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**Determinants and Consequences of Having a Sense of  
Purpose in Life and at Work**

**by**

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A thesis submitted in partial fulfilment of the requirements for the  
degree of Doctor of Philosophy

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# Contents

List of Tables .....	iv
List of Figures.....	v
Abbreviations .....	vi
Acknowledgements .....	vii
Declaration .....	ix
Abstract.....	x
CHAPTER 1: Purpose in Life: Theoretical and Methodological Perspectives.....	1
1.1. Introduction.....	1
1.2. Early Conceptualisations of Purpose in Life in Clinical Psychology.....	2
1.3. Purpose in Life as Psychological Well-being .....	3
1.4. Purpose in Life as Identity and Character.....	6
1.5. Contextualizing Purpose as an End Goal.....	9
1.6. Conclusion .....	10
CHAPTER 2: Determinants and Consequences of Having a Sense of Purpose in Life .....	13
2.1. Introduction.....	13
2.2. Benefits of Having a Sense of Purpose in Life .....	13
2.3. Determinants of Having a Sense of Purpose in Life.....	15
2.3.1. Sociodemographic Factors .....	15
2.3.2. Work-Related Factors.....	16
2.3.3. Personality .....	17
2.3.4. Self-Concordant Goals and Activities .....	17
2.3.5. Self-Concept Clarity .....	18
2.3.6. Prosocial Goals and Activities.....	18
2.3.7. Social-Relational Factors.....	19
2.4. Conclusion .....	19
CHAPTER 3: Longitudinal Associations Between Sense of Purpose in Life and Physical Activity .....	22
3.1. Introduction.....	22
3.1.1. Literature Review .....	24
3.1.2. Current Study.....	25
3.2. Methods .....	26
3.2.1. Sample .....	26
3.2.2. Measures.....	28

3.2.3. Statistical Analysis .....	31
3.3. Results.....	34
3.3.1. Descriptive Statistics in HRS .....	34
3.3.2. Sense of Purpose and Physical Activity in HRS .....	35
3.3.3. Descriptive Statistics in MIDUS .....	38
3.3.4. Sense of Purpose and Physical Activity in MIDUS .....	38
3.4. Discussion.....	40
3.4.1. Limitations and Future Directions.....	41
3.5. Conclusion .....	43
CHAPTER 4: The Effects of Retirement on Sense of Purpose in Life.....	45
4.1. Introduction.....	45
4.1.1. Literature Review .....	47
4.1.2. Current Study.....	49
4.2. Methods .....	51
4.2.1. Sample .....	51
4.2.2. Measures.....	51
4.2.3. Statistical Analysis .....	54
4.3. Results.....	57
4.3.1. Retirement and Sense of Purpose in Life .....	57
4.3.2. Retirement and Financial, Health and Social Resources.....	60
4.3.3. Retirement and Subjective Well-Being .....	61
4.3.4. Who Drives the Effects of Retirement?.....	62
4.4. Discussion.....	64
4.4.1. Limitations and Future Directions.....	66
4.5. Conclusion .....	67
CHAPTER 5: Perceived Social Purpose and Job Satisfaction: A Cross-Country Analysis of Moderation by Economic Conditions .....	70
5.1. Introduction.....	70
5.1.1. Literature Review .....	73
5.1.2. Current Study.....	81
5.2. Methods .....	83
5.2.1. Sample .....	83
5.2.2. Measures.....	85
5.2.3. Statistical Analysis .....	90
5.3. Results.....	92

5.3.1. Relative Contributions of Income Satisfaction and Social Purpose to Job Satisfaction .....	92
5.3.2. Moderation Analysis of Macroeconomic Indicators .....	94
5.3.3. Additional Analysis .....	99
5.4. Discussion .....	101
5.4.1. Limitations and Future Directions .....	105
5.5. Conclusion .....	107
CHAPTER 6: Conclusion.....	109
References .....	121
Appendix .....	154

## List of Tables

Table 1. Summary Statistics for the Analysis of Sense of Purpose in Life and Physical Activity (Data: Health and Retirement Study 2006-2016) .....	31
Table 2. Summary Statistics for the Analysis of Sense of Purpose in Life and Physical Activity (Data: Midlife in the US 2004-2013).....	33
Table 3. Prospective Associations Between Sense of Purpose in Life and Moderate and Vigorous Physical Activity (MVPA) (Data: Health and Retirement Study 2006-2016).....	37
Table 4. Prospective Associations Between Sense of Purpose in Life and Moderate-Vigorous Physical Activity (MVPA) (Data: Midlife in the US 2004-2013).....	39
Table 5. Summary Statistics for the Analysis of Retirement and Sense of Purpose in Life (Data: Health and Retirement Study 2006-2016) .....	55
Table 6. The Impact of Retirement on Sense of Purpose in Life (Data: Health and Retirement Study 2006-2016) .....	59
Table 7. The Impact of Retirement on Resource Outcomes (Data: Health and Retirement Study 2006-2016) .....	61
Table 8. The Impact of Retirement on Happiness and Life Satisfaction (Data: Health and Retirement Study 2006-2016).....	62
Table 9. Complier Characteristics for the Instrumental Variable Analysis of Retirement and Sense of Purpose in Life (Instruments: Social Security Early and Normal Retirement Ages) (Data: Health and Retirement Study 2006-2016) .....	63
Table 10. Summary Statistics for the Analysis of Social Purpose and Job Satisfaction (Data: International Social Survey Program 2015) .....	89
Table 11. Associations Between Job Satisfaction and Job Attributes in 36 Countries (Data: International Social Survey Program 2015) .....	93
Table 12. Associations Between Job Satisfaction and Job Attributes in 36 Countries - Moderation Analysis by Country-Level Economic Indicators (Data: International Social Survey Program 2015).....	96

## List of Figures

<i>Figure 1.</i> Frequency of 'Purpose in Life' in Academic Publications.....	1
<i>Figure 2.</i> Mean Levels of Sense of Purpose as a Function of Age .....	58
<i>Figure 3.</i> Proportion of Retirees as a Function of Age .....	58
<i>Figure 4.</i> Marginal Associations Between Job Satisfaction and Job Attributes (Social Purpose and Income Satisfaction) Based on GDP .....	97
<i>Figure 5.</i> Marginal Associations Between Job Satisfaction and Job Attributes (Social Purpose and Income Satisfaction) Based on Country-Level Volatility in GDP .....	97

## **Abbreviations**

DV: Dependent Variable

FE: Fixed Effects

GDP: Gross Domestic Product

HRS: Health and Retirement Study

ISSP: International Social Survey Program

IV: Instrumental Variable

MIDUS: Midlife in the US

MVPA: Moderate and Vigorous Physical Activity

OECD: Organization for Economic Cooperation and Development

SES: Socioeconomic Status

UK: United Kingdom

US: United States

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*Whenever you wake up, that is your morning.*

Igbo Proverb

## Declaration

This thesis is submitted to the University of Warwick in support of my application for the degree of Doctor of Philosophy. It has been composed by myself and has not been submitted in any previous application for any degree. All aspects of the work presented was carried out by the author except in the cases outlined below:

1. The study on sense of purpose in life and physical activity (Chapter 3) was conducted under the supervision of Prof. Ivo Vlaev. As the co-author in the project, Prof. Vlaev provided direction for revisions in writing and analyses.
2. The study on retirement and sense of purpose in life (Chapter 4) was conducted under the supervision of Prof. Nattavudh Powdthavee and Prof. Ashley Whillans, who provided direction for the analyses. As the co-authors in the project, the professors provided direction for the analyses.
3. The study on prosocial job purpose and incomes (Chapter 5) was conducted under the supervision of Prof. Nattavudh Powdthavee and Prof. Ashley Whillans. As the co-authors in the project, the professors provided direction for the analyses.
4. The data used in the analyses were publicly available and de-identified. The procedures for data collection and consent can be found in the respective websites below:
  - a. Midlife in the US: <http://www.icpsr.umich.edu/icpsrweb/NACDA/>
  - b. Health and Retirement Study: <http://hrsonline.isr.umich.edu>
  - c. International Social Survey Program: <http://w.issp.org/menu-top/home/>

## **Abstract**

This thesis presents three empirical investigations on the consequences and determinants of having a sense of purpose in life and at work. The first chapter reviews the theoretical approaches to purpose in life to provide a conceptual basis for the empirical work. The second chapter discusses the literature on the determinants and consequences of sense of purpose in life, measured by the extent to which people have goals and aims that give their lives direction and meaning.

Using a longitudinal analysis in two national samples, the third chapter shows that sense of purpose in life is a unique long-term determinant of physical activity, a behaviour that contributes significantly to health and well-being. The fourth chapter applies an instrumental variables analysis to longitudinal data and shows that retirement increases sense of purpose in life. This effect is driven by adults with lower socioeconomic status who retire from dissatisfying jobs.

