Considering Time-Use in New Zealand's Wellbeing Approach

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Abstract
With the increased worldwide emphasis on wellbeing economics, the New Zealand Treasury (NZT) has committed to measuring national wellbeing to form a more holistic view of the country's prosperity.

Their approach is based on the OECD's Better Life Index but unfortunately current availability of data limits the true potential. Due to this data limitation, the domain of time-use is not considered in the empirical analysis, despite being identified as a critical component of subjective wellbeing. Therefore, this dissertation aims to explore correlations between subjective wellbeing and time-use across different demographics. The results could strengthen the case for NZT to allocate funds and collect the necessary data to ascertain the impact on the wellbeing of New Zealand's people.

The results show that the amount of time spent in paid work is negatively correlated with SWB, although access to employment is positive. This finding provides some additional support for the four-day working week that has been trialled in New Zealand. This allows employees to spend more time with their families and in leisure activities, which are found to have positive correlations with SWB.

Table of Contents

Tables

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning:

1. Introduction

The global rise of wellbeing economics has resulted in New Zealand being engaged with monitoring the wellbeing of her citizens more closely. One of the ways this has been done is through publishing the country's first-ever wellbeing report (McLeod, 2018). This report captured a measure of subjective wellbeing (SWB), which aims to represent an individual's evaluation of their own life. It also compared various domains that are considered essential components of wellbeing and allowed for the comparison of these domains across different demographic groups. The NZT has based the selected domains on those put forth by Stiglitz, Sen, and Fitoussi, in their seminal report 'Measurement of Economic Performance and Social Progress' in 2010. This report emphasised how wellbeing economics may be appropriate, and even imperative, to measure and guide social progress in the future. Stiglitz et al. (2010) propose that wellbeing is multidimensional and that doing well in terms of income or gross domestic product (GDP) is only one element of wellbeing. They classify income or GDP as a measure of material living standards (including income, consumption and wealth). The other components central to wellbeing are health, education, political voice and governance, social connections and relationships, environment, insecurity (of both economic and physical nature), and 'personal activities' (representing one's day to day use of time). Apart from these, NZT has also added a category to represent cultural identity due to New Zealand's diverse nature.

Following on from the work done by Stiglitz et al. (2010), it stands to argue that time-use is a key component of wellbeing in New Zealand (see appendix A). Despite this, it does not appear in the NZT report, due to the paucity of information gathered on this topic by the General Social Survey (GSS), which generates the data to inform the report. However, the report does state a focus of the 2020 GSS will be on collecting data on time-use. Despite the lack of available information, it suggests that 'long work hours are measured and could reflect a lack of time for leisure and recreation' (McLeod, 2018, p.10). Although there is not enough information to determine the point conclusively, it would appear that time-use in New Zealand is skewed towards work, with little time for relaxation and recreation. This raises primary concerns that call for closer research into time-use in New Zealand, as many studies have illustrated that leisure time is a crucial determinant of SWB (see for example Brajsa-Zganec, Merkaš, & Šverko, 2010; Stiglitz et al. 2010; Flemming &

Spellerberg 1999; Niemim 1999; Willis & Willis 1986). The speech put forward by the Treasury to announce the 2019 budget claimed that the government was beginning to put the wellbeing of the people at the heart of policy decision making. They acknowledged that this could not be done unless the components that contribute to peoples' wellbeing were valued, measured, and taken into account (Robertson, 2019). Since one such component is known to be time-use, it is clear that this should be considered if this new wellbeing approach is to be comprehensive.

Considering the importance of time-use, the primary aim of my research is to explore the relationship between time-use and SWB. The focus will be on the relationship between different time-use categories, including leisure and SWB. The results could justify focusing on time-use in subsequent wellbeing reports in New Zealand. This could allow the NZT to more accurately depict wellbeing in New Zealand and formulate policy to enhance SWB.

The rest of my study is structured as follows. The next section discusses the relevant literature. Section 3 describes the data, whereas section 4 contains the outline of the methodology used. The results and analysis follow in section 5, while the study concludes in section 6.

2. Literature Review

2.1 Introduction of Wellbeing Economics

As pointed out by Crespo and Mesurado (2014), Aristotle proposed that 'the economic' (oikonomiké) should focus on enabling citizens to live a 'good life', which he believed would lead to happiness. In order to do this, he wrote that a city must firstly supply food, followed by arts and crafts, arms, property, a means for public worship, and finally a method of deciding 'what is demanded by public interest and what is a man's private dealings' to its citizens (Crespo, 2012). Since Aristotle, many economists have attempted to define how governments should go about supplying a sufficient standard of living and maximising their citizens' opportunities to live good lives and be happy. Historically these approaches often held economic growth as the single most important goal, with the belief that this will invariably lead to better life outcomes. However, it has been demonstrated that improvements in economic circumstances do not necessarily lead to an increase in one's happiness. This notion is supported by the seminal work by Easterlin (1995), who demonstrated that beyond

a certain level of subsistence, raising income does not necessarily simultaneously increase happiness.

These findings presented challenges to traditional theories of economic growth and its importance. Subsequently, the field of wellbeing economics was developed, which aims to optimise the overall wellbeing of individuals, as opposed to interpreting economic growth as a proxy for wellbeing. Wellbeing is defined by Deaton (2013, p.24), as '*all of the things that are good for a person*' and which enables a '*good life*', making this approach to economics substantially similar to that outlined by Aristotle, although the means of achievement are different. This concept includes both the material and psychological components of life, in an attempt to gain a more holistic understanding than previous approaches. Wellbeing economics is also primarily informed by Sen's Capabilities approach. This approach argues that people should be capable to make the choices to lead the kinds of lives they value and have reason to value' (1999, p. 285). With this in mind we must aim to not only satisfy individuals' basic material needs that contribute to wellbeing but also facilitate them to pursue their interests. Traditionally when performing a cost-benefit analysis and the like, abstract elements of wellbeing are considered intangible, and so either totally neglected or arbitrarily estimated. Considering the research done in this field, economists are beginning to realise that this approach is no longer sufficient (Van Praag, 2007).

Wellbeing economics is not without its criticism, with most centering around the fact that many of its components, such as one's satisfaction with life, can be mostly dependent on the individual's personal outlook (which cannot be directly affected by economic policy). Diener & Suh (1997) acknowledge that wellbeing research needs to focus on the interaction both between internal factors and external factors to adequately capture people's lives. In the literature, these are categorised as 'top-down' and 'bottom-up' factors respectively. Bottom-up factors are situational influences on SWB; such as external events and demographics. Their importance stems from the idea that there are basic universal human needs, and if one can fulfil these needs, they will be happy.

In contrast, top-down factors are those that are unique to the individual; including personality-temporal predisposition, and cognitive dispositions such as extraversion, neuroticism, and optimism. The studies I will consider in this report generally take a bottom-

up approach, as it is a key idea of wellbeing economics that changes in circumstance will influence subjective wellbeing. Thus, we can make economic decisions that have a positive effect. However, when looking at subjective wellbeing the top-down effects should always be remembered, as they likely do still play a significant role. This may take the form of influencing which activities a person chooses to engage in, or how they are affected by their decisions (Hills and Argyle, 1998). It would be preferable for economic studies to control for top-down factors, but this is problematic as these factors are difficult to measure reliably.

