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The effects from working time reductions on intra-individual time use and environmental impact - a Swedish case study

by

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Abstract: Climate change is causing unprecedented damage to our planet, requiring new tools and accelerated efforts to mitigate the adverse effects. Working time reductions (WTR) have long been proposed as a promising approach, yet first recently it is gaining increasing attention. The environmental effects from working time reductions, with kept wages, are however less studied. This paper adopts a qualitative case study to explore how WTR with kept wages will impact intra-individual intentional time use and consumption in Sweden. This study conducts semi-structured interviews and a digital survey to explore the dynamics and its potential environmental effects. The data depicts more ambiguity than previous studies have assumed. It suggests that individuals in high-income societies might be more likely to create time use rebound effects from WTR with kept income levels. The results indicate that more research is needed to fully understand how WTR affects the environment.

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1. Introduction

The latest report from the Intergovernmental Panel on Climate Change (2022, p.4) states that “[h]uman activities, principally through emissions of greenhouse gases, have unequivocally caused global warming...”. The consequences are accelerating widespread climate change leading to severe loss and damage to both nature and humans, disproportionately affecting the most vulnerable communities (IPCC, 2022). Nearly 90% of all marine fish stocks in the world are completely exploited, 75% of the surface on earth has been altered by human activities and one out of eight million plant and animal species are threatened to become extinct (UNEP, 2023).

Countless attempts have been made and initiated to adapt to and mitigate climate change on multiple levels in our society, yet so far we are not on par with reaching the 2030 Agenda (UN, 2022). Apart from global and national goals and regulations on production and emissions, some researchers point toward the necessity of degrowing the economy to reach our climate goals while contributing to an even more prosperous society through increasing life satisfaction and rising equality (Jackson, 2016; Martinez-Alier et al. 2010; Victor, 2008). One of the most common mitigation strategy tools proposed by degrowth proponents is working time reductions (hereinafter called WTR).

WTR is proposed as a triple dividend mitigation strategy tool to create sustainable societies. First, research suggests that WTR might play a significant role in reducing unemployment and increasing equality by more evenly distributing displaced workers in society. Secondly, WTR is proposed to contribute to increased well-being and life satisfaction by reducing stress. The third benefit from WTR is the assumed environmental benefits, which will be the focus of this paper. WTR is proposed to lower emissions and the ecological footprint from both scale (income) and composition (time) effects, encompassing production, consumption, and individual energy-intensive time use. However, reducing working hours has not yet been implemented or achieved on a global scale, suggestively due to low firm incentives and rigorous consumer desire to achieve a high-status quo.

1.1 Research Problem

WTR policies have gained increasing popularity and media attention, rising the probability of implementing WTR on a global scale. Recently, the largest trial of WTR was conducted in the UK and reported positive results on productivity and employee well-being (Autonomy, 2023). Previously, a similar trial has been conducted in Iceland, showing comparable results (Autonomy, 2021). Furthermore, the trials have been designed so that employees have been able to keep 100% of their wages while reducing their working hours (Autonomy, 2023). The outcome is encouraging, increasing the incentives for firms and employees to adopt WTR. This has gained increasing popular interest and media attention (Ferragioni & Colombo, 2023; Kelley, 2023; Törnquist, 2023).

However, the results differ from previous research proposing a triple dividend to society. Former research has assumed that WTR would decrease production and lower income levels, which in turn would create environmental gains. However, these results indicate that the new WTR implementation design would allow the employees to keep their income levels, and the companies to keep (or even increase) their production levels. The trials have not discussed how these factors might affect the environment, except for one sentence stating *“Interestingly, 52% of employees reported an increase in leisure travel, while 44% reported no change in this regard”* (Autonomy, 2023, p.43). This implies that even though well-being might increase, the environmental benefits from both scale and composition effects following WTR are questioned (Fitzgerald, 2022).

No research has been conducted to specifically analyze the environmental impact of working time reductions with kept wages. Previous studies have focused on reductions with *reduced wages*. This difference in approach suggests that the outcomes of working time reductions with kept wages may vary significantly. The introduction of a new implementation design that includes kept wages for employees could potentially limit the environmental benefits or, in the worst case scenario, have adverse effects on the environment. Hence, it is not appropriate to conclude how WTR with kept wages might benefit the environment based entirely on previous studies. These studies lack the necessary generalizability to serve as a reliable policy tool. Consequently, it is imperative to conduct research specifically on WTR with kept wages to fully

understand their potential effects on the environment. This is especially important in the context of the ongoing climate change crisis, where it is essential to implement policy mitigation tools correctly and avoid any adverse effects on the environment.

1.2 Aim and Research Question

To contribute with more knowledge to the gap of how WTR with kept wages might impact the environment, this study aims to explore intra-individual intentional time use and consumption patterns in Sweden. Studying aggregate national data in Sweden offers limitations to connecting individual working hours with individual time use since the datasets are built on two separate samples. By analyzing intra-individual changes, however, this study seeks to provide a deeper and more insightful understanding. Intra-individual studies analyze the changes within an individual, in contrast to between (inter) individuals.

Furthermore, due to the limitations on gaining access to individuals who have been exposed to WTR with kept wages, this paper will analyze *intentional* time use behavior on both individuals who have been exposed to WTR with reduced wages, and those who have not been experiencing WTR at all. This approach is valuable because the implementation of WTR on a global scale would impact both voluntary reducers (those who choose to reduce their working hours) and individuals who would not willingly opt for WTR due to reduced income levels. By including both types of individuals, the study will generate a more comprehensive and relevant dataset.

WTR is a mitigation tool intended to be implemented in affluent societies. Sweden poses an interesting case as a handful of companies already have implemented WTR with kept wages. Additionally, one political party has six-hour workdays, with kept pay, as an election question (Vänsterpartiet, 2022) highlighting Sweden as a likely candidate for targeted mitigation strategies like WTR. Furthermore, even though Sweden's consumption-based emissions have decreased in the last decade they were still at 7.65 ton carbon dioxide equivalents per person in 2020 (Naturvårdsverket, 2023), mainly divided into the four areas of food products, housing, transportation, and clothing/shoes (SCB, 2023).

In consideration of these preconditions, this paper conducts a qualitative case study in Sweden based on semi-structured interviews including four individuals, two reducers, and two non-reducers. Additionally, a complementary digital open-ended survey including 28 non-reducers from Sweden will be conducted. The study will differ from previous studies by incorporating an additional dimension of kept income levels and aim to explore its effects on intra-individual intentional time use and consumption patterns. Thus, to contribute to the existing gap in research on WTR with kept wages, this study aims to explore the following research question;

“How would working time reductions affect individual intentional time use, consumption patterns, and environmental rebound effects in Sweden, and in what way does income impact this dynamic?”

In particular, two sub-research questions have been formulated based on previous literature, discussed further in section 2. Literature Review. According to a study conducted in Switzerland (Hanbury et al. 2019), individuals' motivations for reducing their working hours are associated with the environmental impact of their actions. Thus, the first sub-research question this paper will explore involves how motivations might play a role as working time reduces.

Sub-Research Question 1: *“In what way could motives for working time reductions impact the intentional time use of individuals in Sweden?”*

Additionally, the literature on composition effects shows various results which indicate complex dynamics of intra-individual time use and consumption patterns. Therefore, the second research question this paper aims to explore is;

Sub-Research Question 2: *“How would increasing discretionary time impact an individual's intentions regarding daily activities, consumption, and travel patterns, and in what way would income affect those intentions?”*

1.3 Delimitations

Even though WTR is suggested to offer a triple dividend, this study is limited to analyzing the environmental benefits on an intra-individual level. Analyzing both the effects of unemployment as well as the individual gains in mental health and well-being are subject to three completely separate studies. Furthermore, the environmental effects are assumed to be affecting both production and consumption. However, as the production function would incorporate the productivity levels, technological innovation, and incentives of the firms, it is considered too broad of a topic to discuss in this paper. Thus, this study is limited to only analyzing the individual effects of implementing WTR.