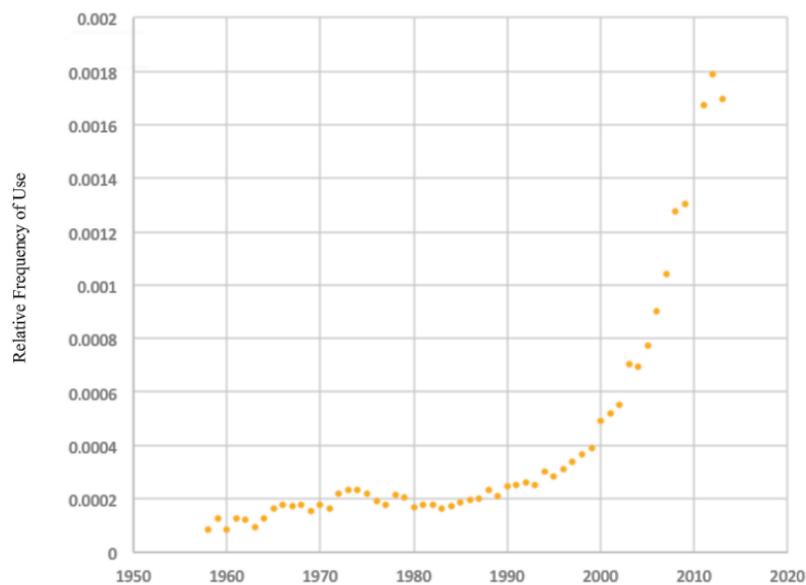
The fifth chapter studies social purpose in jobs, measured by subjective assessments that job is socially useful. Using data from 36 countries, this chapter shows that perceived social purpose is positively related to job satisfaction and this relationship is attenuated in countries with higher economic volatility.

Prior research has highlighted the potential benefits of sense of purpose for health and well-being and for motivating people at work. The current thesis provides a potential explanation as to why sense of purpose may be beneficial by showing its relationship to behavioural outcomes; presents some of the first causal evidence on how sense of purpose can change at the population level; and sheds light on when, why, and for whom work may be a source of sense of purpose. The scientific contributions and practical and policy implications of the findings are discussed in the sixth chapter.

# CHAPTER 1: Purpose in Life: Theoretical and Methodological Perspectives

## 1.1. Introduction

The intellectual interest in people’s experiences of meaning and purpose in life has a long history in Western thought (Aristotle, 350 B.C./1926). Yet, only recently, these constructs have been of interest to social scientists. In a recent study, researchers tracked the words ‘purpose in life’ and synonymous phrases in books and academic articles (Grant, 2017), showing that purpose-related phrases have been used with increasing frequency since the 1980s and the rate of use has become exponential since the beginning of the 2000s (see Figure 1).



*Figure 1.* Frequency of 'Purpose in Life' in Academic Publications  
*Note.* Adapted from ‘Exploring the Possibility of Peak Individualism, Humanity's Existential Crisis, and an Emerging Age of Purpose,’ by G. B. Grant, 2017, *Frontiers in Psychology*, 8, p. 5. Copyright 2017 by Grant. Reprinted with permission.

The late-blooming interest in the study of meaning and purpose can be attributed to the widely held view that these constructs are rather elusive and subjective and therefore, difficult to measure (Bronk, 2014; Martela & Steger, 2016; Ratner et al., 2019). To address this criticism and build the theoretical foundation for the empirical studies that follow in the next chapters, I dedicate this introductory chapter to a review and discussion of the theoretical and methodological approaches

to purpose in life. In this review, I primarily draw from psychological and behavioural sciences as a discipline because this thesis approaches purpose as a subjective experience both in its conceptualisation and measurement.

As described below, a review of the literature revealed four main themes that describe the most influential and widely used perspectives to purpose in life: i) early conceptualisations of purpose in clinical psychology, ii) sense of purpose in life as a motivational aspect of psychological well-being, iii) purpose in life as a motivational aspect of identity and character, and iv) contextualized operationalizations of purpose as the end of goal of activities. The current chapter summarizes these approaches with the aim of clearly distinguishing them from one another. Additionally, this chapter identifies robust and clear conceptual/methodological approaches to purpose in life which are used in the empirical analyses that follow in this thesis.

## **1.2. Early Conceptualisations of Purpose in Life in Clinical Psychology**

In his influential book *Man's Search for Meaning*, psychiatrist Victor Frankl proposed one of the first comprehensive accounts of purpose in life. In this book, Frankl described the immense torture that was inflicted upon him and other inmates during the three years he spent in a Nazi concentration camp (Frankl, 1984). He argued that those who could survive the harsh indignities of their circumstances were people who had a meaningful purpose in life. Whether it is a hope to reunite with loved ones, projects to complete or spiritual faith, having a purpose helped people endure adversities and survive. Frankl suggested meaning and purpose are fundamental motivations for human beings - much more important than the widely accepted drives for pleasure and power. He also emphasized that in the absence of a purpose, a wide range of psychopathologies would arise like boredom, addictions, and obsessions. As a psychiatrist, he developed logotherapy, a method of psychotherapy that is aimed at helping individuals find meaning and purpose in life.

Frankl's conceptualisation of purpose and his logotherapy were influential in clinical psychology and led to the development of scales that quantitatively assess purpose in life (Crumbaugh, 1968; Crumbaugh & Maholick, 1964; Reker, 1977). In these scales, respondents rated their agreement with statements like 'In life, I have clear goals and aims' or 'My personal existence is meaningful and purposeful.' A detailed overview of these measurement tools is presented in the book chapter

entitled 'Measuring Purpose' by Bronk (2014). Historically, this was a time when psychology as a discipline was predominantly concerned with identifying psychological disease; therefore, these measurement tools were mostly used among psychiatric patient populations with the hope of identifying purposelessness and underlying pathologies. These studies confirmed Frankl's proposition and showed that purposelessness was indeed associated with outcomes like drug and alcohol abuse, and anxiety among many others (Bronk, 2014).

Overall, Victor Frankl's conceptualisations laid out the foundations upon which the contemporary science of purpose has been built. Notwithstanding their contributions, these earlier theories and measures have been criticized for using meaning and purpose synonymously; recent discussions emphasized the conceptual differences between these two constructs (King et al., 2016; Martela & Steger, 2016). These discussions highlighted that purpose is about motivations, goals, and future-directedness, while meaning is a cognitive assessment of life and its constituents (King et al., 2016). In addition, researchers conceptualised meaning as a broader construct that encompasses purpose as well as other factors like coherence and significance (Martela & Steger, 2016). In line with this evidence, although measures of meaning usually include some items on purpose (Steger, 2013), researchers have developed assessment tools that uniquely address purpose in life (Ryff, 1989b; Scheier et al., 2006).

The measures that uniquely assess purpose in life have revealed further empirical support for the differences between these constructs. For instance, meaning and purpose show different trajectories of change as a function of age; while sense of purpose steadily declines (Ryff & Keyes, 1995), perceptions of meaning in life increase (Steger et al., 2009). Altogether, these findings have led to the conclusions that although meaning and purpose are related, they are conceptually and empirically distinct (King et al., 2016). Building on these foundational distinctions between meaning and purpose, more recent approaches have made purpose a clear focus in their theories and studied this construct outside of the psychiatric contexts among healthy populations.

### **1.3.Purpose in Life as Psychological Well-being**

As the positive psychology movement shifted the emphasis of psychology from the study of pathologies to the examination of the good life, purpose also started to be

thought of in a more positive light - as a component of psychological well-being. In 1989, Carol Ryff made an extensive review of the existing theories of psychological functioning from existential, humanistic and developmental psychology and proposed that purpose in life is one of the key components of psychological well-being along with self-acceptance, autonomy, environmental mastery, positive relations, and personal growth. She described sense of purpose as having goals and aims that give life meaning and direction (Ryff, 1989b). Ryff and colleagues developed a scale that measured sense of purpose in life (Ryff & Keyes, 1995). This scale have been integrated into large-scale surveys and have been used to discover longitudinal relationships between purpose in life and the numerous life outcomes described in Chapter 2.

Ryff's conceptualisation of sense of purpose as well-being was similar to the definition of sense of purpose proposed by Scheier et al. (2006) as the extent to which people have goals and activities that are valued and important. Drawing upon behavioural self-regulation theories, this approach emphasized the importance of identifying behaviours that are personally valued and being actively engaged in life. Thus, the corresponding scale for this construct was entitled 'Life Engagement Test' and involved items such as 'To me, the things I do are all worthwhile', 'I value my activities a lot', and 'I have lots of reasons for living.' Although the authors do not directly conceptualise purpose in life as an aspect of well-being, they highlight purpose as a close antecedent to psychological and physical health.