2.2 Subjective Wellbeing

The measurement of one's subjective wellbeing (SWB) has been a key focus of wellbeing economics. It aims to capture an individual's evaluation of their quality of life quality (Cummins, 2018). Since it is self-evaluated, it is difficult to ensure consistency and can be prone to biases such as leading questions and focusing biases (Cummins, 2018; Kahneman, Kruger, Schkade, Schwartz & Stone, 2004). Additionally, there is considerable disagreement in the literature regarding what questions are suitable when measuring SWB. Due to this there are significant discrepancies in how to capture SWB in the wellbeing and time-use literature.

Many studies construct an index to capture SWB, including several aspects such as 'Morale', which asks respondents to rate their expected future conditions five years down the track as 'much worse, worse, about the same, better, or much better' than their current circumstances (Moller, 1992). See also the 'wellbeing index' constructed across multiple categories (Cummins, 2002, as cited in Brajša-Žganec, Merkaš, and Sverko, 2010) or the Oxford happiness inventory (Hills and Argyle, 1998).

To ensure the methods used in the field are accurate and well informed, the OECD published a report on 'Measuring SWB' in 2013. This document advises on how to measure SWB and interpret the results. SWB is broken down into the core modules of i) life satisfaction (captured with the question 'Overall, how satisfied are you with your life as a whole these days?', which respondents giving a rating between 0-10); ii) eudaimonia, or a sense of flourishing (captured with the question 'Overall, to what extent do you think the things in your life are worthwhile?', again rated on a scale of 1-10) and finally iii) day to day affect

(captured by asking respondents to rate how much of the previous day they felt ‘happy’, ‘worried’, and ‘depressed’, rating each emotion on a scale between 0-10) (OECD, 2013). When this comprehensive approach is deemed too taxing on survey participants, it is considered appropriate to only inquire about l-Life satisfaction (LS). Due to ease, comparability, and research supporting the validity of this measure, it is the most predominantly used within the literature. The Cantril ladder is another, similar method, adopted by researchers and organisations such as the Gallup Group responsible for the Gallup World Poll data. This method asks participants to imagine a ladder with steps numbered from zero at the bottom to ten at the top. The top of the ladder is said to represent one's best possible life, and the bottom of the ladder represents the worst. Respondents are then asked to rate where they consider themselves standing on the ladder currently from 0-10. Cummins (2018) states such measures are desirable and popular due to their personal, non-specific and inclusive nature.

Although these approaches are far from the more objective methods typically used in economics, SWB has been shown to correlate with other factors that would be expected to indicate that individuals feel positively about their lives. For example, it has been found that individuals who report high levels of SWB smile more (Pavot, Ekman, Davidson & Frieson, as cited by Alesina, Di Tella, and MacCulloch 2003) and are more easily able to recall positive life events (Siedlitz, Wyer, and Diener, 1997; Sutton & Davidson, 1997). Additionally, such subjective reports are negatively correlated with high heart rates in response to stress (Shedler, Mayman, & Manis, 1993). Due to the large number of studies supporting measuring SWB the OECD (2017) currently deems it both compelling and reliable.

The OECD (2017) also guides gathering information such as survey design and interpretation of results. The report aims to encourage standardisation in the field of wellbeing measures to allow for international comparisons between domains. Despite this sentiment, it is generally believed that innate cultural differences of self-expression mainly discourage international comparisons of SWB (Cummins, 2018). Documented SWB should always be interpreted with caution, with a clear understanding of how the information was gathered.

2.3 Time-use

As discussed in section 1, personal activities (referred to here as time-use) is identified in the literature as a component of SWB. Time-use is expressed in terms of four key categories of personal care (including fundamental human functioning's such as sleeping, eating, grooming, and so on), work (being all things that one receives payment for), unpaid work (forms of household production such as caring for others and housework), and leisure (the most difficult defined group, often characterised in empirical studies as the residual after the three other areas are counted (Stiglitz et al., 2010; Bascand, 2011).

The category of leisure is unique within the domain of time-use as it is the most self-determined, and encompasses a vast range of activities. I will approach leisure from the Beard and Ragheb (1980) definition, which defines leisure not only as non-work activity but one in which the individual has free choice to participate, adding the dimension of personal choice to the domain. Leisure is under the control of the individual and provides them a space within which to pursue their own goals and meet personal needs (Brajša-Žganec et al. 2010; Willits and Willits, 1986). This functioning can be seen by considering the placement of leisure in Maslow's hierarchy of needs (Maslow, as cited in McLeod, 2018). This theory holds that we are motivated to action by the desire to satisfy several innate human needs (see appendix B). Leisure is the primary way to achieve some of the higher-order needs, such as self-actualisation and esteem needs. It is also an essential way to meet belongingness and love needs, as many leisure activities form the basis for social relationships. Additionally, it also creates an opportunity for individuals to meet their subjective standards, through the likes of learning, expanding their skill sets, and building relationships (Brajša-Žganec et al. 2010). This is especially important since intimacy is a critical component of wellbeing (Cummins, 1996). Stiglitz et al. (2010) highlight the rich tradition of leisure research, demonstrating the legacy of interest surrounding this topic. It is considered to have such a significant effect on the quality of life that in some studies it has itself been used as a proxy for wellbeing (Niemi, 1991).

Of course, it can be argued that work can also be a tool to meet such needs, but work as an individual pursuit is more constrained. The freedom that we have over our leisure time means we can use it more directly as a self-serving activity. Due to this, it is suggested that available

leisure time is a key component of wellbeing, and is 'one measure of the standard of living of a given population' (Fleming & Spellerberg, 1999, p.5). In what is considered one of the preliminary documents on wellbeing economics, Stiglitz et al. (2010) named 'personal activities' (representing one's day to day use of time) as one of the key dimensions that should be taken into account when considering wellbeing.

As pointed out by Diener & Suh (1997), leisure is likely to be an essential source of subjective wellbeing, but only once more basic biological needs have been met. For '*no man can live well, or indeed live at all unless he is provided with necessities*' (Aristotle, as cited in Dierksmeir and Pirson, 2011, p. 43). We must acknowledge that basic physical needs must be met before attention is given to leisure. In this vein, Stiglitz et al. (2010) pointed out that considering how people generally used their time was the starting point to understanding the value of leisure, and it is through different types of time-use that citizens may fulfil their more basic human needs. Engaging in work provides one with the capital to purchase food, sleep allows for the body to rest, and so on. Allen and Beattie (1984) illustrated this point by describing a dichotomy of subsistence and satisfaction. They argued that the likes of income (generated through work) are a dimension of subsistence, whereas leisure is a dimension of satisfaction. They believe that once the subsistence dimensions are met, satisfaction factors such as leisure will become significant predictors of satisfaction. However, leisure time will always be constrained by the more primary areas of time-use. Due to this, it is often argued that we should gather ample time-use data to better understand leisure in the context of the other activities in citizens' lives (Harvey, 1990).

