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Circular economy rebound effect in the context of secondhand clothing consumption in the Netherlands

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Abstract

Secondhand fashion has been known for its potential benefits in minimizing the environmental footprint of fashion by elongating the lifecycle of clothing (Tafuri, 2017). However, since the demand for fashion products is ever increasing, the fashion industry is susceptible to rebound (Zink & Geyer, 2017). Circular economy rebound (CER) occurs when secondary production (secondhand clothing) is unable to substitute primary production (brand-new clothing), or when price effects lead to an increase in demand due to the opening of a new market, which would explain the potential failure of circular economy (CE) activities to achieve the expected environmental benefits (Zink & Geyer, 2017).

The purpose of this study was to analyse the extent to which circular economy rebound occurs due to secondhand clothing (SHC) consumption in the Netherlands. A total of 422 respondents participated in a survey that included three blocks for analysis: a) adequacy of SHC to substitute brand-new clothes (BNC), b) effect of low prices, re-spending, and liquid asset effect, and c) displacement of BNC with SHC. The results show that within consumers of the survey population, CER is likely to occur due to SHC consumption. In terms of substitutability, respondents perceive SHC as an adequate substitute for BNC. However, the propensity for rebound found in this study is attributed to low prices, re-spending effect, and liquid asset effect. Furthermore, the insight obtained from this study shows that the displacement of BNC with SHC is low due to the opening of a new market and overconsumption enabled by low prices of SHC. This research contributes to understand the factors that can offset the environmental benefits of SHC.

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SHC   Second-hand clothing

BNC   Brand-new clothing

CER   Circular economy rebound

CE   Circular economy

MLR   Multinomial logistics regression

POLR   Proportional ordinal logistics regression

Chapter 1: Introduction

Secondhand fashion is clothing apparel or accessories that had a previous owner (Manchado et al., 2019), and it has become well-known for its potential contribution in diminishing the environmental footprint of fast fashion by stretching the lifecycle of clothing items (Tafuri, 2017). However, the environmental benefits of reuse depend on the extent in which new production is replaced (Sandin & Peters, 2018).

In this regard, CER has emerged with the idea that CE activities, such as reuse of clothes through secondhand consumption, can lead to rebound (Zink & Geyer, 2017). Rebound could be regarded as no change or an increase in primary production that is due to: a) insufficient substitutability or b) price effects, thus reducing, or canceling out the previously assumed environmental benefits (Zink & Geyer, 2017).

In modern times, the demand for fashion products is insatiable and ever increasing, which makes the fashion industry prone to rebound (Zink & Geyer, 2017). This industry, however, not only represents a high propensity to CER, but also there is a great potential to avoid it since in theory, circular fashion products (e.g., SHC) could achieve high substitution levels regarding fashion items originated from primary production (Siderius & Poldner, 2021). The Netherlands is an appropriate setting for the present research due to the internationally recognized Dutch inputs in circular initiatives in the textile and fashion industry (Fischer & Pascucci, 2017)

1.1   Problem statement

As SHC retail is increasingly seen as an environmentally friendly market (Machado et al., 2019) and this market is expected to increase in the next few years (Kim et al., 2021), it is relevant to determine whether this CE activity delivers the environmental benefits of reuse. CER has emerged as an explanation for the potential failure of CE activities to achieve the expected environmental benefits (Zink & Geyer, 2017). According to Siderius & Poldner (2021), circular activities can only materialize environmental benefits if secondary production generates a displacement or significant reduction in primary production. In terms of SHC, the environmental benefits of reusing clothes can only be achieved if there is a displacement of brand-new clothing (BNC) consumption. Rebound could occur by inadequacy of SHC to substitute BNC, or by price effects that occur when lower prices of clothing enabled by the SHC market, allow the opening of a new market for people

who previously could not afford clothing at all, generating an overall rise in consumption of clothing. According to D'Adamo et al. (2022), CER would indicate irresponsible SHC purchasing that could potentially increase sales and consumption.

This study aims to determine the substitutability and price factors that could lead to CER due to SHC consumption in the Netherlands, to generate awareness in consumers and promote the materialization of the environmental benefits of reuse.

1.2 Research objective

The objective of the present research is to evaluate the substitutability and price effects that can generate a CER effect due to SHC consumption in the Netherlands. Therefore, the main question of the present research is: To what extent does circular economy rebound occur due to secondhand clothing consumption in the Netherlands?.

As research has begun to acknowledge that the rebound effect poses a risk for CE practice (Figge & Thorpe, 2019), this study aims to contribute to the body of literature that addresses such risks, by analysing the factors that could offset the environmental benefits of CE activities, specifically in the field of SHC consumption. Furthermore, this research aims to further develop the framework of CER by presenting indicators to measure the substitutability and price effects that can lead to rebound, facilitating the measurement of propensity of rebound for other CE activities.

Chapter 2: Theoretical framework

In this chapter, an overview of the challenges influencing the present research and the theories framing the research will be presented.

2.1 Modern fashion industry: environmental and social costs

The fashion industry has been classified as the second most polluting worldwide (Chen et al., 2021), since it generates environmental harm at all stages, and is the most water polluting industry (Gbolarumi et al., 2021).

The lifecycle of clothing consists of: Raw material extraction, textile production, clothing manufacturing, use, and end of life (Munasinghe et al., 2021). For raw material extraction, Munasinghe et al. (2021) mentions cotton farming requires intense water and chemical use, while polyester manufacturing requires intense energy and chemical use. The next phase is fabric manufacturing (Munasinghe et al., 2021), characterized by high water demand, chemical demand, and wastewater generation (Fletcher, 2014). Next is the clothing manufacturing stage where the main input is energy and high labor-intensity (Munasinghe et al., 2021). The following is retailing (Weinswig, 2016), and the greatest impact of this stage is the energy used in retail (Eryuruk, 2012).

The final stage is the end of life, where clothing can be either reused, recycled, incinerated with/without energy recovery, and landfilled (Munasinghe et al., 2021). According to the European Commission (2015), the hierarchy of preference for waste management is direct reuse, recycling, or repurposing, transforming waste to energy through incineration, incinerating without recovery, and at the end, landfilling. Both reuse and recycling are methods capable of avoiding more GHG emissions that they emit (Erbach, 2015). On the other hand, landfilling is regarded as having the most negative impacts to the environment (Fletcher, 2014) because of the GHG emissions generated by landfilling natural fibers, and the centuries required for synthetic fibers to decompose in soil (Muthu, 2020).

For purposes of the present research, the final three stages of the lifecycle of clothes (figure 1) are of importance since reuse is directly linked to the use phase. This link allows for a temporary avoidance of the end of life, while possibly returning to the retail phase as a second-hand valuable good.
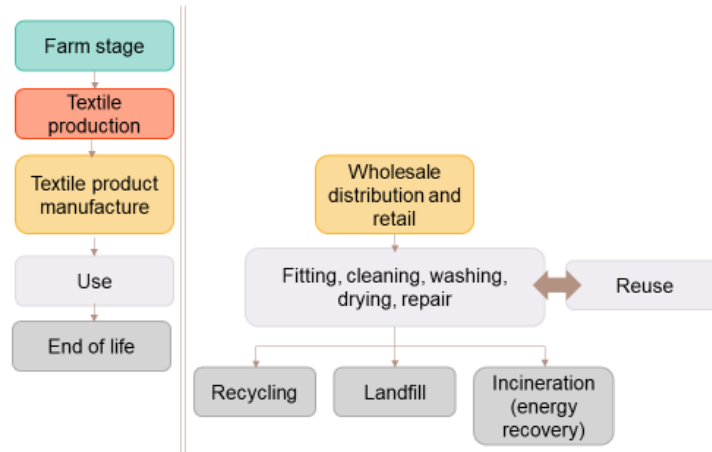
Figure 1. Life cycle of clothing. Adopted from Henry et al. (2015)

In terms of social costs, the fashion industry is responsible for environmental and human health damages, and human rights violations, at all phases of the production chain (Kapp, 1977). According to Bick et al. (2018), in the fashion industry, high income countries tend to shift the occupational burdens linked to mass manufacturing and disposal to countries of low and middle income.

With aims to contribute to overcome the environmental and social impacts attributed to fashion, sustainable alternatives have risen, such as secondhand clothing consumption, which will be introduced in the following sub chapter.

2.2   Secondhand clothing consumption

Secondhand fashion is clothing apparel or accessories that had a previous owner (Manchado et al., 2019), and it has become well-known for its potential contribution in diminishing the environmental footprint of fast fashion by stretching the lifecycle of clothing items (Tafuri, 2017). SHC consist of reused clothing items, and in this scheme consumers play a role as both buyers and sellers (Machado et al., 2019). Yrjölä, Hokkanen, & Saarijärvi (2021) describe the secondhand business model as represented in table 1.

Table 1. Second-hand business model (Yrjölä, Hokkanen, & Saarijärvi, 2021)

Characteristic	Second-hand business models
Exchange type	-Transfer of ownership from seller to buyer -Ownership is transferred from seller to company or platform and then to buyer
Interaction type	-The exchange could be consumer to consumer, business to consumer, or business to business
Offer type	-Should be used goods -Could include additional products and services
Offer marketing	-Seller or company/platform performs the marketing of the offer
Offer channel	-Different channels such as digital platforms, retail shops, kiosks, e-commerce websites

Evidence demonstrates that environmental concerns have led to an increase in consumers' inclination to purchasing second-hand products (Yan et al., 2015). Furthermore, it is anticipated that the value of the second-hand fashion business will "more than double from $24 billion in 2018 to $64 billion in 2028", which is more than the expected size of the fashion industry in 2028 (Kim et al., 2021). According to Thomas (2003), SHC markets are global, large-scale, and economically powerful businesses, and as they continue growing, they progressively compete with producers of new goods, potentially reducing resource depletion.

Nowadays, three types of SHC businesses can be identified: thrift stores that typically sell used items that proceed from donations (e.g., Goodwill), consignment or resale stores that are businesses that search for profit, and online consignment stores (e.g., Threadup) (Zaman et al., 2019).

It has been said that secondhand fashion can be a fit market scheme to motivate sustainable acquisition of fashion (Tafuri, 2017). However, although this market can be seen as environmentally friendly, consumer motivations are not necessarily ecological, but can be material or psychological, and secondhand fashion consumers don't necessarily demonstrate anti-consumer behavior (Machado et al., 2019).

The following sub-chapter will explain the concept of CE, which will be further linked to SHC.

2.3   Circular economy

CE is defined, according to Machado et al. (2019), as a novelty system consisting in the reduction of the flow of waste and resources through loops of material and energy. Additionally, CE has been defined by the Ellen MacArthur Foundation as "an industrial economy that is restorative or regenerative by intention and design" (EMF, 2013, p.14).

CE promotes three key principles: Designing out waste, keeping materials in use, and regenerating natural systems (Rijksoverheid Nederland, 2016). The aim of CE is to separate value creation from waste generation and resource depletion by changing the notion of end-of-life to restoration and products with closed loops life cycles (Camacho-Otero et al., 2018). The notion of closed-loop circular models includes maintaining the value of products, materials, and services for as long as possible with active use through the principles of recycling, reducing, and reusing (Goyal et al., 2016).

In contrast with common linear models of value creation, the CE model promises environmental benefits through two main sources according to Korhonen et al. (2018). The first source includes diminishing the necessity of primary production, which is obtained either by substitution by secondary production, or increased efficiency resulting in the fulfillment of demand using fewer resources. The second source mentioned by Korhonen et al. (2018) is by reducing releases to the environment such as emissions and waste by applying renewable inputs in the production of primary products as much as possible.

The concept of CE has gained popularity in the 21st century among decision makers, academy, nations, and enterprises (Merli et al., 2018). This model has been associated to being a solution to environmental and socio-economic issues that result from depletion of non-renewable sources, resource scarcity, waste generation, and pollution (Lieder and Rashid, 2016).

However, suspicion has arisen from the fact that CE is presented as a business opportunity in the capitalist framework (Hart & Pomponi, 2021). Although CE may be presented with good intentions, this model is susceptible to being used for greenwashing, and much of the CE products are designed to satisfy wants instead of needs, with the objective of generating more of them, with disregard for the type of business model being followed (Hart & Pomponi, 2021).

Since CE has the principle of increasing the efficient use of resources, the concern for rebound has risen (Figge & Thorpe, 2019). The rebound effect conveys that resource efficiency gains assumed from new practices or technologies are not obtained or remain smaller than assumed for external reasons (Ottelin et al., 2020). In the following subchapter, the concept of CER will be introduced to understand the reason for potential failure of CE activities to materialize environmental benefits.

2.4   Circular economy rebound

CER has recently emerged as an explanation for the potential failure of CE activities to achieve the expected environmental benefits, with the idea that CE mostly focuses on reducing material flows, disregarding the behavioral and economic forces that drive the market (Zink & Geyer, 2017). According to Zink & Geyer (2017), environmental improvement cannot be achieved simply by closing material loops as thought by CE, and instead, the focus should additionally be on causing displacement of primary production. Furthermore, CER has been described as a negative consequence of an efficiency increase that, contrary to being followed by a positive behavioral change, the illusion of consuming with diminished environmental impacts creates a counterproductive effect in consumer behavior (Siderius & Poldner, 2021).

CER elaborates on the original rebound effect that is described as an increase in overall production/consumption caused by greater efficiency in production processes, which induces the cancellation of the environmental benefits of the achieved efficiency, known as Jevons' Paradox (Barket et al., 2009). Font Vivanco et al. (2016), debated that since this fist definition of rebound, the effects have outgrown the energy efficiency scope, and should now be regarded as a set of behavioral and economic mechanisms. This led to the term of environmental rebound effect, which uses lifecycle analysis to study further environmental consequences of new technologies, aside from energy efficiency improvements (Font Vivanto et al., 2016).

Zink & Geyer (2017) draw on the idea that CE activities can potentially lead to rebound by two principal factors: insufficient substitutability, thus failing to compete effectively with primary production, or by lowering prices and leading to a raise and shift in consumption. Furthermore, CER supports the idea that CE activities can only materialize environmental benefits if secondary production generates a displacement or significant reduction in primary production (Siderius & Poldner, 2021). The lack of displacement of the primary products can be explained by inferior

quality secondary products, or when lower prices induce consumers who previously didn't purchase the primary goods, to begin purchasing the secondary goods, opening a new market, and generating an overall increase in consumer demand (Geyer & Doctori Blass, 2010).The assumption that every unit of secondary production will displace one unit of primary production is an imprecise conclusion (Cooper & Gutowsku, 2015). CER states that the overall environmental impact of CE activities is set by two factors: the difference in environmental impact generated in primary production vs. the competing CE activity product, and additionally, the change in production quantities (Zink & Geyer, 2017).