1.4 Outline of thesis

The first section of this paper will discuss the historical overview of average working hours in selected countries, the background to working time reductions from a degrowth perspective, and the empirical studies conducted to date. Furthermore, a discussion of applicable theoretical frameworks, guiding the methodology and analysis will follow. The third chapter will thoroughly present chosen methodology containing the research design, data collection, process of analysis, and limitations of this study. Finally, the results will be analyzed and discussed through the applied theoretical framework and ultimately end with a short conclusion and recommendations for future research.

2. Literature Review

This chapter will initially provide an overview of the historical annual working hours, explain WTR, and discuss previous empirical findings on working hours and environmental impact from macroeconomic and microeconomic perspectives. Furthermore, it will acknowledge the changes in WTR implementation design and the existing gap requiring further research. Lastly, this chapter will discuss theoretical frameworks and argue for the need to apply economic behavioral theory to explore intra-individual time use.

2.1 Background - history of annual working hours

During the last 150 years, working time has halved in the global North (see Figure 1). The most significant decrease occurred at the beginning of the 20th century, during a time when for example Sweden moved from ten to eight-hour work days (Bengtsson & Molinder, 2017). However, the shift did not occur naturally but was pressured by labor unions and regulated by governments (Bengtsson & Molinder, 2017; Schor, 2005). As seen in Figure 1, little has progressed in terms of decreasing annual working hours globally during the last 40-50 years. Researchers mean that since the 1980s productivity gains in Western societies have been translated to higher levels of output and increasing income, in contrast to decreasing hours of work (Kallis et al. 2013; Knight et al. 2013; Schor, 2005). Schor (2005) argues that persistent working hours are affected by little firm incentives to reduce productivity, and consumer desire to constantly reach for higher levels of status-quo.

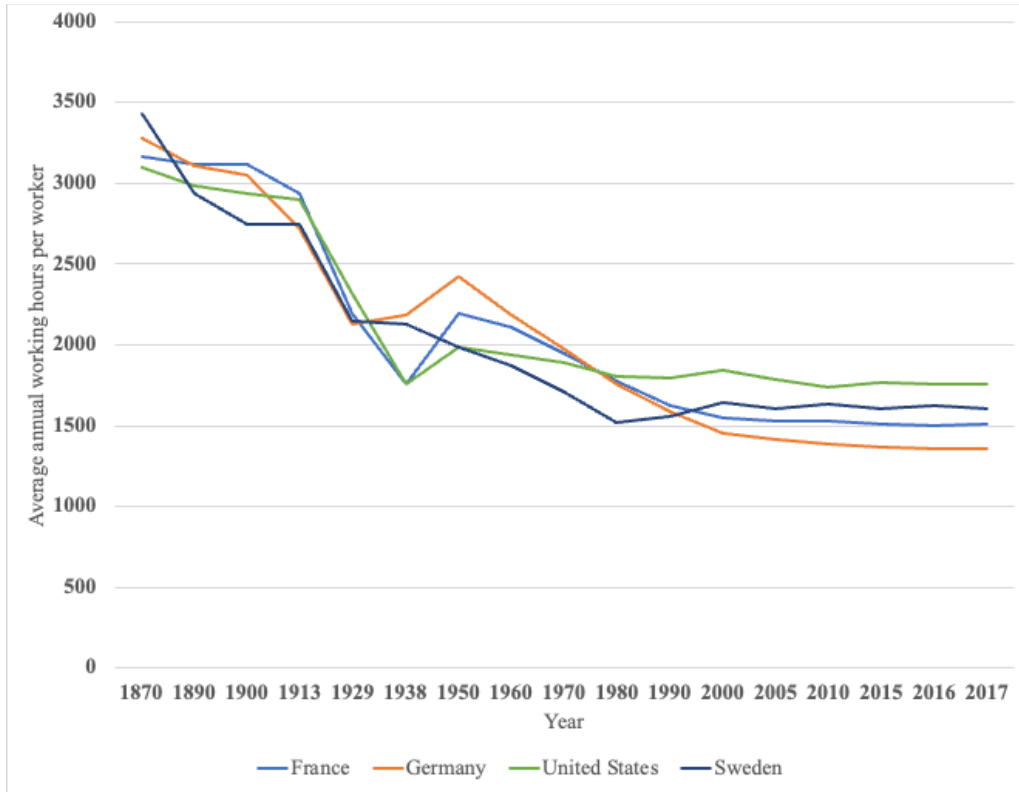


Figure 1: Average Annual Working Hours Per Worker In Selected Countries Between 1870-2017 (Ourworldindata, 2019)

Research suggests that continuous economic growth, desire for conspicuous consumption, and affluent lifestyles are in turn affected by inequality which incentivizes individuals to work longer hours (Fitzgerald, 2022). Even though some individuals voluntarily choose to work less for a lower income in favor of more discretionary time, the economic structures and societal norms are argued to hinder voluntary working time reductions from reaching a global scale (Osikominu & Bocken, 2020). Nonetheless, due to the growing urgency of implementing multiple climate change mitigation policies, working time reductions have gotten increasing interest among ecological economists as a means to provide socio-economic benefits while degrowing the economy (Jackson, 2016; Kallis, 2011; King & van den Bergh, 2017; Lange, 2018; Victor, 2008).

2.1.2 WTR and degrowth

Economic growth and total emissions have not yet been decoupled on a global scale, see Figure 2. Even though there is evidence that relative decoupling has been achieved, it is unlikely that absolute decoupling will occur (Kallis et al. 2018). Sustainable development or green growth proponents argue that economic growth is necessary to achieve decoupling as it enables cleaner energy sources and less throughput from technological advancements (Lenaerts et al. 2022; Lindmark, 2013). The assumptions are based on that relative decoupling between economic growth and CO₂ emissions is possible with the help of new technology generating energy efficiency (Lenaerts et al. 2022). Furthermore, it has been proposed that countries experience an Environmental Kuznets Curve (EKC), indicating that their environmental degradation increases with economic growth up to a certain point before it starts descending again (Grossman & Krueger, 1994). Nonetheless, the EKC has been refuted due to the lack of robustness and accounting for consumption-based emissions (Knight et al. 2013; Lange, 2018, pp.52-54). Moreover, as argued by Kallis et al. (2018) increasing energy efficiency has historically only led to lower prices, leading to even higher use of energy resources. A phenomenon usually described as Jevons Paradox (Alcott, 2005).

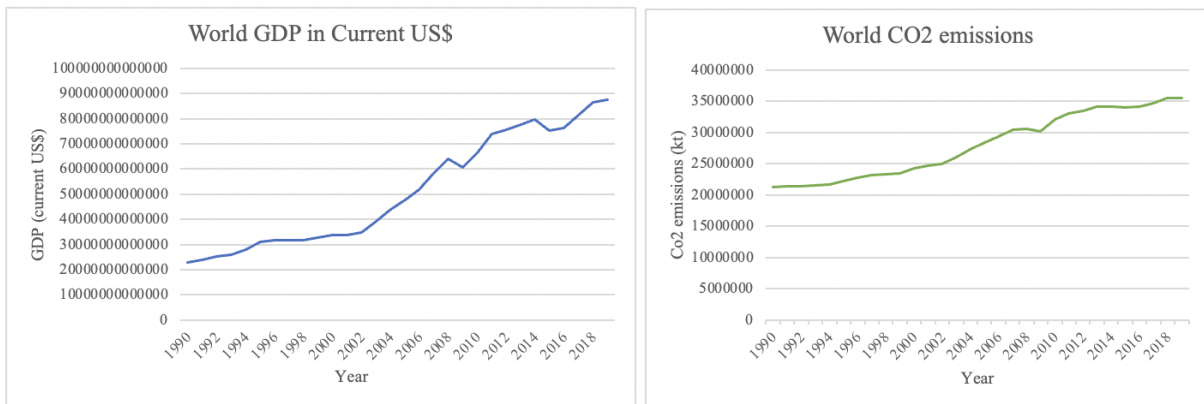


Figure 2: Total Economic Growth And Co2 Emissions 1990-2019 (The World Bank, 2023a; The World Bank, 2023b)

Degrowth proponents argue that absolute decoupling will most likely not be obtained during the critical time frame necessary to avoid extreme climate change by continuously transgressing planetary boundaries (Jackson, 2016; Kallis, 2011; Rockström et al. 2009; Victor, 2008).