Of course, due to the varying and subjective nature of leisure, its relationship with quality of life is very complicated, and dependent on many variables. When considering the relationship between various types of leisure activities and quality of life quality, characteristics of the individual must be taken into consideration. For example, Gramm (1987) points out the judgment on leisure must be relative to the different values of different cultures. Generally, a case by case analysis must be used, with results being interpreted only in the environment for which it was found.

2.4 Time-use Surveys

Time-use surveys have a long history, with some going back as far as the 1850s (Fisher, 2013). Collecting information on time-use can serve several purposes. It is often used to gain a more comprehensive understanding of economic output, as it typically considers the domain of 'unpaid work', which many traditional measures of economic output fail to do. This can result in misleading data, as countries where the cultural norm is to hire others to do one's domestic work can appear to have more prolific economies than countries where people complete these same chores themselves (Bascand, 2011).

Furthermore, it can provide insights into work/life balance, as well as social contact and leisure. It can also be used to study the effect of policy changes on people's day to day activity (Fleming & Spellerberg, 1999). For reasons such as these, many countries opt to conduct regular time-use surveys to better understand the lives of their citizens. These use a variety of collection methods. Perhaps the most simple of these is the stylised time-use matrix, which requires that participants fill out on a matrix which of the planned activities they have engaged in over some time. There is also the diary method, a more demanding approach which requires that participants fill out a diary as they go about their day to day activities. This can generate more detailed and reliable information than stylised matrices but does place considerable burden on the participant.

More recently, the Day Reconstruction Method (DRM) has risen in popularity. This approach involves asking participants to recall all of the specific activities that they engaged in the previous day, and report on how they felt when completing these activities. This method captures wellbeing experienced from day-to-day, which is believed to be distinctly unique to overall recollections of wellbeing captured through measures such as life satisfaction (Kahneman et al., 2004). This method offers a middle ground between the two techniques mentioned above and is increasingly popular in time-use surveys. The DRM is considered more reliable than stylised matrices as individuals can name their activities, and are only recalling the previous day (matrices may ask participants to indicate all that they engaged in over a period of a week, a month, and so on). Moreover, it is less taxing than the diary method as the information is gathered in hindsight, not as the participant is going about their day (Kahneman et al., 2004).

The American time-use survey, produced by the Bureau of Labor Statistics, is one of the oldest and most comprehensive time-use surveys. It is especially worthy of note as most time-use surveys only consider the distribution of activities, but the American time-use surveys have included a component on SWB from the years 2010-2014 (U.S Bureau of Labor Statistics, 2014). Participants of the DRM, were asked about a specific activity that they had participated in the previous day, and to rate how intensely they felt the feelings of 'happy, tired, stressed, sad, pain, meaningful' as they carried it out on a scale of 0-6. They were also asked to rate their general life satisfaction on a scale of 0-10, and to compare their how they'd felt the previous day with how they'd felt the week before this (U.S Bureau of Labor Statistics, 2014). This approach allows for information to be gathered both on how people experience their lives as it occurs, and how they rate their life overall cognitively. It should be noted that these are two distinct concepts (Kahneman et al., 2004)[1]. Despite this data collection, little attempt has been made at understanding the relationship between the two variables of SWB and distribution of time-use. It should be noted that like many components of wellbeing economics, time-use can be difficult to reliably measure, mostly due to recollection as the classification of activities is not always clear. Additionally, it has been emphasised that time-use categories need more explicit definitions and distinctions within the literature and that harmonisation of definitions would be beneficial for international comparisons (Stiglitz et al., 2010).

2.5 Time-use Studies

Maditinos et al. (2014) investigated the relationship between the spread of time-use allocation and life satisfaction (proxy for SWB). The study utilised the satisfaction with life scale created by Pavot and Diener (1993, as cited in Maditinos et al., 2014) and Quality of Life (QoL) was captured using a 36-question instrument proposed by Hays, Sherbourne and Mazel (1993, as cited in Maditinos et al., 2014) which considers both physical and mental QoL independently. The results indicate that paid work has a positive relationship with life satisfaction, and leisure has no significant correlation with SWB, although 'active leisure' did have a positive relationship with physical QoL. However, these results should be interpreted with caution as this study was carried out when Greece was experiencing one of

[1] Most time-use studies tend to focus on the former, but I will focus on the latter. The NZT focuses on general SWB, and so it is most informative for my research to focus on this too.

its highest unemployment rates in ten years (see appendix C). As pointed out by Harvey (1990), unemployment forces free time on the population. Due to such a high percentage of the population being unable to get sufficient paid work, and instead having free time forced upon them, it is unsurprising that paid work alone is such a significant component of being satisfied with one's life. Future research should acknowledge this by considering how the relationship between the variables change across different levels of employment.

2.6 Leisure Theories

Leisure as a component of time-use has received considerable attention in the domain of wellbeing literature due to its unique and varied nature. As previously discussed, there is a consensus in the literature that leisure does contribute to overall SWB. To understand how this may be possible, we first must build an understanding of how leisure impacts wellbeing. Many studies have attempted to define how the interaction between leisure and SWB takes place, and several theories have been developed to explain this. The first theory concentrates on the benefits that come from physical leisure. The links between physical activities and its impact on health and mood has been extensively explored (see, for example Penedo & Dahn, 2005; Leung and Lee, 2005; Morgan, 1985). The second theory is based on the previously discussed idea that leisure provides an opportunity for individuals to meet their personal needs and thus provides self-fulfillment (Brajša-Žganec et al., 2010). Called the 'Needs theory', it proposes that the very act of satisfying needs benefits SWB, and this is the total value of leisure (Rodrigues et al., 2008, as cited in Brajša-Žganec et al., 2010). Third is the theory called 'Activity theory', which suggests that higher levels of SWB are related to frequent participation in leisure activities, as well as activities that are more intimate for the participant (Rodrigues et al., 2008, as cited in Brajša-Žganec, et al., 2010; Lemon et al., 1972).

Lastly is the general social motivation theory. It suggests that humans are social creatures, and our SWB benefits from engaging in social activities. Hills, Argyle, and Reeves (2000) investigated several different leisure theories and found the general social motivation theory was the soundest. A critical issue with developing explanations for the benefits of leisure is the discrepancies in definitions of the term and the fact that different types of activities appear to offer unique benefits. Additionally, top-down factors may play a mediating role, but as

discussed in section 2.1, these are very difficult to control for in studies. Ultimately, Iwasaki (2007) stated that current theories seeking to explain the relationship between leisure and quality of life were inconclusive and that more research was required. That some benefit may be offered is generally agreed on, but exactly how this function is not yet known.

