year (Gopal, Sivaram & Barik, 2019). Furthermore, paper packaging often contains elements of plastics and the innate problems of plastic still applies to paper packaging. Such is the case with paper cups since it is not commonly known that they are lined with plastic films. This lack of awareness can be used by companies to increase sales and conduct greenwashing simply by including paper in their plastic packages.

Although paper is more advantageous in terms of decomposition in nature, the production of paper still poses a big problem. For instance, in India, paper mills have been characterized as one of 17 well-known polluting industries, and concerning the generation of dangerous waste that are mixed with water, it is ranked sixth worldwide (Mandeep, Gupta, Liu & Shukla, 2019). Therefore, we can not simply turn from plastic to paper if the same linear business model continues to be adopted, with no attempt of achieving a more circular economy where we reduce, reuse and recycle materials.

2.2 Circular economy

For a long time, resources on Earth were considered infinite, and production was running without any reflection on the impact it had on the environment. Inputs were processed without considering the consequence that the output could cause. This way of thinking is referred to as linear economy, and it can be seen in Figure 1. When the global economy was small enough so that the planet could restore its resources faster than they were extracted, this was not an issue. However, according to Bonciu (2014), by the time after the Second World War, the global population started to increase rapidly, and it was no longer reasonable to think of resources as infinite.

Authors such as Boulding (1966) and Meadows, Meadows, Randers and Behrens (1972) provide some of the most influential research on this topic. Boulding (1966) compares our planet to a spaceship, where the amount of resources are finite and have to be recycled in order to secure a sustainable future. He thereby argues that our planet is a closed system, where all outputs are interconnected with inputs. Similarly, Meadows et al. (1972) propose that there are limits to the global population growth, because the amount of resources available is fixed.

In Pearce and Turner (1990), they compare natural and economic systems and find that waste is generated in both, although natural systems “recycle their waste” (p. 36), whereas the economic systems generally do not. Along the lines of Boulding (1966) and Meadows et al. (1972), they do however question this and argue that waste should be considered a resource to use as an input in production. The cups that we are studying are produced from 50% waste, supporting these authors’ argument. Thanks to their research, the concept of the circular economy is generally attributed to them.

There are several definitions of what circular economy actually is. Generally though, the three Rs are fundamental in explaining what it is, and these are: reduce, reuse and recycle (Feng cited in Yuan, Bi & Moriguichi, 2006). This means that the goal should be to reduce the amount of new production, to avoid single-use items and instead encourage reuse, as well as recycle all goods when they can no longer be used. This way, the materials can be used as inputs in the next “cycle” of production. This can be seen in Figure 2. According to Ertz et al. (2017) and Poortinga and Whitaker (2018), reusing has been proven more efficient than recycling in terms of reducing the strain on the environment, and it is also more economically

efficient. For this reason, we should not only rely on recycling but also encourage reduce and reuse.



FIGURE 1. Visualisation of linear economy, where resources are used once and then incinerated. (Circular Tayside, n.d.)

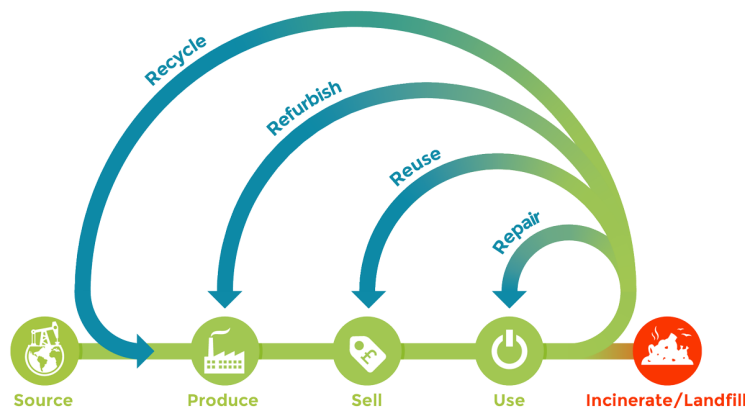


FIGURE 2. Visualisation of circular economy, where raw materials from used products are repurposed. (Circular Tayside, n.d.)

2.3 Alternatives to disposable items

The many environmental and social issues regarding disposable items are increasingly brought to attention, and several solutions, other than the swap system, have been developed. For instance, there are several companies that provide reusable cups for events, such as Ecocup, Cup Concept and Ecoverre. The customer usually has to pay a deposit fee when buying a drink, which they will then get back upon returning the cup. In Germany, a system called reCup works in a similar way, where the consumer pays a deposit fee of one euro for a reusable cup, which they will retrieve upon returning the cup in any of the participating cafés.

Two of the largest convenience stores in Sweden, in collaboration with Swedish foundation Håll Sverige Rent, introduced a discount of 3 SEK, from 23 to 20 SEK, for customers who bring their own cup in an attempt to decrease the number of disposable cups used (Håll Sverige Rent, 2019). Having evaluated the campaign after four months, the number of disposable cups was found to have decreased by on average 1.6%, and 5.7% in areas close to universities.

Considering production alone, reusable cups have a larger environmental impact than disposable cups, which is explained by the need for more raw material to produce them. For this reason, many uses are required before the cups are more environmentally friendly. The most common type of reusable cup is made of stainless steel, and Johannesson, Sanne, Youhanan and Zhang (2019) estimate that it has to be used at least 45 times before its per use environmental impact is lower than that of the most common disposable cup, made of paper and plastic. Garrido and Del Castillo (2007) conduct a life cycle analysis of cups used at an event in Barcelona, and found that a reusable cup has to be used ten times before having a smaller environmental impact than the disposable cup made of the same material.

Another item whose environmental consequences are widely discussed, is the disposable plastic bag. Bangladesh was the first country in the world to place a ban on it, in 2002, and many countries have followed (Clean Seas, n.d.). Another solution is charging customers for the bags, which several retail brands in Sweden are doing since 2017. According to Naturskyddsföreningen (2019), MQ and Apotek Hjärtat both saw a decrease of the use of plastic bags with around 60% in the two years after the charge was implemented. This evidence suggests that a transition from single use to multi use is not impossible. In this case, plastic bags are abandoned in favour of reusable bags, which is an indication that a transition from disposable cups to reusable cups may also be possible. In addition, this year, in 2019, the European Parliament proposed a directive for banning several disposable plastic items by 2021. This further suggests that society is increasingly moving away from single-use items.

2.4 Previous research

In this section, we provide an overview of previous research on behaviour regarding recycling and reuse.

Mannetti, Pierro and Livi (2004) discuss how variables from the Theory of planned behaviour model can explain variations in intention to recycle. They discover that the variable *perceived behavioural control* strongly affects the intention to recycle, and the weakest is *subjective*

norms. One reason why behavioral control has a strong impact on intention had to do with barriers concerning differentiated collection. After all, it takes time and effort to recycle material and it can be seen as an obstacle.