To mitigate CE rebound, Zink & Geyer (2017) proposed three conditions that could potentially reduce this effect. Firstly, they mention that secondary production goods need to have comparable quality, price, and offering efforts as primary production goods to effectively serve as alternatives, otherwise, substitution will be unlikely to occur. The second condition mentioned by Zink & Geyer (2017) is that products from CE activities should either induce no effect in overall demand, or better yet, decrease overall demand for the good. The authors mention that markets with satiable demand and that are not too sensitive to low prices, would be less likely to fall in rebound effects. The last condition Zink & Geyer (2017) mention is that although the two previously mentioned conditions are in place, diversion of consumers from primary production to the goods offered by CE activities should be ensured when introducing the new products to the market, which is especially difficult since the common methods to attract consumers to a product (searching for new markets or offering lower prices) should not be used to avoid rebound.

In the following two sections, the substitutability and the price effects leading to rebound will be further discussed.

2.4.1 Substitutability and Price Effects

Rebound which is attributed to insufficient substitutability according to Zink & Geyer (2017), consists in the idea that secondary goods might not be appropriate substitutes for primary goods because these secondary goods might possess inferior quality, resulting in being perceived as less desirable goods. Abbey et al. (2015), suggest that buyers perceive used products as inferior compared to the same product as brand new, with feelings of aversion towards them on some occasions, resulting in a considerable proportion of consumers (more than 35%) perceiving used products as not only imperfect substitutes, but as not even a potential substitute. In this sense, Makov & Font (2018) suggested that secondary production consumption could potentially

generate an overall increase in consumption, in which consumers purchase used products in addition to new products, and not instead.

The second type of rebound mentioned by Zink & Geyer (2017) is the price effect, which consists in the idea that secondary goods compete in the market as an alternative to primary goods, and in line with basic economic principles, an increase in the supply of a good will lead to decline in its price and the price of the secondary good, while both markets compete for buyers and buyers incline towards the cheaper option. According to Zink & Geyer (2017), the lower prices of secondary goods will generate the market to open to other consumers who previously would not have been able to afford such products.

Furthermore, secondary goods that do not compete with the same market of the primary goods, instead of causing displacement of primary production, would potentially generate the opening of a new market (Zink & Geyer, 2017). Such is the case of refurbished smartphones, where these hardly compete in the same market as primary phones (Skerlos et al., 2003). Instead, these are sold in low-income countries where new smartphones are not affordable, and in consequence, instead of refurbished smartphones competing with new smartphones, refurbished smartphones compete with no smartphone at all because these consumers would otherwise not have bought the new product, leading to rebound due to an increase in overall consumer demand (Zink & Geyer, 2017).

Additionally, the term re-spending is of importance regarding the price effects that could induce CER. Font Vivanco et al. (2014), describe this term as the phenomenon in which income that is released due to reduced costs, can be spent over a variety of goods. Since secondary production lowers costs and causes an increase in apparent income, the excess will be spent somewhere else (Allwood, 2014). In this sense, an increase in prices of environmentally friendly products will lead to favorable environmental effects since consumers will not have liberated income to spend on other goods (Siderius & Poldner, 2021)

Due to the perceptions of consumers towards used products, and the idea that these are not valued the same as new products, Abbey et al. (2015) draws on the idea that some consumers who are more accepting of pre-owned products would consider switching from new to used products for an adequate economic incentive (discount). According to Ghose et al. (2006), the willingness of a consumer to pay for a used product is usually lower than the willingness to pay

for the same product new. This is most likely due to the consumer's belief that used products may possess functional or physical defects, leading consumers to balance cost savings against the perceived risk (Abbey et al., 2015). However, the cost saving obtained from buying used versus buying new, would lead to rebound in the form of re-spending (Makov & Font Vivanco, 2018).

Furthermore, in terms of price effects that can potentially lead to rebound, Waldman (2003) suggests that reuse might induce an increase in new production by giving consumers the opportunity to sell their old products and use the profit to purchase new goods, considering the items as "liquid assets". This will most likely lead to an increase of the environmental impacts (Makov & Font Vivanco, 2018).

2.5 Circular economy rebound and SHC consumption

In present times, the life cycle of clothing is almost completely linear, involving extraction of non-renewable resources, used in a very short period, which is later thrown away to landfills or burnt (Chen et al., 2021). This linear system, according to Chen et al. (2021), has economic and environmentally degrading consequences, for which there is a need to convert the linear economy into a CE. Furthermore, in the context of fashion, Kim et al., (2021) describe circular fashion as a concept derived from CE, being a system in which clothes are manufactured with the objective of maintaining the items in circulation within the supply chain for as much time as possible prior to returning the items to the environment for biodegradation.

Reduce, reuse, and recycle are the three central models highlighted in circular fashion (Kim et al., 2021), and from these, the reduce and reuse models are distinguished as the most effective according to the US Environmental Protection Agency (2020). Recycling is usually not preferred because this process is often labor and energy intensive. On the other hand, the reduce model involving the decline of consumption has been highlighted as the best option since it alleviates resource exhaustion, waste production, and energy use (Kim et al., 2021). Finally, the reuse model, which is defined as "any operation by which products or components that are not waste are used again for the same purpose for which they were conceived" (EU WFD, 2008), is at the top of the waste hierarchy since it promotes resource efficiency and reduces pollution to air, water, and soil (Castellani et al., 2015).

Studies related to life-cycle assessments on clothing have proven that through reutilization and increasing the lifespan of clothing items, environmental advantages could be obtained by reducing the exploitation of virgin materials, water, and energy associated with new textile production (Laitala & Klepp, 2017). According to Liang & Xu (2018, p.121): "Extending the average life of clothing by just three months of active use per item would lead to a 5–10% reduction in each of their carbon, water and waste footprints". Furthermore, the reutilization of clothing has also been linked to reduction in the amount of clothes that is disposed of in landfills, consequently reducing pollution (Xu et al., 2014). However, there are greater environmental benefits in avoiding primary material production, than in avoiding landfill (Geyer et al., 2016).

The practice of secondhand fashion has been known for its potential benefits in minimizing the environmental footprint of fast fashion by elongating the lifecycle of clothing, and according to Tafuri, (2017), this trend's economic viability compared to other eco fashion strategies results as an appropriate strategy to incentivize sustainable fashion consumption. Since the secondhand business model implies the reutilization of a product for its original purpose, this model could be regarded as a ''reuse and redistribution'' model in the context of CE (Lüdeke-Freund et al., 2019).

Figure 2 illustrates the general stages of a product's lifecycle, where the reuse model creates a loop between the final disposition and the product use or consumption stage, promoting circularity.
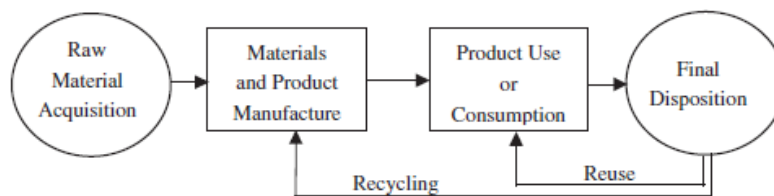
Figure 2. Representation of material flow of a product's lifecycle. Adapted from Curran (1996).

However, in past studies it has been concluded that secondhand consumption activities can increase the demand for new goods. Furthermore, secondhand markets potentially promote the idea in consumers of considering resalable goods (such as clothing) as liquid assets that can be traded in exchange for cash, recovering the investment and using it to purchase new items (Chu & Liao, 2007; Fox, 1975). Similarly, Kursten (1991) drew on the idea that the overall effect of the secondhand markets is an increase in the wealth of consumers and an increase in general demand.

The benefits of reusing products and of potentially substituting new products depends on the extent in which new production is replaced (Sandin & Peters, 2018). According to Sandin & Peters (2018), it is often assumed that products that are reused, replace new products made of virgin raw materials on a 1:1 ratio. Assuming that the replacement rate of new clothing with SHC items is 1:1 is a problem due to the misleading conclusions about the environmental advantages of reuse that could be made.

The issue relies on the idea that SHC and new clothes are not perceived by consumers as having the same values. According to Farrant et al. (2010), SHC is different (e.g., cost, style, previous users) from new clothes, and thus, consumers perceive these items differently. Zeithaml (1988) suggests that perceived value is defined as a "consumer's overall assessment of the utility of a product (or service) based on perceptions of what is received and what is given". Sweeney & Soutar (2001) developed a multiple item scale to categorize consumer perceived values in pre and post purchase situations. They determined that consumers not only assess products in terms of functionality and quality/cost, but in terms of emotional value regarding the pleasure obtained from the product, and through social value which is built upon the idea of what the item communicates to others, and the social consequences this entails (Sweeney & Soutar, 2001). In modern times, the demand for fashion products is insatiable and ever increasing, which makes the fashion industry prone to rebound due to the high volumes of items that are continuously being produced and consumed (Zink & Geyer, 2017). Thomas (2003) established that the perception of consumers regarding the value of secondhand goods is the variable that determines if used products will avoid the consumption of an equivalent new product. Furthermore, Thomas's (2003) study concluded that secondhand consumption might generate partial displacement, but in some cases, increase the demand for new products.

Although in many cases, according to Zink, Geyer, & Startz (2016), even a partial displacement of primary production can generate environmental benefits, in some other cases the contrary effect can occur, increasing overall environmental impacts if displacement is sufficiently low.

As a summary to this chapter, the modern fashion industry poses a risk in terms of sustainability. In contrast, SHC consumption is a potential alternative that, in the context of CE, could alleviate the social and environmental burdens generated by the fashion industry. However, the framework of CER challenges the idea that full environmental benefits are obtained from CE activities. These

arguments have framed the objective and questions of the present research, which will be further discussed in chapter 3.

Chapter 3: Methodology

This chapter elaborates on the procedures and methods that were used to address the research questions and fulfill the objective of the present research.

3.1   Research framework

The objective of the present research was to evaluate the potential substitutability and price effects that can lead to CER due to SHC consumption in the Netherlands, to create awareness and promote the materialization of the environmental benefits of reuse. The research objects of the present study were SHC consumers in the Netherlands. The nature of the present research was a theory-testing study. The hypothesis in the present research was that CE rebound could occur derived from SHC consumption in the Netherlands due to inadequacy of SHC to substitute primary production, price effects, and inadequate displacement of primary production.

The present research used scientific literature to construct a conceptual model. The key concepts and frameworks are mentioned in table 2.

Table 2. Sources for research framework

Key Concepts	Frameworks
SHC consumption	Circular economy
Reuse	Circular economy rebound
Price effects	
Substitutability effects	

A schematic representation of the research objective is illustrated in figure 3.
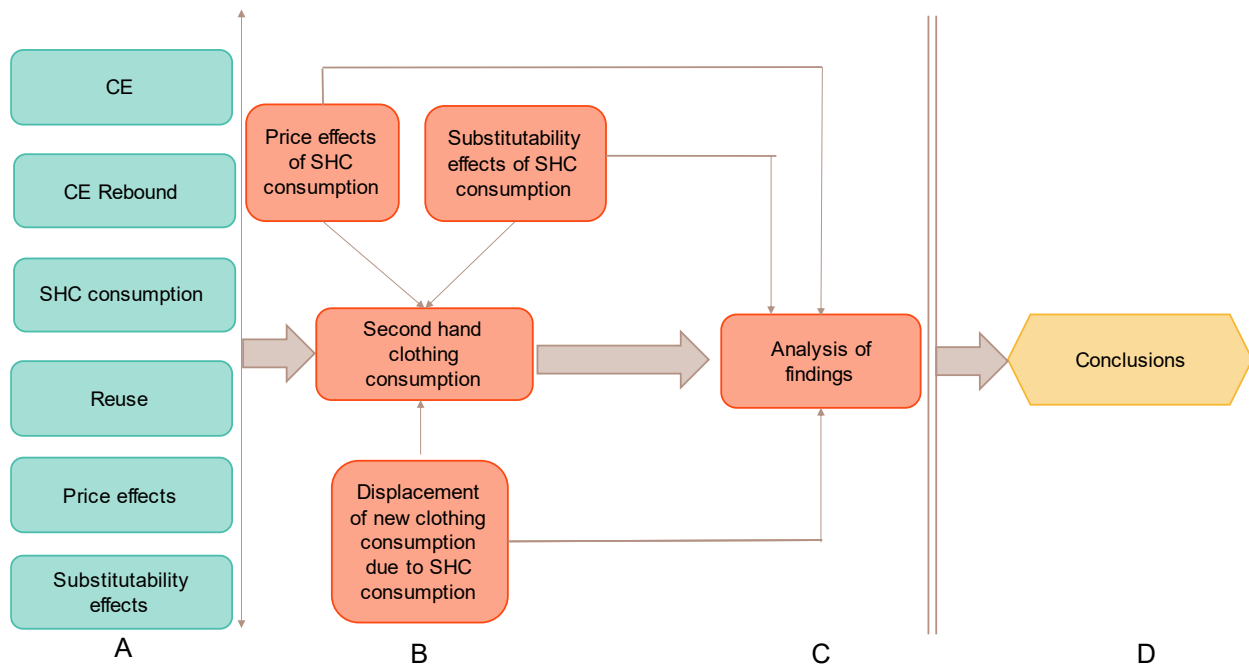
Figure 3. Schematic representation of the research framework. A) Core concepts and frameworks, B) Research objectives.

3.2 Research question

There has been limited research on CER, and how to measure the substitutability and price effects that are the basis of this framework. This study contributes to expand the theoretical framework of CER by using perceived value to measure substitutability and integrating the liquid asset effect, re-spending effect, and effect of low prices as a path to estimating the price effects mentioned in the CER framework. Furthermore, this study contributes to the body of literature that addresses the risks of rebound attributed to circular activities, particularly SHC, by generating original data that serves to estimate the potential rebound effects of SHC consumption in the Netherlands.

The main research question of this research was:
- ✓ To what extent does circular economy rebound occur due to secondhand clothing consumption in the Netherlands?.

To answer this question, the following sub-questions were examined:
- ● To what extent is SHC an adequate substitute for new clothing?
- ● To what extent is there evidence of price effects due to SHC consumption (effect of low prices, re-spending, and liquid asset effect) that could lead to rebound?

- To what extent do consumers of SHC displace their consumption of new clothing?

3.3 Research strategy

The research strategy of the present study was survey research. Cross-sectional research was applied consisting of many research units, which were SHC consumers of the Netherlands, through which extensive data was collected by a series of closed questions in the form of a survey that provided data for analysis.