2.7 Leisure studies

Since the exact way leisure effects SWB has not been uncovered, leisure studies vary regarding which variables they consider in their analysis. Objective variables are often the key focus, with the type and frequency of the activity being considered. In the leisure literature, social and physical kinds of leisure are most commonly considered, as these are based on the soundest theories linking them to SWB, as discussed above.

Person-to-person interaction is explained as a critical aspect of leisure, with a significant effect on the positivity of experience (Csikszentmihalyi, 1997; Foong, 1992). Cummins (1996) attempted to order the domains on life satisfaction and found that intimacy was rated as the most significant domain, giving weight to the idea that social interaction may be a key benefit of leisure. Adding to these categories, the components of outdoor activities, cultural activities, hobbies, and media use are often considered (Lloyd and Auld, 2002).

Some also look at the differing effects of leisure on different demographics, for example Brajša-Žganec et al. (2010) considered several leisure activities, and how their relationship with wellbeing varies across ages and genders. They found that the contribution of different leisure activities to SWB was substantial, and varied across the demographic groups. For those aged 61+, only attending cultural events and leisure activities involving family had a positive impact on SWB. In women aged 18-60 and men 31-60, active socialising and going out results in higher SWB. In the age bracket of 18-30, only family centric leisure activities were found to have a positive impact. In light of these findings, Brajša-Žganec et al. (2010) present the idea that the most significant element of leisure that makes an impact on SWB is the increase in social connection, and increased frequency provides more significant benefits. They cite activity theory as the most supported in this case and conclude people should participate more frequently in social activities, especially with family.

Lloyd and Auld (2002) point out that most studies focus almost exclusively on objective leisure attributes such as the amount of time spent engaged in non-work activities and the access that one has to leisure facilities (Moller 1992; Kernan and Unger, 1987) and that this has presented varied findings. Based on Osborne's (1992) observation that quality of life depends not only on the 'conditions of life', but also 'the experience of life', the authors propose the need to distinguish between place centered (conditions based) leisure variables, and the primarily ignored element of person-centered (experience-based) leisure variables. Lloyd and Auld (2002) propose a measurement matrix where both variables are measured against an objective criterion (such as frequency of use of a facility) and subjective criteria (such as resulting satisfaction) to examine the relationship between life quality and leisure. The authors propose that social characteristics must also be considered (for example age, gender, and employment status). To determine the nature of an activity, the categories of mass media, social activates, outdoor activities, sports activates, cultural activates, and hobbies were used.

Lloyd and Auld (2002) find that person centric leisure attributes are the most significant predictors of QoL, and place centered leisure variables on QoL was negligible. It is speculated that this may be due to the argument put forward by Herzberg (1968), that some needs (largely physical ones) once satisfied become dormant, while other needs (e.g. personal achievement and social recognition) tend to continue to become more potent as the individual derives increased satisfaction. They also found that the frequency of social leisure participation was the best predictor of QoL, supporting the idea that social intimacy derived from leisure can have a positive impact on wellbeing. Interestingly, the frequency of participation in media activities showed a positive and significant relationship with QoL. This in contrast with historical opinion, which generally considers such pursuits lazy with a detrimental effect on the quality of life

2.8 The New Zealand context

There have been two-time-use surveys in New Zealand, one in 1998/1999, and one in 2008/2009. These were undertaken with the dual intention of both providing a more comprehensive picture of the country's economy, and exploring the difference between how the genders spend their time. These studies divided time-use into personal care, paid work, unpaid work, and leisure. They also allocated specific activities to the categories as

recommended by Stiglitz et al. (2010). The survey used an initial survey to gather information on the household, and then appropriate respondents were requested to complete a time-use diary on the activities they completed throughout a particular day, as well as who they were with during these activities. Ultimately it was found that on average, men spend approximately 63 per cent of their time in paid work and women spent 65 per cent of their time doing unpaid work (Bascand, 2011). This finding is interesting since participation in paid work has been shown in previous studies to have a positive effect on SWB (Maditinos et al., 2014). Exclusion from the paid work sector, therefore, has potential negative consequences for SWB of women, ultimately increasing gender inequality.

The initial survey was planned to be carried out across 10-year intervals, but funding was only secured for two surveys. Thus, at present there is no comprehensive study of time-use in New Zealand. Although such time-use research has been undertaken in the past in the New Zealand context, no attempt has been made to understand the relationship between time-use and SWB.

There has, however, been some general literature on the subject of leisure within New Zealand. The quality of the natural environment is acknowledged as an essential location for leisure. New Zealand's natural systems are also identified as contributing to 'cultural' services, referring to recreation and a range of activities such as walks and picnics. (Roberts et al., 2015). This literature also acknowledges that such types of physical and non-physical leisure can have positive impacts on mental health, such as reducing depression and anxiety, and enhancing self-esteem and mental functioning. Ultimately it is concluded that there is a strong correlation between time spent in nature and SWB.

As discussed in section 1, while data on SWB was gathered, the domain of time-use has been excluded from the NZT report on wellbeing due to insufficient data. Nevertheless, it is reported that long work hours are typical in New Zealand, and this may cause a lack of time available for leisure (although it is noted that this is not explored in a comprehensive way and so robust conclusions cannot be drawn).

3 Data and methodology

3.1 Data

Since New Zealand data is unavailable at this time, the American time-use survey (ATUS) will be used in this analysis, as this provides information on many of the variables of interest as highlighted by the literature. This data has been used in publications such as the American Economic Review, Journal of Labor Economics, Quarterly Journal of Economics, and Social Indicators Research. It provides data from a representative sample of those aged over 15. Cross-sectional data for 2013 will be used, as this year also collected information on SWB. This survey provides details of time spent engaged in various activities, which cover the four main domains of personal care, paid work, unpaid work, and leisure. Each category is then further subdivided. This data also provides information on additional control variables that are highlighted in the literature, such as income and employment.

3.2 Methodology

My dependent variable will be SWB (proxied in this case by the Cantril ladder measure with a range of 0-10). Ferrer-i-Carbonell and Frijters (2004) point out that while psychologists tend to interpret wellbeing ratings as cardinal, economists are skeptical of such treatment and instead usually treat the data as ordinal.

I conduct an ordinal logistic regression since my dependent variable has more than two categories and the values of each category have a meaningful sequential order where a value is indeed 'higher' than the previous one.

The ordinal logistic regression can be expressed as follows:

$$SWB^*_{it} = \beta_1 X_{it} + u_{it}$$

$$y_{it} = \begin{cases} 0 & if\ y^*_{it} \leq \mu_3 \\ 1 & if\ \mu_1 < y^*_{it} \leq \mu_2 \\ 2 & if\ \mu_2 < y^*_{it} \leq \mu_3 \\ . & . \\ . & . \\ N & if\ \mu_n < y^*_{it} \end{cases}$$

Where:
$\beta = Vector\ of\ coefficients$
$X = Vector\ of\ demographic\ \&\ time-use\ variables$
$u_{it} = Error\ term$
$\mu_n = Externally\ imposed\ endpoints\ of\ the\ observable\ categories$

I have included a number of demographic indicators as control variables, since characteristics of the individual must be taken into consideration, when considering the relationship between leisure activities and SWB . I would have appreciated the opportunity to include top-down factors, but unfortunately it was not available for my study. Therefore, I limit the analysis to including only the bottom-up variables of income, age, education, health labour force status, the presence of a partner at home, the employment status of said partner, the number of dependent children, and gender. These will be discussed below:

1. Income (proxied by weekly earnings) is a vital variable to control for as it is widely accepted that until a level of subsistence is reached, income remains the most significant determinant of SWB (Easterlin, 1995).