Hornik, Cherian, Madansky and Narayana (1995) identify four different categories of factors that could affect recycling behaviour. These are: intrinsic incentives, extrinsic incentives, internal facilitators and external facilitators. They discover that consumer knowledge and commitment to recycle, which are internal facilitators, have the largest impact on recycling behaviour. This is followed by external incentives, especially social influence, but also monetary rewards. Thus, if people have knowledge about recycling, which also raises their commitment, the probability that they will recycle should increase. Similarly, if recycling is rewarded and it increases your status or influence, this should increase the likelihood of recycling. Vining and Ebreo (1990) also find that social influence strongly impacts recycling behavior, which will increase if supported by neighbours or family.

In the research by De Young (1990), data from several studies on recycling is analyzed. The author finds that attitudes towards recycling were very positive; 85% of respondents found recycling very important, and between 54% and 86% of respondents stated that they do recycle. However, the author advises that these numbers should be interpreted with caution, as they are based on self-reported and not observed behaviour. Regarding barriers to recycling, lack of information was the most commonly reported reason among those who do not recycle. This is consistent with the findings of Hornik et al., 1995, and it means that respondents simply do not know how to correctly recycle different types of waste. In addition, De Young (1990) finds that another major factor, reported both by those who recycle and those who do not, is that recycling is problematic and that much space was needed. In conclusion, Vining and Ebreo (1990) uncover that people find recycling important, but that convenience seems to be a strong barrier.

Poortinga and Whitaker (2018) state that paper cups are poly coated, meaning that the paper is protected from water, grease and oil. Due to this, they are difficult to recycle and many paper cups end up in landfills. To combat this issue, the aim of their study is to see how the use of reusable cups can be promoted. Their research uncovers that environmental messaging and alternatives can greatly stimulate behaviour to use reusable cups instead of disposable cups. Furthermore, they conducted a field experiment on 12 different universities, and one of these universities chose to have a charge on disposable cups for an extended period of time. Students from this university were also given reusable cups for free. This increased the usage

of reusable cups by 34%, which shows that promoting environmentally friendly substitutes and implementing a charge on disposable cups, are viable solutions to promote the use of reusable cups instead of disposable cups. A trial on four cafés led by Zero Waste Scotland reveals that charging for disposable cups instead of giving a discount when reusable cups are used, significantly contribute to people turning to reusable cups instead of using disposable cups (Lenaghan, Clark & Middlemass, 2019).

The term sharing economy is increasingly being discussed today. Although there is no clear definition, it entails circulation and sharing of goods, which can be done either through businesses or directly between consumers (Schor, 2016). Leismann, Schmitt, Rohn and Baedeker (2013) also discuss “using rather than owning”, in the context of textiles and tools. They argue that increasing resource efficiency is crucial for reaching a truly sustainable society, which can be done through renting or loaning goods instead of owning them. This way, goods are used more extensively instead of remaining idle, which is particularly important when it comes to goods that are rarely used, such as lawn mowers or training equipment. This is consistent with the notion of reuse postulated by circular economy, and the concept is similar to that of the swap system in this study.

In a report by Håll Sverige Rent (2019), solutions to the single-use issue are examined. The authors find that environmental concern is high, especially among young people. They are somewhat prepared to change their behaviour in favour of sustainable consumption, although Håll Sverige Rent (2019) also states that convenience will probably always be an important factor. Instead, price seems to affect decision-making and can explain why the often expensive, sustainable solutions are not as desirable as conventional goods. In addition, the authors of this study suggest that convenience and spontaneity is key when consuming coffee to go, which might explain why single use is common even though environmental awareness is high.

The study by Ertz et al. (2017) uncovers the underlying factors that affect the consumption of reusable containers by using the theory of planned behaviour, which is introduced in section 3.1. Their results indicate that context strongly impacts perceived behavioural control, motivations as well as attitudes. From this, they suggest that motivation is caused by inner tensions and needs, which affects the intention towards a certain behaviour. They thereby suggest that the original theory should be extended with context and motivation as well. Ertz et al. (2017) also claim that reuse needs to be easier and single use more difficult, indicating that we need to create a push towards making reuse the more convenient option. This is

called nudging, and it may be one of the most effective approaches to reduce single use, as changes in behavior and habits often are difficult.

We find that much research has been made on what attitudes and circumstances affect people to recycle. However, we do not find as much information on reuse. This is the reason we want to measure how much people are willing to join a swap system with environmental friendly cups, using willingness to pay as a measurement. By providing new information, we hope to bridge this gap and provide policy makers and businesses with more insights on what opportunities there are to solve the problems caused by disposable cups.

3. Theoretical framework

3.1 Theory of Planned Behaviour

According to Madden, Ellen and Ajzen (1992), the theory of planned behaviour consists of three determinants of intention. These can be seen in Figure 3. The first is *attitude* towards a certain behaviour, which essentially means to which degree someone finds a certain behaviour favourable or not. The second is *subjective norms* which postulates that social pressure to perform or not perform a behaviour is a determining factor (Ajzen, 1991). Finally, *perceived behavioural control* is an antecedent of intention, which means that the perception of how difficult a behaviour is will greatly determine whether the behaviour in question will be carried out. Ajzen (1991) also writes that past experience plays a factor, because anticipated obstacles will be greatly influenced by previous experience. If someone is insecure and lacks confidence, it is more likely that they will perceive the behaviour as beyond their control to perform. In conclusion, the more favourable an attitude, and the more positive people surrounding the person are towards a behaviour (subjective norms), but also the greater the perceived behavioral control, the stronger the intention will be to act out a particular behaviour (Ajzen, 1991).

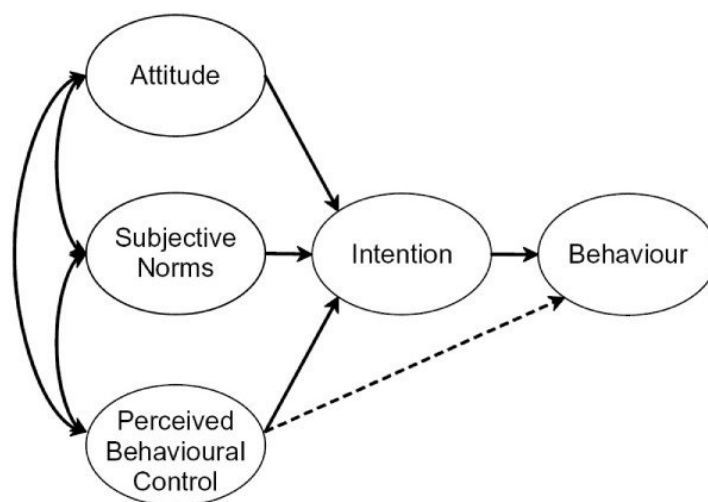


FIGURE 3. The Theory of Planned Behaviour
(Ajzen, 1991)

The theory of planned behaviour can offer valuable insights about the determinants for people to join a swap system or not. Generally, people could have a favourable attitude

towards a swap system, especially when it is based upon environmental friendly and easily recyclable cups. However, the convenience that disposable cups offers, will have to be given up when choosing to join a swap system. Therefore, the attitude will probably differ among people depending on environmental awareness, which would greatly affect the intention that determines if they join the swap system. However, the focus in this study is to find out how attitudes affect intention. The attitudes are measured using several questions in our survey, and the intention is measured in the form of willingness to pay. Perceived behavioural control is also briefly discussed using the comments retrieved from our survey.

