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Time and inequality – A study of individual preferences

Abstract

This thesis consists of three papers that study individual preferences. The focus of the first two papers is on time preferences. In the third paper, preferences regarding how inequality in health and income should be defined are elicited.

In the first paper, we study the long-term stability of survey-based subjective time preferences using a Dutch household survey panel. We find that while the individual ranking of survey-based subjective time preferences is stable over time, there are considerable shifts in the aggregate over time. To shed light on the observed instability, we first study whether the observed shifts can be explained by shifts in the socioeconomic situation of individuals over the period studied, but find no evidence supporting this. We then study whether the macroeconomic situation at the regional level explains the variation in the aggregated subjective time preferences. Our findings show that economic growth is positively correlated with patience, while income inequality is negatively correlated with patience. Moreover, we find considerable heterogeneity in the relationship between the macroeconomic situation and the survey-based measure of subjective time preferences across income groups.

In the second paper, we utilize experimental methods to investigate whether time preferences are context-dependent. More precisely, we study whether time preferences are affected when the cognitive demands of multitasking increase. In our within-subject laboratory setting, multitasking is present in both the treatment and the control tasks and consists of secondary tasks that pop up, demanding subjects' attention from time to time. The secondary tasks are easy in the control group but difficult in the treatment group. The novelty of this paper is that it studies how time perception and cognitive capacity mediate the effect of multitasking demands on time preferences. Results from experimental psychology show that time is experienced as passing quicker when people are cognitively busy. As a result, people perceive the future as being closer, which, in turn, leads to more patience. Conversely, a standard prediction from behavioral economics is that being under cognitive load leads to less patient decisions due to lower cognitive capacity available for the temporal task. Our hypothesis is that when the cognitive demands of multitasking increase, increases in patience, driven by the speeding up of time, and decreases in patience, driven by cognitive deficiency, added together explain the total effect of increasing the cognitive demands of multitasking on time preferences. We find strong evidence for the channel of time perception but fail to find support for the channel of cognitive capacity.

In the third paper, we study whether the ethical assumptions regarding the weighting structure underlying the Gini index for income inequality and the concentration index for income-related inequality in health are in line with the views of the Swedish population. Extended versions of these two indices that allow for different weighting structures by incorporating a weighting parameter have been developed. Using an Internet-based survey that was sent out to a representative sample of the Swedish population, we elicit this individual weighting parameter, which describes the relative weight each participant puts on the poorer part of the income distribution relative to the richer part of the distribution when inequality is assessed. Our results show that the estimated weighting parameter of the median respondent for income-related inequality in health is in line with the underlying weighting assumptions of the concentration index. For income inequality, on the other hand, our results show that the median respondent puts higher weight on the poorer part than what is implied by the Gini index. We link the estimated weighting parameters to a variety of socioeconomic background variables, health behavior, and survey-based measures of attitudes and preferences. We find that women and individuals with poorer health status put higher weight on the poorer part when assessing inequality than men and healthier individuals. Our results suggest which weighting parameters' values are reasonable to use when inequality is measured in a Swedish context.

Key words

Behavioral economics, experimental economics, individual preferences, time preferences, health inequality, income inequality, social preferences

Classification system and/or index terms (if any)

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Time and inequality - A study of individual preferences

Hjördis Hardardottir

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If you ever get close to a human
And human behaviour
Be ready, be ready to get confused
There's definitely, definitely, definitely no logic
To human behaviour
But yet so, yet so irresistible

And there's no map

They're terribly, terribly, terribly moody
Oh human behaviour
Then all of a sudden turn happy
But, oh, to get involved in the exchange
Of human emotions
Is ever so, ever so satisfying

And there's no map
And a compass wouldn't help at all

Human Behaviour by Björk

Contents

Abstract

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Keywords: Behavioral economics, experimental economics, individual preferences, time preferences, health inequality, income inequality, social preferences

JEL Classification: C91, D01, D9, D31, D63, D91, J31, I14.

Acknowledgments

My route into economics was perhaps not the most usual one. It began with physics studies, which turned into mathematics and theoretical philosophy, which then turned into master's and PhD studies in economics. When my bachelor's studies in math and theoretical philosophy were coming to an end, I figured I had to make a decision about what to do next. I liked working with mathematical methods but found that I had to have some interesting purpose for the math. On the other hand, I found philosophy very interesting, but given the rumor about the poor career prospects of philosophers, a career in philosophy was not something I wanted to invest in. Then, just before the deadline for applications for the autumn's master's programs, I realized that economics was the closest I could come if I was to combine mathematics and philosophy. It studies human behavior in economic situations (which can be quite philosophical) using mathematical methods. Consequently, I applied to the master's program in economics and my economics journey started.