3.3.1 Selection of research unit

The participants for this research were selected based on their country of residence (the Netherlands) and their SHC consumption practices. The survey was distributed publicly, however, the first block of the questionnaire provided a filter to collect data only from people living in the Netherlands, between the ages of 16-60 years, and who had bought SHC in the past.
The respondents of the surveys of this research were taken through the Slovin formula with a margin of error of 5%:

$$n = \frac{N}{1 + N\,e^2}$$

$$n = no.\,of\,samples$$
$$N = total\,population$$
$$e = margin\,of\,error$$

400 respondents were required for a 5% margin of error with a 95% confidence level.

3.3.2 Research boundary

This study only focused on the behavior of consumers of SHC in the Netherlands, and no other stakeholders of SHC were included in the design. Consumers of SHC were asked to participate, regardless of the type of channel from which they had purchased the SHC. Furthermore, only consumption practices were studied, focusing solely on retail (purchasing by consumer) and use phase of SHC, compared to BNC. The survey respondents were selected using the criteria mentioned in section 3.4.2.

3.4   Research material and accessing method

The data required to answer the research questions was collected through surveys and content analysis. Additionally, document analysis was conducted through the review of existing literature concerning fashion production and consumption trends, SHC consumption trends, and CER in other secondhand markets. The data required and the accessing method used were identified through the sub-questions of this research as established in table 3.

Table 3. Data and information required for the research, the accessing method and the methods of analysis.

Research sub-questions	Information required to answer the question	Sources of data	Accessing data	Method of analysis
To what extent is SHC an adequate substitute for BNC?	Consumer's perceived value of SHC vs. BNC.	Primary data Consumers of SHC	Survey	Qualitative- Analyzing the differences of perceived values of SHC compared to BNC.
	Use phase of SHC vs. BNC.	Primary data Consumers of SHC	Survey	Qualitatively- Analyzing the differences in times SHC and BNC is worn.
To what extent is there evidence of price effects due to SHC consumption (effect of low prices, re-spending, and liquid asset effect) that could lead to rebound?	Effect of low prices of SHC on consumer's purchasing behaviors.	Primary data Consumers of SHC	Content analysis Survey	Qualitative- Analyzing the likelihood of overconsumption related to low prices.
	Consumers' tendency to sell their clothes in the SHC market (liquid asset effect).	Primary data Consumers of SHC	Survey	Qualitative- Analyzing the tendency of consumers to sell their clothes in the SHC market.
	Destination of savings from buying SHC instead of BNC.	Primary data Consumers of SHC	Survey	Qualitative- Analyzing the propensity of re-spending effect due to savings from buying SHC instead of new.
To what extent do consumers of SHC displace their consumption of BNC?	Drivers for purchasing SHC, purchasing intentions of consumers if SHC didn't exist, and tendencies of consumers to buy SHC additional to BNC.	Primary data Consumers of SHC	Survey	Qualitative- Analyzing the drivers for purchasing SHC and the changes in BNC consumption attributed to SHC consumption.

3.4.1 Survey design

A four-block survey consisting of 20 questions including multiple option, five-point Likert scales, and open text, was designed and distributed online through Facebook and LinkedIn. Participants who fit into the criteria of living in the Netherlands, being 16-60 years old, and having bought SHC before were included in the survey results. The first block included questions about general data of the respondent, such as country of residence, age, and monthly clothing consumption practices. The second block included questions regarding the substitutability effect, such as perceived value of SHC and use phase. The third block included questions regarding the price effect, such as liquid asset effect, re-spending, and effect of low prices. Finally, the fourth block included questions about the displacement of new clothes with SHC. The original survey can be found in appendix I.

The survey distribution began on May 13, 2022. After 286 respondents had already answered the survey, on May 18, 2022, an additional question (Q18) was added for consumers to explain their response to Q17. Although a total of 422 consumers answered the survey, Q18 was only offered to 136 respondents, however, since this question was conditioned to the response of Q17, only 38 respondents were asked to answer the question. The low response count of this section derives in a low level of confidence and replicability for the results obtained from this question. However, the results of Q18 provided insight to answer the research questions, and for future research to elaborate on this. The survey was closed on May 25, 2022.

The items from the question blocks were partially inspired in the work of other authors. The section of perceived value was inspired by the multiple item scale developed by Sweeney & Soutar (2001), by evaluating the consumer's perception in terms of the following indicators: a) enjoyment obtained from the product, b) social value built upon what the item communicated to society, c) value for money, and d) quality. Furthermore, some questions used in blocks 3 and 4 were adapted from the work of Laitala & Klepp (2021) and Farrant, Olsen & Wangel (2010). Additionally, the CER effect framework first explained by Zink & Geyer (2017), formed the basis for the formulation of the questionnaire.

3.5 Analytical framework

The analytical framework that was used in the present research is represented schematically in figure 4:
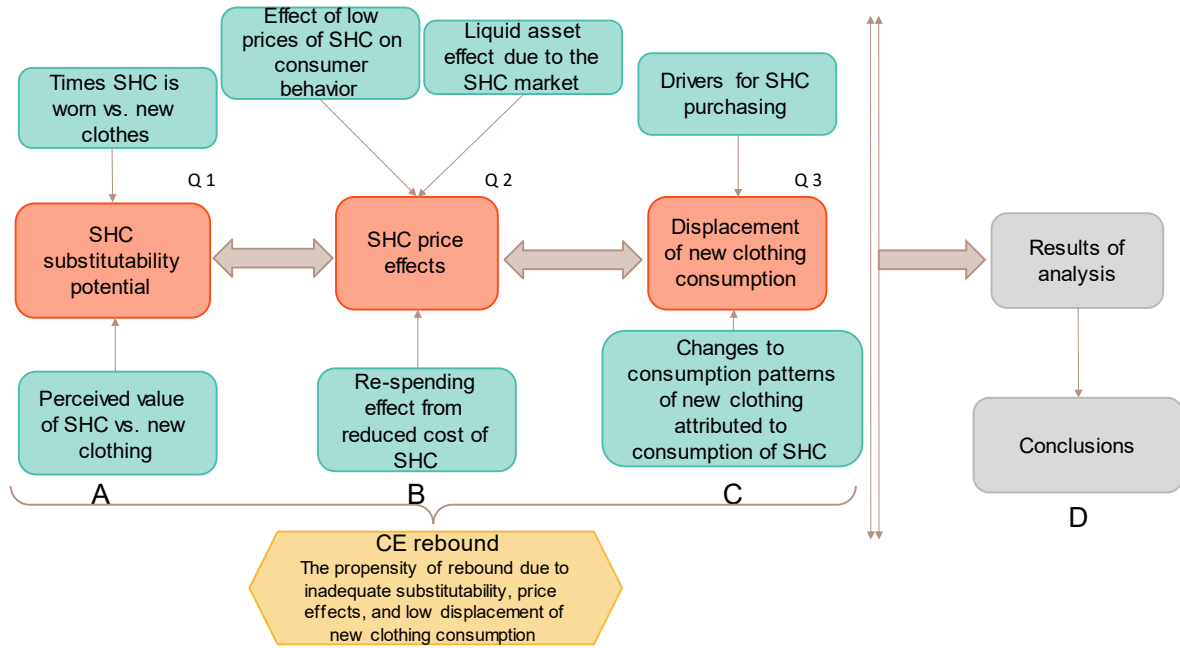
Figure 4. Schematic representation of the analytical framework

The sequence for obtaining the data and generating results was as follows:

A) This step investigated whether SHC was assumed by consumers as an equal substitute for BNC, in the context of CER. This was done through identifying the perceived values of SHC vs. BNC, and by comparing the times SHC is worn vs. BNC. This step provided answer to sub-research question 1.

B) The following analysis investigated whether price effects due to the SHC market (low prices, liquid asset and re-spending effect) could lead to rebound. This was done firstly by analyzing the effect that lower prices of SHC (compared to BNC) have on the purchasing behaviors of consumers. Next, the effect that the SHC market had over consumer's tendency to view clothing as liquid assets was analysed. Thirdly, the re-spending effect attributed to SHC consumption was evaluated by investigating the destiny of saved money from buying SHC instead of BNC. These three analyses helped answer sub-research question 2.

C) In this step, the displacement of BNC that is attributed to SHC was investigated. Two principal variables were assessed: a) the reasons why consumers are inclined to purchase SHC instead

of new clothing and b) the changes in BNC consumption patterns associated to SHC consumption. The results from these analyses gave insight on whether SHC competes in the same market as BNC, or if SHC creates a new market. These results helped answer sub-research question 3.

D) This section included the analysis of results and conclusions. Descriptive statistics were generated from the survey data to provide information about the variables and highlight potential relationships between variables. Furthermore, a data base was created in SPSS using the categorical and ordinal data from the survey. Next, the data base was uploaded to the program R studio, where multinomial logistic regressions (MLR) and proportional ordinal logistic regressions (POLR) analyses for several variables were performed. Regression analysis was chosen to explain the variability in the dependent variables of this study by means of more than one independent variable. In total, 5 regression analyses were conducted. Appendix IV provides a detailed explanation of the variables used for the regression analyses. The results were discussed using literature related to secondhand markets and rebound effects to generate conclusions.

3.6 Ethical considerations

Ethical reflections were made in the process of the present study since it involved the study of human behavior. Privacy of data was essential to protect participants from social prejudice. To avoid ethic gaps, this research has used the principles of consent, confidentiality, and anonymity to protect the privacy of participants. Participation in this research was voluntary. The survey included a consent form as the first page of the questionnaire. Only when consent was given through this form, the results were taken in consideration for the present study. The results obtained from each survey were kept confidential. Only relevant data to the study was disclosed, with proper prior consent from the participants. Furthermore, the survey respondents were anonymous, and the only personal data processed were gender and age.

3.7 Limitations

Using a short survey with closed questions to obtain the data for this project posed limitations by compromising free and open explanations. Additionally, potential bias could have been created by respondents that might have responded survey questions untruthfully, for example, because they believed there was an expected answer. Furthermore, it is uncertain whether people's responses are in accordance with their behavior, which is why only the opinion and the self-

perceived and expected actions can be measured in this study. The answers provided by the consumers could have a non-conscious bias due to the potential assumptions made by consumers about the expected outcomes, since the design of the survey questions the ethical consumption of clothing. To measure applied tendencies and behaviors, a long-term behavioral study should be conducted.

Only people with access to social media, participating in the platforms through which the survey was distributed, and who saw the post about the survey could participate in the study. Accordingly, some individuals got excluded because they did not have access. Furthermore, it is likely that only people with interest in SHC took part in the survey.

Furthermore, there is a potentially wide variety of cultural backgrounds from the survey population, since the survey was directed to the general population of the Netherlands, regardless of the nationality. The variety of cultural background could have created stronger deviations in the results.

The total survey respondents were 422, however, Q18 of the survey which provided useful insight was only responded by 38 of the participants, leading to a low confidence level for this section of the research. Furthermore, a few other questions also have a lower response count than 400, which also compromises the confidence level of the entire study. Due to time limitations, it was necessary to close the survey with the responses obtained to have enough time for the data analysis. However, most questions fulfill the 400-count requirement.

Chapter 4: Findings

This chapter elaborates on the results of the research that derived from the data gathered through the survey. The survey used for this study can be found in appendix I.

4.1 General data of respondents

422 people living in the Netherlands responded the survey, composed by 352 female, 66 male, and 4 respondents who identify as nonbinary/third gender, as illustrated in figure 5. The higher response rate among the female gender could be explained because according to Civic Science (2021), SHC shopping is more popular among this gender.
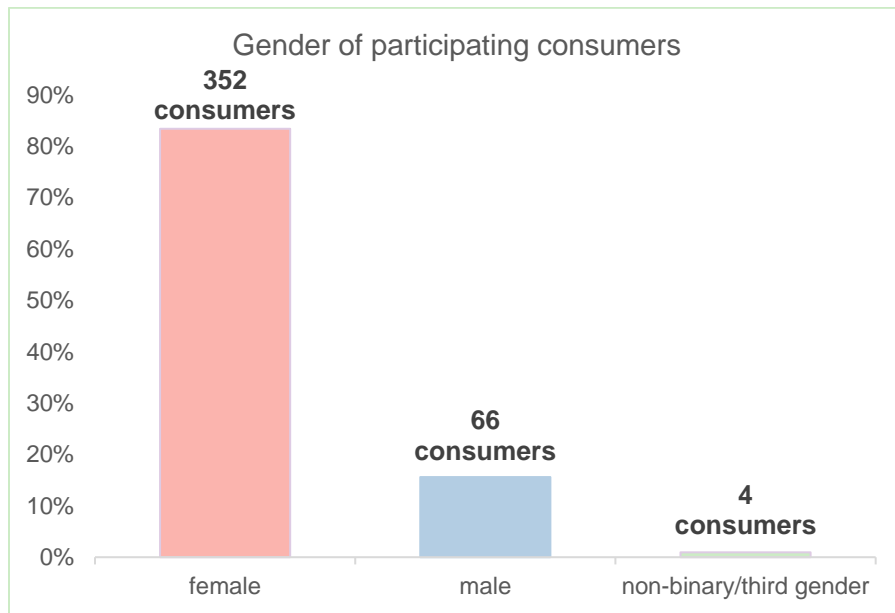
Figure 5. Distribution of respondents by gender

The respondents were between 16-60 years old. The distribution of respondents by age is as follows: 18.6% were between 16-25 (Gen Z), 60% were between 26-41 (Millennials), and 21.4% were between 42-60 (Gen X), as illustrated in figure 6. Most respondents corresponded to the millennial's generation. According to a study conducted by Thredup (2021), 42% of people born in the millennial's generation are willing to buy secondhand apparel, while only 32% of the population born in generation X are willing to buy secondhand apparel. This would explain the higher response rate among millennials.
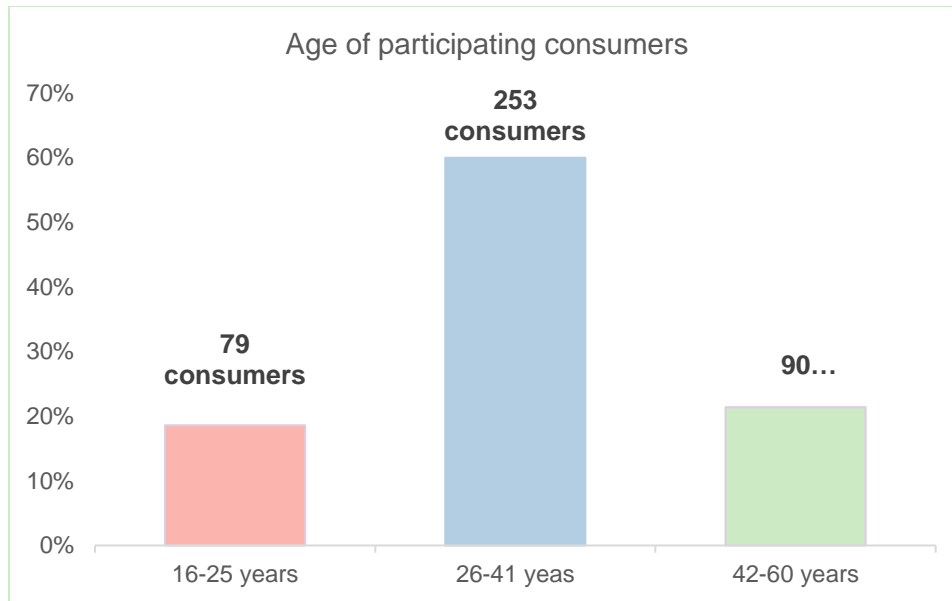
Figure 6. Distribution of respondents by age