3.2 Willingness to pay and consumer welfare

A consumer's willingness to pay is defined as the maximum amount they would be willing to pay for a certain amount of a certain good, without suffering a loss in well-being, or utility. They do not have unlimited resources, hence their behaviour on the market is limited by their budget constraint. Contingent on their budget constraint, the goal is to maximize the utility derived from consuming a certain combination of goods, or a *bundle* (Perloff, 2017). The specific bundle chosen by each consumer is largely determined by their preferences, and therefore preference is also closely connected to willingness to pay. Consumption is not restricted to market goods, but also environmental goods. Kolstad (2011) discusses how environmental quality can be incorporated into the utility function: $U_i(x_i, e)$, where x_i represents the composite good consumed by each individual, and e represents the (fixed) level of environmental good consumed. It is assumed that all individuals consume the same amount of the environmental good, but the utility is specific to each individual.

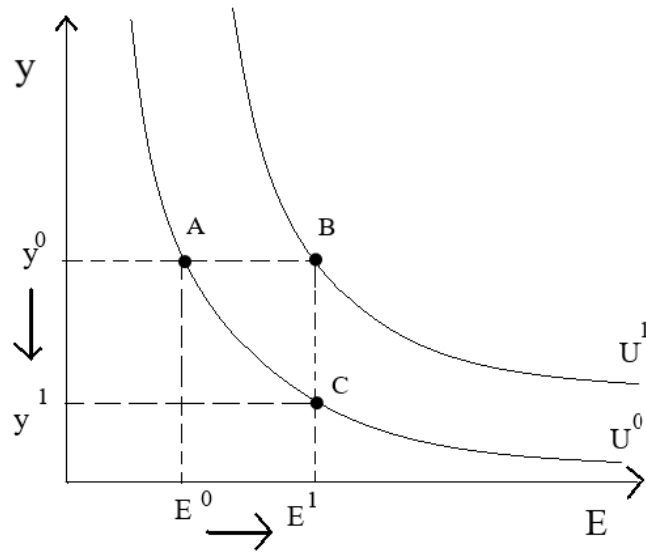


FIGURE 4. The relationship between willingness to pay and utility.

y denotes income and E environmental quality.

(Brännlund & Kriström, 2012, p. 80)

In Figure 4, willingness to pay and how it is affecting utility is depicted graphically. The starting point is at A, where environmental quality is E^0 and income y^0 . The increase in utility from increased environmental quality ($E^0 \rightarrow E^1$) is shown by the movement from point A to point B, which is located on a higher utility curve. However, the individual simultaneously has to pay for this increase in environmental quality, so its income decreases from y^0 to y^1 , at point C. Point C is located on the original indifference curve, which means that the decrease in utility from decreased income, is the same as the increase in utility from improved environmental quality. This way of measuring welfare is called *Compensating Variation* and it is attributed to John Hicks (Brännlund & Kriström, 2012). The following expression further describes this welfare mechanism:

$$v(Q^0, y) = v(Q^1, y - WTP)$$

where v denotes utility, Q^0 the original level of environmental quality, Q^1 the improved environmental quality, y denotes income and WTP the willingness to pay. Since moving from Q^0 to Q^1 increases utility, the income y has to be reduced by WTP so that the equation is satisfied.

4. Methodology

In this section, the method applied to answer the research questions is described. An introduction to the contingent valuation is provided, as well as a description and a discussion of the survey design and sampling strategy.

4.1 Contingent Valuation

In order to elicit the respondents' WTP, the contingent valuation method (CVM) was used. It is a type of Stated Preferences method that is often used in cost-benefit analysis to assess how individuals value goods that are not traded on any market, typically environmental goods (Kolstad, 2011; Pearce, Atkinson & Mourato, 2006). The other one is Choice Experiment, where the respondent is asked to choose between two scenarios with different characteristics. A hypothetical market where the good would be supplied is described, and the individual is asked for their preference, or willingness to pay, for the good, and the utility generated is derived from that. For goods that are traded on markets, revealed preferences are used, which means that the actual behaviour of consumers is observed (Breffle, Morey, Rowe & Waldman, 2006). One of the most important factors for a successful contingent valuation study, is the description of the market scenario. Not only does the good have to be thoroughly described, but also the context and method of payment need to be provided (Kolstad, 2011). Kolstad also argues that it is essential that the market scenario is realistic and understandable for all respondents, or else they may incorrectly interpret the information and the study's results will not be reliable or useful.

There has been some controversy surrounding the validity of the CVM. One issue frequently mentioned is hypothetical bias, which means that people may overstate their WTP due to the situation described being hypothetical and no transaction will actually occur (Murphy, Allen, Stevens & Weatherhead, 2005). In order to solve this issue, the cheap talk script is often presented as a good measure, because it reminds the respondent to keep their budget restriction in mind when stating their WTP. However, Boyle (2017) raises the question whether this will provide more reliable results or merely encourage respondents to lower their stated WTP. There is also the issue of warm-glow. The meaning of this is that people may place a value on something not only because they value the good itself, but they also gain utility from looking good in front of others (Andreoni, 1990). This may have caused respondents in this study to state a higher willingness to pay for the goods than otherwise. On the other hand, Carson, Flores and Meade (2001) argue that this is only an issue because the

respondent wants to please the interviewer, so it is possible that the use of an anonymous online survey solved this issue.

4.2 Survey design

Pearce, Atkinson and Mourato (2006) suggest that the survey should consist of three parts, and this became our method of choice since it provided a clear outline and made the survey easy to answer². First, the respondent was asked about their habits regarding coffee drinking, and their attitude towards several environmental problems, such as the importance of reducing disposable cups and recycling. Then the swap system was presented, including information about disadvantages and advantages with disposable and reusable cups. The respondent then stated their willingness to pay to join such a swap system if it existed in every café (WTP1). After that, they were informed that the cups included in the swap system are made from husk, and they were asked how much their willingness to pay for the swap system increases with that information (WTP2). If the stated willingness to pay was zero for either of the two elicitation questions, the respondent was asked to explain why. This was believed to provide valuable insights into what aspects of the swap system that were not appealing, and whether there are substitute goods that the respondent would prefer. Lastly, standard demographic questions such as age, gender and income were asked to examine how these factors affect the WTP. A Swedish as well as an English version was created in order to reach both Swedish and international respondents. The English version can be found in the appendix.