2. Age is also included as it has been noted in the literature that SWB tends to vary across different age groups (McLeod, 2018). Life circumstances and outlook tend to change with age, which in turn will affect an individual's evaluation of their SWB. Because of this this variable is typically included in regression analysis of SWB.

3. Education is another important variable to control for, as SWB has also been shown to differ depending on one's educational attainment OECD (2017). It is proxied by highest level of schooling achieved ranging from 0=not completing high school to 5=obtaining a doctoral degree.

4. Employment is of interest given the aforementioned findings of Maditinos et al. (2014). This is coded using a dummy variable where 1 represents an individual being currently employed. This variable is essential to consider as the labour force status of the individual determines one's time commitments (most notable in the domain of paid work, but the spill-over effects from this are significant). In contrast, unemployed individuals effectively have free time forced upon them, as pointed out

by Harvey (1990). This may potentially lead to greater 'opportunity' to enjoy leisure time and produce more at home (although this is involuntary) and engage more in money-saving activities (Hamermesh and Pfann, 2004). In this way, this variable will change an individual's distribution of time, which in turn influences the relationship between their SWB and the various time-use domains. As discussed before, Maditinos et al. (2014) found that paid work was the only category of time-use that had a positive relationship with Life Satisfaction. However, these results are interpreted with caution because this study was carried out in Greece during a period in which it experienced one of its highest unemployment rates in a decade. Future research should account for the effect of access to paid work by considering how the relationship between the variables changes across different levels of employment.

5. Health has unsurprising been found to impact self-reported SWB (Ngamaba et al., 2017). Additionally, self-reported health has been found to have a stronger correlation with SWB than an independent physician rating of health (Okun et al. 1984). Thus, health will be controlled for using self-rated health where 0=poor, 1=fair, 2=good, 3=very good, and 4=excellent.

6. A dummy variable for gender is also included, allowing for differences in time-use and SWB to be observed. Females were coded as zero and males as one. Brajsa-Zganec et al. (2010), found differences in what elements of time-use appear to have a relationship with the subjective wellbeing of men and women. Due to such observed differences between these groups, gender must be included as one possible explanatory variable within my research. Additionally, New Zealand's earlier forays into time-use intended to explore differences between genders, and further analysis of these established differences can help provide data on New Zealand's distribution of paid and unpaid work.

7. The presence of a spouse/partner at home is also important to consider. Hamermesh and Pfann (2004, p.10) point out that rational household members would re-adjust their own time-use distribution depending on the presence and commitments of the household members. Therefore, this variable will impact time-use distribution. This

is coded as a dummy where one represented the presence of a spouse of partner at home.

8. The number of dependent children (those under the age of 18) in the household was also controlled for in the study. This factor will likely cause variation in both SWB and time-use distributions. Hamermesh and Pfann (2004) found that there is a significant amount of time redistribution after the birth of a child. Additionally, the differing impact of children on the time-use of men and women is a component of interest. Women's use of time is generally considered more constrained by the presence of a child, as they often perform the majority of care (Hamermesh and Pfann, 2004). Due to the such impacts, the number of children one has is included as a control variable, and a binary dummy variable where one represents having children and zero represents no children was also coded for. This allows the impact of having a larger number of children to be captured, as well as the impact of having any against having none.

9. Finally, the various domains of time-use were included as independent variables. As identified in the literature, there are four domains considered essential; personal care, paid work, unpaid work, and leisure. These were captured through self-reported amount of time spent engaged in each activity from 4:00 am the previous day to 4: 00 am the day the interview takes place.

    a. Personal care includes necessary activities, such as sleeping, washing, self-care, and so on.
    b. Paid work included all work-related activities.
    c. Unpaid work was captured by unpaid care (children and adults, both household members and non-household members) and domestic activities such as laundry and cleaning.
    d. Leisure activities were also included, here understood as all residual activities that one is not paid for, is able to choose and provides the individual with a space within which to pursue their own goals and meet personal needs (Brajša-Žganec et al., 2010; Willits and Willits, 1986). Additionally, the areas of physical and social leisure were included, as these are frequently identified

as the most significant in the existing literature (Bascand, 2011; Lloyd and Auld, 2002; Auld and Case, 1997; Csikszentmihalyi, 1997; Foong, 1992).

Table 1: Descriptive Statistics of variables

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
SWB	11,358	7.11	2.04	0	10
Age	12,443	47.91	17.83	15	85
Gender	12,443	0.44	0.50	0	1
Education	12,443	2.02	1.31	0	5
Weekly earnings	12,443	4,8053.42	660704	0	288461
Number of children	12,443	.84	1.15	0	12
Having a partner present	12,443	.51	.50	0	1
Employment	8,120	.88	.32	0	1
Health	11,358	3.47	1.06	0	4
Time spent engaged in personal care	12,443	577.14	142.87	0	1430
Time spent in unpaid work	12,443	158.58	169.554	0	1405
Time spent in paid work	12,443	153.07	239.78	0	1367
Time spent engaged in leisure	12,443	353.67	223.73	0	1416
Time spent engaged in social leisure specifically	12,443	48.74	99.14	0	1024
Time spent engaged in physical leisure	12,443	20.45	62.03	0	1140

Variance inflation factor (VIF) analysis was carried out to detect if the coefficients described had strong linear relationships with one another. This would result in inflated standard errors and inaccurate coefficients being computed. All variables were found to have VIF values below the threshold of 10, indicating that multicollinearity is not of concern in this regression.

Using this data, I will investigate whether there is a relationship between subjective wellbeing and different categories of time-use. Additionally, this analysis will allow me to investigate time-use and subjective wellbeing for the different demographical groups of gender, employment status, support of a spouse/partner and having dependent children.

4. Results and Analysis

Table 2 provides the results for the various demographic groups under investigation on this study. As can be seen, all of these groups have statistically significantly different SWB means. On average, women's SWB is 0.1 points higher than the average SWB for men. This finding is supported in the current New Zealand wellbeing literature by McLeod (2018), who reported that women are more likely than men to report high SWB. This relationship is also found to exist in other countries, as reported by Hartog and Oosterbeek (1998). The employed have a SWB on average 0.6 points higher those who are unemployed. This is logical as employment provides one with access to a stable income, which is a critical component of SWB. Additionally, Clark, Georgellis, & Sanfey (2001), have highlighted the consistent finding in the literature that unemployment is consistently related with lower reported levels of wellbeing. This relationship is shown across countries and study methodologies. Finally, the presence of family in the home is asscoiated with higher SWB. Those with a partner living at home have a SWB average 0.6 higher than those without, and those with children at home have a SWB 0.15 higher on average than those without. This finding is supported by Thomas, Liu, & Umberson (2017), who discuss that those who live with a partner report better physical and mental health that those who don't (See Carr & Springer, 2010; Umberson, Williams, & Thomeer, 2013, as cited in Thomas et al., 2017). The presence of intergenerational family relationships, including children are also reported to be associated with higher wellbeing (Merz, Schuengel, & Schulze, 2009; Polenick, DePasquale, Eggebeen, Zarit, & Fingerman, 2016 as cited in Thomas et al., 2017).