The respondents considered for the results section of this project all declared to have bought SHC before. Respondents were asked how many SHC and BNC items they purchased per month (n=421), and the results are illustrated in figure 7. A higher consumption of SHC per month than BNC is observed.
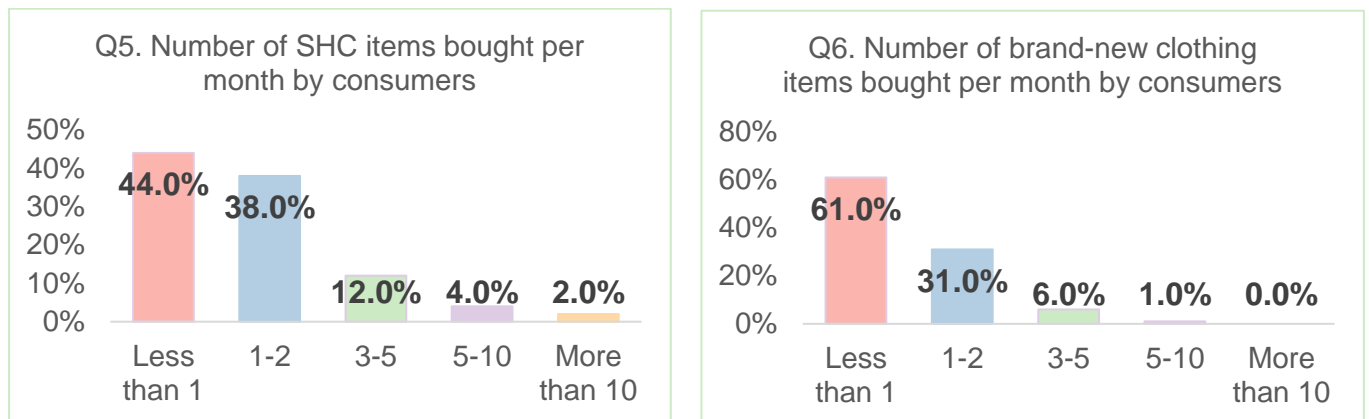
Figure 7. Number of SHC items respondents buy per month (left graph), and number of BNC items respondents buy per month (right graph).

It was found that among respondents, 43.8% buy equal number of SHC and BNC per month, while 37.1% buy more SHC, and 19% buy more BNC (see appendix II). Furthermore, through Pearson correlation, it was determined that a positive correlation of 0.13 exists between quantities of SHC and BNC items respondents buy per month, with a significance level of 0.01 (see appendix II). It

is likely that consumers who buy more SHC per month, will also buy more BNC per month, and vice versa.

The multinomial logistics regression (MLR) illustrated in table 4 shows that compared to people who consume less than 1 BNC item per month, people who consume 1-2 BNC items per month are more likely to consume 1-2 SHC items per month rather than consuming less than 1 SHC item per month. Additionally, compared to people who consume less than 1 BNC item per month, people who consume more than 10 BNC items per month are more likely to consume more than 10 SHC items per month rather than consuming less than 1 SHC item per month. These results also provide insight to determine that it is likely that people who consume more BNC, also consume more SHC and vice versa.

Table 4. MLR estimates of SHC, BNC, and less than 1 SHC bought per month.

	1-2 SHC per month	3-5 SHC per month	5-10 SHC per month	More than 10 SHC per month
Age Reference group: 26-41				
Age 16-25	-0.404	-0.888	0.047	-52.803 ***
	(0.295)	(0.537)	(0.630)	(0.000)
Age 42-60	-0.288	0.110	-50.694	-0.287
	(0.277)	(0.379)	(0.547)	(0.862)
Gender Reference group: Female				
Male	-0.943 **	-0.817	-0.007	-0.614
	(0.325)	(0.514)	(0.690)	(1.116)
NonBinary	0.154	-25.627 ***	2.329	-9.036
	(1.427)	(0.000)	(1.465)	(0.000)
BNC per month Reference group: Less than 1 BNC per month				
1-2 BNC per month	0.471 *	0.239	-0.268	1.255
	(0.241)	(0.372)	(0.693)	(0.790)
3-5 BNC per month	0.522	0.677	0.437	-28.197 ***
	(0.478)	(0.644)	(1.117)	(0.000)
5-10 BNC per month	-27.961 ***	1.876	-25.570 ***	3.787 *
	(0.000)	(1.105)	(0.000)	(1.543)
More than 10 BNC per month	-10.550 ***	47.468	-1.941 ***	0.563 ***
	(0.000)	(1.183)	(0.000)	(0.000)

* P < .05
** P < .01
*** P < .001

4.2 Substitutability effect

The first block of the survey, which intended to provide an answer for sub-research question 1, included an analysis of the adequacy of SHC to substitute new clothing. In this block, two different criteria were used: a) consumer perceived value of SHC vs. BNC and b) times SHC is worn vs. BNC. The following section describes the results obtained.

4.2.1 Consumer perceived value of SHC vs. BNC

In terms of enjoyment, illustrated in figure 8 (a), for most of the survey population (86%), SHC is at least an adequate substitute for BNC with respect to enjoyment, since respondents mostly perceive either equal enjoyment in buying SHC and BNC, or even greater enjoyment in buying SHC.

The results for social value (b) indicated that 84% of consumers experience at least equal social acceptance when consuming SHC and BNC. Same as for enjoyment, the results show SHC is an adequate substitute for BNC with regards to the value of social acceptance.

With respect to the indicator of value for money (c), for most consumers (94%), SHC has at least equal value for money than BNC. These results indicate that SHC is an adequate substitute for BNC in terms of value for money, and furthermore, many respondents (78%) find SHC as an even better product than BNC in terms of value for money.

Concerning the value of quality and durability (d), 81% of consumers find SHC has at least the same quality and durability than BNC, which indicates that in terms of quality and durability, SHC is also an adequate substitute for BNC for the survey population.

The insight obtained from these results is that concerning the indicators used (enjoyment, social acceptance, value for money, and quality), SHC is an appropriate substitute for BNC, meaning that in terms of consumer perception, these two items are seen as equivalents. These results indicate that it is unlikely for consumers of SHC to feel unsatisfied with the SHC product, and thus, it is unlikely for CER to occur derived from the inadequacy of SHC to substitute BNC. This will be further elaborated in section 4.2.2.
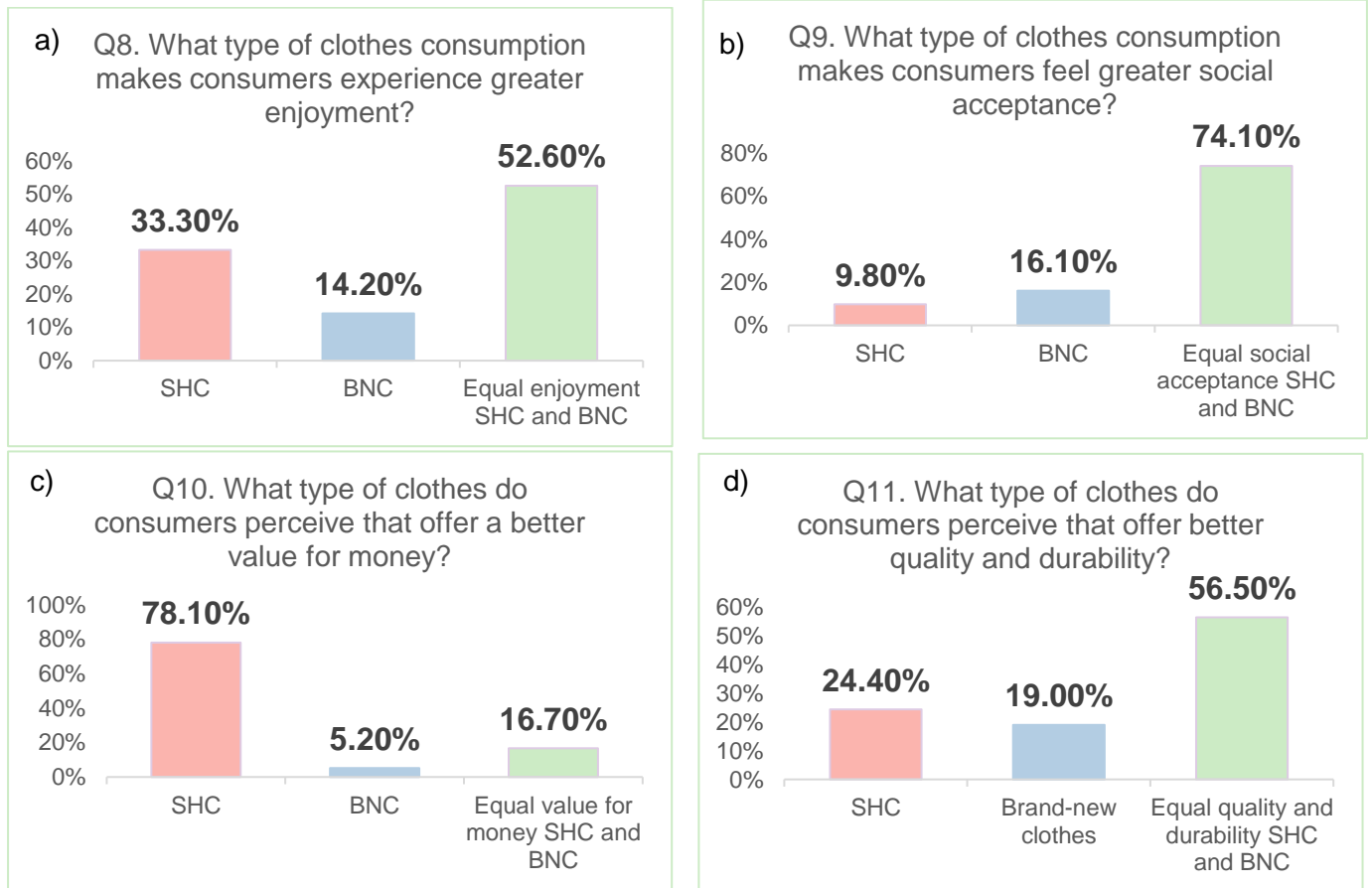
Figure 8. Distribution of consumers (n=409) in terms of the type of clothes consumption they perceive provides them greater enjoyment (a), social value (b), value for money (c), and quality (d).

4.2.2 Use phase

The type of use in terms of times worn before discarding a clothing item (n=409) has also been considered to evaluate the adequacy of SHC to substitute BNC (figure 9). It was found that 83% of consumers use SHC at least equal times as BNC.
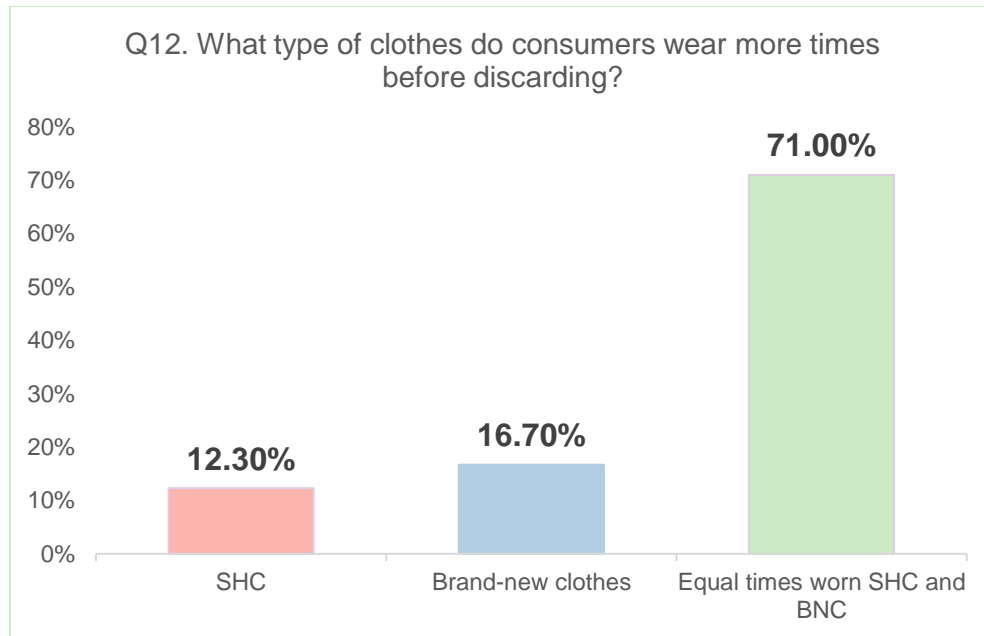
Figure 9. Distribution of consumers in terms of the type of clothes they wear more times before discarding.

The results obtained for the use phase indicator coincide with the results mentioned in section 4.2.1. Since SHC was demonstrated to be an adequate substitute for BNC according to consumers perceptions (in terms of enjoyment, social acceptance, value for money, and quality and durability), it was expected that consumers would also give an equal use to the two types of products. These results reinforce the idea that SHC is indeed an adequate substitute for BNC.

MLR was used to validate the analytical framework designed in this study to measure the adequacy of SHC to substitute BNC. The results are illustrated in table 5.

Table 5. MLR estimates of SHC, BNC, and equal use.