It took me a while to find my field within economics. From development economics to the economics of corruption and psychological game theory to macroeconometrics, I finally found my place in behavioral economics. I feel that I found the part of economics that is closest to my original motivation to combine philosophy and mathematics. Behavioral economics digs into the core of both economic theory and human behavior utilizing (more or less) mathematical methods. I admit that my crooked way through the field of economics partly reflects my restlessness, but it is also evidence of the many inspiring teachers I have had along the way who have sparked interest in the fields they taught.

The most important spark of interest was generated by my main supervisor, Erik Wengström, during his course on behavioral economics that I took in my first term as a PhD student. I am grateful to Erik for introducing me to behavioral economics

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do what you want, and don't have kids too early. I think her words have shaped me and my sisters and cousins. All of us have been to university, doing what we want, and none of us has had kids unreasonably early. Finally, thanks to Sólveig Þorbjörg and Einar. Sólveig for offering reality checks: It is cooler to build giant submarines like dad does than to "teach the kids and write stuff" like mum does. And to Einar for miraculously arriving in the middle of the PhD journey, giving me time to think about everything and nothing (but mostly him) for 10 whole months.

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Lund, April, 2019
Hjördís

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Introduction
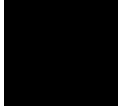
Introduction

1 Background

The foundations of preferences

Individual preferences are at the core of economic decision-making. Individual time, risk and social preferences determine how patient an individual is, how risk-taking she is, and how, and to what extent, she cares about others. Therefore, understanding the nature of economic preferences is a key to understanding economic behavior in general. Indeed, there is ample evidence that preferences are correlated with important life outcomes in domains such as health, education, and savings (see e.g. Castillo et al., 2011; Golsteyn et al., 2014; Åkerlund et al., 2016; Harrison et al., 2018). In traditional economic theory, individual preferences are assumed to be something inherent and fixed. As (Stigler and Becker, 1977, p. 76) state when they compare preferences to the Rocky Mountains: "Both are there, will be the same next year, too, and are the same to all men". Assuming preferences to be fixed certainly makes economic theory where incentives determine behavior easier. However, many agree that the assumption of fixed preferences is somewhat unrealistic. In more recent research, economists have, to an increasing degree, started to see preferences as something that is heterogeneous across agents and malleable within agents and over time.

Given the assumption of heterogeneous preferences, the question of what determines individual preferences arises. An increasing amount of research studies this topic. Some studies have investigated intergenerational transmission of preferences from parents to children (Dohmen et al., 2011; Brown and van der Pol, 2015; Alan et al., 2017), some have analyzed the relationship between culture, language and preferences (Fehr and Hoff, 2011; Benjamin et al., 2010; Chen, 2013; Sutter et al., 2018)

and some have studied the relationship between personal traits, such as cognitive ability or personality measures, and preferences (Borghans et al., 2008; Dohmen et al., 2010; Becker et al., 2012; Chen et al., 2013; Benjamin et al., 2013; Andersson et al., 2016). The results of these studies show that while individual preferences are dependent on the environment of the individual, the evidence on a link between other individual characteristics, such as cognitive ability and personality, and preferences is mixed.

Another line of research has studied how life events affect preferences. Natural disasters, financial crises, and personal crises, such as the loss of a child, have all been found to affect individual preferences (Callen, 2015; Bucciol and Zarri, 2015; Cassar et al., 2017), suggesting that our preferences are not only shaped by the environment we grow up in, but they also continue to be shaped by our environment and experiences when are grown up. Taking it one step further, individual preferences could be dependent on the context of a decision maker. There is some evidence that this is the case.Cohn et al. (2015) found that risk aversion of financial professionals is dependent on being primed with a boom or a bust scenario prior to preference elicitation, and Ifcher and Zarghamee (2011) found that mild positive emotions increase patience. Finally, McKenna et al. (2007) found that sleep deprivation reduces risk aversion over gains but increases it over losses. Taken together, the results of this branch of studies indicate that individual preferences are shaped by our upbringing and our environment, both in the past and in the present.