In this study, the respondent was to answer the valuation question using a payment card. This means that the respondent was given numbers to choose from, and then asked to state the number that best corresponds to their WTP. The payment card for WTP1 ranged from 0 to 220 with incremental intervals of 20 SEK, and between 0 and 60 SEK for WTP2, with incremental intervals of 10 SEK. This method was used for several reasons, discussed by Pearce, Atkinson and Mourato (2006). For instance, they point out that the payment card is known to facilitate the valuation of the scenario for the respondent, whereas for example using an open-ended question, where the respondent is simply asked to state their maximum

² Before finalizing the survey, it was tested by a few individuals to verify that it was understandable. Several comments were made regarding the phrasing of the elicitation questions, therefore these were adjusted. In the original survey, all questions were required to ensure that a full set of variables would be generated for all respondents, however, several individuals consequently felt “uncomfortable” and therefore this option was abandoned. It is better to be able to skip a question they do not wish to answer, rather than have them not complete the survey at all.

WTP, can lead to various issues and unreliable responses such as outliers or protest answers. For this reason and others, using open-ended questions has largely been abandoned.

Using payment cards does not come without problems though, the most important being the potential bias arising from the range of numbers chosen (Pearce, Atkinson & Mourato, 2006). This has also been studied by Rowe, Schulze and Breffle (1996), who found no evidence of range or centering bias, but their results do indicate bias related to what maximum value is chosen. They argue that if many responses are gathered around the maximum value, it may be set too low, and the mean willingness to pay would be underestimated. Similarly, Whynes, Wolstenholme and Frew (2004) test for range bias by comparing the WTP for two payment cards with different lengths, and find that when a payment card with values up to £1000 is used, the mean WTP is 30% higher than for a payment card that ranges only to £100. Similarly, if many responses are gathered around zero, it indicates that some of the respondents may even have a negative WTP. If this is not accounted for, the mean WTP will be overestimated, and conclusions about the societal benefits will be inaccurate (Hanley, Colombo, Kriström & Watson, 2009).

4.3 Data collection and sampling

The sample includes students at School of Business, Economics and Law in Gothenburg, Sweden, and to achieve a larger share of international respondents, we sent the survey to friends from the following countries: England, France, China, USA and Spain. Among our international respondents, 23 out of 74 are students. At the university, we approached students on a number of occasions, between december 4 and 11, 2019, mainly during lectures but also in the cafeteria and other places in school. We believed that approaching students during lectures would be effective and generate a high response rate. The subject and purpose of the thesis was described shortly to them, and they were then asked to scan a QR-code in which the survey, created in Google Forms, was linked. Digital format was used over paper format for several reasons, among others, it is making compilation of data quick and simple. It is also more convenient for the respondent to choose when to fill out the survey, and be able to do that independently, without having to hand it in when done. However, the disadvantage of not being present while the respondent answered the survey, was that if they found any part of the survey unclear, there was no possibility to receive clarification.

Several studies have examined whether charity donations create incentives for response and therefore generate a higher response rate, with mixed findings. For instance, Robertson and

Bellenger (1978) found significant differences in response rates using charity incentives compared to cash incentives or no incentives. For this reason, we informed respondents that for every answer, 1 SEK would be donated to a company working with installing solar power worldwide, in the hope that it might incentivize people to answer, meanwhile doing something good.

Knowing the subject of the thesis, the choice to participate in the survey or not may depend on the respondents' interest in the topic. For example, environmentally conscious people may find this more interesting and therefore be more likely to answer, which in turn may skew the results. This is known as self-selection bias (Heckman, 1979). However, the inclusion of several questions regarding environment attitudes is thought to control for this and therefore this problem may be avoided. Furthermore, there is the possibility of sampling bias because all students at the school are not equally likely to be selected into the sample. The response rate was about 68%.

5. Results

5.1 Descriptive statistics

Table 1 shows the summary statistics of our sample. The sample size is 188, age obtained a mean of 27 and monthly gross income equaled to approximately 21 000 SEK. Women constituted a large share of our sample, 62%, and the number of Swedish people was 114, and non-Swedes 74. The average number of to go cups per month was approximately four, and a fourth of our sample stated that they consume at least 12 cups per month. The importance of reducing disposable cups averaged 4.4, meanwhile recycling averaged 4.7, greenhouse gases 4.8 and convenience 3.9, indicating that environmental issues are important for the respondents in our sample.

TABLE 1. Descriptive statistics of the variables

Variable	Description	Mean	Min	Max	Obs.
Age	Years	26.9	19	68	182
Income	(In thousands SEK, per month)	20.63	10	75	188
Female	=1, if woman	0.62	0	1	188
Student	=1, if student	0.69	0	1	181
Non-Swedish	=1, if not Swedish	0.39	0	1	188
Coffee consumption	No. of cups to go, per month	4.45	0	12	187
Own cup	=1, if respondent has used their own cup	0.3	0	1	187
Important reduce disposable cups	Importance of reducing disposable cups, scale 1-5 where 1 is not important and 5 is very important	4.44	1	5	187
Important recycling	Importance of recycling, scale 1-5 where 1 is not important and 5 is very important	4.68	1	5	187
Problem littering	Magnitude of littering problem in local area, scale 1-5 where 1 is not a problem and 5 is a big problem	3	1	5	186
Important reduce greenhouse gases	Importance of reducing greenhouse gas emissions, scale 1-5 where 1 is not important and 5 is very important	4.78	2	5	187
Important convenience	Importance of convenience when buying coffee to go, scale 1-5 where 1 is not important and 5 is very important	3.92	1	5	186
Used cup - less WTP yes	=1, if the cup has been used by someone else, WTP will be reduced	0.19	0	1	187
Used cup - less WTP maybe	=1, if the cup has been used by someone else, WTP will maybe be reduced	0.3	0	1	187
Knew hard to recycle	=1, if respondent knew disposable cups are difficult to recycle	0.47	0	1	187

Note: The table reports the summary statistics of the demographic and attitude variables used in the analysis.

5.2 The willingness to pay

In this section, the answers to the first and second research questions are explored. Because payment cards were used in this study, there is always the possibility that some true values lie outside of the range. In the case of willingness to pay for the swap system, 23 respondents stated a WTP of 0 kr, and six respondents stated a WTP of 220 kr or more. Regarding willingness to pay for the recyclability of the cup, 32 respondents stated a WTP of 0 kr, and 15 respondents stated a WTP of 60 kr. This is seen in Figure 5 and Figure 6, respectively.

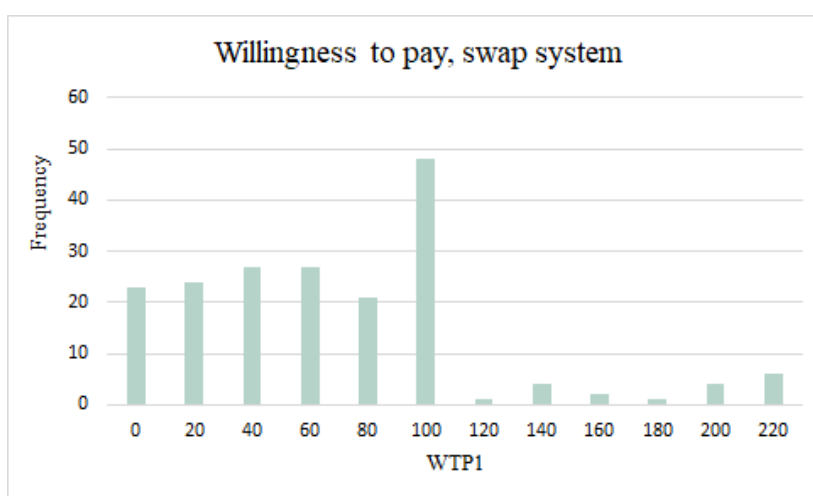


FIGURE 5. Distribution of willingness to pay, swap system.