Table 2: Comparisons of SWB across demographic groups

Demographic group	Number of observations	Mean SWB
Female	6,306	7.19
Male	5,052	7.01
		T-stat: 4.62***
Unemployed	887	6.57
Employed	6,586	7.14
		T-stat: -8.38***
No spouse living at home	5,515	6.81
Spouse living at home	5,843	7.39
		T-stat: -15.12***
No dependent children	6,376	7.04
Some dependent children	4,982	7.19
		T-stat: -3.89***

Table 3: Regression results

Variable	Coefficient	Standard error	Z score
Age	.0137877***	.0016622	8.29
Gender	-.1977194***	.0422803	-4.68
Education	-.0646272***	.0090041	-7.18
Employment	.3619455***	.0707658	5.11
Weekly earnings	1.65e-06***	3.30e-07	5.00
Health	.5704174***	.0230888	24.71
Number of children	.0634735***	.0203221	3.12
Having a partner present	.5244957***	.0456634	11.49
Time spent engaged in paid work	-.0002077***	.0000848	-2.45
Time spent engaged in sports related leisure	.0006578***	.0003277	2.01
Time spent engaged in social leisure	.0004283*	.0002236	1.92
N	7,473		

Table 4 presents the differences in the mean amount of time spend in each time use category across the different demographics. As table 3 presents the regression coefficients for the significant time use categories, comparing the differences in time spent may provide insight into possible reasons for the SWB discrepancies in table 1, as will be discussed below.

Between men and women, men spent more time engaged in paid work and women spent more in unpaid work. This was also found to be the case in the New Zealand time-use literature (Bascand, 2011). Women spent more time engaged in personal care, which may be due to the extra time women are expected to put into their physical appearance. It is also reported by Burgard & Ailshire (2013) that women tend to spend more time sleeping then men, despite engaging in more unpaid work (even if they are employed), and having less time for leisure (Sayer, 2005, as cited in Burgard & Ailshire, 2013). The latter is found to be reflected in for sports leisure habits, which men spend more time engaged in than women, but not for social leisure, which women spent more time in than men.

Regarding the employed and unemployed, it is unsurprising that the employed spent a great deal more time than the latter in paid work. Some unemplyed individuals do report participating in paid work, as informal arrganments may occur. The unemployed spent more time in every other category, likely because they do not have much of their time constrained by work the way that the employed do, and thus have more tie to spend in the other activities.

Those who lived with a partner spent more paid work than those without. This is likely because those with a partener at home where also more likely to have dependant children, and thus needed to spend more time at work in order to support their family. Those who lived alone spent more time devoted to personal care, perhaps also because they where less likely to have a family at home constraning personal care activities such as sleeping. They also spent more time in social leisure activities. As those who live with partners will enjoy increased social interaction at home, it seems likely that those without partners engage in more social leisure to compensate for this.There was no significant differnence between time spent in unpaid work or sports leisure for these two groups

As touched on above, those with children at home spent more time in paid work, likely as they needed to work longer hours to support their dependents. Kaufman and Uhlenberg (2000), found that males especially increase hours spent in paid work after having children. They also spent more time in unpaid work. This is unsurprising as one of the components of unpaid work is childcare. Additionally, having dependent children generates considerably more housework. Those without children spent a little more time in sporting leisure, possibly

due to their increased free time resulting from not having children to look after. Time spent in social leisure was not statistically significantly different, however.

Table 4: Time-use averages across different demographics

Time-use categories	Demographic groups		T-statistic
	Men	**Women**	
Unpaid work	121.0139	188.6906	22.57***
Paid work	185.4063	123.7277	-14.44***
Personal care	561.3094	589.8274	11.12***
Sport leisure	27.51319	14.79629	-11.42***
Social leisure	45.88078	51.0304	2.88***
	Employed	**Unemployed**	
Unpaid work	142.1962	191.5333	8.8963***
Paid work	260.1134	11.61799	-28.7590***
Personal care	557.7865	604.3852	10.0782***
Sport leisure	19.54871	30.94603	5.1049***
Social leisure	43.71289	60.21376	5.0275***
	Partner present	**No partner present**	
Unpaid work	188.396	127.2264	0.3711
Paid work	172.6957	128.5314	-10.3594***
Personal care	560.8611	594.258	13.1224***
Sport leisure	20.66579	20.2529	0.3711
Social leisure	46.47366	51.12185	2.6147***
	Dependent children	**No dependent children**	
Unpaid work	193.5103	130.9917	-20.7733***
Paid work	170.5893	135.83	-8.0860***
Personal care	573.8002	579.777	2.3174***
Sport leisure	18.1975	23.31124	-4.5698***
Social leisure	48.1319	48.1319	-0.7689

Much of the criticism directed at SWB measures is based on the argument that traditional economic measures such as income remain the most dominant indicators of wellbeing, rendering other measures superfluous. Easterlin (1995) challenged this with his findings that suggested that income was only positively correlated with happiness up to a point of satiation. While often cited, this idea is still challenged in the literature. Recently, Stevenson and Wolfers (2013) discuss a body of data that indicates that satiation points are not always supported, and income may continue to be the largest influence on wellbeing for all income brackets. As the ATUS data included unemployed and low-income groups who would be well below any satiation point, it is unsurprising that earnings are strongly positively correlated with SWB regardless of whether or not one accepts Easterlin's findings. While the wellbeing literature proposes that there are determinants additional to earnings which play a role in wellbeing (especially amongst those who already have sufficient income), it is clear that this is still an important factor in wellbeing analysis. The findings presented here unsurprisingly support this.

The significance of top-down factors is another often-cited argument against the validity and necessity of wellbeing research. Traits such as personality, and outlook on life are understood to impact how an individual may view their SWB, and economic policy can do little to affect this realm. The closest element to this notion in the ATUS study is self-reported health. This may capture some elements of top-down factors, as individuals with positive affect may be more likely to rate their own health highly. Self-reported health was indeed found to be positively correlated with SWB (a finding supported by Ngamaba et al., 2017; Okun et. al, 1984). Further investigating is necessary to establish whether this variable proxy's top-down factors to some degree. If so, this may be a valuable instrument for researchers going forward.