Preferences and inequality measures

In light of the increasing evidence of heterogeneous and malleable preferences, the question of if and how the heterogeneity and malleableness of preferences are problematic to economic models and measures arises. Preferences are commonly at the core of economic models and measures, and it is hard to find a micro-based economic model that does not include a parameter for risk or time preferences. Therefore, it should perhaps not come as a surprise that measures of inequality commonly used in economics are also dependent on preferences. It is difficult to develop any meaningful theory that includes economic agents without making some assumptions about, or references to, individual preferences.

The purpose of measuring inequality is to be able to compare the distribution of something, e.g., income or health, across societies in a meaningful way. The stan-

dard method of doing this is to utilize an index that summarizes the spread of the un-equal factor in the society such that it can be compared to other societies or the same society but at different points in time. This would not be problematic if everybody agreed on what inequality is and how it should be defined. However, people do have preferences about how inequality should be defined. For example, some people might want to give inequality at the bottom more weight than inequality at the top, or vice versa. Therefore, since all measures of inequality are dependent on a certain definition of inequality, they are, as per the definition, preference-dependent.

Some inequality measures take the heterogeneity of preferences into account. One example of such a measure is the Atkinson index (Atkinson, 1970). The Atkinson index is a welfare-based measure of inequality that is based on an additive social welfare function where individual utility is governed by the parameter ε that determines the curvature of the utility function over the distribution and can therefore be interpreted as inequality aversion. Other popular indices are the Gini index and the concentration index.[1] They are calculated as the area under the Lorenzo curve and the concentration curve, respectively. An underlying assumption of both indices is that inequality is defined in a symmetric manner around the median of the distribution, such that, for example, the poorest 10 percent receive the same weight when inequality is measured as the richest 10 percent. Although this is not made explicit in the Gini index or the concentration index, both indices are dependent on the assumption that inequality is defined in this particular way. The assumption is, in fact, a matter of individual preferences regarding inequality.

Ethically flexible extensions of both the Gini index and the concentration index have been developed that take this into account. Donaldson and Weymark (1980) and Yitzhaki (1983) developed the single parameter Gini index (s-Gini), where the underlying weighting structure of the Gini index was made dependent on a parameter that shifts focus toward the lower part of the distribution when the parameter value is high, and to the higher part of the distribution when the parameter value is low. When the parameter takes the value 2, the weights are symmetric and the s-Gini corresponds to the standard Gini index. Wagstaff (2002) developed a similar extension of the concentration index utilizing the same parametrization as in the s-Gini. Despite the extensions of the Gini index and the concentration index, the standard versions remain the most commonly used versions. This is perhaps partly due to the

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[1]The Gini index is one of the most popular indices utilized for measuring income inequality. The concentration index is a two-dimensional extension of the Gini index and is the most common measure utilized when socioeconomic inequality in health is measured.

lack of guidelines on which weighting structure is in line with general preferences on the matter.

2   Contribution of the thesis

The contribution of this thesis is twofold. First, it adds to the previous knowledge and results on the foundations and nature of time preferences. The first and second papers study changes in time preferences within individuals but across time and contexts. In the first paper, we utilize a panel survey with a long time horizon to study the stability of survey-based, subjective time preferences and link shifts in subjective time preferences to shifts in the macroeconomic situation. In the second paper, we use experimental methods to study how time preferences are affected by multitasking. In particular, we study if, and how, the effect of multitasking on time preferences is mediated by cognitive capacity and time perception.

Second, this thesis adds to the literature on inequality measurement by investigating individual preferences regarding which weighting structure is preferred when inequality is measured with the s-Gini and the extended concentration indices. The third paper serves as a first guideline on which type of weighting is in line with general preferences when income inequality is measured using the s-Gini, or when income-related health inequality is measured with the extended concentration index.

Paper 1: Long term stability of time preferences and the role of the macroeconomic situation

The first paper studies the long-term stability of subjective survey-based time preferences. In the paper, we utilize the DNB household survey, Dutch panel data with a long time horizon. In particular, we focus on a series of questions that address attitudes to time and intertemporal choices for the period 1998?2012. We study the stability of three of those questions. We argue that the three questions represent three different aspects of subjective time preferences. Our results show that the ranking of individuals in terms of these measures is stable over time. However, we observe that the aggregate of the three measures is notably unstable over the period studied. To explain this, we first study whether this is driven by shifts in the socioeconomic situation of survey participants, but find no evidence supporting this. We then study

whether the macroeconomic situation at the regional level correlates with shifts in subjective time preferences. We study the relationship between economic growth, income inequality, and inflation in house prices, all at the regional level, and subjective time preferences. Our findings show that economic growth is positively related to patience, income inequality is negatively related to patience, and inflation in house prices is positively related to patience, but the three macroeconomic factors each relate to a different aspect of subjective time preferences. Moreover, we observe a heterogeneous effect of income inequality and inflation in house prices on subjective time preferences across income groups.