Therefore, it is suggested that prompting economic degrowth is imperative to escape an unwanted and uncontrolled economic descent occurring from irreversible climate change and ecological degradation (Fitzgerald et al. 2018; Martinez-Alier et al. 2010). Among other policy tools and strategies, WTR is proposed as a core instrument to mitigate mass unemployment and increasing inequality as the economy degrows (Fitzgerald et al. 2018; Jackson, 2016; Kallis, 2011; Schor, 2005).

A triple dividend of socio-environmental benefits is a suggested outcome from WTR (Buhl & Acosta, 2016; Jackson, 2005). First, reduced working hours and thus increasing time affluence are associated with societal benefits such as increasing the well-being of employees (Kasser & Sheldon, 2009). Secondly, it is suggested that WTR could have a positive effect on unemployment and equality, caused by either degrowth or increased use of AI, as it would distribute work more evenly among displaced workers (Fitzgerald et al. 2018; Schor, 2005; Victor, 2008). The last suggested benefit from the triple dividend, and the main focus of this paper is the suggested environmental effects on both macro- and microeconomic levels (Devetter & Rousseau, 2011; Knight et al. 2013; Nässén & Larsson, 2015; Rosnick & Weisbrot, 2007; Schor, 2005).

WTR is a broad concept describing multiple variations of reducing working hours such as daily, weekly, monthly, or annually (Lukács & Antal, 2022). Measuring working time is elusive as the meanings of concepts differ, like commuting from work (Thaler, 1980) or having a long coffee break to boost creativity (Lukács & Antal, 2022). Furthermore, Lukács and Antal (2022) highlight the importance of being specific in the type of measurement in research and WTR trials as the definition of work might differ from paid work, overtime hours, and actual work to measurements of job training, education, and resting time. To be able to compare various sources of literature it is important to acknowledge the differences in how WTR are measured. Since this paper will study intra-individual perspectives, it will mainly focus on WTR as a definition of reducing actual working hours on a daily or weekly basis. Measuring annual or lifetime working hour reductions might not be appropriate to measure the intra-individual dynamics and effects of changes in working hours.

2.1.3 WTR and the Environment

Previous literature has identified two main factors of how WTR would positively impact the environment, through scale and composition effects (Fitzgerald et al. 2015; Knight et al. 2013). The scale effect from WTR refers to the degrowth of the economy from decreasing labor input, generating lower output, *ceteris paribus* (Knight et al. 2013). It is assumed that working fewer hours lead to lower wages which in turn facilitates decreasing consumption and subsequently reduced impact on economic growth (Schor, 2005). The composition effects, on the other hand, assume that time use impacts ecological intensity (Fitzgerald et al. 2018). Individuals and households working shorter hours and enjoying more leisure are suggested to live less energy and ecologically intensive lives compared to those with less time affluence working longer hours (Devetter & Rousseau, 2011). The empirical results of composition effects are however less clear as rebound effects might potentially harm the environment (Buhl & Acosta, 2016; Hanbury et al. 2019; Jalas, 2002; Nässén & Larsson, 2015). The empirical literature has hitherto been divided between macro- and micro-level impacts, both contributing to the overall understanding of how WTR might have socioeconomic and environmental impacts on multiple levels.

A macro-level perspective

Multiple macroeconomic studies show empirical evidence of scale effects on the environment. Several cross-national studies have suggested significant positive correlations between average annual working hours and ecological footprint in high-income countries (Hayden & Shandra, 2009; Knight et al. 2013; Schor, 2005). A similar pattern has been seen in a sub-national analysis in the US measuring average weekly working hours and CO₂ emissions from fossil fuels (Fitzgerald et al. 2018). Additionally, Rosnick and Weisbrot (2007) found a positive correlation between primary energy consumption and total national working hours in their cross-national analysis. They estimate that a 1% increase in work hours results in a 1% increase in energy use. Similarly, Fitzgerald et al. (2015) found a positive relationship between annual working hours and primary energy consumption using a wider range of countries. However, their relationship shows that within developed countries a 1% increase in work hours resulted in a 0.404% increase in energy consumption. Further, their temporal analysis suggests that the energy consumption per working hour has increased over time, from negative in 1990 to positive in 2008, indicating that the effects have strengthened in magnitude over time. As highlighted by Antal et al. (2021) the

varying results may also depend on the time of measurement and type of measurement. They point out that most studies use various methods to calculate working hours and environmental impact which make the studies difficult to properly compare and evaluate. Furthermore, they argue that ecological footprint might be a flawed indicator of environmental pressure as it adopts inconsistent weighting from sources of emissions. Nevertheless, the studies have found significant, albeit varying, results from scale effects (income effects) on the environment.

Composition effects have, on the other hand, had more contradicting results. Composition effects measure time use effects net of GDP, in other words, environmental impact is affected by the use of time rather than income or economic effects. Most cross-national analyses have shown no statistically significant correlation between working hours and composition effects on either ecological footprints measured from 1970-2007 (Knight et al. 2013) or energy consumption measured between 1990-2008 (Fitzgerald et al. 2015). In contrast, Fitzgerald et al. (2018) found a positive correlation on both scale and composition effects between carbon emissions and average weekly working hours in their longitudinal sub-national analysis in the US between 2007 and 2013. The authors suggest that the findings are likely to be associated with long working hours leading to higher carbon-intensity lifestyles as a result of less free time. The varying results between the studies, however, might be caused by the different indicators used to measure environmental pressure, or the time frame analyzed.

It has also been hypothesized that the level of income and inequality in society might impact the effects of WTR. Fitzgerald (2022) finds that inequality seems to play a significant role in the relationship between composition effects and emissions. His analysis finds that the correlation between working hours net of GDP and emissions increases with high levels of inequality. He concludes that the findings might in part be caused by the so-called 'Veblen Effects', explaining that competitive consumption arises with higher levels of inequality. On a similar note Shao and Shen (2017) suggest that the environmental impacts are nonlinear and vary based on the number of working hours and income level of the country. They find that beyond a certain threshold, WTR might have adverse effects on the environment, as high-income countries might use increasing free time for energy-intensive activities such as long car or air travel. The findings reveal the complexity of WTR and how time use might vary depending on the timeframe and

characteristics of the country. Furthermore, composition effects from WTR need to be assessed on a microeconomic level to further understand how time use impacts individual and household-level energy intensity and consumption patterns (Fitzgerald et al. 2018; Knight et al. 2013).

A micro-level perspective

Similar to macroeconomic analyses, quantitative studies on the scale effects of household and intra-individual working hours on the environment show significant correlations. The scale effects caused by decreasing income levels from fewer working hours indicate that households and individuals that work less live less carbon-intensive lives (Fremstad et al. 2019; Nässén & Larsson, 2015; Neubert et al. 2022). Individuals with a lower income, following reduced working hours, are assumed to spend less money on clothing consumption, have smaller living spaces, and travel fewer kilometers by car and air travel (Ivanova et al. 2018; Neubert et al. 2022). Cross-sectional studies have confirmed this relationship by analyzing household annual working hours and CO₂ footprint in the US (Fremstad et al. 2019), paid working time in minutes on Swedish households and greenhouse gas footprint and primary energy use (Nässén & Larsson, 2015) and weekly work hours on consumption patterns in France (Devetter & Rousseau, 2011). However, the elasticities have varied from 0.3 (Fremstad et al. 2019) to 0.84 (Nässén & Larsson, 2015) indicating that the magnitude of the effects is ambiguous. Furthermore, the findings are limited since they only confirm that individuals who work less, thus have a lower income, tend to consume less or consume less resource-intensive goods. The studies do however lack a causal, longitudinal analysis of intra-individual change in consumption *following* working time reductions. By analyzing cross-sectional aggregate data on a national level it is difficult to exclude that individuals who consume less are also more likely to work less.