It is worth highlighting that, sense of purpose has generally been considered as a manifestation of Aristotle's idea of eudaimonia (Ryff & Singer, 2008). According to Aristotle, what mattered in life was the ends people aimed at and the highest of all aims achievable and worth pursuing in life was 'eudaimonia' (Aristotle, 350 B.C./1926). While interpretations of Aristotle's conceptualisation of eudaimonia are abundant, there has been some agreement that eudaimonia is to be reached through the pursuit of excellence, the best within us, based on our unique potential (skills and dispositions) (Huta & Waterman, 2014). Hence, eudaimonia can be exemplified by goals and activities that are driven by moral excellence as well as personal expression and growth.

Motivated by these ancient Greek philosophies as well as more recent psychological perspectives from the likes of Rogers (1961), some scholars accept constructs like purpose, meaning, personal expression and growth as critical to

understanding and measuring psychological well-being and optimal functioning (Ryff, 1989b; Waterman, 2008). This eudaimonic approach to well-being has been contrasted with the hedonic approach which emphasizes the experience of pleasure and avoidance of pain (Huta & Ryan, 2010; Ryan & Deci, 2001). Hedonic well-being has often been captured by assessments of the frequency and intensity of positive vs negative feelings, or judgements about overall happiness and satisfaction with life (Kahneman et al., 1999).

There have been extensive discussions on the converges and divergences between these so-called hedonic and eudaimonic approaches (Huta & Ryan, 2010; Ryan & Deci, 2001). Some studies have demonstrated that certain life domains, activities and experiential states (e.g., work, volunteering, spending time with children, stress, and anxiety, thinking about one's self and identity) are rated low in terms of happiness, and yet receive high ratings in terms of how meaningful or worthwhile they are (Baumeister et al., 2013; White & Dolan, 2009). Empirical research has also shown that expected sense of purpose has a strong explanatory power, above and beyond pleasure, in predicting people's decisions when they are making hypothetical life choices (Benjamin et al., 2012).

On the other hand, critics suggested that eudaimonia is better thought of as a philosophy or a code of conduct that could predict or be predicted by well-being (as measured by happiness), but should not be considered a kind of well-being (Ward & King, 2016). The critics referred to the strong correlations observed between the subjective assessments of hedonic and eudaimonic approaches (e.g., how happy vs meaningful one feels) and the rarity of those who report high meaning and low happiness as evidence that these two constructs are not distinguishable from one another. An expert panel of scientists encouraged the further development of measures on meaning and purpose to accompany happiness and life satisfaction questions for the assessment of well-being (National Research Council, 2013). Policy institutions such as the OECD (Durand, 2013) and governments such as the UK (Dolan & Metcalfe, 2012) also addressed both happiness and life satisfaction as well as meaning and purpose in measuring citizens' well-being.

In sum, lately, the broad theoretical umbrella under which researchers study meaning and purpose (i.e., eudaimonia or hedonia) has been under debate (Huta & Ryan, 2010; Ryan & Deci, 2001). In addition, researchers have challenged the empirical distinctions between subjective judgements of meaning and happiness

(Ward & King, 2016). However, today, *sense of purpose in life* has emerged as a unique and clearly defined component of well-being. Existing conceptualisations and assessment tools do not confound sense of purpose with meaning (Ryff & Keyes, 1995; Scheier et al., 2006). In addition, researchers have shown that sense of purpose predicts outcomes like longevity above and beyond positive affect while the latter fails to demonstrate associations with longevity (Hill & Turiano, 2014). Hence, there is strong evidence that sense of purpose is a component of well-being that is conceptually and empirically distinct both from meaning and hedonic measures of happiness. Motivated by this, I present two empirical studies that investigate the determinants (Chapter 4) and consequences (Chapter 3) of having a sense of purpose in life in this thesis. In Chapter 2, I also present a review of the literature on determinants and consequences of sense of purpose in life to motivate the empirical analyses.

#### **1.4. Purpose in Life as Identity and Character**

As the scientific literature on sense of purpose developed, a parallel literature has also emerged in which purpose has been conceptualised and studied as a motivational aspect of character and identity. In one of the foundational theoretical studies on this topic, McKnight and Kashdan defined purpose as ‘a central self-organising life aim’ that guides lower-level goals and behaviours like a compass (2009, p. 242). The authors argued that purpose is a central construct because it is at the core of a person’s identity, in particular, their ‘narrative identity’ that involves a person’s internalized and evolving life story of who they are and what they aim to achieve in life (McAdams & Pals, 2006).

This conceptualisation of purpose is aligned with and based on the proposition of a hierarchy of goals (Carver & Scheier, 2000), at the bottom of which are concrete goals like going to movies and higher in the hierarchy are more abstract goals that become ever more central to identity. For instance, a higher-order goal than going to movies may be to entertain oneself or to be informed about social-political issues, which would represent aims that are closer to the stable ideals and aspirations that drive people’s behaviours over time and space. By placing purpose at the highest level of this hierarchy of goals (2009), McKnight and Kashdan distinguished it from more concrete or directly achievable like lower-level goals and emphasized its enduring and far-reaching characteristics.

Related literature that uses a similar conceptualisation of purpose was initiated by qualitative researchers in youth research. In a seminal article, Damon and colleagues proposed a definition of purpose as ‘a generalized intention to accomplish something that is at once meaningful to the self and leads to productive engagement with some aspect of the world beyond the self’ (Damon et al., 2003, p.121). They argued, based on theories by developmental psychologists (Erikson, 1994), that adolescence is the stage of life when people first start to form belief systems and dedicate themselves to enduring life goals, therefore, having a purpose in life should be considered an indicator of positive youth development. Since then, researchers have produced a large body of evidence that adolescents and young adults are capable of understanding and committing to a life purpose and those who do report such commitment experience desirable life outcomes (Bronk et al., 2009; Bronk, 2012; Hill, Burrow, Brandenberger, et al., 2010; Malin et al., 2017). Because of its emphasis on beyond-the-self intentions, this concept of purpose has often been referred to as a self-transcendent purpose. The authors have pointed to purposes that are about helping others and making the world a better place, although they also admitted that some purposes may be anti-social and destructive.

These theories suggest that purpose may initiate a psychological mechanism (i.e., behaviours, cognitions) that would generate well-being, but cannot be considered as an aspect of well-being. The strong emphasis on identity and character is the first basis on which these approaches can be distinguished from previous perspectives that defined purpose as well-being. This is reflected in the descriptions of these concepts as *a sense of purpose* (well-being) vs *a purpose in life* (identity). Another distinctive characteristic is that these theories of purpose have an emphasis on singularity in terms of a goal. While purpose as well-being indicates the presence of multiple goals that overall make life worth living, the idea of purpose as a component of identity and character highlights the presence of one or only a few goals that individuals would commit to. McKnight and Kashdan (2009), for instance, emphasized that although people may possess multiple purposes, having the guidance of a single high-order purpose would provide greater efficiency to the organisation and execution of lower-order goals.

Finally, the idea of purpose as a central life aim can also be distinguished by the methodological choices adopted by researchers. For instance, those who approach purpose as a life aim relevant for identity typically study *commitment* to a

purpose, that is, how dedicated one is to the pursuit of a life goal (Burrow et al., 2010; Hill, Edmonds, et al., 2016). Or, researchers also study the *content* of purpose by using life goal paradigms whereby respondents choose among a list of goals that emphasize prosocial or self-oriented aims (Hill, Burrow, O'Dell, et al., 2010; Johnson et al., 2018). This conceptualisation of purpose also makes it relevant to assess the clarity of purpose to determine the extent to which people can clearly articulate what they deem as their purpose in life. Although this aspect of purpose has not yet been researched, it would offer promising research directions for understanding processes of self-reflection, social judgement, and effective communication, especially in the context of professional settings.

Clearly, this conceptualisation of purpose is closely related to the well-being measure of sense of purpose in life and perhaps because of this, it is common for researchers who study purpose in life as well-being or identity to reference each other's research to motivate their studies. Researchers also use the words of 'sense of purpose in life' or 'a purpose in life' interchangeably. It is, however, crucial to clearly define and diligently distinguish these constructs to draw the right scientific and practical conclusions from these studies.

For example, it is possible that commitment to a single, overarching life goal does not directly translate into an improved sense of purpose in life in comparison to a balanced pursuit of multiple goals. Pursuing a single goal may lead people to underperform in domains that are unrelated to this goal (Ordóñez et al., 2009) and undermine sense of purpose, health, and well-being in the long run.

Importantly, the interventions that would lead to the cultivation of these types of purpose may also differ. Identifying a central life purpose or improving sense of purpose may both require individuals to engage in significant identity work (e.g., discovering one's interests, skills, and values). However, commitment to a life purpose may additionally require people to search for an all-encompassing goal which may be overwhelming and stressful (Rainey, 2014). Hence, it is important that future studies clearly define and commit to their approach when they study sense of purpose in life or purpose as an overarching life goal related to identity. As the next chapters focus on sense of purpose in life, it is worth noting that the conclusions drawn may not apply to purpose as an overarching goal that is a component of identity.