	More Use SHC	More Use Brand New
Age Reference Group: 16-25		
Age 26-41	1.626 **	-0.742
	(0.624)	(0.403)
Age 42-60	1.102	-0.663
	(0.721)	(0.499)
Gender Reference group: Female		
Male	0.767	0.295
	(0.481)	(0.429)
NonBinary	0.816	-11.577 ***
	(1.31)	(0.000)
Enjoyment Reference group: Equal enjoyment		
More enjoyment SHC	1.227 **	-0.334
	(0.410)	(0.449)
More enjoyment BNC	1.015	1.896 ***
	(0.744)	(0.417)
Social acceptance Reference group: Equal social acceptance		
More acceptance SHC	1.180 *	0.212
	(0.468)	(0.622)
More acceptance BNC	-0.086	1.062 *
	(0.561)	(0.384)
Value for money Reference group: Equal value for money		
More value SHC	0.400	0.172
	(0.697)	(0.420)
More value BNC	-0.313	0.531
	(1.285)	(0.718)
Quality Reference group: Equal quality		
More quality SHC	1.389 ***	-0.580
	(0.381)	(0.548)
More quality BNC	-0.554	1.026 **
	(0.797)	(0.364)

* $P < .05$
** $P < .01$
*** $P < .001$

Compared to people who experience equal enjoyment from SHC and BNC, people who experience more enjoyment from SHC are more likely to use SHC more rather than to use SHC and BNC equally. Furthermore, people who experience more enjoyment from buying BNC are more likely to use BNC more, rather than to use SHC and BNC equally.

Additionally, compared to people who experience equal social acceptance when consuming SHC and BNC, people who experience more social acceptance when consuming SHC are more likely to use SHC more rather than to use SHC and BNC equally. Furthermore, people who experience more social acceptance when consuming BNC are more likely to use more BNC rather than using SHC and BNC equally.

Similarly, for perceived quality, compared to people who experience equal quality in SHC and BNC, people who experience more quality in SHC are more likely to use SHC more rather than to use SHC and BNC equally. Additionally, people who experience more quality in BNC are more likely to use BNC more rather than to use SHC and BNC equally.

These results validate that enjoyment, social value, and quality are appropriate indicators to estimate extent of use and thus, substitutability.

4.3 Price effect

The second block of the survey was intended to provide data to answer sub-research question 2 and included an analysis of the price effects attributed to SHC consumption that could potentially lead to rebound. In this block, three different categories were assessed: a) Effect of low prices, b) Liquid asset effect, and c) Re-spending effect.

A five-point Likert scale of likelihood going from "definitely not" to "definitely yes" was used in this section to evaluate the three categories mentioned before, as represented in table 6.

Table 6. Five-point Likert scale used to evaluate likelihood.

Numerical value	Likelihood category
1	Definitely not
2	Probably not
3	Might or might not
4	Probably yes
5	Definitely yes

The results are shown in the following section.

4.3.1 Effect of low prices

In terms of price effects, most consumers perceive they are likely to save money when buying SHC instead of BNC, with a 4.13 Likert score. The following analysis intended to determine whether low prices incentivize higher consumption of SHC (n=395). Measured by the Likert scale, the score resulted in 2.71, meaning that consumers probably don't consume SHC items they don't necessarily need due to the low prices. However, 36% of consumers stated they are likely to consume SHC items they don't necessarily need due to low prices (figure 10).
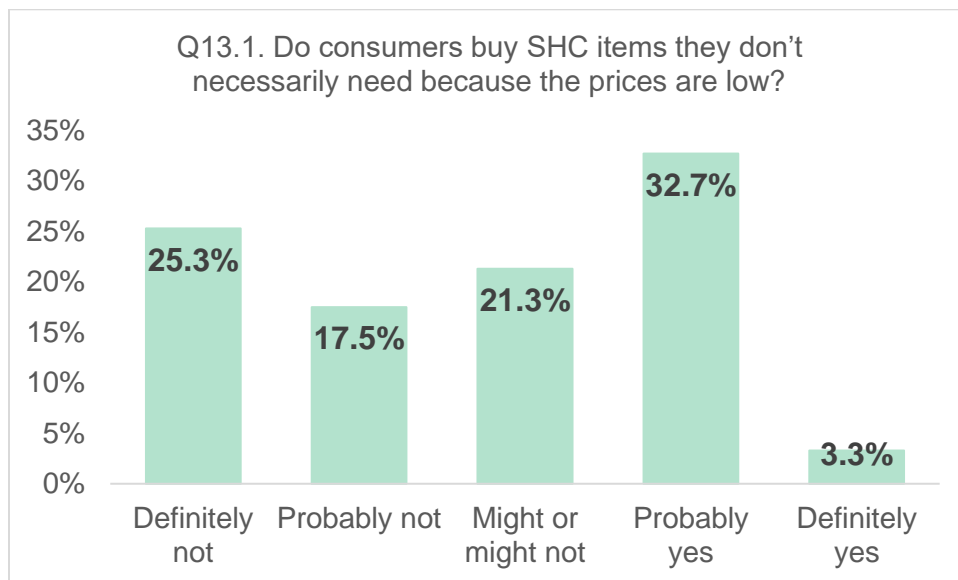
Figure 10. Likelihood of consumers to buy SHC items they don't necessarily need because the prices are low.

This indicates that from the survey population, there is a tendency for an overall increase in clothing demand attributed to the SHC market due to the 36% of respondents who mentioned they are likely to buy SHC items they don't necessarily need due to the low prices of SHC.

The next analysis focused on determining whether consumers would still buy SHC if it were to cost the same as BNC (n=395). The Likert score resulted in 2.22, meaning most consumers are unlikely to buy SHC if it were to cost the same as BNC (figure 11).
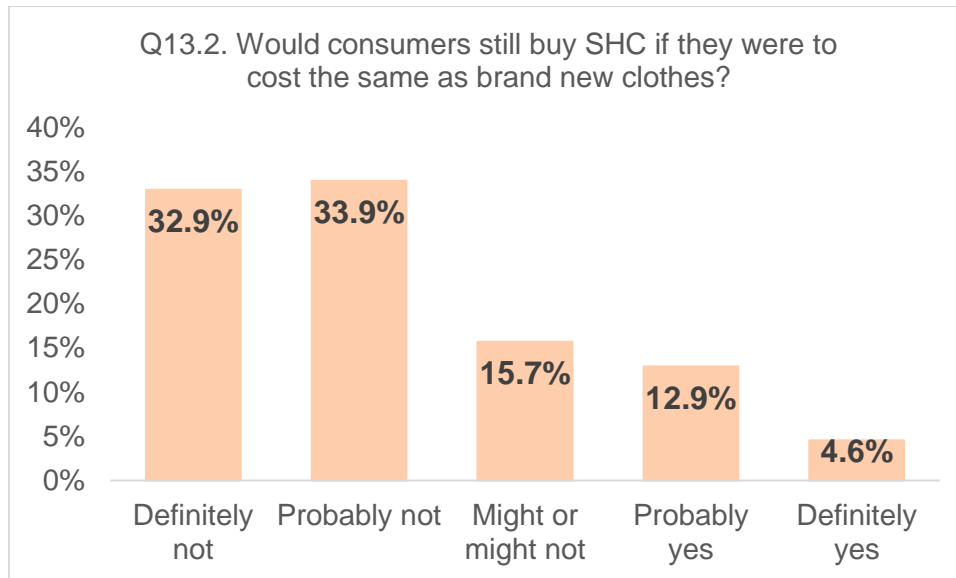
Figure 11. Likelihood of consumers buying SHC if it were to cost the same as BNC.

From these results it is possible to assume that lower prices are one of the main drivers that lead consumers to purchase SHC.

The fact that consumers would not buy SHC if it were to cost the same as BNC, and that 36% of the population stated they are likely to buy SHC they don't necessarily need due to the low prices, indicates there is a tendency for an overall increase in clothing demand, which is enabled by the low prices of SHC. The increased demand in clothing can lead to CER attributed to price effects.

4.3.2 Liquid asset effect

Regarding the study of the liquid asset effect, when consumers (n=389) were asked what they would most likely do with the clothing they no longer want/need, most consumers (62.7%) mentioned they would give away the clothes for free, while 20.8% of consumers would sell their clothes to recuperate the investment and buy some other clothing item (figure 12). This implies that 20.8% of the survey population perceives clothes as liquid assets they can sell in the SHC market and use the money to buy new items. The likelihood of the population to perceive clothing as liquid-assets due to the existence of the SHC market is low, however, it does affect the behavior of a portion (20.8%) of the survey population. The actions of this portion of the population can partially offset the environmental benefits of SHC consumption, since they are incentivized to replace their clothing with a higher frequency, increasing overall demand of clothing and potentially contributing to CER.

40

Figure 12. Destination of clothes consumers have only worn a few times but they no longer want/need.

4.3.3 Re-spending effect

It was determined that consumers are likely to perceive money savings when they buy SHC instead of BNC (n=395), as illustrated in figure 13, with a score of 4.13 in the five-point Likert scale.
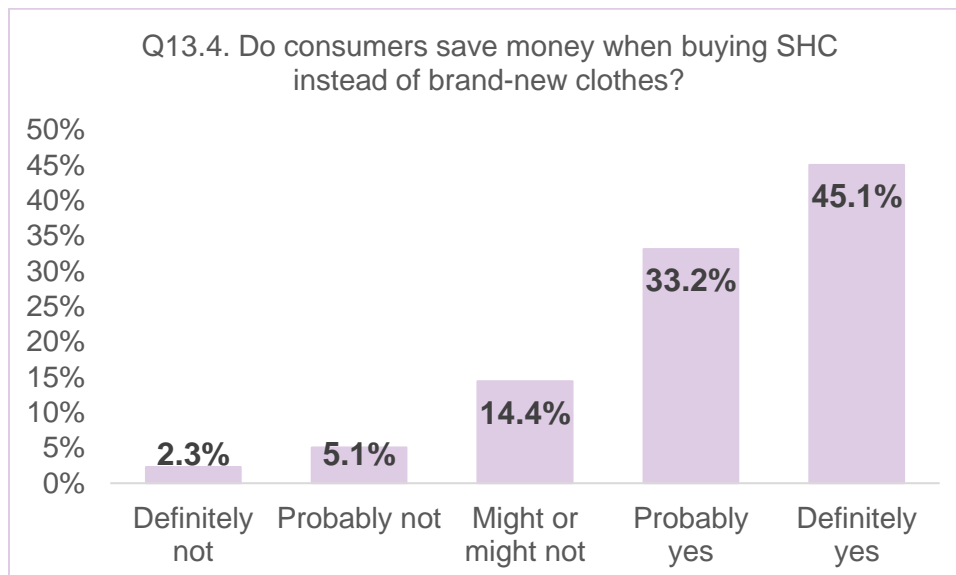
Figure 13. Likelihood of consumers saving money when they buy SHC instead of BNC.

These results indicate that most consumers have additional spending power when they purchase SHC instead of BNC, meaning the money saved would be invested in something else. To determine if re-spending occurred, consumers were asked where the saved money from buying SHC instead of BNC was spent (n=302). Consumers mentioned they used the money for savings for household expenses (38.3%), holidays (27%), and 21% of the survey population mentioned they use the money to buy clothes, fashion items and/or other material goods. Other responses (13.6%) included savings, going out, food, sustainable items, charity, school, and hobbies (figure 14).
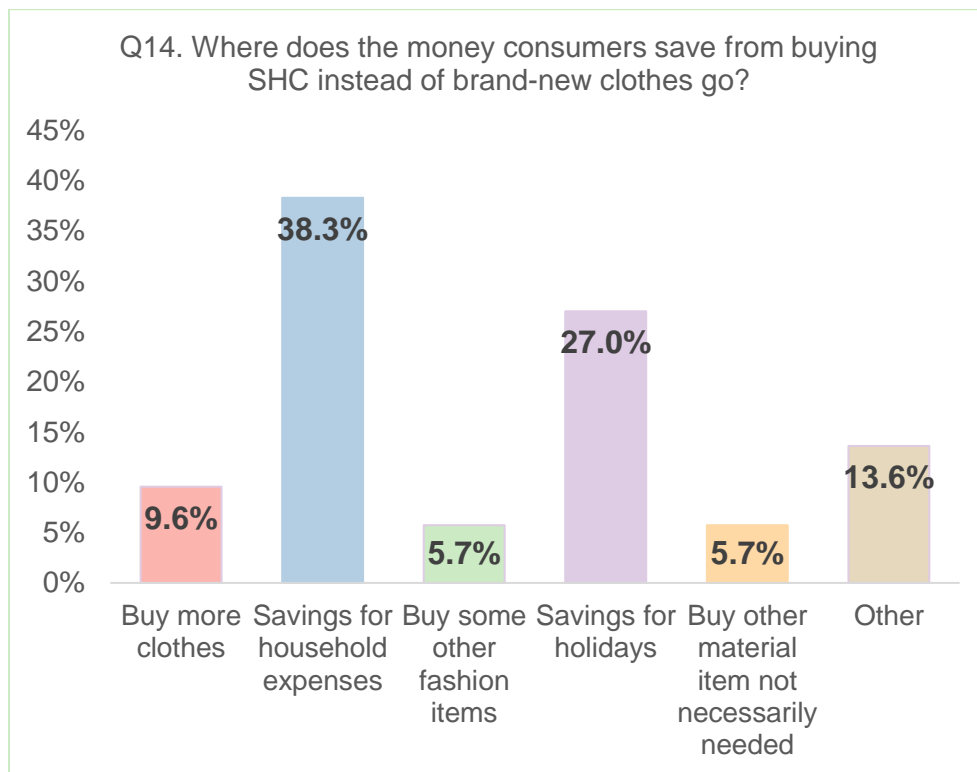
Figure 14. Destination of money that consumers save when they buy SHC instead of BNC.

These results indicate that re-spending is likely to occur in 21% of the survey population since the perceived savings are invested in more clothing, fashion items or other materials not necessarily needed. This re-spending could partially offset the environmental benefits of reusing clothes due to the additional energy and resources required to produce the additional objects that are consumed.

The MLR shown in table 7 indicates that compared to people who prefer to give their clothes away for free or throw their clothes away when they no longer want/need it, people who prefer to sell

the clothing and use the money to buy more clothing (liquid asset effect) are more likely to re-spend the money they save from buying SHC in buying more clothing, other fashion, or material items, rather than spending it in household expenses, holidays or other activities. This means that people who view clothing as liquid assets, also tend to re-spend in more products, potentially offsetting the environmental benefits of reusing clothing.

Table 7. MLR estimates of re-spending and saving money for household expenses, holidays, other.

	Buy more clothes, other fashion, or material items
Age Reference group: 16-25	
Age 26-41	-0.918 *
	(0.379)
Age 42-60	-0.929 *
	(0.449)
Gender Reference group: Female	
Male	-0.710
	(0.580)
NonBinary	0.397
	(1.262)
Type of disposal given to a clothing item no longer wanted Reference group: sell it and buy some other clothing item	
Give it away for free	-0.933 **
	(0.327)
Keep using it until it's worn out	-1.513 **
	(0.522)
Throw it away	-7.736
	(53.012)

* P < .05
** P < .01
*** P < .001

As a summary for the results from sub-research question 2:

Effect of low prices: Some consumers (36%) are likely to overconsume SHC, enabled by the low cost. This generates a potential rebound since a rise in overall demand for clothes is likely to occur. It is possible that the environmental benefits of reusing clothes could be partially offset due to the overconsumption of some consumers.