Composition effects, on the other hand, are suggested to affect the environment through time effects. In other words, gaining increasing discretionary time will impact how individuals behave and consume. Most quantitative studies, analyzing composition effects, have been performed using time use surveys and national household budget accounts (Devetter & Rousseau, 2011; Fremstad et al. 2019; Jalas, 2002; Nässén & Larsson, 2015). Some studies suggest that longer working hours contribute to higher stress which prompts more consumption of

resource-intensive goods and activities, such as eating out or using the car instead of public transportation (Devetter & Rousseau, 2011; Fremstad et al. 2019; Jalas, 2002). Other studies indicate that increasing leisure time leads to more time spent on activities (Buhl & Acosta, 2016) which might correspond to rising energy use and GHG emissions depending on the carbon intensity of each activity (Nässén & Larsson, 2015). This relationship is referred to as time use rebound effects (Jalas, 2002) and could mean that increasing discretionary time would have negative effects on the environment. However, studies analyzing both scale and composition effects have shown that the decreasing energy use from scale effects is larger than the increasing energy use from time effects, leading to positive net environmental gains (Buhl & Acosta, 2016; Nässén & Larsson, 2015). The datasets, on the other hand, have limitations as they only depict a pattern on aggregate data, justifying the need for intra-individual studies depicting the process of time use substitutability and the motives behind them (Buhl & Acosta, 2016).

Intra-individual research on WTR explores how increasing discretionary time might cause a rearrangement of household time and income budgets. It is shown that increasing discretionary time increases time spent on hobbies, socializing, voluntary engagement, and spending time with their children which can create time use rebound effects negatively impacting the environment (Buhl & Acosta, 2016). To understand why some individuals would engage in more energy-intensive activities and why some would not, Hanbury et al. (2019) analyzed the motivations behind choosing to voluntarily reduce their working hours. Their findings suggest that working time reductions were only beneficial for the environment if the intention was a time-binding activity such as education or parenting. If, in contrast, the motivation was to gain more recreational time it posed a higher risk of increasing the environmental impacts. On the other hand, Neubert et al. (2022) found that individuals who decreased their working hours tended to commute less, which would be a significant gain in environmental composition effects. They emphasized that the contributing factor was commuting fewer days resulting from a four-day workweek design rather than if WTR would be implemented as fewer hours every day. On the other hand, it is also assumed that increasing discretionary time might lead to increasing leisure travel (Nässén & Larsson, 2015). Current studies have shown that individuals tend to travel fewer km by air following a working time reduction (Neubert et al. 2022). Nevertheless, the findings are only due to income effects. In summary, the findings show that scale effects from

WTR with reduced wages, will most likely lead to decreasing consumption. However, the composition effects following increasing discretionary time are more complex as they might be bound to rebound effects.

In conclusion, previous studies have indicated that countries or states that work fewer hours have less environmental impact. Household-level studies confirm this relationship but acknowledge that increasing time might lead to rebound effects. The data suggest that the net environmental gains should be positive as scale effects are larger than the negative composition effects. However, current studies have only been conducted on individuals who voluntarily reduce their working hours coupled with reduced income. Thus, even the time effects might be impacted by a reduction in income. Furthermore, it has been proposed that the effects depend on the level of individual income and the level of inequality in society (Fitzgerald, 2022; Shao & Shen, 2017). The effects may also vary depending on if the implementation is designed as fewer days per week or fewer hours per day, as well as if the implementation will be conducted with kept wages or reduced wages (Fitzgerald, 2022; Kallis et al. 2013; Neubert et al. 2022).

Due to the trials conducted by the organization Autonomy (2023a; 2023b), increasing attention has been given to WTR with kept wages. The studies indicate that organizations would keep their productivity levels and that employees would experience increased well-being. However, the studies do not pay significant attention to the environmental effects of WTR with kept wages. Only one of the studies mentioned that individuals tended to engage in more leisure travel, however, there is no mention of data, how it was calculated, or what other factors might be omitted in the study. Moreover, the studies are not peer-reviewed or released by a renowned paper, which offers limited liability to the results. Thus, further research is needed to understand the complex dynamics of how WTR with kept wages might impact the environment from both scale and composition effects.

2.2 Theoretical Framework

This section aims to explain the theoretical framework shaping the ideas and underpinnings of working time reductions from a macroeconomic perspective. Furthermore, as this paper aims to analyze intra-individual time use, the Theory of the Allocation of Time and Behavioral Economic Theory will be proposed as an appropriate foundation for subsequent analysis and interpretation of results.

2.2.1 Challenges to economic growth

“As more and more people achieve higher and higher levels of affluence, they consume more and more of the world’s resources. Material growth cannot continue indefinitely because planet earth is physically limited.” Jackson, 2016, p.12

The paramount political goal in neoclassical economics is to create economic growth (Kallis et al. 2018; Lange, 2018, p.111). However, economic growth has been the main driver of rising levels of GHG emissions causing adverse impacts and unprecedented climate change (IPCC, 2022). Thus, due to the natural constraints of our planet, some researchers challenge classic economic theory and continuous economic growth as the only way forward in society (Jackson, 2016; Lange, 2018; Victor, 2008). Degrowth has therefore emerged as a field of economic theory proposing political agendas to reach zero or negative growth to create socially sustainable societies (Jackson, 2016; Kallis et al. 2018; Lange, 2018; Martinez-Alier et al. 2010).

The contrasting paradigm, green growth or sustainable development, argues that technological innovations and investments will decouple economic growth from emissions, allowing for continuous global prosperity while decreasing the environmental burden (Lenaerts et al. 2022). Green growth proponents argue for instance that degrowth theories have challenges such as mass unemployment, lack of working time and decreasing investments spent on green technologies which could have adverse effects on the environment (Lenaerts, 2022; Lindmark, 2013). However, multiple investments have been allocated to green technologies, yet absolute decoupling has not been achieved on a global scale (Lange, 2018, pp.21-25). Thus, this paper

assumes that absolute decoupling is unattainable, despite the current technological advancement, and adopts a degrowth theoretical perspective to subsequent analyses and interpretations of data.

2.2.2 Time Use and behavioral economic approach

One of the main frameworks used to analyze WTR from a degrowth perspective is the IPAT framework, or the more sophisticated version of STIRPAT (Devetter & Rousseau, 2011; Hayden & Shandra, 2009; Knight et al. 2013; Schor, 2005), describing the environmental impact (I) as a function of population (P), affluence (A), and technology (T) (Chertow, 2000). Degrowth proponents like Knight et al. (2013) and Schor (2005) argue that technological advancements (T) are unlikely to generate absolute decoupling and that population growth (P) is a question of ethics. Therefore they suggest that affluence (A) should be scaled down through WTR policies by reducing income and breaking the work spend cycle in favor of more leisure time (Schor, 2005). However, as highlighted in the previous literature review, the empirical results are less clear regarding the individual impacts on affluence through composition effects. The literature suggests that conspicuous consumption from high inequality, income levels, and motivation behind choosing WTR might all influence the subsequent outcomes (Fitzgerald, 2022; Hanbury et al. 2019; Shao & Shen, 2017). Therefore, the IPAT framework might be considered insufficient to describe intra-individual processes of time use, consumption patterns, and environmental rebound effects. Instead, this paper will draw on the theories from time use allocation, rebound effects, and behavioral economics.

Analyzing how increasing discretionary time might affect intra-individual intentional time use and consumption patterns require a theoretical framework incorporating both the allocation of time and consumer choice theory. Classical economic consumer choice theory is a branch within microeconomics assuming that consumers are rational agents aiming to maximize their utility (also described as happiness) based on a budget constraint of their incomes (Becker, 1965; Thaler, 1980). Their choice of goods, within their consumption bundle, is thereby determined by the price per unit of each good and the wealth of the consumer. However, it is argued that classical consumer choice theory is limited. Becker (1965) proposed that time availability is an important factor impacting the optimal consumption bundle of each consumer. He suggests that

households in affluent societies might even forfeit income in favor of increasing leisure time to maximize their utility function. Further, he suggests that the availability of time will impact the perceived cost of time-intensive consumption. If the wages increase, time-intensive goods will be relatively more expensive, thus shifting the consumption bundles accordingly. This might also play a role in why some studies have seen a shift in time-intensive versus resource-intensive goods when WTR is implemented. Even though Becker (1965) argues that time and money are interchangeable, Jalas (2002) suggests that individual consumption in high-income households is more restricted by time rather than income. This means that time and money are not interchangeable but that increasing discretionary time might disproportionately impact the rearrangement of consumption bundles through time use rebound effects (Jalas, 2002).