### **1.5. Contextualizing Purpose as an End Goal**

As described above, most studies on purpose have approached it as a life-level construct and measured it by questions that assess the overall sense of purpose in life or as an overarching goal that guides life. However, another line of more recent work has emphasized that purpose can also be studied in a more contextualized manner, as an end goal people associate with certain activities and domains. One stream of research that adopted such a perspective to the study of purpose in life is rooted in educational psychology. In this literature, researchers have studied the purpose of school or schoolwork through an assessment of students' beyond-the-self motives for studying (e.g., become an engineer and solve the world's energy problems) (Yeager et al., 2014). Similar to the above-mentioned description by Damon and colleagues, Yeager and colleagues defined self-transcendent purpose as 'a goal that is motivated both by an opportunity to benefit the self and by the potential to have some effect on or connection to the world beyond the self' (p. 560). In addition to directly measuring young people's perceptions of such a purpose via self-report questions, these studies have also adopted a novel experimental approach whereby they manipulated purpose by asking students to write about their beyond-the-self motives for studying.

Similarly, purpose has also been operationalized as an end goal associated with a labour task, one's job or an organisation in behavioural economics research and organisational sciences (Ariely et al., 2008; Chandler & Kapelner, 2013; Gartenberg et al., 2019; Henderson & Van den Steen, 2015; Steger et al., 2012). Some organisational psychologists have assessed purpose in the context of work using a subjective approach and asking people whether they think their work serves a greater purpose (e.g., making a positive impact on the world) (Fairlie, 2011; Lips-Wiersma & Wright, 2012; Steger et al., 2012). Others in behavioural economics and management research have adopted a more objective measurement approach and classified tasks, jobs, or companies as purposeful or not based on the impact they are making, without relying on subjective judgements (Chandler & Kapelner, 2013; Gartenberg et al., 2019; Henderson & Van den Steen, 2015). These studies have also adopted an experimental approach and manipulated purpose by increasing the salience of the impact people are making through work.

By studying the construct of purpose in the context of activity at work or school, this emerging research presents a new line of inquiry into our understanding of purpose. Importantly, this line of work suggests that purpose is not only a broad, life-level construct that requires an assessment by global life evaluations. Purpose can also be experienced and assessed on a day to day, moment to moment basis. This line of work also has implications for broadening our understanding of people's daily activity engagement and well-being. Further, this research makes it possible to advance the science of purpose through experimental research whereby the salience of one's goals and impact is manipulated. Given that most of the research that relies on subjective judgements of purpose is based on cross-sectional or longitudinal observational data, these experimental methods can significantly advance our scientific understanding and applications of the study of purpose.

Again, this conceptualisation of purpose is closely related to sense of purpose in life as a measure of well-being. For example, students who hold both self-transcendent and self-oriented motives for their future careers were more likely to experience an increase in their sense of purpose in life in the future (Yeager et al., 2012). Yet, the conceptual differences of this approach are straightforward since the constructs and measure directly focus on an activity (e.g., at work, or school) vs life. In Chapter 5, I focus on this contextualized measurement of purpose in the domain of work through an empirical study that is focused on perceived social purpose of jobs. Chapter 5 also includes a more targeted and in-depth review of social purpose in the context of work.

## **1.6. Conclusion**

This chapter reviewed the theoretical and methodological approaches to the study of purpose in life primarily in psychological and behavioural sciences. The chapter began with a discussion of the early accounts of purpose in life in clinical psychology where the interest has been to understand and remedy purposelessness in clinical populations (Frankl, 1984). Next, several approaches to purpose in contemporary psychological science has been distinguished.

One of the most important contributions of this chapter was to highlight the construct of *sense of purpose in life*, which is a state of well-being that arises from having goals and aims that give life direction and meaning (Ryff, 1989b). As indicated by the current review, sense of purpose in life is a robust measure of well-

being that is both conceptually and empirically distinct from traditional well-being measures of positive affect and the broader construct of sense of meaning in life. The validated scales that assess this construct are based strongly on psychological theory and do not confound this measure with meaning or affect (Ryff & Keyes, 1995). As described in Chapter 2, this measure also uniquely predicts a large number of important life outcomes and behaviours.

In sum, despite the conceptual ambiguities in the literature of purpose (Bronk, 2014; Martela & Steger, 2016; Ratner et al., 2019), measures of sense of purpose in life represent a promising tool that is both conceptually clear and valid and can be used in empirical studies. Studying sense of purpose in life using these tools could broaden our scientific understanding of well-being and the good life especially in contexts that are relevant for long-term motivation and life engagement. Motivated by this, Chapter 3 and 4 present novel empirical evidence on the longitudinal determinants and consequences of sense of purpose in life at the population level.

The current review also presented a second prominent approach to the study of purpose in life which entailed conceptualising it as an aspect of identity and character. As an identity measure, purpose has been described as an overarching life goal (McKnight & Kashdan, 2009) with most research approaching it as a self-transcendent life goal that is aimed at making a positive difference in the world (Damon et al., 2003). Methodologically, researchers operationalized this idea of purpose by measuring people's commitment to or the content of life goals (e.g., prosocial or self-oriented goals). It is important to note that the well-being measures of sense of purpose that are used in the next chapters assess the presence of meaningful goals and activities which will naturally be closely intertwined with identity and character. Further, having an overarching aim is linked to increases in people's sense of purpose in life (Yeager et al., 2012), so the consequences of sense of purpose likely apply to the construct of purpose as a central life aim. Yet, sense of purpose captures more than an overarching unitary goal. Hence, caution must be paid while applying insights about the determinants of sense of purpose to the construct of purpose as a motivational component of identity and character. As described above (see Section 1.4), factors that help people identify a single overarching life goal may differ from those that affect people's engagement in meaningful goals and activities in general.

Another contribution of this chapter was to highlight a different approach of studying purpose in life whereby researchers focus on the end goals associated with an activity. This line of work often emphasized the pursuit of a self-transcendent purpose such as helping others and contributing to the broader society via activities at work (Chandler & Kapelner, 2013) or school (Yeager et al., 2014). This line of work represents a unique and promising direction for future research since it enables researchers to study the role of subjective judgements of purpose in day to day behaviours and well-being. To build on this growing literature, Chapter 5 presents an empirical investigation that uses people's subjective ratings of social purpose in their jobs (e.g., job helps others or contributes to society). As described in detail in the literature review in Chapter 2 (Srimathi & Kiran Kumar, 2010; Steger et al. 2012), we would expect people who work in jobs with a social purpose to report greater levels of sense of purpose in life. Therefore, the conclusions about the consequences of sense of purpose may also apply to having a sense of social purpose in jobs, however, sense of purpose is a broader construct, and its determinants may encompass other activities and experiences.

By describing and distinguishing the main streams of research that focused on the construct of purpose in life, this review attempted to address and improve upon the conceptual ambiguity and confusion over terminology that exists in the contemporary science of purpose (Bronk, 2014; Martela & Steger, 2016; Ratner et al., 2019). Importantly, for the current thesis, this review helped build the foundation for the next few chapters (Chapter 2, 3, and 4) that focus on the well-being measure of sense of purpose in life and investigate its determinants and consequences. The current review chapter also built the conceptual foundations for the work presented in Chapter 5 where the focus is on perceived social purpose in the context of work. The present review suggests that it is possible to conduct robust empirical work using the measures of sense of purpose in life and perceived social purpose at work to advance our understanding of human behaviour and well-being on important life domains such as health and work.

## **CHAPTER 2: Determinants and Consequences of Having a Sense of Purpose in Life**

### **2.1. Introduction**

Sense of purpose in life arises from having goals and aims that give people a direction and meaning in life (Ryff, 1989b). Drawing from life-span developmental theories as well as clinical and mental health perspectives in psychology, researchers suggest that sense of purpose in life should be considered as an important aspect of psychological well-being (Ryff, 1989a). Furthermore, scales have been developed and validated to measure sense of purpose in life (Ryff & Keyes, 1995). This has given rise to numerous studies that examined the determinants and consequences of having a sense of purpose in life. The current chapter is dedicated to a review of this literature on sense of purpose as it is assessed with a subscale of psychological well-being developed by Carol Ryff and colleagues (1995). This scale measures the extent to which people have goals and aims that give their lives direction and meaning. In some cases, I reference studies that used closely related measures of sense of purpose. In those cases, I describe the specific measures used to highlight their differences from the Ryff measure.

The chapter begins with a review of the scientific literature on the relationship between sense of purpose in life and various beneficial life outcomes in terms of physical and mental health and economic success. Next, the literature on the determinants of sense of purpose in life is reviewed and the factors that have been shown to improve or impede people's sense of purpose in life are discussed.