Top-down factors may also play a nuanced role in the relationship between age and education and SWB. An increase in age is found is found to be positively correlated with SWB, and this finding is supported by existing research on SWB in New Zealand (McLeod, 2018). This may be explained by the angst that plagues youth, and the growth of a more content outlooks as one grows wiser. Including age squared as a variable was not done in this analysis, but it is recommended in the literature to capture the impacts of ailing health and the like as one grows older. The aforementioned apparent that comes with age is

not the same as knowledge, however, and education is shown to have a negative coefficient, indicating that educational achievements after high school result in an increased chance of having a lower SWB. Increased knowledge may give one greater expectations of what one can and should achieve, leading to a greater propensity for disappointment. Veenhoven (1996) provides support for the negative correlation between education and wellbeing, and proposes that this is due to the lack of availability of suitable jobs in particular that cases low self-rated wellbeing amongst this cohort.

Being male is negatively correlated with SWB, which may to a degree reflect masculine culture that fails to support men's mental health. The American Psychology association (2018) identifies that many features attributed to traditional masculinity, such as aggression and stoicism, can inhibit healthy handling of ones' emotions and thus result is psychological harm. It is well known that males in New Zealand suffer from higher suicide rates than their female counterparts, further supporting the argument that man face considerable issues with mental wellbeing (Statistics New Zealand, 2017).

A number of social elements, such as having a spouse or dependent children at home or engaging in social leisure activities appear to be significantly correlated with one's chances of reporting a higher SWB. This finding is supported by the significant quality of literature that finds intimacy and a sense of belonging as key determinants of SWB (Cummins, 1996). It also provides support for a number of the leisure theories previously discussed in section 2 (Hills, et. al, 2000; Lemon et a., 1972; Rodrigues et al., 2008, as cited in Brajša-Žganec, et al., 2010, Morgan, 1985; Penedo & Dahn, 2005; Leung and Lee, 2005). People with no partner present engage in more social leisure, perhaps to make up for this reduced social contact. Those with dependent children spend more time at work on average, and less time engaged in personal care and leisure. This group is understandably short on 'me time' as they strive to provide for their dependents. Despite this, this group still had a higher average SWB than those without dependent children. This could be explained by their increased likelihood of strong social connections (through their children, and they are also more likely to have a spouse living at home), or the sense of purpose that comes through raising a family. The positive impact of such socialisation may explain in part the finding that women are reporting higher SWB on average than men. It is shown that in this sample women spend more time

than men engaged in social leisure, and unpaid work including caring for children (which has a distinct social element).

Unpaid work is found to be insignificant which is surprising as it would be expected that engaging in large quantities of work without payment would have a negative relationship with SWB. As this does not appear to be the case, it is argued here that that such work may result in some sort of intrinsic reward, such as self-satisfaction or social payoffs (especially unpaid work that involves caring for others). Sayer (2005) argues, for example, that mothering roles may be sources of satisfaction and self-identify. More research into this area is needed to illuminate this argument.

It is also interesting to note that overall, women spent slightly more time than men in over all work (combining paid and unpaid labour). While the difference is small (seven minutes on average), it may provide some support for the 'second shift' theory, as proposed by Coltrane, (2000) and Hochschild (1989) (as cited in Sayer, 2005). This proposes that as more women move into the workforce, men fail to pick up comparative amounts of unpaid work. This results in women working a 'second shift' as they attempt to cover both roles.

While spending more time than men in unpaid work, women are found to spend less time in paid work on average. Interestingly, being employed has a positive relationship with SWB, however, after controlling for this there is a statistically significant negative relationship between SWB, and the amount of time spent at work. This is contrary to the findings of Maditinos et al. (2014), who found that the amount of time spent in paid work had a positive relationship with SWB. They did not, however, account for the extremely high levels of unemployment in their sample group which may have influenced this relationship, which may explain the discrepancies between their findings and those reported here. The employed and the unemployed had the largest difference between the means of SWB. This suggests that employment is very important, as even though unemployed people aren't spending time in paid work (which is negatively correlated with SWB), and spending more time engaged in leisure, they still report lower SWB on average.

Thus, it is imperative that future studies of time-use control for employment, as this has not always been done in the past. Access to employment provides one with financial stability as

well as a purpose, and so it is unsurprising that this plays such a significant role in SWB. The variances in SWB and time-use across the demographics discussed was significant and warrants further investigation. The discussion presented here suggests a rich and multifaceted relationship between demographic variables and how these impacts one's use of time. A better understanding of this is necessary to help the New Zealand Treasury and Government understand the wellbeing of the people.

5. Conclusions and limitation of the study

This research is understood to be a preliminary foray into the nature of the relationship between SWB and time-use and the primary implication of my findings is that there is a need for further research in this area. Data needs to be gathered in the New Zealand context, as only through local data can relevant assumptions be drawn. As discussed in section 2, the need for such time-use data has been established for some time. The Economic and Social Research Council (2019) points out that gathering information on time-use is vital to understand important aspects of how a society is functioning, including the division of labour, work/life balance and patterns of social interaction. ATUS (U.S. Bureau of Labor Statistics , 2018), additionally points out the need to understand the value of unpaid work, which is largely ignored in traditional measures of economic activity. The need for such information was already locally established in the discontinued NZ time survey but has not been give adequate attention in recent years.

The finding that the amount of time one spent in paid work is likely associated with a lower level of SWB provides potential support for a shorter working week. This notion has already been discussed in New Zealand by the trust Perpetual Guardian, who introduced a short-term program to trial a four-day working week in 2018. The company reported lower stress levels, as well as increased productivity, profits and retention of staff. They subsequently introduced a four-day work week permanently throughout the company due to its success. They cite the importance of spending sufficient time engaging with one's family and community, social activities which have been shown to have a positive relationship with SWB. The company found a shorter working week so successful that they offer advice to other companies looking to trial the approach for themselves (Bateman, 2019). Prioritising such time-use activities, it

seems, may benefit both SWB and productivity levels when one is at work. However, despite the possible benefits of such an approach, the managing director of the company has stated that New Zealand's current legislation makes such changes hard to implement. The current Employment Relations Act defines work in terms of hours in the office, and so encourages businesses to put people on contracts. Changes to this legislation may benefit businesses who wish to try this approach (Palmer, 2018).

The findings presented in this study also provide motivation to prioritise the promotion and funding of sports and social leisure activities. Government sponsors of recreational programs may help engage the public, and employers who understand the importance of their workers' SWB may also wish to encourage engagement further. The 2019 NTZ wellbeing budget identifies improving mental health as one of its primary aims and identifies building community and combating loneliness as one of the ways to achieve this. It is identified that within New Zealand, 17 per cent of the population felt lonely most, or even all of the time within the four-week period prior to being surveyed (The Treasury, 2019). Ensuring that individuals are spending enough time out of work and engaged in social and physical leisure will likely improve mental health outcomes, which is in line with the government's current objectives.

Since my study was cross-sectional, I was unable to control for fixed effects such as personality traits. As discussed by Ferrer-i-Carbonell and Frijters (2004), such effects are of considerable significance when considering SWB. Of course, the issue of reverse causality is also poignant. The analysis only considers correlations between the variables, and does not attempt to draw any conclusions regarding the nature of causality. This further highlight the need for consistent long term research to be undertaken within New Zealand, which could allow for inquiries into causality in the future.