Paper 2: Many balls in the air makes time fly: The effect of multitasking on time perception and time preferences

In the second paper, we study how increasing the cognitive demands of multitasking affects time preferences. A standard prediction from behavioral economics is that being cognitively loaded results in lower remaining cognitive capacity, which leads to decision-making that is less patient and more present-biased. On the other hand, results from experimental psychology show that people perceive the time as passing quicker when cognitively loaded. When time passes quicker, the future is perceived as being closer and patience increases. A novel aspect of this paper is that it studies the contribution of these two channels, cognitive capacity and time perception, to the total effect of increased multitasking demands on time preferences. In the lab, we induce multitasking by tasks, which are either easy or difficult, that pop up randomly during the elicitation of time preferences, time perception, and cognitive capacity. By studying the within-subject differences in time preferences, time perception and cognitive capacity between the easy and the difficult multitasking conditions, we are able to study the contribution of the channel of cognitive capacity and the channel of time perception to the total effect of multitasking demands on time preferences. Our hypothesis is that the two channels, at least partly, cancel each other out, leading to a zero or small total effect of multitasking demands on time preferences. Our results show a zero total effect of increasing multitasking demands on time preferences, as expected. Regarding the two channels, we observe a relatively strong correlation between shifts in time perception when multitasking demands increase and shifts in time preferences when multitasking demands increase, suggesting that time perception mediates the effect of multitasking demands on time preferences. However, we do not observe the expected patience-decreasing effect of reduced cognitive capacity on time preferences when multitask-

ing demands increase. Nevertheless, in light of the zero total effect of multitasking demands on time preferences, the results suggest that there is an unobserved factor that pulls patience down when multitasking demands increase, counterbalancing the patience-increasing channel of time perception. Our analysis of the effects of increased noise in the time preference measure when multitasking demands increase suggests that noise might be this unobserved factor. Furthermore, we study the relationship between time preferences, cognitive capacity and time perception between subjects in the easy multitasking demand condition and find that both time perception and cognitive capacity are related to time preferences.

Paper 3: What kind of inequality do you prefer? Evaluation measures of income and health inequality using choice experiments

In the third paper, we measure individual preferences regarding the weighting of income groups when income inequality is measured with the s-Gini index and income-related inequality in health is measured with the extended concentration index. The s-Gini and extended concentration indices are extended versions of the commonly used Gini and concentration indices that allow for flexibility regarding how the underlying distribution is weighted when inequality is measured. In the standard versions of the indices, a symmetric and linear weighting scheme around the median of the underlying distribution is implicitly assumed, but in the extended versions, a parameter determines whether and to what extent the weights are shifted toward the lower or upper part of the underlying distribution. We elicit this parameter for both income inequality and income-related inequality in health in a representative sample of the Swedish population using an Internet-based survey. In the survey, participants answer a series of questions where they are asked to imagine that they are consultants for the government of the imaginary country Alfaland, which is about to launch a new economic policy that will alter the distribution of income or the distribution of health over the income distribution. In a series of five questions, they are asked to choose between two societies, A and B, with different distributions of income/health. The A society is the same in all five questions, while inequality is gradually increasing in the B society. An interval for the individual weighting parameter can then be estimated, given the point at which a given participant switches from choosing society B to choosing society A. Moreover, we elicit the socioeconomic background of the participants, as well as their health behavior, attitudes, and preferences. Our findings show that the median estimated weighting parameter of the extended concentration index for income-related inequality in health is

in line with the symmetric linear weighting scheme implied by the standard version of the concentration index. For income inequality, we find that the median participant puts higher weight on the poorer part than what is implied by the standard Gini index. We find considerable heterogeneity in how people prefer to weight income groups when measuring inequality. In particular, we find that women and individuals in poor health prefer to put higher weight on the poorer part than men and healthier individuals. We also find a relatively strong relationship between our estimated weighting parameters and survey-based measures regarding attitude to inequality.

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