### **2.2. Benefits of Having a Sense of Purpose in Life**

In one of the earliest theoretical accounts of purpose, Victor Frankl conceived it as a critical motivational resource for tackling adversities (1984). Empirical evidence that cumulated in recent years have confirmed this proposition: having a sense of purpose in life has been shown to be a protective factor against a wide range of adverse outcomes. Researchers found that people with a higher sense of purpose have better regulation of amygdala (a centre of the brain involved with stress and anxiety) after exposure to negativity (Schaefer et al., 2013). In the lab and real-life setting, purposeful people responded less strongly to stressful situations (Burrow et al., 2014; Hill et al., 2018) and showed less biological signs of long-term stress

(Zilioli et al., 2015). Longitudinal studies have demonstrated that sense of purpose is associated with a reduced risk of Alzheimer's disease (Boyle et al., 2010), heart disease (Kim et al., 2013), and depression (Windsor et al., 2015). Individuals with higher purpose are also affected less by events like earthquakes (Feder et al., 2013).

Recent theories suggest that having a sense of purpose does not only promote a willingness to endure adversities; it also enhances one's motivation to live well. Studies found positive associations between sense of purpose in life and happiness and life satisfaction (Ryff & Keyes, 1995), as well as self-rated health (Ryff et al., 2015). Sense of purpose has also been linked to better cognition (speed and episodic memory) (Windsor et al., 2015) and multiple biological indicators of health such as neuroendocrine regulation, inflammatory processes, including gene expression, and glycaemic control (Friedman & Ryff, 2012). Furthermore, multiple studies have shown that sense of purpose in life predicts longer life expectancy (Hill & Turiano, 2014; Windsor et al., 2015).

Researchers have also demonstrated that people with a greater sense of purpose are better at taking care of their health, which could explain why they experience superior health outcomes and increased longevity. Longitudinal evidence on the relationship between sense of purpose and health behaviours is relatively scarce. In one longitudinal study, researchers have shown that people who report a higher sense of purpose in life used preventive health care like pap-smears and colonoscopy more frequently over six years (Kim et al., 2014). Purposeful people also showed less symptoms of sleep disturbances over four years (Kim et al., 2015). Cross-sectional studies have revealed associations between sense of purpose, as it is measured by the Life Engagement Test (Scheier et al., 2006), and health-promoting behaviours like exercise, eating vegetables and flossing (Hill et al., 2017).

Studies on the relationship between sense of purpose in life and economic outcomes have been limited compared to those on health associations of purpose. Still, they are suggestive that having a strong sense of purpose in life may also be a pathway for financial success. In one longitudinal study, Hill and colleagues demonstrated that people with a greater sense of purpose earn higher incomes and are more likely to report increases in income over time (2016). Others found a small but robust negative association between financial impulsivity and sense of purpose in life, as it is measured by a multi-item scale that focuses on having a clear sense of purpose (Burrow & Spreng, 2016).

In terms of work-related factors, sense of purpose was found to be positively related to vocational identity, defined as having a clear and stable understanding of one's career goals, interests, personality, and talents (Strauser et al., 2008). The same study, which was conducted in a small sample of American undergraduates ( $N = 91$ ), found that sense of purpose is also negatively associated with anxiety about committing to a career decision; yet, no statistically significant relationship was found with confusion or external conflict in career decision-making.

Finally, it is worth mentioning that studies have not, yet, demonstrated any negative effects of having a sense of purpose in life.

### **2.3. Determinants of Having a Sense of Purpose in Life**

Given the number of beneficial outcomes that are associated with having a sense of purpose in life, it is important to understand how people can cultivate this state of well-being, and what are the factors that may thwart people's sense of purpose in life. Below I review existing empirical evidence on the determinants of sense of purpose, as it is measured by the Ryff scale (Ryff & Keyes, 1995), and discuss potential avenues for enhancing sense of purpose.

#### **2.3.1. Sociodemographic Factors**

Perhaps the most important sociodemographic determinant of sense of purpose in life is age. Initial cross-sectional studies demonstrated decremental age profiles for sense of purpose (Ryff, 1989b) and longitudinal studies with national samples have also shown declines in sense of purpose in life (Springer et al., 2011). Studies found no differences in average self-reported levels of sense of purpose of men and women, even among different age groups (Ryff, 1989b). In terms of race, in the US, only Mexican Americans had lower levels of sense of purpose compared to the White, while Black individuals had higher levels of sense of purpose in life compared to the White at greater levels of education and no differences existed at lower levels of education (Ryff et al., 2003). Educational attainment was significantly and positively associated with sense of purpose in life controlling for other background and early ability variables (high school IQ, parental SES) (Ryff et al., 1999). Variation in sense of purpose, however, was higher at lower levels of education (Ryff et al., 2004). The married had a higher sense of purpose in life compared to the divorced, widowed or never married (Bierman et al., 2006).

### **2.3.2. Work-Related Factors**

One study has examined the relationship between time spent in paid employment or unpaid labour (e.g., household tasks, child or elderly care, voluntary work) in a matched sample of middle-aged men and women working at least 35 hours in white-collar jobs in the US (Lindfors et al., 2006). Men with a low workload had a lower sense of purpose compared to those who were classified as having medium or high workload. The results showed a negative relationship between sense of purpose in life and being engaged in paid work among women, whereas no significant associations with paid work emerged for men. There were no associations between sense of purpose in life and unpaid work among men or women. Another study found that American women with no clear career aspirations in their 30s demonstrated significantly lower levels of sense of purpose in life in their 50s (Carr, 1997).

In terms of occupations, a study with women living in the US revealed highest scores of sense of purpose for teachers, followed by employees in call centres and banks, while the lowest scores were observed for women working in the industry (Srimathi & Kiran Kumar, 2010). In another sample of employees from the US, researchers also found positive correlations between sense of meaning in life, measured with a scale where the majority of the items are about purpose (e.g., 'I have a clear sense of purpose'), and the meaningfulness of work, which is defined as the work that is aligned with one's purpose in life, contributes to personal growth and makes a difference in the world (Steger et al., 2012).

Researchers have also examined the associations between retirement and sense of purpose in life. A meta-analysis found eight estimates of the correlational relationship between retirement and sense of purpose (Pinquart, 2002). The weighted average of these estimates was negative ( $r = -.11$ ), and the size of the estimates did not differ much across studies. Yet, this meta-analysis was comprised primarily of unpublished research from books or dissertations. A more recent line of work used longitudinal data in the US to compare levels of sense of purpose between people who retired during the eight years of the study and those who continued working. In this work, self-reported sense of purpose declined among retiring adults, whereas no changes occurred in the working group (Hill & Weston, 2017).

Overall, existing research suggests that the relationships between work and sense of purpose may be dependent on contextual factors (e.g., the quality of work, sociodemographic factors). Importantly, there is a strong need for causal evidence to better understand the impact of retirement/work on sense of purpose.

### ***2.3.3. Personality***

Early correlational studies suggest that extraversion and conscientiousness are positively associated with sense of purpose in life while neuroticism is negatively associated (Schmutte & Ryff, 1997). Similar patterns are observed for prospective associations between extraversion and neuroticism in early life (age 16) and sense of purpose in life during mid-life (Abbott et al., 2008). Optimism (Ferguson & Goodwin, 2010) and self-esteem (Paradise & Kernis, 2002) also positively predict sense of purpose in life.

### ***2.3.4. Self-Concordant Goals and Activities***

Self-concordant goals are those that are aligned with one's interests, values, and skills (Sheldon & Elliot, 1999). There is a wealth of research showing that people find self-concordant goals meaningful, they are more likely to successfully pursue them and reap well-being benefits from their achievement (Sheldon, 2014). In one study, researchers directly measured the impact of self-concordant activities on sense of purpose in life. Young adults were instructed to engage in exercises to discover their personal character strengths (e.g., humour, courage) and to use their strengths at work activities. Compared to a control group that did not receive any treatment, those who used their strengths at work experienced higher sense of purpose in life at a two-month follow-up (Forest et al., 2012). This finding supports the idea that acting in alignment with one's dispositions would lead to a greater sense of purpose.

Studies also suggest that reflecting directly on one's goals and trying to identify personally meaningful goals may also be an effective means of enhancing sense of purpose in life. In one study with 102 American college students, participants were randomly assigned to a group that was interviewed for 45 minutes about their goals in life, or a control group that was not interviewed (Bundick, 2011). The authors showed that nine months after, those who reflected on their goals reported a higher sense of purpose in life.

### ***2.3.5. Self-Concept Clarity***

Identifying what goals and activities are meaningful for the self would require a clear understanding of one's skills, interests, values, and motivations. Indeed, research in a college sample has shown that self-concept clarity, which indicates the extent to which beliefs about the self are clearly and confidently defined, internally consistent, and stable over time (Campbell et al., 1996) is positively related to longitudinal changes in meaning in life, as it is measured with a scale that comprises of questions about having a clear sense of purpose (Shin et al., 2016). Recent research has provided convincing evidence that self-concept clarity is much more malleable than initially thought. Researchers have shown that self-concept clarity increased as a result of experiences that triggered self-reflections about who people are (e.g., living abroad) (Adam et al., 2018). There is also some evidence that reflecting on the self (e.g., self-descriptive traits) increases self-concept clarity, although this effect held only for women who had low clarity to begin with, while self-reflection decreased clarity among those with high initial levels of clarity (Csank & Conway, 2004). Hence, activities that are aimed at increasing self-concept clarity may lead to positive changes in sense of purpose, although there is no definitive causal evidence on this link.