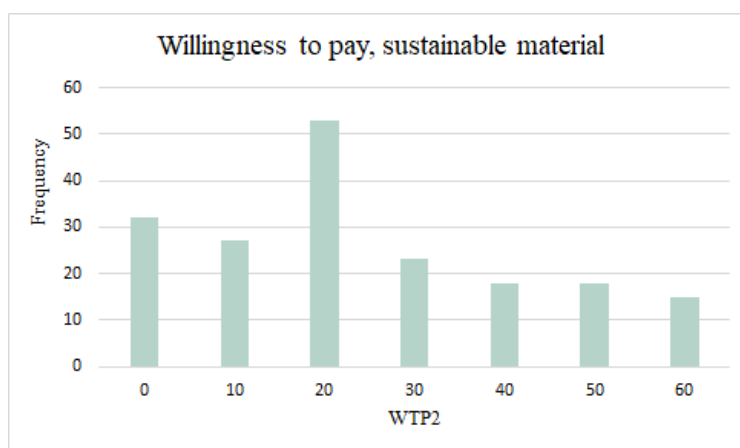


FIGURE 6. Distribution of willingness to pay, cup made from sustainable materials.

The results show that the mean willingness to pay for the reusability of the cup, and the swap system, was 69 SEK. The mean willingness to pay for sustainable material was 24 SEK. The median³ was slightly lower, for WTP1 and WTP2 it was 60 SEK and 20 SEK, respectively (see Table 2). However, due to our sample not being representative, we cannot extrapolate these results to represent the Swedish population.

TABLE 2. The willingness to pay.

Variable	Description	Mean	Std. dev.	Median	Obs.
WTP1	WTP for a swap system	68.9	51.59	60	188
WTP2	WTP for a sustainable cup	24.4	18.25	20	186

5.3 Variables explaining the probability of having a willingness to pay

To answer the third research question, firstly, we examined what variables affect the probability of there being a WTP. These were firstly demographic; *age*, *income*, *Female*, and also *student* and *non-swedish*. These were tested both for WTP1, and WTP2, and are shown in regressions (1) and (4) in Table 3, respectively. Then, *coffee consumption* was added as a sixth variable to analyze whether this changes the outcome. This is seen in (2) and (5) in Table 3. Lastly, regression (3) and (6) include attitude variables to test whether these can explain the variation in willingness to pay. In order to study this, we created a binary dependent variable where 0 indicates that the respondent does not have a WTP, and 1 indicates that they have a WTP. Because the dependent variable is binary, we used logit regression. Using this regression model, the coefficients are slightly difficult to interpret, and therefore we will not discuss to what extent the variables affect the WTP, only whether they negatively or positively affect the probability of having a WTP.

³ The mean WTP is often higher than median WTP, caused by a few respondents stating very high values. In our study this was not possible, thus the values from the two measures are fairly similar. Pearce, Atkinson and Mourato (2006) however, argue that it is sometimes necessary to report both, especially when the difference in mean and median may cause differences in acceptability towards policy implementation among the general public.

TABLE 3. Results from logit regressions.

Variable	WTP1			WTP2		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.013 (0.032)	-0.023 (0.033)	-0.048 (0.038)	0.024 (0.033)	0.017 (0.033)	0.025 (0.036)
Income	-0.003 (0.02)	0.002 (0.02)	0.005 (0.024)	0.007 (0.021)	0.01 (0.021)	0.021 (0.024)
Female	1.587*** (0.494)	1.5*** (0.498)	0.353 (0.635)	1.714*** (0.447)	1.646*** (0.45)	1.075** (0.536)
Student	0.234 (0.941)	0.045 (0.924)	0.028 (1.147)	1.003 (0.923)	0.903 (0.912)	1.62* (0.965)
Non-Swedish	0.908 (0.727)	0.731 (0.713)	-0.366 (0.824)	1.766** (0.757)	1.669** (0.746)	1.53* (0.796)
Coffee consumption		-0.074 (0.05)	-0.091 (0.068)		-0.053 (0.046)	-0.001 (0.059)
Yes own cup			0.962 (0.831)			-0.181 (0.607)
Important reduce disposable cups			0.456 (0.349)			0.546* (0.322)
Important recycling			0.108 (0.401)			0.126 (0.393)
Problem littering			0.441 (0.321)			0.284 (0.25)
Important reduce greenhouse gases			0.752 (0.504)			0.554 (0.557)
Important convenience			0.556** (0.27)			-0.124 (0.229)
Used: Less WTP yes			-0.429 (0.685)			0.291 (0.611)
Used: Less WTP maybe			0.501 (0.784)			0.599 (0.642)
Knew hard to recycle			0.125 (0.67)			0.258 (0.546)
No. of observations	1/5	1/4	1/1	1/5	1/2	1/0

Note: *, ** and *** indicate significance at 0.1, 0.05 and 0.01, respectively. Standard errors in parantheses. Outcome variables: WTP1 (swap system) and WTP2 (sustainable material). Control variables include demographic and attitudinal variables. The regression method used is logit.

5.3.1 Willingness to pay for the swap system

In regression (1), Table 3, the coefficient for the variable *Female* is positive, suggesting that women are more likely than men to have a positive WTP1, with a significance of 1%. One reason for this could be that when asked for the importance to reduce disposable cups, women measured a mean of 4.7, and men a mean of 4. Moreover, the data for the importance of recycling reveals that women and men had a mean equal to 4.9 and 4.4, respectively. A similar outcome was found with regards to minimizing greenhouse gases, where women rated it a higher importance than men. In regression (2), the variable *Coffee consumption* was added. The reason we believed it would significantly impact the WTP, is that frequent coffee drinkers will be more affected by the swap system. In addition, it would be interesting to study because they would be responsible for the biggest change. However, this variable was not significant. In regression (3), attitude variables were controlled for, and the variable for gender was no longer significant. Only the variable *Important convenience* had a positive impact on WTP1 with a significance level of 5%.

5.3.2 Willingness to pay for sustainable material

In regression (4), Table 3, both coefficients for *Female* and *Non-Swedish* were positive at significance levels of 1% and 5%, respectively. This means that women and non-Swedes are more likely to have a WTP2. When adding the control variable *coffee consumption* in (5), both these coefficients were reduced in size, but remained significant. In regression (6), when controlling for attitude, the previously mentioned variables and *Important reduce disposable cups* show significance, but the positive effect of *Female* and *Non-Swedish* becomes considerably lower, indicating that some of the effect was dependent on whether or not the respondent thinks it is important to reduce disposable cups. Furthermore, when accounting for attitudes, the variable *Student* is significant at a level of 10%, suggesting that being a student alone will positively affect the probability having a WTP2.