Access to New Zealand data would also allow for the exploration of time-use unique to the country's people. As pointed out by Gramm (1987), the judgment on leisure must be relative to the different values of different cultures. My analysis has been performed using American data, which may be unrepresentative of New Zealand demographics, especially as Mcleod (2018) reported that wellbeing outcomes differ for the Maori and Pacific groups especially. Generally, a case by case analysis must be used, with results being interpreted only in the

environment in which they are found. For this to be possible this domain of wellbeing must be acknowledged as important. It is hoped that this preliminary study provides some support for more research into this domain in the future.

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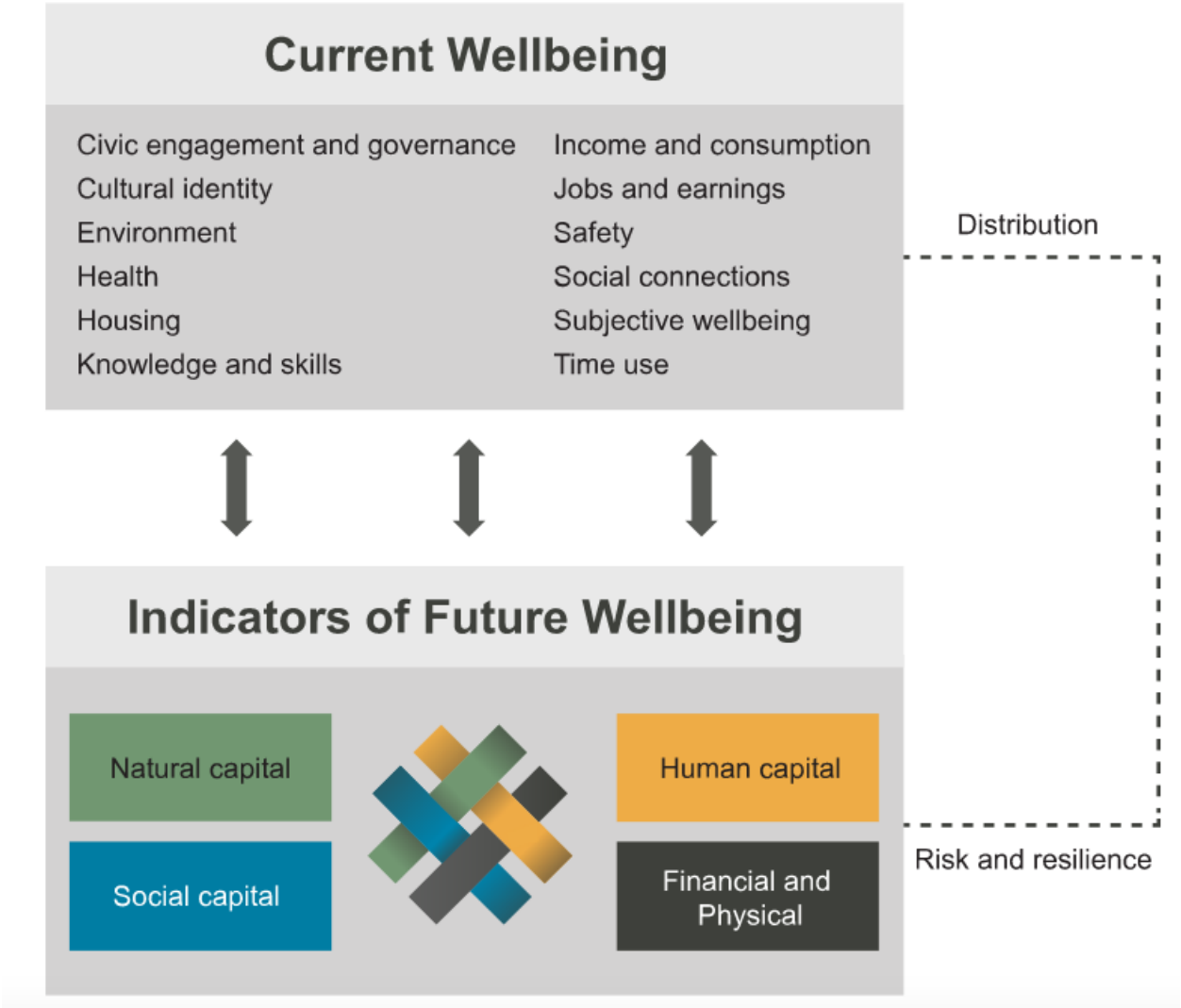
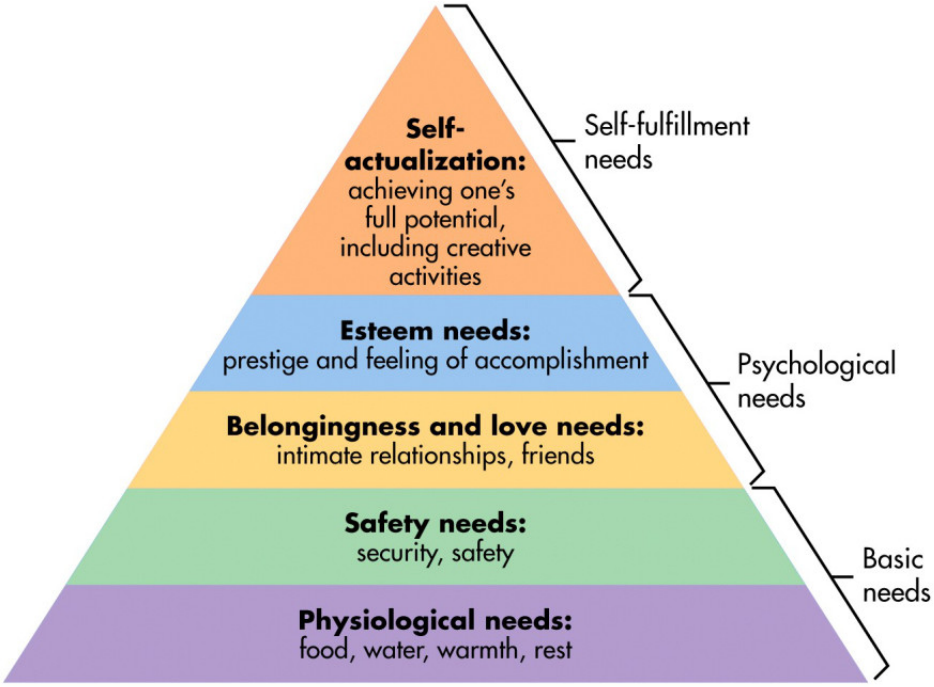
Appendix A. The Treasury's Living Standards framework



(The Treasury, 2018)

Appendix B. Maslow's Hierarchy of Needs



(Maslow, as cited in McLeod, 2018)

Appendix C. Unemployment rates in Greece over the last 10 years

(Trading Economics, 2019)