### ***2.3.6. Prosocial Goals and Activities***

An alternative pathway to increasing sense of purpose would be to shift one's attention and resources (time and money) to the pursuit of activities that aims to help others and improve the world in some way. Causal evidence on the impact of prosocial activities on sense of purpose in life is lacking. However, a longitudinal analysis has shown that sense of purpose in life is positively associated with whether or not an individual is volunteering, although there is no relationship between hours of volunteering (Son & Wilson, 2012). What is more, an experimental study has shown that when individuals were instructed to spend money on others vs self, they reported higher levels of purpose in life the next day, although sense of purpose in life was assessed by a scale that also assesses meaning (Klein, 2017). As mentioned above, as part of the work-related determinants of sense of purpose, working in jobs that has a social purpose has also been linked to greater sense of purpose in life (Srimathi & Kiran Kumar, 2010, Steger et al. 2012).

### **2.3.7. Social-Relational Factors**

The extent to which people can find and commit to meaningful goals and activities can also be impacted by the social context, especially in terms of how supportive one's environment is for the pursuit of personally meaningful life goals (Bronk, 2012). Studies have shown that parents play a significant role in youth purpose, since adolescents with healthier parental relationships, in terms of attachment, individuation and conflict, experience a higher sense of purpose concurrently (Hill, Burrow, et al., 2016) and longitudinally (Hill et al., 2019). The former study (Hill, Burrow, et al., 2016) has measured sense of purpose in life using the Life Engagement Test (Scheier et al., 2006). The latter study (Hill et al., 2019) used another measure whose content overlaps significantly with the Ryff measure: 'There is a direction in my life', 'My plans for the future match with my true interests and values', 'I know which direction I am going to follow in my life', and 'My life is guided by a set of clear commitments.'

### **2.4. Conclusion**

The current chapter overviewed existing evidence on the determinants and consequences of having a sense of purpose in life. A review of the literature has demonstrated that a great deal of research has uncovered the predictions of sense of purpose in terms of health outcomes and longevity. Although most of this research remains longitudinal and causal evidence is lacking, this growing evidence highlights the possibility that sense of purpose in life may be an important psychological resource to maintain and promote health. In addition, there is emerging evidence that sense of purpose may also be linked to beneficial outcomes in other domains (e.g., financial status, career choices), although more research is needed to test to what extent these associations would generalise to other outcomes in these domains and whether these relationships are causal.

Overall, despite their methodological limitations, studies have so far documented positive associations between sense of purpose and beneficial life outcomes. An important next step in this literature is to understand the mechanisms that drive these associations. Why would having a sense of purpose lead to desired outcomes? An important candidate that can explain these associations is behaviours. In other words, individuals with a greater sense of purpose in life may be more

likely to engage in behaviours that lead to desirable life outcomes like better physical and mental health and financial well-being. It is, in fact, highly likely that sense of purpose would drive positive behaviours given that it has motivational implications as a construct. As described in Chapter 1, sense of purpose in life indicates having a motivation for living, and being driven by meaningful, enduring goals in life. Thus, it can have a positive influence on people's ability to adopt and persist in behaviours that lead to greater health and well-being. However, research that examines the relationship between sense of purpose and behaviours is scarce. In Chapter 3, I will present empirical analyses that address this gap in the literature by focusing on the links between sense of purpose and physical activity behaviours.

In addition, only a few studies have examined the determinants of having a sense of purpose in life. This is an important limitation because to the extent that sense of purpose is a driver of positive life outcomes, understanding the determinants of sense of purpose can prove valuable for improving people's lives. Some of this can be achieved by deepening our understanding of the psychological processes that lead to an increase in sense of purpose (e.g., self-concordant or prosocial goals, greater self-understanding). In parallel, it is also crucial to understand the life events and contexts that may enhance or undermine people's experiences of sense of purpose at the population level to inform and improve policies and practices that can impact public health and well-being. In Chapter 4, I will study the effects of retirement on sense of purpose in life at the population level to address this gap in the literature.

In studying the determinants of sense of purpose in life, research needs to provide more attention to 'work' as a context. There is a widely held view that work is a source of sense of purpose in life since work gives structure to daily life, provides long-term goals and aspirations and ties people to the larger society (Morse & Weiss, 1955; Ward & King, 2017). Yet, studies have rarely empirically tested this idea and explored under what conditions the positive relationship between work and sense of purpose may hold. The empirical work presented in Chapter 4 addresses this gap in the literature by studying the causal effects of retirement on sense of purpose in life among older adults and exploring the population characteristics that drive the effects of retirement on sense of purpose. Although prior studies have found negative associations between retirement and sense of purpose (Hill &

Weston, 2017; Pinquart, 2002), there is a need to provide causal evidence on this topic.

Furthermore, existing findings on the determinants of sense of purpose show strong trajectories of decline in sense of purpose in life at older ages. Given the prevalence of demographic ageing in contemporary societies, it is important to understand factors that could affect changes in sense of purpose over time in older population groups. The study on retirement and sense of purpose in life that is presented in Chapter 4 will also address this need and help us understand the contextual drivers of long-term changes in sense of purpose in older ages.

## **CHAPTER 3: Longitudinal Associations Between Sense of Purpose in Life and Physical Activity**

### **3.1. Introduction**

Sense of purpose in life arises from having goals and aims that give life direction and meaning, and is considered a component of psychological well-being (Ryff, 1989b). As described in Chapter 2, health-related predictions of sense of purpose have received significant attention in the last years and sense of purpose has been linked with numerous health outcomes and longevity. This motivated me to focus on health-related associations of sense of purpose in this chapter. Longitudinal studies have shown that purpose in life is associated with a reduced risk of Alzheimer's disease (Boyle et al., 2010), heart disease (Kim et al., 2013), depression (Windsor et al., 2015), stress (Zilioli et al., 2015) and mortality (Cohen et al., 2016; Hill & Turiano, 2014). In explaining these associations, researchers often point to health behaviours as pathways, although empirical work on the behavioural predictions of purpose is limited (Kim et al., 2014). In this chapter, my objective is to advance this literature on the behavioural predictions of sense of purpose in life and investigate the longitudinal associations between sense of purpose in life and physical activity.

There are several reasons why physical activity was chosen as an outcome of interest in this chapter. First, physical activity is associated with many outcomes that sense of purpose predicts such as improved mental health (Penedo & Dahn, 2005), decreased risk of major chronic diseases and increased life expectancy (Lee et al., 2012). Further, global statistics suggest that most people do not engage in activity at sufficient levels. At least a third of adults across the world fail to meet the minimum level of activity recommended by the World Health Organization (Sallis et al., 2016). Engagement in activity tends to decrease as people get older, although older adults could benefit significantly from being active (DiPietro, 2001). It is, therefore, relevant and important to study determinants of physical activity and identify the psychological factors that may affect activity behaviours in the long run.

In studying the determinants of health behaviours and outcomes, researchers have mostly focused on risk factors that may hinder engagement in healthy behaviours (Azevedo Da Silva et al., 2012). Yet, recently, researchers have shifted

their focus on health assets, namely, the resources that enable people to adopt and maintain healthy behaviours and positive health outcomes (Boat, 2015; Kubzansky et al., 2018; Seligman, 2008). Evidence suggests that an important psychosocial resource to enhance health behaviours could be psychological well-being (Boehm et al., 2018). Motivated by this line of work, the current study investigates a specific component of psychological wellbeing, sense of purpose in life, as a potential psychosocial resource that could help people adopt and maintain physical activity.

Second, as described in Chapter 1, sense of purpose in life has significant motivational implications that make it a critical construct to explain and predict health behaviours, including physical activity. Psychologists have long argued that having a sense of purpose manifests a willingness to live and to overcome challenges in life (Frankl, 1984). When people maintain a strong motivation for living, they also have a higher propensity to engage in behaviours that prolong life and improve the quality of living. As Ryff and Singer state, ‘taking good care of oneself in terms of daily health practices presupposes a life that is worth taking care of’ (1998, p. 22). Hence, we would expect individuals with a greater sense of purpose to be more likely to set goals for being vital and healthy, including goals to participate in physical activity. Since sense of purpose represents an enduring outlook on life, it could provide a willingness to remain active over many years, as people age.

Sense of purpose may also influence physical activity behaviours by increasing people’s efficiency and success in goal pursuit. According to behavioural self-regulation theories, goals are organised hierarchically and at the top of this hierarchy are high-order, long-term goals that are personally meaningful (Carver & Scheier, 2000). Such high-order goals make it easier to choose between and execute lower-order, shorter-term goals (McKnight & Kashdan, 2009). Thus, being directed by meaningful life goals and experiencing a sense of purpose may also induce physical activity by fostering an ability to develop strategies for successful goal pursuit (Amireault et al., 2013; Nigg et al., 2008). Purposeful people may be more likely to plan where and how to exercise in the future and make long-term commitments to be active (e.g., sign up for a gym). They may also be better prepared to tackle long-term barriers to activity goals such as the age-related progression of physical disabilities or reduced proximity to recreational facilities (Amireault et al., 2013; Bauman et al., 2012).