5.4 Variables explaining the level of willingness to pay

In this section, the extent to which the variables affect the level of WTP is discussed, which is also needed to answer the third research question. Like in the case of the logit-regressions in section 5.3.1, demographic variables were first examined, followed by the inclusion of *Coffee consumption*, and finally these were regressed together with variables related to attitudes. Regressions 1 through 3 measures the level of WTP1 for the swap system, and regressions 4 through 6 measures the level of WTP2 for sustainable material. The results of these

regressions are shown in Table 4. As previously mentioned, payment cards with values from 0 to 220 SEK and from 0 to 60 SEK were used in this study. It is possible that some of the true values lie outside this range, for example some of the respondents may have a negative WTP. In order to estimate the linear relationship between variables when the dependent variable is right and left censored, we use tobit regression (Gujarati, 2003).

TABLE 4. Results from tobit regressions.

Variable	WTP1			WTP2		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.508 (0.687)	0.489 (0.695)	-0.025 (0.645)	0.361 (0.28)	0.321 (0.28)	0.296 (0.272)
Income	-0.105 (0.385)	-0.116 (0.397)	-0.186 (0.372)	0.019 (0.155)	0.034 (0.158)	0.073 (0.153)
Female	32.711*** (9.303)	32.034*** (9.418)	9.943 (9.793)	13.661*** (3.804)	12.763*** (3.809)	7.782** (4.112)
Student	-16.961 (16.439)	-17.776 (16.577)	-15.943 (15.605)	0.787 (6.904)	0.116 (6.856)	4.041 (6.55)
Non-Swedish	-12.228 (11.836)	-12.96 (11.95)	-24.2** (11.503)	2.959 (4.89)	2.275 (4.867)	1.291 (4.832)
Coffee consumption		-0.444 (1.024)	0.675 (1.041)		-0.715* (0.416)	-0.263 (0.442)
Yes own cup			-1.513 (10.016)			-3.837 (4.19)
Important reduce disposable cups			13.553* (6.98)			5.726* (2.962)
Important recycling			5.88 (8.873)			0.724 (3.757)
Problem littering			0.995 (4.156)			2.195 (1.763)
Important reduce greenhouse gases			26.017** (10.478)			5.471 (4.686)
Important convenience			4.705 (3.893)			-2.567 (1.631)
Used: Less WTP yes			-30.352*** (11.425)			1.725 (4.764)
Used: Less WTP maybe			-12.507 (9.917)			-0.248 (4.166)
Knew hard to recycle			1.155 (9.016)			4.567 (3.775)
No. of observations	175	174	171	173	172	170

Note: *, ** and *** indicate significance at 0.1, 0.05 and 0.01, respectively. Standard errors in parantheses. Outcome variables: WTP1 and WTP2. Control variables include demographic and attitudinal variables. The regression method used is tobit.

5.4.1 Willingness to pay for the swap system

In regression (1), the only variable that affects the WTP1 is *Female*, and it has a coefficient of 32.7, with a significance of 1%. This means that women on average have a WTP1 that is 33 SEK higher than men, *ceteris paribus*. When the variable *coffee consumption* was included in regression (2), the results did not notably change; although the coefficient *Female* slightly decreased in magnitude. In regression (3), *Female* is no longer significant when attitude variables are controlled for.

Additionally, the variable for non-Swedish is significant at a level of 5%, and with a coefficient of -24.2. This means that controlling for all other variables, non-Swedes on average have a WTP1 that is 24 SEK lower than Swedes. The variable *Important reduce disposable cups* showed a coefficient of 13.6 with a significance of 10%. It is interpreted as follows: for each incremental step from 1 to 5, WTP1 is expected to increase with 14 SEK. Moreover, the variable *Important reduce greenhouse gases* had a coefficient of 26, and was significant at 5%. It means that for each incremental step in importance from 1 to 5, WTP1 will increase by 26 SEK. The reason for *Non-Swedish* not being significant in regression (1) and (2) is probably because they have stronger environmental attitudes. This would “compensate” for the negative impact of not being Swedish on WTP1 seen in (3). For this reason, *Non-Swedish* is significant in (3) when these environmental attitudes are controlled for.

The variable *Important reduce greenhouse gases* is significant for WTP1, but not for WTP2, and *Important convenience* turns out to be significant for whether there is a WTP or not, but not for the level of WTP. Lastly, the variable *Used : Less WTP yes* also shows a significant and negative impact of -30.4, on a significance level of 1%, which was expected. This means that people who have an issue with the cup having been used by someone else have a WTP1 that is 30 SEK lower than those who do not have an issue with it.

5.4.2 Willingness to pay for sustainable material

Concerning WTP2, it is shown in Table 4 that *Female* was the only significant variable in regression (4), and this on a significance level of 1%. The coefficient is 13.7, which means that women have a WTP2 that is 14 SEK higher than that of men, *ceteris paribus*. When *coffee consumption* is added in regression (5), this is significant on a level of 10%. The coefficient is negative at -0.7, which was unexpected. This means that for each additional take-away coffee bought per month, the WTP2 decreases with 0.7 SEK, everything else held

constant. The inclusion of this variable does not change the significance of *Female*, although the coefficient slightly decreases in magnitude. In (6), *Female* has a smaller impact on the WTP2 than previously; its coefficient is now 7.8, and it is significant only at a 5% level. The only significant attitude variable in this regression is *Important reduce disposable cups*, and it is significant on a 10% level. This means that for each incremental step from 1 to 5, the WTP2 is expected to increase by 6 SEK.

6. Discussion

Our overall results suggest that women generally care more about issues such as recycling, reducing disposable cups and greenhouse gas emissions. The variable *Female* had a significant effect on WTP1, but when controlling for attitude variables it was no longer significant. This indicates that attitudes serve as a mediator between gender and WTP, which means that the relationship between gender and WTP is in fact explained by attitudes. However, different attitude variables showed significance in the logit-regressions compared to the tobit-regressions. In the logit-regression, *Important convenience* was significant, suggesting that the positive effect on WTP1 did not depend on gender, but rather how important convenience was when purchasing coffee. Therefore, with all control variables accounted for, it is convenience that will positively affect WTP1.

The expectation was the opposite since the assumption was that a swap system would be less convenient compared to disposable cups. After all, the person would have to take responsibility for the cup and carry it around, while paper cups are simply used once and then disposed of. The following citations put it well: “*Disposable cups represent the essence of an over consumptive society: an obsession with convenience*” (Alsop, 2004). This had inspired our line of thought, which is why a positive coefficient on *Important convenience* was very unexpected. The questions preceding importance of convenience measured environmental attitudes, and it is possible that the respondents were influenced to answer the question on convenience in a similar way. Another viable reason could be that they simply compared the swap system with reusable cups and thought that the swap system, in addition to being more environmental friendly, would also be more convenient.