Liquid asset effect: Some consumers (20.8%) prefer to sell the clothes they no longer use in the SHC market and use the money to buy new clothing items. These consumers are likely to perceive clothing as a liquid asset, since it is likely that they sell the clothes they no longer want in the SHC market and use the money to buy new items. Although the occurrence is low, the liquid asset effect enabled by the SHC market influences consumer behavior and can potentially generate rebound due to more frequent replacement of clothing items.

Re-spending effect: Since participating consumers perceive money saving when buying SHC instead of BNC, there is a propensity for re-spending since the saved money can be invested in other products associated with emissions and resource depletion. Regarding the survey population, 21% of consumers mentioned they invest the extra capital in more clothes, fashion items, or other materials, which could partially offset the environmental benefits of reusing clothes. Additionally, consumers who treat clothing as a liquid asset enabled by the SHC market are more likely to also re-spend in more clothing or fashion products.

4.4 Displacement of BNC consumption with SHC consumption

The following analysis provided insight on whether consumers displaced their consumption of BNC when they buy SHC. The purpose of this section was to determine if SHC competes in the same market as BNC or if it opens a new market.

Consumers were asked to what extent their purchases of SHC replace their consumption of BNC (n=383). The results indicated that most consumers (71.3%) only partially displace their consumption of BNC with SHC, while 17.8% consumers stated they did not displace their consumption of BNC at all, and only 11% of consumers stated they fully displaced their consumption of BNC with SHC (figure 15). These results coincide with the positive correlation obtained between SHC bought per month and BNC items bought per month. It is understood from this data that survey consumers buy SHC as an extra to BNC and not instead of, and as their consumption of SHC increases, so does their consumption of BNC, and vice versa.

Q16. To what extent do purchases of SHC replace the purchases of brand-new clothing consumers make?
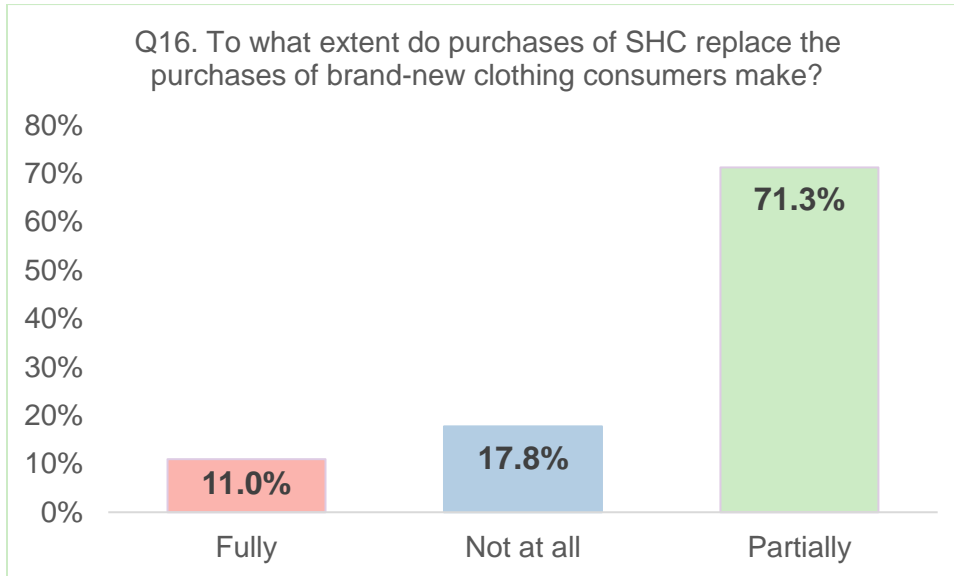
Figure 15. Distribution of consumers depending on the extent to which their SHC purchases displace their consumption of BNC

Consumers were then asked whether they would have bought the same SHC items they have if they were to be only available as brand-new items (n=383). Measured by the Likert scale, the score resulted in 2.57, indicating that most consumers are unlikely to buy the same quantities of clothes if only BNC were available (figure 16).

Q17. Would have the consumers bought the same SHC they have, as brand-new items?
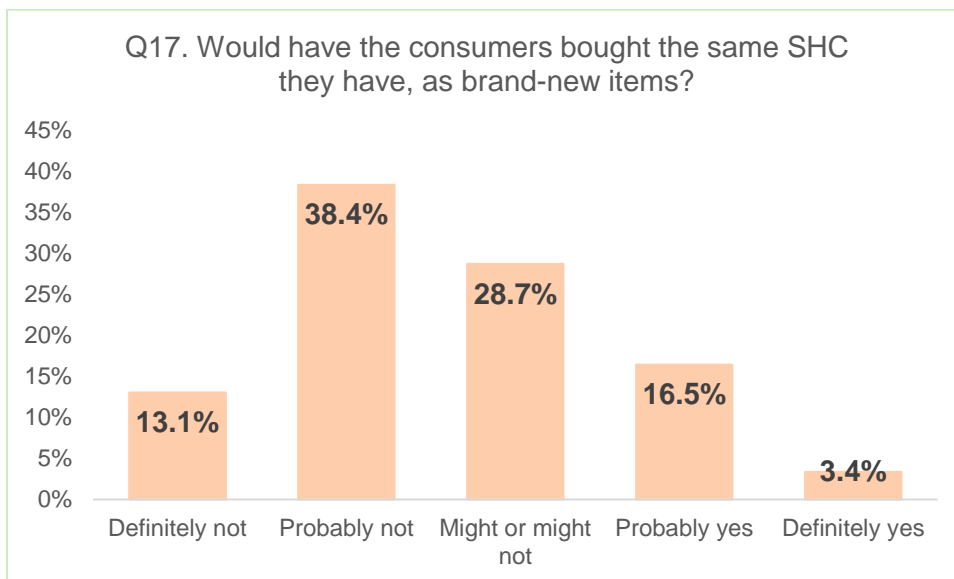
Figure 16. Distribution of consumers depending on the likelihood of them buying the same SHC items they have bought, as brand-new items.

A follow up question to Q17 was directed to a portion of the consumers who indicated they "probably would not" and "definitely would not" have bought the same SHC items they have as brand-new items (n=38). These consumers were asked to describe in open text why they would have not bought the items as brand new. The responses were divided into two categories: financial motives (79% of consumers) and environmental motives (21% of consumers).

A full review of the responses provided is shown in Appendix III.

Some examples of the financial motives described were: "I wanted them for the secondhand price, so I might not want them for the full price", "Because SHC shopping is for fun and for items I would never buy if they were brand new priced", and "Because probably I don't consider them essential, so wouldn't pay "brand new" price for them".

These results match the previously mentioned results from section 4.3.1 in which consumers are unlikely to buy SHC if it were to cost the same as BNC. The consumers who have financial motives (79%) are consumers who would not have the money to buy BNC or who prefer not to spend their money on BNC. This provides insight to assume that the SHC market potentially opens a new market for those consumers who can't afford new clothing, or who don't like to spend much money on BNC. Since these consumers could previously not afford clothes at all (or afford less), the availability of low-price SHC allows them access to this product. However, a displacement of BNC consumption does not occur since this portion of consumers would not have otherwise bought BNC. Counterproductively, the opening of the SHC market may lead to an increase in overall clothing consumption since there is a new demand for clothes.

On the other hand, some examples of the environmental motives (21%) described were: "Because of the environment and working conditions", and "Because that would go against the aspect of reusing resources which are already available".

Consumers were asked to indicate the reasons why they purchase SHC (figure 17). The most popular responses were because of the cheap price and because consumers find it environmentally friendly, with a count of 270 and 247 consumers respectively. Other reasons were because of the good quality (164), because it corresponds to what consumers need (156),

because the items cannot be found new (116), because consumers find items they don't necessarily need, but really like (109), and 40 consumers described other reasons.

Figure 17. Reasons why consumers buy SHC.

Those who selected the option "other" mostly stated financial reasons (e.g., "I like the style and cannot afford normal retail price"), originality reasons (e.g., "I like that the items have a story"), and environmental reasons (e.g., it's selfish to destroy the environment for mere appearance").

The last analysis was to discover if consumers think SHC is good for the environment (figure 18) The Likert score for this analysis resulted in 4.34, meaning most consumers believe SHC is definitely good for the environment.

Q20. Do consumers think SHC is good for the environment?

Definitely not: 0.3%
Probably not: 1.6%
Might or might not: 10.0%
Probably yes: 40.2%
Definitely yes: 48.0%
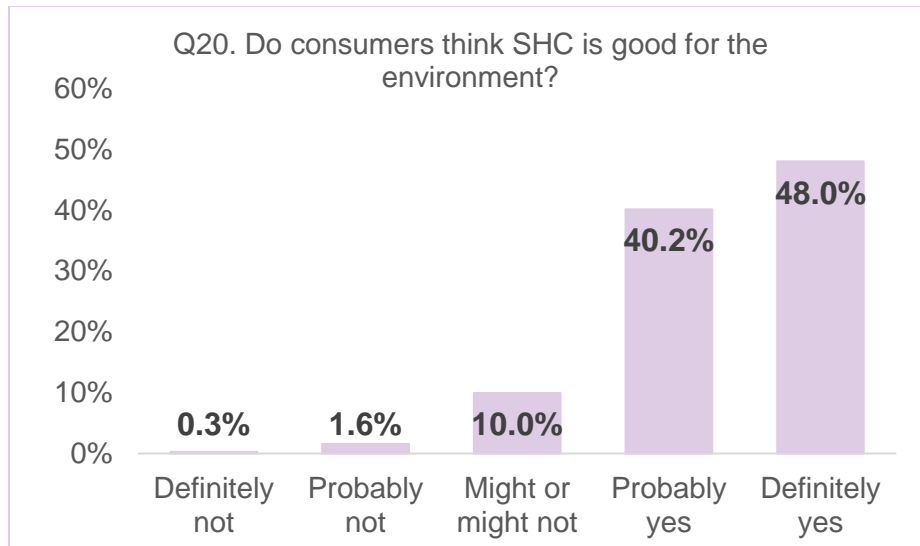
Figure 18. Consumers perceptions of the likelihood of SHC to be good for the environment.

As described before, some of the SHC consumers (36%) who responded the survey tend to buy SHC items they don't need, because of the low prices (figure 10). Furthermore, at least half of the consumers would not have bought the same SHC items they have if they had only been offered as BNC (figure 16) and the reason for this is because consumers could not afford or would not like to spend as much money buying BNC (figure 11 & Q18). These results indicate that there is a low displacement of BNC attributed to SHC shopping because if consumers did not have the option to buy SHC, they would have otherwise not bought BNC at all. Additionally, SHC opens a new market for consumers who could previously not afford as much BNC.

The proportional ordinal logistics regression (POLR) estimates in table 8 show that compared to people who would have not bought the SHC items they have if they were only available as BNC, consumers who would have bought the SHC items even if they were only offered as BNC, are less likely to overconsume SHC due to low prices. Furthermore, these results show that compared to consumers of the female gender, consumers of the male gender are less likely to overconsume SHC due to low prices.

Table 8. POLR estimates of overconsumption of SHC.

	Value	Std. Error	t value	p value	OR	2.50%	97.50%
Likelihood of buying the same SHC items they have if they were only offered as brand-new Reference group: definitely not							
Q17ONLYBProbably not	0.006	0.292	0.021	0.983	1.006	0.566	1.785
Q17ONLYBMight or might not	0.285	0.301	0.945	0.345	1.33	0.735	2.402
Q17ONLYBProbably yes	-0.702 *	0.352	-1.994	0.046	0.495	0.247	0.986
Q17ONLYBDefinitely yes	-0.436	0.642	-0.679	0.497	0.646	0.18	2.284
Gender Reference group: female							
Q1GENDERmale	-0.634 *	0.278	-2.277	0.023	0.531	0.306	0.914
Q1GENDERnonbinary/third gender	-1.569	0.948	-1.655	0.098	0.208	0.026	1.342
Age Reference group: 16-25							
Q3AGE26-41	-0.253	0.258	-0.978	0.328	0.777	0.467	1.288
Q3AGE42-60	-0.465	0.305	-1.527	0.127	0.628	0.345	1.14
Definitely not|Probably not	-1.51	0.35	-4.316	0			
Probably not|Might or might not	-0.683	0.342	-1.996	0.046			
Might or might not|Probably yes	0.237	0.341	0.696	0.487			
Probably yes|Definitely yes	3.018	0.427	7.061	0			

* P < .05
** P < .01
*** P < .001

Similarly, the POLR shown in table 9 demonstrates that compared to people who would buy SHC if it were to cost the same as BNC, people who would not buy SHC if it were to cost the same as BNC are more likely to overconsume SHC due to low prices.

Table 9. POLR estimates of overconsumption of SHC

	Value	Std. Error	t value	p value	OR	2.50%	97.50%
Likelihood of buying SHC if it were to cost the same as BNC Reference group: Probably yes							
Q13.2Definitely not	0.174	0.293	0.592	0.554	1.19	0.669	2.117
Q13.2Probably not	0.619 *	0.295	2.102	0.036	1.858	1.043	3.318
Q13.2Might or might not	0.15	0.337	0.444	0.657	1.161	0.6	2.253
Q13.2Definitely yes	0.127	0.511	0.249	0.803	1.136	0.417	3.13
Gender Reference group: female							
Q1GENDERmale	-0.469	0.264	-1.775	0.076	0.626	0.372	1.05
Q1GENDERnonbinary/thirdgender	-0.967	0.9	-1.074	0.283	0.38	0.058	2.316
Age Reference group: 16-25							
Q3AGE26-41	-0.327	0.243	-1.343	0.179	0.721	0.446	1.16
Q3AGE42-60	-0.429	0.29	-1.481	0.139	0.651	0.368	1.148
Definitely yes|Definitely not	-3.493	0.414	-8.443	0			
Definitely not|Probably not	-1.01	0.322	-3.136	0.002			
Probably not|Might or might not	-0.233	0.318	-0.734	0.463			
Might or might not|Probably yes	0.685	0.32	2.141	0.032			

* P < .05
** P < .01
*** P < .001

People who would have bought the SHC they have even if they were only offered as BNC are more likely to generate a displacement of BNC when they buy SHC because if they hadn't bought the SHC, they would have probably otherwise bought it as BNC. These consumers are less likely to overconsume SHC, regardless of the low prices, potentially because when they buy SHC, they do it because they need it, instead of impulsively buying.