Motivated by this theoretical framework, below, I review the literature on the relationship between sense of purpose in life and physical activity to identify the gaps in this literature and motivate the current study.

### ***3.1.1. Literature Review***

Investigating how sense of purpose in life as a resource may have a relationship with physical activity behaviours in the long-run requires researchers to use longitudinal data. However, despite the close theoretical links between sense of purpose and long-term participation in physical activity, there exists, to my knowledge, no longitudinal research on this topic. One longitudinal study has found a positive association between a composite index psychological well-being (control, autonomy, self-realization, and pleasure) and physical activity for over 11 years (Kim et al., 2017). However, sense of purpose is a conceptually distinct measure of psychological well-being that can have a unique prospective relationship with physical activity.

On the other hand, a large number of cross-sectional studies have shown a positive association between sense of purpose and activity among gifted individuals ( $N = 162$ ) (Holahan & Suzuki, 2006), women ( $N = 21$ ) (Holahan et al., 2011) and Hawaiians ( $N = 749$ ) (Hill et al., 2017). Researchers also found such positive correlations with sense of purpose when activity is measured with accelerometers ( $N = 104$ ) (Hooker & Masters, 2016). These studies, however, are conducted in selective samples and use a limited set of covariates. These correlational findings can also be biased due to unmeasured and unobserved factors that affect physical activity and sense of purpose simultaneously. Importantly, findings from these cross-sectional studies may be biased due to reverse causality – for example, if higher activity levels increased sense of purpose. Since sense of purpose arises from having meaningful long-term goals and activities, it is possible that, at least for some individuals, being committed to long-term activity goals increases sense of purpose.

In a longitudinal design, it is possible to tackle some of these sources of bias (VanderWeele et al., 2016) and provide more accurate estimates of the relationship between sense of purpose and physical activity. Importantly, a longitudinal design where more than two waves of data exist allows researchers to apply techniques that address reverse causality. Recent methodological approaches suggest that controlling for prior values of the outcome variable, especially two-period lagged

values of the outcome and the independent variable, in regression analysis tackles concerns about reverse causality (VanderWeele et al., 2016). Controlling for prior values also removes potential confounding influences from unobserved historical factors (Wooldridge, 2012). For example, influences of early childhood experiences, stable aspects of personality and genetics (Bauman et al., 2012), or physical and social environments (Sallis et al., 2016) on stable components of activity and sense of purpose can be accounted for.

### **3.1.2. Current Study**

Given the implications of sense of purpose for long-term motivation, in the current study, I hypothesised that individuals with greater levels of sense of purpose in life would experience more positive changes in activity levels over time. To test this hypothesis, I used a longitudinal panel of older adults ( $M_{\text{age}} = 66$ ) surveyed every four years at three time points as part of the Health and Retirement Study (HRS). At each wave, individuals reported their sense of purpose in life and frequency of engagement in moderate and vigorous physical activity along with a host of important health and psycho-social outcomes. Using these measures, the analyses employed a residualised change model where activity was regressed on one-period lagged values of sense of purpose while controlling for one-period lagged values of activity. I additionally controlled for two-period lagged values of sense of purpose and activity to improve the estimates by tackling potential sources of bias due to reverse causality (VanderWeele et al., 2016) and unobserved confounding factors (Wooldridge, 2010). By using longitudinal multi-wave data and these regression-based techniques, the current study improved upon existing correlational evidence to provide more valid estimates of the relationship between sense of purpose and physical activity.

The results were replicated in the Midlife in the US (MIDUS) panel ( $M_{\text{age}} = 56$ ) with a nine-year follow-up. HRS and MIDUS captured different baseline age profiles and follow-up periods, so they allowed me to examine the relationship between sense of purpose and activity during different stages of life. The datasets also employed different measures of activity: leisure time activity in HRS, and a more comprehensive measurement concerning activity at work, home (e.g., chores) and leisure time in MIDUS. In MIDUS dataset, however, only two waves of data were available which prevented me from applying more advanced methodological

techniques that I could apply in the multi-wave data in HRS. For this reason, the results for MIDUS are presented as a secondary replication analysis.

HRS and MIDUS provide a rich set of psychosocial and health measures, so the current study could account for a large set of covariates in the analyses. In addition to consistent demographic and socioeconomic correlates of activity, which include age, gender, race/ethnicity, education, and income (Bauman et al., 2012), and marital and work status (Feng et al., 2016), I controlled for a range of health variables that have been previously linked to long-term activity (Amireault et al., 2013); perceived health, BMI and smoking status, and chronic diseases. The models also controlled for positive and negative affect, which contrast and complement sense of purpose as a well-being measure (National Research Council, 2013). In addition, by controlling for depression and anxiety, the analyses accounted for a confound that was shown to predict physical activity over eight years (Azevedo Da Silva et al., 2012). Adjusting the models for these psychosocial measures aimed to test whether sense of purpose has unique predictive power, above and beyond other traditional measures of psychological well-being and mental health states.

## **3.2. Methods**

### ***3.2.1. Sample***

*Health and Retirement Study.* The main analyses used data from the Health and Retirement Study (HRS), a panel study that investigates the physical and economic well-being of older American adults (Health and Retirement Study, 2006-2016). HRS has first been fielded in 1992 and every two years since then. The initial sample consisted of people between ages 51 and 61, and their spouses. Over time, new cohorts were added to the study in order to make the sample more representative of the US population (Sonnegga et al., 2014). Every six years, new cohorts were added to the sample to represent younger cohorts. Further information about HRS can be found at <http://hrsonline.isr.umich.edu>.

In 2006, 50% of the HRS panel were randomly chosen for an interview and responded to a lifestyle questionnaire at the end of the interview. This module included questions on sense of purpose and had a longitudinal follow-up in 2010 and 2014. The remaining 50% of the sample participated in the questionnaire in 2008, with follow-ups in 2012 and 2016 (Sonnegga et al., 2014). 14,159 individuals had

completed and returned the lifestyle questionnaire at the initial waves. The analytic sample consisted of 7,968 individuals who participated in all three waves throughout the eight years of the study. Table 1 summarizes the characteristics of the analytic sample at the baseline. Table A1 provides a summary of the sample that were lost to follow-up. For sensitivity analysis, I also used only the first two waves of the current HRS data since attrition was lower at the first follow-up (22%). The results are presented in the Appendix (Table A3).

20% of the analytic sample had missing data on at least one of the variables of interest. Hence, complete case analysis would have resulted in a significant loss of the sample. To retain individuals with missing data, a multivariate normal multiple imputation technique was used to impute missing data on all variables. Compared to other methods of handling missing data, the multiple imputation has been shown to provide more accurate estimates (Sterne et al., 2009). Therefore, imputed data were used in the main analysis. The complete case method was applied for sensitivity analysis (Table A3).

MIDUS. For replication analysis, I used data from the National Survey of Midlife Development in the US (MIDUS), a panel study that investigates physical and psychological functioning in the US (Radler, 2014). The main sample were recruited via random digit dialling and expanded with the siblings of the main sample, a national sample of twins, and oversamples from metropolitan areas in the US to increase representation. A follow-up was completed in 2004 (MIDUS II – 75% retention) and a second follow-up was completed in 2013 (MIDUS III – 83% retention (Radler & Ryff, 2010). Further details of the MIDUS study are available at <http://www.icpsr.umich.edu/icpsrweb/NACDA/>.

Participants of MIDUS II and III were used for the current study as these included a psychometrically sound measure of sense of purpose in life. The analytic sample included people who completed the self-administered mail questionnaire where questions about sense of purpose existed (81% of the sample in MIDUS II and 83% in MIDUS III) ( $N = 2,552$ ). 11% of the sample had missing data on at least one variable of interest. Multiple imputation was applied to impute all missing variables. Detailed summary statistics for this sample are provided in Table 2.

### 3.2.2. Measures

*Purpose in Life.* Purpose in life was assessed with a widely used, seven-item scale (Ryff and Keyes, 1995) in both HRS and MIDUS. Respondents were asked to rate their agreement with following statements: i) ‘I enjoy making plans for the future and working to make them a reality’, ii) ‘My daily activities often seem trivial and unimportant to me’, iii) ‘I am an active person in carrying out the plans I set for myself’, iv) ‘I don't have a good sense of what it is I'm trying to accomplish in life’, v) ‘I sometimes feel as if I've done all there is to do in life’, vi) ‘I live life one day at a time and don't really think about the future’, and vii) ‘I have a sense of direction and purpose in life.’ Consistent with the original scale (Ryff and Keyes, 1995), respondents used a response scale of 1 (*strongly disagree*) to 6 (*strongly agree*) in HRS but the scale ranged from 1 (*strongly disagree*) to 7 (*strongly agree*) in MIDUS. The reasons for this change of the response scale are unclear and have not been described in reports of MIDUS (Radler, 2014) but it is likely driven by issues related to the administration of the survey. Following the guidelines (Smith et al., 2013), a single index of sense of purpose in life was created by averaging the scores across items. The variable was set to missing if more than three items were missing. The Cronbach's alpha ( $\alpha$ ), which measures how closely related the scale items are and hence, the reliability of the scale, was high in both datasets and equalled .73 in HRS and .70 in MIDUS.