In tobit regression (3), the significant attitude variables were *Important reduce disposable cups*, *Important reduce greenhouse gases*, *Used: less WTP yes* and *Non-Swedish*. This suggests that the increase in WTP1 is not because of gender, since *Female* became insignificant, but is rather mediated by the previously mentioned attitude and demographic variables. Furthermore, the largest effect on WTP1 was reallocated to the variable *Used: less WTP yes*, suggesting that some people may value the good less if another person has already used it. This is known as the law of sympathetic magic (Ertz et al., 2017). Since all significant environmental attitude variables have positive coefficients, it indicates that these attitudes lead to a higher WTP1, which was expected.

Important reduce greenhouse gases showed significant only for WTP1 and not WTP2 in the tobit regressions. One reason for this could be that reusability is a more direct solution to the

reduction of greenhouse gases, since a larger part of this type of pollution comes from the production of materials. If we instead reuse what we already have this provides a clear and direct way of reducing greenhouse gases.

Regarding WTP2, *Female* proved significant with large positive coefficients for all regressions. Hence, for environmental friendly cups made from 50% waste, women proved to be more favourable for such an initiative compared to men. It suggests that women are more favourable to achieving a more circular economy. According to Brosseau, Dedeurwaerdere, Jouvét and Willinger (2012), being female will have a stronger, positive effect on the warm-glow effect mentioned earlier. This means that women, especially younger, gain more satisfaction from giving than men, which could explain why their WTP is higher.

We expected that, due to the Swedish fika and coffee culture, Swedish respondents may demonstrate a higher WTP than non-Swedish respondents. Reasons for this were expected to be related to coffee consumption and environmental attitudes. In logit regression 4 to 6, however, the results indicate that non-Swedes have a higher probability of having a WTP2 than Swedes, even when controlling for attitude variables. On the other hand, in tobit regression (3) it is implied that non-Swedish people have a significantly lower WTP1, when attitude variables are controlled for. One reason that non-Swedes have a higher WTP regarding the sustainable material compared to Swedes, could be that the problem of waste is more serious abroad. Our international respondents came from England, France, China, USA and Spain and it is possible that the problem of waste is more severe in these countries.

Coffee consumption was believed to have a positive effect on both WTPs, because frequent coffee drinkers may find this sustainable alternative more relevant. It did however not prove significant in any regression except in tobit regression (5), where it, surprisingly enough, was negative. This means that the more coffee you drink, the less you would pay for a cup that is sustainable and recyclable. The hope was that this variable would have a positive impact on the WTP for the swap system, because it would mean a more significant decrease in the amount of disposable cups used if this system was to be implemented.

In conclusion, several of the attitude variables proved significant, especially *Important reduce disposable cups*, since it was significant for 3 out of the 4 regressions. The level of WTP for the swap system is higher if the respondent does not care that the cup has been used before, and notably, the WTP for the sustainable material of the cup is not affected. Neither did it affect the probability of having a WTP. This is consistent with our expectations, and

also with the discussion brought up by Ertz et al. (2017), who argue that consumers may value a good less if they know another person has touched it.

We measured the WTP in two different ways, one as a dummy variable (logit), and one as a continuous variable (logit). They generated similar results, where *Female* and *Important reduce disposable cups* both positively affect the WTP, which indicates that our results may be robust, although some variables were only significant in one of the regression models. The continuous variable contain more data compared to the dummy variable, but on the other hand, the dummy variable may potentially generate more exact data since it is more narrow in its outlook.

Perceived behavioural control also play a factor in the decision to join a swap system, since it demands a change of habit which can be perceived as a difficult task. Past experience could lead people to think that they would fail to remember to bring the cup, or that they would lose it because they have to carry it around. Such worries do not exist with paper cups. One respondent from our survey stated that she would not remember to bring the cup, and might as well use her own cup instead of joining the swap system.

From our comments, it is also evident that some respondents think other initiatives should be prioritized in order to combat climate issues, such as helping other countries increase their use of renewable energy, or to reduce carbon dioxide generated by the coal and cement industry. This is then used as a reason to not join a swap system.

From our results, it is clear that the environmental awareness is high. It is also clear that the willingness to pay generally is positive, indicating that people may actually be willing to transition from disposable cups to reusable cups. It also paves the way for companies to find new and creative solutions. It is possible that additional initiatives to reduce disposable articles will follow the 2021 EU ban, and if that is the case, it is important to have found viable substitutes that are accepted among the general public.

32% of our respondents had a high enough WTP to buy the cup that already exists on the market. Today it is priced at 120 SEK, which means that based on our results, there are potential customers. This suggests that there is a potential market for this swap system.

6.1 Limitations

There are some limitations to this study which would make inferences about the general population in Gothenburg, or in Sweden, difficult. First, students make up a large share of the

sample, 69%. Although only significant in one regression, logit regression (6), it is possible that students, and young people in general, are different from other demographic groups in terms of environmental awareness. This was also found in Håll Sverige Rent (2019), where a discount on coffee lead to greater reduction in disposable cups in areas close to universities. This suggests that students generally care more, or are more willing to change their behavior for the benefit of the environment. The results clearly indicate that women generally rank several environmental issues higher than men, as well as state a higher WTP2 even when attitudinal variables are controlled for. Because women constitute a larger share in our sample than men, 62%, this could cause the WTP to be overestimated in our sample compared to the population level.

In addition, because of the way the survey was designed, it was not possible to state a negative WTP for either the swap system or sustainable cups. It is therefore possible that some of the true values are negative instead of zero, and consequently our estimated WTP may be overestimated compared to the true WTP. For example, one of the respondents from our survey argued that the reason was not clear why one should pay to join a swap system, and that the extra “burden” should be compensated for instead of paid for. Another issue that may have biased the results is self-selection bias, where people who have an interest in environment issues found the survey more interesting to participate in. Finally, there is the possibility that hypothetical bias and warm-glow may have affected the results as well.

The way the elicitation questions were phrased, it may be possible that many respondents stated a positive WTP, although they are not prepared to completely substitute disposable with reusable cups. It is reasonable to believe that many people own a reusable cup but few use it all the time. This is shown by the fact that 30% (36% of women and 22% of men) of the respondents have at one point used their own cup when buying coffee, but only 19% of these use it every time. If the willingness to pay to replace disposable cups altogether was studied instead, the outcomes would likely be different.

6.2 Future research

There are several ways to study the possibilities of reducing the use of disposable cups, other than the swap system that was the main focus of this thesis. Based on the comments obtained in the survey, it was the opinion of some respondents that a swap system was not desirable or convenient, or that they did not wish to pay to make “a sacrifice”. It could then be interesting to study alternative ways to promote the use of reusable cups. One suggestion is examining

the possibility for a “deposit” system to be implemented, where the consumer could leave their reusable cup in a container, where it would later be collected and used again. This is in many ways similar to using disposable cups, where the consumer may experience the same level of convenience. Although the theory of planned behaviour was used in this study to explain the connection between attitudes and willingness to pay, the influence of norms was not extensively discussed. The correlation between social norms and environmental behaviour is known, and it would be interesting to study to what extent it may also influence behaviour in regards to reusable coffee cups.