Similarly, people who would buy SHC even if it were to cost the same as BNC are unlikely to overconsume SHC due to low prices. These consumers are possibly environmentally conscious consumers who wouldn't mind paying more for SHC. Additionally, these consumers are more likely to displace their consumption of BNC with SHC, since they would be financially capable of buying BNC, but instead, decide to buy SHC, compared to consumers who cannot afford BNC.

The following chapter provides a further explanation of the meaning of the findings that have been discussed in this section and will provide answers to the sub-questions and main question of this research.

Chapter 5: Discussion

This chapter provides a discussion for each sub-research questions and ultimately, for the main research question.

5.1 To what extent is SHC an adequate substitute for new clothing?

SHC consumers who participated in the survey tend to find equal value for SHC and BNC in terms of enjoyment, social acceptance, and quality and durability. Additionally, most consumers found that SHC offers better value for money than BNC. These results contradict the findings of Farrant et al. (2010), mentioning SHC differs from new clothes in cost, style, previous ownership, and thus, consumers perceive these items differently. Although SHC might have different characteristics, the results indicate that SHC is perceived as an adequate substitute for BNC in terms of the perceived values measured, for the SHC consumers who responded the survey.

The positive results obtained for perceived value can be explained because the survey population included only people who consume SHC. In a study conducted by Hur (2020) that evaluated the enabling and disabling factors that influence SHC consumption, it was found that SHC consumers find different value in SHC than non-SHC consumers. Hur (2020) found that SHC consumers believe SHC has good value for money, and consumers enjoy the shopping experience from a unique array of product options, as well as the environmental and social benefits of ethical consumption. On the other hand, Hur (2020) mentions that non-SHC consumers find barriers for SHC because they perceive less social acceptance, and they have quality and hygiene concerns when it comes to SHC. Since all the respondents were SHC consumers, the results coincide with the finding of Hur (2020), where these consumers find value for money and enjoyment when buying SHC, making this product an adequate substitute for BNC for these types of consumers.

Since it was found that the SHC consumers participating in the survey perceive the same values in SHC and BNC, it was expected that they also gave an equal use to both types of products. This is because according to Hou & Sarigöllü (2020), functional value (measured in this study as quality and durability) and emotional value (measured as enjoyment) are negatively correlated with the intention to replace a product. This means that if consumers find high functional value and high emotional value, consumers are encouraged to treat the product with care and are less likely to replace the product prematurely (Hou & Sarigöllü, 2020). This explains why the participating SHC

consumers tend to wear the same times SHC and BNC items before discarding them. As consumers perceive these two types of products with equal values, consumers will also tend to treat both products with the same care and use the items equally.

5.2 To what extent is there evidence of price effects due to SHC consumption (effect of low prices, re-spending, and liquid asset effect) that could lead to rebound?

The participating SHC consumers mostly find they save money when they buy SHC instead of BNC. One of the effects of the low prices of SHC is that some consumers (36% of the survey population) are likely to buy clothing they don't necessarily need because the price is low. These results match the idea that SHC consumption might lead to higher consumption and disposal than common retail (Bowser et al., 2015). Also, they are in accordance with the theory of Zink & Geyer (2017), mentioning that the accessibility to cheaper, secondhand products, may generate more consumption by enabling consumers to afford more products. The issue relies in the fact that this study revealed that people who consume more SHC per month, will also tend to buy more BNC per month.

Some SHC consumers tend to view clothing as liquid assets which they can sale when they no longer want/need, and buy some new clothing item (20.8%), while others (62.7%) prefer to give out for free their unwanted clothes. According to van Loon et al. (2021), the existence of a second-hand market incentivizes people to replace their clothes with new ones more frequently, by giving them the opportunity to earn back some of the investment. In this sense, the liquid asset effect associated with SHC promotes primary production by allowing BNC consumers to sell their clothing in the SHC market and buy new (Thomas, 2003). Additionally, the second-hand market gives people who sell or donate their clothes the relief that the clothes will continue to be used by someone else, reducing the moral burden (Loon et al., 2021). Those consumers who decide to give their clothes for free to the SHC market might feel a moral burden relief, by assuming that someone else will continue to wear it. This is not necessarily true since clothing that does not end in landfills is commonly sent to the SHC trade in low- and middle-income countries, where clothing that is not sold ends up becoming solid waste that generates environmental and health hazards in these countries that don't have quality municipal waste systems (Bick et al., 2018).

With regards to the re-spending effect, participating consumers perceive money savings when they buy SHC instead of BNC. This is explained because according to Crang et al. (2013), the price for which SHC is sold is around 10-20% of the price of BNC. This remaining expenditure means an increase in the effective income of consumers, who consequently have an extra spending power (Makov & Font Vinanco, 2018). According to Makov & Vivanco (2018), consumers tend to react to this by buying extra goods and services. Such is the case in the survey population of the present research, in which 21% of consumers declared to re-spend the saved money in more clothes, other fashion items, and other material items they don't necessarily need. These additional product demand leads to increased emissions, and total emission savings might be less than those assumed by SHC consumption, and could even result in backfire (Druckman et al., 2011). Additionally, the expenditure spent in holidays, household expenses and other activities will also affect the environmental savings obtained from reusing clothes due to the emissions and resources associated with these activities.

Consumers who fall in the liquid asset effect due to SHC, also tend to re-spend in more clothes, and other products. These tendencies, if coupled with irresponsible clothing consumption, can lead to CER by increasing demand in primary production from frequently selling their BNC to buy more (liquid asset), and by reducing emission savings from buying SHC due to re-spending in more clothing and other products.

5.3 To what extent do consumers of SHC displace their consumption of BNC?

To evaluate the benefits obtained from reusing clothes, the rate with which a purchase of a SHC item replaces the purchase of a similar BNC item is critical, because this replacement indicates the new production that is avoided (Nørup et al., 2019). It is unlikely for the survey population to have bought the same SHC they have if they were only available as BNC items. Additionally, one of the main drivers for consumers to purchase SHC is the cheap price.

The main driver for consumers in this study to buy SHC is the low price, rather than necessity, and this type of consumerism does not generate any effect on primary production (Levänen et al., 2021). Such is the case with consumers who would not have bought the same SHC they have if it were to cost the same as BNC. According to Brooks & Simon (2012), there is a greater demand of secondhand items among consumers with weak purchasing power. Furthermore, according to

Siderius & Poldner (2021), there is a lack a displacement when lower prices induce consumers who previously didn't purchase the primary good (BNC), to purchase the secondary goods (SHC), opening a new market, and generating overall increase in consumer demand. This is the case for consumers who mentioned reasons for not buying the same SHC items they have bought as BNC items such as: ""I wanted them for the secondhand price, so I might not want them for the full price", and "Because secondhand clothes shopping is for fun and for items I would never buy if they were brand new priced". Additionally, the extended use of clothing achieved through SHC markets does not necessarily mean that consumers stop buying BNC (Levänen et al. 2021). The results of this study show that consumers who buy more SHC per month, also tend to buy more BNC per month. This could be explained because according to Nørup et al. (2019), SHC in high-income countries (such as the Netherlands) is commonly consumed in addition to BNC, and not instead of.

On the other hand, it was determined in this study that consumers who would have bought the SHC they have, even if it were to cost the same as BNC, were also unlikely to buy SHC they don't necessarily need due to low prices. These consumers are encouraged to buy SHC for other reasons beyond the cheap price, and possibly motivated by environmental reasons. However, only 17.6% of consumers from this survey fall in this category. This shows that there is a great potential to avoid CER because if more consumers acted according to this reasoning, the environmental benefits of SHC could more easily be materialized.

The reuse of clothing has been linked to reduction in the amount of clothes that is disposed of in landfills, consequently temporarily avoiding pollution (Xu *et al.*, 2014). However, the benefits of extending the lifespan of clothing through SHC consumption are obtained by reducing the exploitation of virgin materials, water, and energy associated with new textile production (Laitala & Klepp, 2017). There are greater benefits in avoiding primary material production than in temporarily avoiding landfill (Greyer et al., 2016). The results obtained demonstrate that SHC consumption as a CE model brings about environmental benefits from temporarily avoiding landfill. However, the insight obtained in this study is that primary production is not yet being sufficiently displaced, and CER is bound to occur since the benefits of secondary production strategies can only materialize when they displace or significantly cause a reduction on primary production (Siderius & Poldner, 2021).

5.4 To what extent does CER occur due to SHC consumption in the Netherlands?

The insight obtained from this study indicates that consumer behavior of SHC consumption in the Netherlands can lead to CER, also known as no change or increase in primary production that can reduce the environmental benefits of CE activities (D'Adamo et al., 2022). According to Zink & Geyer (2017), rebound can occur by two principal factors: insufficient substitutability or by lower prices.

The survey population perceives SHC as an adequate substitute for BNC, and thus makes the same use out of SHC as they would of BNC. This means that CER due to insufficient substitutability is unlikely to occur.

However, in terms of price effects, low prices incentivize 36% of consumers to consume SHC items they don't necessarily need, and consumers who buy more SHC per month, also tend to buy more BNC per month. This entails an increase in primary production demand, which is likely to result in CER. Furthermore, in terms of the liquid asset effect, the SHC market allows BNC consumers to prematurely replace their clothing by earning back some of their initial investment from selling their used clothes, and by relieving the moral burden of discarding a clothing item that can still be used (van Loon et al., 2021). Selling BNC that is still good to use to buy more BNC is likely lead to CER due to the increased demand in primary production. Also, giving away the clothes for free instead of continuing to wear it (or avoiding the purchase in the first place), is likely to lead to counterproductive environmental impacts and CER, since not all clothing that goes to the SHC market is sold and can end up in low-income countries generating environmental and health hazards (Bick et al., 2018), or go straight to landfill. Consumers who tend to sell their clothing to buy more clothes (liquid asset) are more likely to re-spend in more clothes and other material objects. Consumers have a higher acquisitive power when they buy SHC instead of BNC because they perceive money savings when they buy SHC. In this study 21% of consumers re-spend the money on more clothes, and other products. The additional emissions and resources spent in the extra products is likely to cause CER if the emissions and resources associated to re-spending are higher or equal to those associated to the reutilization of clothing.

In terms of displacement, the insight obtained from this study is that CER can occur due to low displacement of primary production from SHC consumption for two reasons. The first reason is

because the availability of SHC opens a new market for consumers who could previously not afford as much clothing. This type of consumption does not generate displacement since consumers would have otherwise not bought BNC if SHC were not available. Only 17% of consumers mentioned they were likely to buy SHC if it were to cost the same as BNC, and these consumers are less likely to overconsume SHC due to low prices compared to those who would not buy SHC if it were to cost the same as BNC. These consumers are more likely to cause a displacement of BNC since their motivations for buying SHC goes beyond the cheap price and might be driven by environmental reasons.

The second reason for which CER can occur due to low displacement of primary production from SHC consumption is that consumers who have a high acquisitive power tend to buy SHC in addition to, and not instead of BNC. In this study, only 11% of consumers mentioned they fully replace their purchases of BNC with SHC, while the rest partially replace them (71%) or don't replace them at all (18%). Additionally, it was determined that the amount of SHC consumers buy per month is directly proportional to the amount of BNC bought per month. When consumers buy SHC in addition to, and not instead of BNC, the environmental benefits of reuse cannot be materialized. This is because the environmental benefits of reusing clothes are obtained to the extent in which primary production is displaced or significantly lowered (Sandin & Peters, 2018).

CER could occur primarily due to the price effects enabled by the SHC market. These price effects have repercussions on the displacement rates and consequently, the environmental benefits of reusing clothes are offset. If these behaviors are not taken in consideration when designing CE models, beside reducing the environmental benefits, backfire could potentially occur by counterproductively generating greater environmental impact through low prices, re-spending effects, liquid asset effects, and low or null displacement of primary production.

When secondhand markets supplement instead of replacing new production, these contribute to overconsumption (Bowser et al., 2015). However, SHC can obtain high substitution levels with regards to BNC (Siderius & Poldner, 2021) because as seen in the results of this thesis, SHC is an adequate substitute for BNC, which is why there is a high potential to avoid CER and for SHC to achieve the environmental benefits of reuse.

To avoid CER, CE activities, such as SHC consumption, must be coupled with behavioral changes in consumers (Levänen et al., 2021). CER could be avoided by integrating the environmental

externalities to SHC prices, through for example carbon tax (Makov & Font Vivanco, 2018). Also, incentivizing consumers to use the money they save from buying SHC in sustainable consumption could avoid rebound attributed to re-spending (Wiprächtiger et al., 2022). Additionally, encouraging consumers to invest in high quality clothes (even if it is less quantity) rather than buying a lot of low-quality garments (Wiprächtiger et al., 2022) would reduce CER by reducing emissions and resources from primary production.

However, non-responsible SHC purchasing stresses sales and increases consumption (D'Adamo et al., 2022). According to Korhonen et al. (2018), most of the assumed sustainability impacts of CE are only theoretical, which is why further research should be carried to study the unexpected implications of CE activities (Haupt et al., 2016). In this sense, rebound should not become a limitation for change or an excuse for inaction, but the knowledge on rebound effects and ways to avoid them should become a conduit for action (Siderius & Poldner, 2021).

Chapter 6: Conclusions

The objective of this thesis was to evaluate the extent in which CER rebound occurs due to SHC consumption in the Netherlands, to create awareness and promote the materialization of the environmental benefits of reuse. In this chapter the answers to the research question are provided in a summarized manner, along with guidance for future research.

6.1 Answer to the research questions

Regarding substitutability, it was found that enjoyment, social value, value for money, and quality and durability are appropriate indicators for adequacy of substitutability. In this sense, consumers find SHC to be an adequate substitute for BNC, and consequently, consumers give equal use to both products. For this reason, it was determined that CER attributed to inadequate substitutability is unlikely to occur.

Regarding price effects, it was found that low prices of SHC incentivize consumers to buy products they don't necessarily, and higher consumption of SHC is associated with higher consumption of BNC, which would lead to CER due to an increase in clothing demand. Additionally, the SHC market enables consumers to discard their BNC clothing more frequently (either by selling it or giving it away for free), because they regain part of their investment and use it to buy more clothes, and it relieves the moral burden by making consumers believe they are not damaging the environment since clothes will be reused (liquid-asset effect). However, not all the clothes that is given to the SHC market is necessarily reused, since the clothes that is not sold is likely to create additional environmental hazards in low- and middle-income countries. Furthermore, consumers who purchase SHC tend to save money in comparison to buying BNC. This additional expenditure is spent by some consumers (21%) in more clothing or other products. When the emissions and resources associated with these products are higher than the emission and resource savings associated with the reutilization of clothes, the environmental benefits of this CE activity can be offset, leading to CER. Overall, low prices, the liquid asset effect, and the re-spending effect created by the SHC market are likely to lead to CER.