The original meaning of rebound effects refers to the increasing use of resources following efficiency gains. Even if resources will initially decrease due to efficiency gains in the production of certain goods, the prices of those goods will decrease leading to even more consumption increasing the final use of resources (Alcott, 2005). Jalas (2002) proposes that a similar rebound effect is bound to a reduction in working hours. He suggests that every activity uses some sort of energy or resource. Thus, moving labor from work will subsequently allocate time to another activity, risking time use rebound effects. The final energy consumption will however be determined by the energy-intensity of each good, and the substitutability of those goods.

To determine the magnitude of environmental rebound effects occurring from additional discretionary time, behavioral economics is adopted. As theorized by Thaler (1980), individual decision-making and substitution of goods are irrational and influenced by several factors such as loss aversion. To better understand how increasing discretionary time might impact environmental rebound effects, behavioral economics and intra-individual intentional time use and consumption patterns should be explored from a behavioral point of view. Behavioral economics combines elements from economics and psychology to understand how and why individuals might act in a particular way (Thaler, 1980). As lifted by Schor (2005) consumers are affected by endowment effects and loss aversion which can make them resistant to reducing their consumption. Prospect theory, explaining loss aversion, assumes that the value of losses is

perceived as steeper than the value of gains (Thaler, 1980). In other words, an individual will experience losing a sum of money to be greater than the pleasure of gaining the same sum.

Thus, exploring how WTR will impact the environment from an intra-individual perspective the allocation of time, rebound effects and behavioral theory will be considered the main theoretical frameworks. Additionally, in contrast to classical economic theories and green growth, degrowth theory assumes that scaling down economic activities will be necessary to reduce the environmental impact on a global scale. Therefore, this paper will evaluate whether WTR will impact the total intra-individual energy use and consumption patterns, without considering that the time use or working hours will affect technological development investments in green technology.

3. Methodology

3.1 Research Design

This study will adopt a qualitative case study as it is appropriate to collect detailed information to conduct an in-depth analysis of a particular event or process (Creswell & Creswell, 2018). It is relevant to gain a qualitative understanding of a certain case when quantitative data is limited (Creswell & Creswell, 2018). Only a few companies have adopted WTR which offers limited possibilities for conducting a quantitative analysis. Thus, utilizing a qualitative case study design helps explore how increasing discretionary time, with kept wages, might impact intra-individual time use in high-income societies.

Most previous research has been conducted using a quantitative approach to assess the correlations between working hours and environmental impact on both micro and macro levels. However, no studies have been conducted incorporating the dynamics of kept wages in their studies. Since WTR implementation trials on larger scales have been designed with kept income levels of the employees (Autonomy, 2023) it has been proposed that this dimension might change the relationship affecting the rebound effects (Fitzgerald, 2022). Therefore this study combines both the elements of reduced income levels and kept wages. By analyzing how individuals' intentional behavior would differ depending on the type of WTR design, a deeper understanding of the impacts is possible to explore.

Furthermore, the case study will be conducted using a set of samples in Sweden. As WTR is proposed by degrowth proponents to be implemented in high-income societies it is important to analyze how individuals in these societies would respond to those changes. Additionally, it is proposed that rebound effects could be limited in countries with higher levels of equality (Fitzgerald, 2022). According to data from the World Bank (2020) Sweden has a Gini index of 29.8, which is smaller, and thus better, than some other high-income countries such as Switzerland, France, Germany, the United Kingdom, and the United States, who all have Gini Indexes between 30 and 40. Furthermore, the political landscape in Sweden has during the last couple of years moved toward harsher climate politics adopting one of the world's highest

emission targets reaching net zero emissions by 2045 (Regeringen, 2017). In addition, one political party has working time reductions in their political agenda (Vänsterpartiet, 2022). Even though Sweden has relatively low CO₂ emissions per capita compared to the neighboring countries, household consumption is continuously contributing to the total emissions largely impacted by transportation, food, and housing (SCB, 2023).

3.2 Data collection

Due to the limited availability of data on WTR with kept wages in Sweden, primary data is necessary to collect. There are possibilities to access aggregate data on working hours in Sweden, however, that dataset is not combined with individual household time allocation and energy use which would limit the analysis. Furthermore, as there is no longitudinal data on how working time reductions with kept wages have affected intra-individual time use patterns, interviews, and surveys are necessary tools for data collection. The data will be collected by combining interviews with four individuals in Sweden together with a digital online survey. The combination of the methods produces rich and complex accounts of participants' experiences, motives, and behavior.

Considering the limited possibilities of accessing data on WTR with kept wages, this study will explore individual *intentional* behavior. In other words, how individuals intend on using their increasing time, following a WTR with and without reduced income. The most optimal analysis would be conducted using longitudinal data on individuals switching to shorter working hours with kept wages. However, that type of data collection would require a longer period of analyzing intra-individual time use before, during, and after a WTR implementation with kept wages in collaboration with an organization. Before undertaking such a vast project that requires extensive resources, it could be useful to base the study on prior ideas derived from a qualitative study. Thus, this study will contribute as a first step including intra-individual intentional time use and consumption patterns including the dynamics of kept wages.

Digital semi-structured interviews

To collect in-depth data, and explore individuals' behavior and consumption patterns semi-structured interviews were conducted. Semi-structured interviews were preferred over group interviews or individual structured interviews. Despite the disadvantage of being more time-consuming, they enabled more elaborate answers without being impacted by other individuals' opinions and views, which is preferable when analyzing intra-individual processes (Creswell & Creswell, 2018). An interview guide was constructed based on the broader themes derived from previous research and theoretical framework, see Appendix A. The interviews were scheduled a week in advance and ultimately held digitally using the software Microsoft Teams as it supports recording.

The interviews were conducted on four subjects, which is considered sufficient for qualitative case studies (Creswell & Creswell, 2018). The four interviewees were chosen using purposive sampling as it is useful when the goal is to explore a particular field in which only certain subjects have experience (Elo et al. 2014). Purposive sampling is limited since it is difficult for the researcher to know which and how many subjects are enough (Elo et al. 2014). Nevertheless, it allows this study to be limited to a homogenous group, which provides additional depth to this particle case study, in contrast to for example random sampling.

Two of the selected subjects had reduced their working hours (henceforth referred to as the 'reducers'). The reducers were chosen as they could contribute with additional insights into their motives and experiences of WTR. However, their WTR had been implemented with reduced wages. Therefore, they were also subject to questions analyzing their intentional time use if their wages would not decrease. Both of the reducers were males in their 30s, living in a two-person household in an urban area in Sweden, while working a hybrid remote (in other words, alternating work from home and from the office). One reducer had every Friday off, while the other reducer had every other Friday off with a corresponding reduction in their wages.

The other two subjects were working normal 40-hour workweeks (henceforth referred to as the 'non-reducers'). All previous studies have been conducted on voluntary reducers with decreasing income, similar to the reducers in this study. However, if WTR with kept wages were to be

implemented as a policy tool, the subjects affected would most likely also include individuals who would not choose to voluntarily reduce their working hours. Therefore, including non-reducers in a study offers important insights to better understand how WTR with kept wages could impact time use and consumption patterns. One of the non-reducers was female, while the other non-reducer was male. Additionally, the characteristics were similar to those of the reducers as both were in their 30s, living in a two-person household in an urban area in Sweden while working hybrid remote jobs.

Digital survey

Using a qualitative survey for social research offers additional richness and depth to interviews (Braun et al. 2021). In contrast to quantitative surveys, qualitative surveys capture the narratives and experiences of the participants as it allows them to provide answers in their own words (Braun et al. 2021). Therefore, a digital online survey, with a total of 23 questions, was sent out using the survey tool SUNET provided by Lund University. The survey consisted of seven quantitative questions including the sample demographics, 13 open-ended questions, and three questions to depict any prevalence of Pro-Environmental Behavior (PEB), see Appendix B. The open-ended questions were divided into two main parts aiming to understand the larger themes occurring from previous studies; motives behind working time reductions, daily activities, consumption and investment patterns, housing, as well as travel patterns. The first part treated the individual's responses and presumed behavior if they were to reduce their working hours and lower their income accordingly. The second part included the same type of questions but treated how the individual's responses and behavior would change if their income were *not to change* when they adopted working time reductions. Finally, the three psychometric questions about PEB were added based on the framework from Félonneau & Becker (2008). To limit bias, the questions were constructed using neutral language. Furthermore, the psychometric questions were the last three questions to avoid conveying the environmental intent of the survey which could affect the respondents' answers.