7. Conclusion

The benefits of reducing waste pollution, should be considered by both policy makers and businesses as the issue will only continue to grow. In this study we have estimated that the average willingness to pay in order to join a swap system is 69 SEK, and the additional willingness to pay if the cups are sustainable is estimated to be 24 SEK. In total, this results in a willingness to pay of 93 SEK.

We have found significant variables that affect the level of the willingness to pay, but also the probability of having a willingness to pay. Our results indicate that being a woman positively affects the level and the probability of having a willingness to pay. For the swap system, this gender difference is explained by attitudes, whereas the willingness to pay for the sustainable material was higher even when controlling for attitude variables. Furthermore, we discovered that willingness to pay is affected by how important someone thinks it is to reduce disposable cups, but also the frequency of take away coffees per month. Additionally, we uncovered that being a student and not caring if the cups have been used by someone else will have a positive impact on willingness to pay. How important someone finds reducing greenhouse gas emissions will also have a positive impact on willingness to pay for the swap system. Another variable that proved to affect willingness to pay was whether the respondent is from Sweden or not. The non-Swedish respondents were more likely to have a willingness to pay for the sustainable material, whereas they had a lower level of willingness to pay for the swap system. Finally, convenience plays a role in determining the willingness to pay for the swap system.

The need for solutions in order to meet society's demand for convenience without damaging our environment has never been greater. We think it is important to find answers and implement existing ideas, especially if there is proof that they could work. Our study has shown that there is a demand for sustainable alternatives to the disposable cups, and that the swap system is a potential solution. This means that there may be a favourable response if the government and businesses wish to take measures to reduce disposable cups.

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9. Appendix - The Survey

Disposable cups vs Swap system

Hi!

We are two students from the University of Gothenburg in Sweden, and we are currently writing our bachelor's thesis about alternatives to disposable coffee cups. This survey will take 3-5 min to finish and we really appreciate your help. For every response we get, we will donate 1 SEK to the Swedish company Trine, who invests in solar energy all over the world.

If you have any questions, please contact us at gusthufa@student.gu.se or gusmeiepo@student.gu.se

Kind regards,
Fanny and Pontus



1. How often do you buy coffee/tea to go?

- Never
- 0-1 times / month
- 2-3 times / month
- 1-2 times / week
- More than 3 times / week

2. Do you use your own reusable cup when buying coffee to go?

- Yes
- No

3. If yes, how often?

- 20% of the time
- 40% of the time
- 60% of the time
- 80% of the time
- 100% of the time
- Other: _____

4. Every year, 500 billion disposable cups end up in landfills, globally. Did you know that they are hard to recycle?

- Yes
- No

5. How important do you think it is that we reduce our use of disposable cups?

	1	2	3	4	5	
Not important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very important

6. How important do you think recycling is?

	1	2	3	4	5	
Not important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very important

7. How big of a problem is littering in your local area?

	1	2	3	4	5	
Not a problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	A very big problem

8. How important do you think it is that we reduce greenhouse gas emissions?

	1	2	3	4	5	
Not important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very important

9. How important is convenience for you when buying coffee to go?

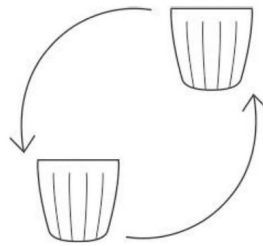
	1	2	3	4	5	
Not important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very important

A sustainable alternative to disposable cups

After crude oil, coffee is the second most sought after commodity in the world, and the demand for coffee is expected to grow. When buying coffee, it is usually served in disposable cups, and these cups are often made out of paper with a plastic coating, which makes them very hard to recycle. Because of this, 500 billion paper cups end up in landfills every year, globally. Moreover, the plastic is made from oil which is a finite resource, and the paper is made from trees, contributing to deforestation and loss of biodiversity.

One way to solve these problems is with reusable cups designed for the end-consumer, but they are still only used to a small extent. Another possible solution has been developed by a company called Huskee. They have developed a swap system called HuskeeSwap centered around cafés instead of the consumers, and it works in the following way:

- Step 1) At the café, you pay a one-time fee to join the swap system
- Step 2) When buying your coffee, it will be served in a reusable cup that you can bring home
- Step 3) You enjoy your coffee in a cup you know is good for you and for the environment
- Step 4) The next time you want coffee, you return your cup to the café, and they will serve your coffee in a new, clean cup.



	Disposable cups	Swap system
Waste	500 billion paper cups end up in landfills globally, every year The amount of plastics in the environment will increase	No paper cups in landfills The amount of plastics in the environment will decrease
Reusability	Increased use of disposable products	Decreased use of disposable products
Environmental Impacts	More CO2 emissions More deforestation, loss of biodiversity and ecological services	Less CO2 emissions Less deforestation, restoration of biodiversity and ecological services
Recycling	Few cups will be reused and recycled	All cups will be reused and recycled
Convenience	Very convenient, the cup is thrown away after use	Less convenient, you have to carry the cup with you
Used or unused?	Cups will always be new	Cups will have been used by someone else

Imagine now that every café in the whole world uses this system. This means that if you have this cup you can go to any café, hand in the cup, and be served coffee in a new clean cup.

10. How much would you be willing to pay to participate in a swap system like this?

- 0
- 2€
- 4€
- 6€
- 8€
- 10€
- 12€
- 14€
- 16€
- 18€
- 20€
- 22€ or more

11. If you are not willing to pay anything, please tell us why.

12. Would your willingness to pay decrease knowing that the reusable cup has been used by someone else before you?

- Yes
- No
- Maybe

The HuskeeCup

The HuskeeCup is 50% made from coffee husk, which is waste from coffee production and it is generally thrown away. This way, waste is turned into new products and the extraction of new raw materials decreases, thus contributing to a circular economy. This makes the cup sustainable, and since coffee production is mostly located in developing countries with poor waste management, the potential environmental problems caused by the coffee husk waste are alleviated.

13. How much extra would you be willing to pay knowing that the eco-friendly cups described above are used in the swap system?

- 0
- 1 €
- 2 €
- 3 €
- 4 €
- 5 €
- 6 € or more

14. If you are not willing to pay more even though the cups are eco-friendly, please tell us why

15. Which gender do you identify with?

- Female
- Male
- Other

16. How old are you?

17. What is your monthly pre tax income (including salary, scholarships and financial aid)?

- Less than 1000€
- 1000 - 2000€
- 2000 - 3000€
- 3000 - 4000€
- 4000 - 5000€
- 5000 - 7500€
- More than 7500€

18. What is your education?

- Some high school, no diploma
- High school graduate
- Trade/technical/vocational training
- Current college student
- Bachelor's degree/Master's degree or higher

19. Are you an exchange student?

- Yes
- No

20. Are you Swedish?

- Yes
- No

21. What is your main occupation?

- Employed
- Self employed
- Student
- Unemployed
- On parental leave
- On sick leave
- Retired
- Other: _____