The findings indicate there is a low displacement of BNC, because SHC opens a new market for consumers who could previously not afford clothing at all, and this type of consumption does not generate displacement but rises overall demand for clothing and leads to CER. Furthermore,

consumers with high acquisitive power tend to buy SHC in addition to, and not instead of BNC. The main benefit observed from this type of practice is the elongation of the lifespan of clothing and temporary avoidance of end of life, while environmental benefits from avoiding primary production are partially offset.

CER is likely to occur in the Netherlands from SHC consumption due to low prices, liquid asset effect, re-spending effect, and ultimately, a low displacement of primary production due to the opening of a new market and the consumption of SHC in addition to BNC, and not instead of. The fact that consumers supplement their BNC purchases with SHC purchases instead of replacing them, generates an increase in primary production due to the increased demand in clothing. However, as seen in the results of this thesis, SHC is an adequate substitute for BNC, which is why there is a high potential to avoid CER and for SHC to achieve the environmental benefits of reuse. Furthermore, this research shows evidence that consumers who are more likely to consume SHC even if it were to cost the same as BNC, are less likely to overconsume SHC, which indicates the existence of consumers who are motivated by reasons beyond low prices.

To avoid CER, consumers must become aware that there is little to no environmental benefit in consuming SHC if there is no reduction in their BNC consumption. Furthermore, the main driver for purchasing SHC should not be the low price, because this will incentivize re-spending. Strategies such as carbon tax or incentivizing consumers to invest their saved money in other sustainable alternatives will reduce the risk of rebound. The liquid asset effect seems inevitable with secondhand markets, however, selling clothing and buying more SHC instead of BNC would reduce the environmental impacts of this effect.

In conclusion, this study shows evidence that CER attributed to SHC consumption in the Netherlands is likely to occur to the extent of price effects and low displacement of primary production. On the other hand, this research has also demonstrated that SHC is an adequate substitute for BNC in the perception of SHC consumers, which is why there is a great potential to avoid CER if there is a behavioral change in consumers and strategies to avoid re-spending and liquid asset effects are implemented.

6.2 Directions for future research

Based on the insights obtained from this thesis, four directions for future research were identified. First, a larger and more homogenous sample should be chosen to verify whether the results obtained from this research are representative of the entire community of SHC consumers of the Netherlands.

Second, financial status should be taken in consideration to find correlations between the different profiles of SHC consumers. This research demonstrated that there are some consumers who don't have the money or don't like to waste it on BNC and therefore buy SHC, thus, don't generate any displacement of BNC consumption, and there are SHC consumers who buy SHC as an addition to their regular SHC purchases and not instead of, also not generating displacement. This indicated that financial status of consumers could play an important role on the susceptibility of price effects to cause rebound.

Third, a mathematical approach to the present research could help quantify how much each factor influencing CER (low prices, re-spending, liquid asset effect, and low displacement), affects the capacity of SHC consumption to deliver the environmental benefits of reuse, and thus, measure the rebound effect.

Finally, a broader study analyzing actual consumer behavior of SHC consumption and BNC consumption over a long span of time, rather than self-perceptions and expected actions like in this thesis, could provide more reliable insights on the rebound effects attributed to SHC consumption in the Netherlands.

Understanding the factors that influence rebound due to SHC consumption can contribute to modify this CE strategy or to educate consumers in a way that the assumed environmental benefits of reuse can be materialized, and thus, avoid rebound.

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Appendix

Appendix I. Survey

Secondhand Clothing Trends in NL

0
Consent   form

You are being invited to participate in a master thesis research study titled **Circular Economy Rebound Effect in the Context of Secondhand Clothing Consumption in the Netherlands**. This study is being done by Paola Carrasco from the Master in Environment and Energy Management at the University of Twente. The aim of this research is to investigate secondhand clothing consumption trends in the Netherlands and will take you approximately **5 minutes to complete**. Your participation in this survey is **voluntary and anonymous**, and you can withdraw at any time. You are free to omit any question. The data gathered will be used to determine trends in   the   secondhand   clothing   market.
Please   continue   with   this   survey   if:
*You   have   ever   purchased   secondhand   clothing   items
*You   currently   live   in   the   Netherlands
*You   are   between   16-60   years   old

This research has been previously approved by the BMS Ethics Committee of the University of Twente. The information gathered will only be used for the purposes of the present study.

If you have any comments or would like to receive further information, please contact: Paola   Carrasco   at   p.a.carrascocampos@student.utwente.nl

Please click on the option below if you agree that the answers you provide in this survey can be used as input for the thesis previously mentioned.

○ I agree

Q1 Gender

○ Male

○ Female

○ Non-binary / third gender

○ Prefer not to say

Q2 Are you living in the Netherlands?

○ Yes

○ No

Q3 What is your age (years)?

▼ 16-25 ... 42-60

Q4 Have you purchased secondhand clothes before?

○ Yes

○ No

Q5 How many secondhand clothing items do you buy per month?

○ Less than 1

○ 1 or 2

○ 3 to 5

○ 5 to 10

○ More than 10

Q6 How many brand-new clothing items do you buy per month?

○ Less than 1

○ 1 or 2

○ 3 to 5

○ 5 to 10

○ More than 10

Q7 Which types of clothing items have you bought second hand? (Multiple answers possible)

☐ Shirts and tops

☐ Pants/Jeans

☐ Jackets/coats

☐ Dresses/skirts

☐ Other (please describe)

_____

End of Block: General

Start of Block: Substitutability

Q8-enjoyment Do you experience greater enjoyment when you consume second hand clothes or when you consume brand new clothes?

○ Secondhand clothes

○ Brand new clothes

○ I experience equal enjoyment

Q9-society Do you feel more socially accepted when you consume secondhand clothes or when you consume brand new clothes?

○ Secondhand clothes

○ Brand new clothes

○ I feel equally socially accepted

Q10-price Between secondhand clothes and brand-new clothes, which option offers a better value for money?

○ Secondhand clothes

○ Brand new clothes

○ Both offer the same value for money

Q11-quality Between secondhand clothes and brand-new clothes, which one has better quality and durability?

○ Secondhand clothes

○ Brand new clothes

○ Both have equal quality and durability

Q12-use phase Which type of clothing do you wear more times before discarding?

○ Secondhand clothes

○ Brand new clothes

○ I wear both second hand and brand-new clothes about the same times before discarding

End of Block: Substitutability

Start of Block: Price effects

Q13-pe1,2/la3/rs4 Rate the following statements:

	Definitely not	Probably not	Might or might not	Probably yes	Definitely yes
1. Do you buy secondhand clothing items you don't necessarily need, just because the prices are low?	○	○	○	○	○
2. Would you still buy secondhand clothes if they were to cost the same as brand new clothes?	○	○	○	○	○
3. Would you sell the clothes you no longer use in the secondhand clothing market?	○	○	○	○	○
4. Does buying secondhand clothes instead of new clothes save you money?	○	○	○	○	○

Q14-re-spending If you do save money when buying secondhand clothes instead of new, what do you usually do with the money? (Multiple options possible)

☐   I buy more clothes

☐   I save it for household expenses

☐   I buy other fashion items

☐   I buy some other material item I don't necessarily need

☐   I save it for holidays

☐   Other (please describe)

_____

Q15-liquidasset If you buy a clothing item and you've only worn it a few times, but you no longer want/need it, what would you do with it?

○ Throw it away

○ Give it away for free

○ Sell it and buy some other clothing item

○ Keep using it until it's worn out since I already have it

End of Block: Price effects

Start of Block: Displacement of new clothes

Q16-post purchase To what extent do second hand clothing purchases replace your consumption of brand new clothing?

○ Fully

○ Partially

○ Not at all

Q17-pre purchase Imagine the secondhand clothing items you have bought were only available as brand new items (thus, priced as brand new), would you have still purchased them?

○ Definitely not

○ Probably not

○ Might or might not

○ Probably yes

○ Definitely yes

Display This Question:

If Imagine the second hand clothing items you have bought were only available as brand new items (th... = Probably not

Or Imagine the second hand clothing items you have bought were only available as brand new items (th... = Definitely not

Q18-pre purchase If your answer was no:

why would you have not bought the second-hand clothing items you have if they were only available as brand new? Please describe in a sentence

_____

Q19; pre purchase Most of the time.. what makes you buy secondhand clothes? (Multiple answers possible)

☐ The cheap price

☐ The good quality of clothes

☐ I find items that I don't necessarily need, but I really like

☐ It corresponds to what I need

☐ I consider it environmentally friendly

☐ I cannot find these items new

☐ Other (please describe)

_____

Q20 Do you think secondhand clothes are good for the environment?

○ Definitely not

○ Probably not

○ Might or might not

○ Probably yes

○ Definitely yes

Appendix II. Distribution of consumers according to the number of SHC items and BNC items bought per month and pearson correlation analysis from section 4.1

Table 10. Distribution of consumers according to the number of SHC items and BNC items bought per month.

Of BNC items consumers buy per   month

		less than 1	1 to 2	3 to 5	5 to 10	more than 10
# Of SHC items consumers buy per month	less than 1	121	54	9	2	0
	1 to 2	92	58	11	0	0
	3 to 5	28	14	4	2	2
	5 to 10	10	3	1	1	0
	more than 10	3	4	0	1	0

Yellow: consumers who buy more BNC items than SHC items per month (19%)

Green: respondents who buy more SHC items than brand new clothing items per month (37.1%)

Grey: respondents who buy the same amount of SHC than BNC per month (43.8%)

Table 11. Pearson correlation analysis of SHC and BNC items bought per month (SPSS).

Correlations

		How many SHC items do you buy per month?	How many brand new clothing items do you buy per month?
How many SHC items do you buy per month?	Pearson Correlation	1	.130**
	Sig. (2-tailed)		.008
	N	421	420
How many brand new clothing items do you buy per month?	Pearson Correlation	.130**	1
	Sig. (2-tailed)	.008	
	N	420	421

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix III. Open text answers from Q18

1.Because that would go against the aspect of reusing resources which are already available.

2.Usually I look for great deals in secondhand shops, e.g., clothes from better brands I don't have the money to buy new clothes from price would be higher

3.I can make work with the stuff I already have, though not much or fashionable. I like to increase my fashion options only if I can find it in secondhand shop because I want to contribute to the environment.

4.I don't like spending money on clothes

5.I think of SH clothes as not a necessity but more of an opportunistic expense - I get to save some money and some carbon. If I'd buy new clothes I would satisfy neither of those conditions.

6.Price might be too high

7.Because consuming new products while there are good quality second hand products out there is bad for the environment for multiple reasons! Material and energy consumption as well as waste production

8.Brand new they would have been too expensive

9. I prefer reducing my buying habits. And buy good quality-fair price clothes.

10.I feel I'm getting a deal in a 2nd hand shop and not really needing the actual item

11.I usually try to buy designer and high-quality brands when it comes to secondhand clothes, and they might be out of my budget normally if they were new

12.Because I can't afford them new

13.Nothing is needed

14.Too expensive

15.They would not be affordable to me at all

16.Price matters

17.Because of the environment and working conditions

18.I don't want to spend too much money on clothes. Food and bills are more of a priority.

19.I like to look around in thrift stores and secondhand stores and I find it important to not further pollute the environment by buying new stuff. Also, I am fond of giving clothes a second life.

20.Because probably I don't consider them essential, so wouldn't pay "brand new" price for them

21.The price, the product is not the same

22.Because I prefer to save my money

23.Often what I buy second hand is decent but not exactly what I like, and I would not spend much money on it

24.Because secondhand clothes shopping is for fun and for items I would never buy if they were brand new priced

25.To reduce the risk of having defected items

26.I have enough clothes, but can justify new secondhand ones as they don't have much cost for me or the planet

27.I prefer more the second hand which let me help save money and help reduces wasting our environment.

28.It a quite expensive for me.

29.I look for higher end used clothes that I mostly couldn't afford at all.

30.I can buy high quality, expensive brands second hand, but not can't afford them on the high street.

31.Because I like to buy high price designer clothes second hand, and would not buy them at full price

32.I would only buy it because the price was reduced as a secondhand item

33.I would not buy because I would not have the money

34.I try to buy less brand-new clothing items whenever possible.

35.I buy clothes and alter them so sounding less money on them makes them part of my hobby and learn more about construction this way

36. I don't like spending too much money on clothes

37. Because I like secondhand because it doesn't cost me much, and brand new is too expensive

38. To reduce the environmental impact of buying new clothes

Appendix IV. Variables used for MLR and POLR estimates.

Three MLR and two POLR analyses were conducted in R Studio. Below a description of the variable data used as input for each regression is described.

Table 12. Variables used for MLR #1

Dependent variable	Use of SHC vs. BNC
Reference group	Equal use SHC and BNC
Control variable #1	Age
Reference group	16-25
Control variable #2	Gender
Reference group	Female
Independent variable #1	Enjoyment
Reference group	Equal enjoyment SHC and BNC
Independent variable #2	Social acceptance
Reference group	Equal social acceptance SHC and BNC
Independent variable #3	Value for money
Reference group	Equal value for money SHC and BNC
Independent variable #4	Quality
Reference group	Equal quality SHC and BNC

Table 13. Variables used for MLR #2

Dependent variable	SHC items bought per month
Reference group	Less than 1 SHC item bought per month
Control variable #1	Age
Reference group	26-41
Control variable #2	Gender
Reference group	Female
Independent variable #1	BNC items bought per month
Reference group	Less than 1 BNC item bought per month

Table 14. Variables used for MLR #3

Dependent variable	Re-spending
Reference group	Save it for household expenses, holidays, other
Control variable #1	Age
Reference group	16-25
Control variable #2	Gender
Reference group	Female
Independent variable #1	Liquid asset
Reference group	Sell clothing and buy some other clothing item

Table 15. Variables used for POLR #1

Dependent variable	Likelihood of overconsumption of SHC due to low prices
Reference group	Definitely not overconsume SHC due to low prices
Control variable #1	Age
Reference group	16-25
Control variable #2	Gender
Reference group	Female
Independent variable #1	Likelihood of buying the same SHC items they have if they were only available as BNC
Reference group	Definitely not buy the same SHC items they have if they were only available as BNC

Table 16. Variables used for POLR #2

Dependent variable	Likelihood of overconsumption of SHC due to low prices
Reference group	Definitely do overconsume SHC due to low prices
Control variable #1	Age
Reference group	16-25
Control variable #2	Gender
Reference group	Female
Independent variable #1	Likelihood of buying SHC if it were to cost the same as BNC
Reference group	Probably would buy SHC if it were to cost the same as BNC