The sample was determined by snowball sampling technique. Although the technique itself is random, the collected sample risked containing a homogenous group of individuals. In consideration of this, demographic questions were added to the questionnaire. Additionally, the

individuals would preferably have work-life experience, to more accurately provide answers of how changes in working hours would change their behavior, whereby an additional question was added investigating their working status. Considering that it was a qualitative survey, the goal was to collect answers until saturation was reached (Creswell & Creswell, 2018). Ultimately, 30 responses were collected and were of homogeneous characteristics, albeit in line with the characteristics of the interviewees, see Appendix C. Most participants were female adults in their 30s with a university degree, living in a two-person household without children in an urban location. The survey did also contain male individuals and individuals with children, although less represented. Two responses were excluded as the participants did not participate in the workforce, leaving the sample with 28 responses to be analyzed. The questions regarding PEB did not show any significant indication in the dataset, meaning that there was not any specific indication that the sample would be more or less inclined to a Pro-Environmental Behavior. The homogeneity of the entire dataset used in this study poses a limitation and is further discussed in section 3.4 Limitations.

3.3. Data analysis

The data analysis was constructed in two steps. The first step aimed to provide themes and patterns from the data. The interviews were transcribed using the tool Otter.ai, and proofread manually to adjust for any errors. The content from both the interview transcriptions and the survey data was analyzed through a hybrid inductive and deductive coding approach which supports a thematic structure, yet allows for the richness of data occurring within social science (Fereday & Muir-Cochrane, 2006). The first set of themes was developed a priori, based on research questions, theoretical framework, and previous literature. The themes derived were Motivation, Type of WTR, Activities, Consumption/ Investment/Saving, Housing, and Travel. These themes guided the interviews and the survey questionnaire. The following inductive approach allowed for a subset of keywords and patterns to emerge, giving new insights into the existing themes. It generated inductive codes such as Children, Other income activities, Mental health, Stress, and Hobbies.

The second step of the data analysis aimed to analyze and interpret the patterns derived from the coding process. The analysis was divided based on the research questions including data from both the interviews and the digital survey. The theoretical frameworks of time allocation and behavioral economics were used to interpret the data. Furthermore, degrowth theory guided the environmental analysis regarding rebound effects following the implementation of WTR.

3.4 Limitations

Using a qualitative method limits the insights regarding correlations and causality. As this is an explorative study, it will not aim to quantify any results but merely provide insights and knowledge into the specific sample studied. Considering the gap in the literature, however, additional exploratory studies are needed to improve the understanding of how WTR with kept wages impacts intra-individual time use. Moreover, the sample size and its homogenous character limit the possibility of extrapolating generalizable results. On the other hand, the insights derived from the analysis can give input to future studies and trials. Additionally, it indicates that future quantitative and qualitative longitudinal research on WTR with kept pay should not be neglected.

Furthermore, in qualitative research there is a risk of interpretation bias, forming a need for reflexivity throughout the research process (Creswell & Creswell, 2018). There is also a risk of some subjects not being equally articulate which could affect the results, experiences, and thus the interpretations. To mitigate bias, however, neither the survey nor the interviews contained any information about the potential environmental effects. Additionally, the questions were constructed to avoid any feeling of providing the ‘wrong’ answers. The interviews also included follow-up questions such as “Do you want to elaborate on that?” to gain more in-depth answers from all participants. Lastly, analyzing intentional time use does not portray an accurate picture of the experiences of the subjects. However, there are no studies to date analyzing WTR with kept wages. Therefore, an intentional time-use approach is considered valuable as it offers insights and guidance for future research intended to evaluate the effectiveness of WTR with kept wages.

4. Analysis

Following the research questions, this chapter aims to answer “*How would working time reductions affect individual intentional time use, consumption patterns, and environmental rebound effects in Sweden, and in what way does income impact this dynamic?*”. The following sections are divided by the sub-research questions and will be analyzed from a theoretical perspective of time allocation and behavioral economics. Furthermore, degrowth theory will guide the analysis of environmental rebound effects as an impact from WTR with kept wages.

4.1 Motivation and intentional time use and consumption

It has been hypothesized that the motivation behind choosing to voluntarily reduce working hours might impact the subsequent time use and thus its environmental impact (Hanbury et al. 2019). Therefore, the first sub-research question this study aimed to answer was “*In what way could motives for working time reductions impact the intentional time use of individuals in Sweden?*”

The motivational factors behind choosing WTR with reduced income were divided between mental health and doing more activities. The two reducers’ motivations for choosing working time reductions were both mental health characteristics. One experienced a lack of motivation at work while the other had family issues that prompted the need for more rest and time to value mental health. The non-reducers emphasized that their motivation to reduce working hours would have been to gain more time to do more things, do voluntary work, or work on a side business, clearly with the intention to be more productive than the intention of the reducers. A similar division of motivational factors to choose to work less with a reduced income was depicted in their survey results. Several of the subjects responded that the motivation would be for mental reasons such as lack of motivation at work or to gain improved recovery. While the most common response was the motivation of being able to do more activities, such as spending more time on hobbies or socializing with friends and family.

“I like to think about it as “I work to live, I don't live to work”, so the less hours I can spend on my work would be hours that I can use on other things that I like to do...” - Interviewee Non-reducer 2

Although the participants' motivational factors varied between mental health and doing more activities, the outcome of intentional time use was still very similar among the individuals. Most participants would gain more energy and time to do more activities. Both reducers did spend more time on activities and hobbies than they had previously done and conveyed that they gained more energy from their WTR to do even more activities during the weeks, and not only on their extra day off. The activities each participant spent time on were more determined by their interests such as playing golf and participating in creative activities such as silver smithing. One non-reducer would, apart from being more in nature, spend more time creating a side business since the feeling of being successful and achieving something in life was important. The other non-reducer would spend more time learning a new skill or volunteering. Furthermore, the survey sample varied between being able to do more activities, feeling less stressed, having time to run more errands, and taking care of their well-being.

The data confirm the idea that increased discretionary time might be subject to rebound effects as individuals will use their additional time on doing more activities, and might even gain more energy to do more activities on other days as well (Jalas, 2002). In contrast to Hanbury et al. (2019), the data did not support the idea that motivational factors might play a role in subsequent time use. The differences might however be explained by the alternate choice of sample characteristics. The study by Hanbury et al. (2019) was conducted on a larger sample of voluntary reducers, while this data only had two reducers and the rest of the *non-reducers*. The differences in outcome might therefore be attributed to that non-reducers would act and be motivated by other factors than voluntary reducers. Although the sample is small and impossible to extrapolate, the results indicate that further research on non-reducers is needed as the individuals most likely will be impacted by WTR if enforced as a policy tool on a global scale.

When analyzing the motivational factor behind choosing WTR coupled with wage reductions, the subjects emphasized the role of income in their decision-making. The reducers conveyed that

their lowered income did not impact their standard of living, while several of the non-reducers responded that they would only choose to reduce their working hours if their income allowed them to keep their standard of living, for example by winning the lottery or that prices on items were to be reduced. This might indicate that even though the motivational factor of for example gaining more time is relevant and strong, the fact that individuals want to keep their standard of living is stronger and impacts their decision to choose WTR or not. It may also portray that if income is high enough to allow the individuals to keep their standard of living, they might opt for working time reductions. The data confirms the idea that economic structures and norms hinder WTR from being implemented on a large scale (Schor, 2005). However, if income is high enough it might contribute to an even higher environmental impact as individuals will gain more energy to do more activities with their time.

“...my salary is very high...so it wouldn't have a great impact on my decision-making if I would have the same pay or not.” - Interviewee non-reducer 1

“I still feel like I have enough free time as it is...because I have a job that is pretty stable in the sense that I don't work too many over hours or so. So I still feel that I get my time to relax and just not think about work... [A]fter five o'clock, I am pretty good at switching off. So I don't think I would need that extra day off from work, if it was for me to reduce the pay, because I still want to keep my salary.” - Interviewee non-reducer 2

In contrast to the findings from Hanbury et al. (2019), this case study does not support that motivations for choosing WTR play a significant role in subsequent intentional time use. Independent of the individuals' motivations behind choosing working time reductions, individuals intended on spending their time on more activities and hobbies. However, the data did show a pattern that mental health might be a particularly motivating factor for individuals to choose to voluntarily reduce their working hours accompanied by a reduction in their wages. Nonetheless, income plays an important role in why individuals choose not to reduce their working hours. Overall, the findings confirm the idea that money and time are not interchangeable as individuals do not easily exchange their income for time (Jalas, 2002).

However, it also confirms that time should be included in individual budget constraints as their activity patterns differ if they gain increasing time (Becker, 1965).

4.2 Time use, consumption, and income dynamics

Previous research has hypothesized that increasing discretionary time might impact both consumption and time use allocation (Schor, 2005). However, empirical studies have shown ambiguous results on the composition effects of WTR (Fremstad et al. 2019; Neubert et al. 2022; Nässén & Larsson, 2015). Nevertheless, research on the environmental impacts has only been conducted on WTR with reduced wages. Therefore, the second sub-research question explored in this study was *“How would increasing discretionary time impact an individual's intentions regarding daily activities, consumption, and travel patterns, and in what way would income affect those intentions?”*

Composition effects from daily activities

A clear pattern was conveyed in both the interviews as well as the survey results regarding daily activities. Increasing discretionary time would mainly be spent or intended to be spent on activities, hobbies, and socializing - independently of whether income is reduced or not. In other words, gaining more time will be spent on doing more activities. To evaluate what type of activities individuals would do, the interviews allowed for more elaborate responses. The activities varied from playing golf, hiking, and learning to kite surf to doing ceramic courses and starting up a side business. This pattern confirms Jalas' (2002) theory of time use rebound effects, indicating that increasing discretionary time might increase individual energy use depending on what the activities are spent on.

When asked how their daily activities might change if income was not to be reduced, but kept at previous levels, the individuals just responded that they could do *even more*, and would find even more joy in life as they would now not face any income restrictions either. However, the answers from the reducers differed on this aspect. They answered that they would not change anything in their daily activities even if they would have kept their income levels. Partly, it might confirm the previous idea that the voluntary reducers choose to reduce their time because of their sufficiently high-income levels. Partly, it could also indicate that individuals think that they will do more if

they have a higher income, but that time restricts consumption more in affluent societies (Jalas, 2002). Nevertheless, activities will most likely increase with increasing discretionary time, and according to this data, individuals intend on doing even more activities if their income will be kept at previous levels. Thus, time use rebound effects from WTR might be even stronger if implemented with kept wages.

Impacts on time-intensive versus resource-intensive time use

A main hypothesis on composition effects however, often cited in degrowth literature, is the idea that increasing discretionary time would lead to increased use of time-intensive activities rather than resource-intensive activities generating lower individual energy use (Devetter & Rousseau, 2011; Rosnick & Weisbrot, 2007). If this relationship turned out to be true, it would mean that composition effects could be positive for the environment, instead of contributing to potential rebound effects from increasing activities. In this study, however, no such pattern was found. When asked about more elaborate details of activities such as household activities, the interviewees explained that they might increase their use of energy consumption by having time to watch more tv and doing more laundry. No indications of a switch from resource-intensive time use to time-intensive time use were found even if WTR were implemented with reduced wages.

Scale effects on consumption patterns

If composition effects have a negative environmental impact, it must be hampered by positive scale effects for net environmental impact to be less than or equal to zero following WTR. All previous microeconomic studies have shown that this is the case if WTR is implemented with reduced wages (Nässén & Larsson, 2015). The studies assume that if income is reduced, individuals will lower their consumption levels (Fremstad et al. 2019; Ivanova et al. 2018; Nässén & Larsson, 2015). However, if WTR were to be implemented with kept wages, scale effects risk disappearing (Fitzgerald, 2022). Fitzgerald (2022) argues that higher levels of equality could hamper the negative rebound effects that could occur from implementing WTR with kept wages, as conspicuous consumption is assumed to be driven by inequality. This study does, however, not support those findings.

To analyze the dynamics of how income might impact consumption patterns, the individuals were asked to answer how their consumption might change following WTR with and without income reductions. Most participants responded that they would most likely have to consume less. Surprisingly, however, a big part of the respondents answered that they would *consume the same or even more* and as a result save less - following a reduction in their income. This pattern was also confirmed by the reducers who indicated that they did not consume less, but tended to save less instead. However, the reducers indicated that they were not big spenders in the first place meaning that they had little consumption to reduce. One non-reducer also responded that the consumption would most likely be the same, but that deal hunting might be a bigger part of life.

“I feel like I don't spend too much money on consumption or goods that you don't buy on a regular or daily basis... I get things when I need it... [a]nd I think that's a pattern that has already changed for me... I will probably think a little bit more... and maybe wait for campaigns... So I will probably try to be a little bit more of a deal hunter so to say.” -

Interviewee Non-Reducer 2

When asked how the participants' consumption patterns would change if they would keep their income levels, most subjects answered that their consumption and savings would not change at all. The reducers answered that their consumption would not change if they kept their previous income levels because they were just not big on spending in the first place. However, they answered that they would most likely save the same amount as before the income reduction. On the other hand, almost half of the respondents answered that they would consume *more* as a result of their more active lifestyle and because they usually tended to spend more money on their free days in comparison to working days. Thus, the data suggest that increasing discretionary time, with kept income levels, could keep the consumption at the previous level, or create an increase in consumption levels. The findings are somewhat alarming since this does not only depict that WTR, with reduced wages, might generate time use rebound effects, but that scale effects might be more ambiguous in high-income societies than previous research has shown. As proposed by Jalas (2002), affluent societies' consumption might be more restricted by time rather than by income, leading to even higher consumption than before a WTR.

Furthermore, it confirms Becker's Time Allocation Theory, that consumer choices are based on both time and income.

Time effects on travel patterns

Apart from consumption, one of the biggest concerns and ambiguities of WTR are travel patterns. Commuting is hypothesized to decrease if WTR is implemented with one day off leading to significant environmental gains (Kallis et al. 2013). The non-reducers from both interviews and the survey sample confirmed this hypothesis since they answered that they would commute less to work if they worked one day less. In other words, if the WTR implementation was one day off, rather than fewer hours every day. Interestingly, however, one reducer answered that he started to go *more often* to the office as a result of WTR. The reducer did work hybrid remotely and was biking to the office, which in turn would not affect the environment. However, it does question the idea of how WTR would impact commuting now that hybrid remote work is more pronounced in society.

“I go to the office much more now... like almost every day or three times a week instead of one or two... When I have my Fridays all by myself, I need people! I have the energy to meet people. It's fun.” - Interviewee Reducer 1

Except for commuting, leisure travel is hypothesized to increase as individuals gain more discretionary time, despite a reduction in their income levels (Hanbury et al. 2019; Jalas, 2002; Nässén & Larsson, 2015). However, the data from this survey indicated that most individuals would not change their travel patterns at all if their income was also reduced, with the motivation that they would not afford to travel more even if their time allowed for it. A few would however travel less and some would travel more. In contrast, a vast majority answered that they would most definitely travel more if they would have kept income levels, indicating that time is the biggest factor limiting their current amount of leisure travel. The results are in line with the trials conducted by Autonomy (2023). The subjects were motivated that it would give them more freedom and create more value in their lives to travel and experience more. However, the reducers pointed out that even if they would have the same income as previously, they would not likely travel more because one rarely travels alone. If their partner would have equal amounts of free time on the same days, nonetheless, they would most likely travel more as well. This

indicates that there are more nuances to how WTR could impact travel patterns in reality. If the WTR would be implemented globally, with kept pay, it could risk increasing leisure travel more than if WTR were implemented sporadically and without kept income levels.

In concluding remarks, both scale and composition effects show greater ambiguity in this case study compared to previous studies. Even though income would be reduced, individuals might consume more and save less as a result of gaining more discretionary time, confirming the theories that time is a factor impacting the consumption bundles (Becker, 1965) and that time might be a larger constraint than income in affluent societies (Jalas, 2002). Although most individuals described that their life and well-being would improve as a result of decreasing their working hours, they choose not to. This is in line with behavioral economics explains that loss aversion impacts an individual's decision-making.

5. Concluding remarks

Climate change is causing adverse effects on the planet as a whole, requiring extensive mitigation policies. Degrowth proponents argue that working time reductions (WTR) are a promising tool offering a triple dividend of socioeconomic and environmental benefits. WTR is gaining media attention increasing the probability of reaching societal-level implementation. Research on the environmental benefits, however, has been conducted on voluntary reducers with lowered income levels. Current WTR schemes are implemented with kept wages, which limits the generalizability of previous research results.

Therefore, this paper aimed to contribute to the knowledge gap by conducting a qualitative case study exploring how WTR would affect individual intentional time use regarding daily activities, consumption, travel patterns, and environmental rebound effects in Sweden. Furthermore, the study aimed to analyze how motives might impact the subsequent time use, and in what way income levels impact the overall intentional time use.

The findings from this study dispute the previous ideas that motivational factors for choosing WTR influence subsequent time use. The study found that individuals' motivations for choosing WTR varied between mental health and the desire to engage in more activities. However, their intentional time use was similar among the individuals, regardless of their motivations. Most participants reported that they would gain more energy and time to do more activities. The findings also demonstrated that income was an important factor in whether individuals would opt for WTR or not. The results indicate that individuals are less likely to reduce their income levels if it would impact their standard of living, even though they responded that they would most likely improve their well-being by reducing their working hours. This pattern confirms the behavioral theory of loss aversion. Individuals might be more willing to keep what they have than gain additional value in the future.

Additionally, this study suggests that WTR might have even more ambiguous environmental effects than assumed in previous studies. The responses confirmed Jalas' (2002) theory that individual consumption is more restricted by time than income in high-income societies. Even

though individuals would experience a WTR with reduced income levels, they responded that their consumption levels would most likely stay the same, but that their savings would decrease. Some individuals responded that their consumption levels might even increase as a result of their increasing discretionary time. In general, most respondents answered that they would do more activities following a WTR because they would have the freedom to do so and gain increasing value in life. This confirms the idea of potential time use rebound effects. However, the magnitude of the effects depends on which activities each individual would opt for.

The factors most associated with decreasing environmental impact were the shift from resource-intensive activities to time-intensive activities and less commuting. This study did not find any pattern of such kind. However, the data suggested that commuting might decrease as a result of switching to four-day workweeks. Nevertheless, one voluntary reducer responded that he had increased his commuting because he got so much more time alone at home due to his one day off in combination with hybrid remote work. This suggests that the findings on commuting should be researched more concerning the new constellations of hybrid remote work.

The findings do not offer any generalizability but give insights and more in-depth information on how individuals in high-income societies might respond to increasing discretionary time. The findings suggest that WTR could affect time use, consumption, and travel patterns. In this study, income seemed to play a role in terms of leisure travel and saving, while time seemed to play a more important role in terms of activities and consumption patterns. This offers important implications for future research and the importance of choosing the correct policy implementation design. In concluding remarks, this study suggests that future research should be conducted on WTR with kept wages to offer more quantifiable data on the potential environmental impacts.

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Appendix A - Interview guide

Interview Guidelines

These interviews are semi-structured and mainly based on themes with some examples of questions, followed up with prompts such as "Can you elaborate on that?" to receive more elaborate responses from the subjects. The questions differ depending on if the interviewee were a reducer or a non-reducer

Non-reducer	Reducer
Warm up and demographic background	
How old are you?	<i>Same / no changes</i>
Education level	
Household size - How many people (including you) live in your household	
Children living at home	
Do you live in an urban area or in the countryside?	
What do you do for a living?	
How long have you been working with that?	
Theme 1 - Shortening working hours and motivation	
How are you working today?	How are you working today?
If you were to reduce working hours, and also receive a lower salary - what factors would that depend on?	How many hours did you work before you reduced them?
<i>What would be the motivation for that?</i>	- How many hours, and how is it distributed? Who decided this division? When did it happen?
<i>Why do you think that is the case?</i>	What factors made you choose to reduce working hours?
What kind of reduction in working hours would you prefer?	- <i>Was it voluntary or forced? Have these factors/motivations changed over time?</i>
<i>Why?</i>	
What obstacles do you think could arise?	How did it affect your income?
	Did you experience any obstacles during the shift to shorter working hours?
Theme 2 - Time use	
How do you think that change would affect your everyday life?	How has the change affected your everyday life?
- <i>How would it affect the chores at home</i>	- How did it affect the chores at home
- <i>Which factors would it mainly affect?</i>	Which factors in your life have the change mainly affected?
How would you spend your extra time?	How do you spend your extra time?
	- <i>Has it changed over time? What activities do you spend your free time doing that you wouldn't otherwise?</i>
How do you think it would change if you had the same income but still reduced working hours?	How do you think it would change if you had the same income but still reduced working hours?
<i>why is that important to you?</i>	
Theme 3 - Time and consumption	
How do you think your consumption patterns would change?	How have your consumption patterns changed?
An increased time but reduced income	How has a gain in time and a loss in income affected your consumption pattern?
How would your savings/investment patterns change?	How have your savings/investment patterns changed?
How would you perceive this compromise between time and salary?	How do you perceive this compromise between time and salary?
How would that affect your choice of accommodation and geographical location?	How has it affected your choice of accommodation and geographical location?

How do you think it would change if you had the same income but still reduced working hours?

How do you think it would change if you had the same income but still reduced working hours?

Theme 4 - Travel habits

In what way would the change affect the way you get to and from work?

How has the change affected the way you commute?

How do you think it would change your travel patterns?
Why?

How has it affected or changed your travel patterns?

How do you think it would change if you had the same income but still reduced working hours?

How do you think it would change if you had the same income but still reduced working hours?

Was it something that surprised you when you reduced your hours, or were not as you would have expected them to be?

Ending phase

Do you have any additional comments regarding working time reductions, lifestyle or the effects on the environment?

Appendix B - Survey Questions

Demographic Questions

What gender do you identify with?

How old are you?

What is your highest level of education?

How many people (including yourself) live in your household?

How many children live in your household?

Do you live in urban areas or in rural areas?

What type of employment do you have?

The next 7 questions deal with if you were to reduce your working time as well as your income: *I.e. work less for a smaller income*

What would be the main reasons why you voluntarily work less and receive a lower income?

How would you prefer a reduction in working hours to be implemented? *For example: work less every day, or work fewer days?*

How and what factors would it affect in your daily life?

How would it affect your consumption and savings/investment patterns?

How would that affect your travel patterns?

How would that affect the way you commute to work?

How would it affect your place of residence and choice of accommodation?

The next 6 questions deals with if you were to reduce your working time, but keep your current income:

How would you prefer a reduction in working hours to be implemented if it did not affect your income?

How and what factors would it affect in your daily life?

How would it affect your consumption and savings/investment patterns?

How would that affect the way you commute to work?

How would that affect your travel patterns?

How would it affect your place of residence and choice of accommodation?

The last three questions involves your environmental behavior

I try to recycle as much waste as I can

I am very careful not to waste water

I try not to use plastic bags when shopping

Appendix C - Demographics of respondents from online survey

Educational level	University	High school	Primary school		Total
Number	20	7	1		28
Age	20-25	26-31	32-37	38+	
Number	5	12	7	4	28
Gender	Woman	Male	Non-binary		
Number	21	6	1		
Household size	1	2	3	4	
Number	4	16	5	3	28
Number of children	0	1	2		
Number	19	6	3		28
Area of residence	Urban	Non-Urban			
Number	21	7			28

Note: 30 responses were collected. Two responses were excluded from the dataset because they were not participating in the workforce. Hence, their responses might be irrelevant or biased as the questions surround worklife patterns