*Physical Activity.* Physical activity was assessed with a continuous measure constructed from questions on moderate and vigorous activity (MVPA) in both datasets. In HRS, moderate activity was assessed by the frequency with which people took part in sports and activities that are moderately energetic, such as gardening, walking at a moderate pace or stretching exercise. Vigorous activity was assessed by engagement in sports and activities that are vigorous, such as running or jogging, swimming, or gym workout. Responses were coded as 1 (*hardly ever or never*), 2 (*one to three times a month*), 3 (*once a week*), 4 (*more than once a week*) and 5 (*every day*). Moderate and vigorous activity measures were moderately correlated at the baseline wave ( $r = .40$ , 95% CI = [0.389, 0.410],  $\alpha = .57$ ). Since there were no formal guidelines to construct a single score from these two items, the main outcome measure was calculated by an average of the scores for moderate and vigorous physical activity ( $M = 2.74$ ,  $SD = 1.06$ ). I additionally used the maximum

value of moderate or vigorous activity scores as an outcome, which was strongly correlated with the average scores at the baseline wave ( $r = .87$ , 95% CI = [0.864, 0.870]).

In MIDUS, 12 questions asked about the frequency of engaging in moderate and vigorous physical activity in summer and winter, at home, at work, and during one's leisure time. Moderate activity was described as 'Physical activity, that is not physically exhausting, but it causes your heart rate to increase slightly and you typically work up a sweat (e.g., leisurely sports like light tennis, slow or light swimming, etc.).' Vigorous activity was described as 'Activity that causes your heart to beat so rapidly that you can feel it in your chest and you perform the activity long enough to work up a good sweat and are breathing heavily (e.g., competitive sports like running, vigorous swimming, etc.).' Responses were coded as 1 (*never*), 2 (*less than once a month*), 3 (*once a month*), 4 (*several times a month*), 5 (*once a week*) and 6 (*several times a week or more*).

Like HRS, there were no formal guidelines to construct a single score from the MIDUS activity measures. Therefore, the main outcome measure was created following the steps outlined in an earlier study (Cotter & Lachman, 2010). For moderate activity, I first took the maximum of activity scores at work, home or leisure during summer, and repeated this step for winter. This way, I could account for the possibility that the primary domain of activity may be different across people. The summer and winter scores were then averaged. The steps were repeated for vigorous activity and the average of moderate or vigorous activity was taken as the final measure. Moderate and vigorous activity measures were moderately correlated at the baseline ( $r = .59$ , 95% CI = [0.560, 0.614],  $\alpha = .74$ ).

*Sociodemographic Factors.* In HRS, education was measured by years of education and ranged from 0 to 17. Household income equalled the sum of the earnings of the respondent and spouse from the last calendar year and included pensions and annuities, social security disability and retirement, unemployment and workers' compensation, other government transfers and household capital income. Income was logarithmically transformed in the analysis. Being married was coded as a binary variable that equalled one if the respondent reported being married or partnered and zero otherwise. Work status was a categorical variable that indicated being out of labour force, working or retired in both datasets. In MIDUS, education was coded as the highest degree obtained and ranged from 1 (*no school or some*

grade school) to 12 (*JD, or another professional degree*). Total household income was the sum of personal wages, pension and social security income that is received by the respondent, spouse or any other household member.

*Health Factors.* In both MIDUS and HRS, perceived health was assessed by a single question that asked people to rate their health on a scale of 1 (*poor*) to 5 (*excellent*). Single item measures of health are related to objective physical health conditions (Pinquart, 2001), and the multi-item measurement of physical functioning (Mavaddat et al., 2011). The measure of BMI was constructed using self-reported height and weight in both datasets. Following prior research (Kim et al., 2017), chronic disease was measured with a dummy variable that equalled one if people reported having at least one of the chronic conditions (i.e., diabetes, cancer, heart disease) in both datasets. Smoking was coded as a binary variable that equalled one if the respondent was currently smoking and zero otherwise.

*Psychosocial Factors.* In HRS, positive affect was assessed by seven items ( $\alpha = .91$ ) where respondents rated how much of the time, during the past 30 days, they felt cheerful, in good spirits, extremely happy and so on, on a scale of 1 (*none of the time*) to 5 (*all the time*). For negative affect, questions refer to seven negative feelings such as worthlessness or nervousness ( $\alpha = .86$ ). In MIDUS, there were four additional questions for both positive ( $\alpha = .80$ ) and negative affect ( $\alpha = .86$ ) (Watson et al., 1988). The depression scale in HRS comprised mostly of the items from the negative affect scale. Thus, these two variables correlated strongly ( $r = .85$ , 95% CI = [0.847, 0.863]) and only negative affect was included in the models. In HRS, anxiety was assessed by an average score of the five items ( $\alpha = .80$ ) from the Beck Anxiety Inventory which distinguish anxiety from depression (Beck et al., 1988). Responses ranged from 1 (*none of the time*) to 4 (*all the time*). Anxiety questions were not included in the third wave; therefore, anxiety was used as a control variable as part of the robustness analyses only. The correlation between anxiety and negative affect was also high ( $r = .55$ , 95% CI = [0.539, 0.562]).

In MIDUS, generalised anxiety disorder was assessed by ten questions that ask about how often people experience feelings of being restless, keyed up, or irritable because of worry during the last 12 months. The final score was the total number of 'Most days' responses. The correlation between negative affect and anxiety was .34 (95% CI = [0.305, 0.378]). In addition, a continuous measure of depression was constructed by summing affirmative responses to seven questions

that ask about depressive experiences such as loss of interest in most things and feeling more tired than usual for two weeks during the past 12 months. The correlation between negative affect and depression was .37 (95% CI = [0.336, 0.406]). Both anxiety and depression measures were based on the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders and have good psychometric properties (Wang et al., 2000).

**Table 1.** Summary Statistics for the Analysis of Sense of Purpose in Life and Physical Activity (Data: Health and Retirement Study 2006-2016)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
Purpose in Life	4.71	0.90	1	6	7,846
MVPA	2.74	1.06	1	5	7,968
Age	65.71	9.08	28	95	7,968
Gender	0.62	0.49	0	1	7,968
White	0.85	0.36	0	1	7,968
Black/African American	0.11	0.31	0	1	7,968
Other Race	0.04	0.20	0	1	7,968
Married	0.72	0.45	0	1	7,967
Education	12.99	2.90	0	17	7,955
Household Income <sup>a</sup>	\$46,854	\$256,893	0	> 1 Million \$	7,968
Out of Labour	0.10	0.30	0	1	7,968
Working	0.33	0.47	0	1	7,968
Retired	0.57	0.49	0	1	7,968
Perceived Health	3.39	1.03	1	5	7,963
BMI	33.78	7.59	13	82	7,851
Smoker	0.12	0.32	0	1	7,887
Chronic Disease	0.84	0.37	0	1	7,968
Positive Affect	3.64	0.72	1	5	7,908
Negative Affect	1.63	0.60	1	5	7,909
Anxiety	1.52	0.55	1	4	7,875

*Note:* All variables were measured in the baseline wave. Three waves of data were drawn from two cohorts in Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016) <sup>a</sup> Median score is reported for the income instead of the mean. MVPA measures average scores for moderate and vigorous physical activity.

### 3.2.3. Statistical Analysis

*HRS Analysis.* Since the main hypothesis was about sense of purpose predicting more positive changes in MVPA over time, the analyses aimed to assess the associations between one-period lagged values of sense of purpose and subsequent MVPA in a regression model. Note that in HRS, three waves of data were available which provided an opportunity to apply more advanced methods than what is possible with the two-wave data in MIDUS. After regressing one-period lagged values of sense of purpose on MVPA in the first model, I gradually adjusted

the model for one-period lagged values of MVPA and one-period lagged values of covariates (sociodemographic, health-related, and psychosocial). In the final model, I included, in addition to one period lagged values of MVPA, two-period lagged values of MVPA and sense of purpose. This model also used two-period lagged values of the covariates. The final step was aimed to tackle potential biases in these estimates due to reverse causality (VanderWeele et al., 2016). This stepwise regression was used to demonstrate how the coefficients and the explanatory power of the model, measured by the  $R^2$ , changed as new covariates were included.

*HRS Models.* To examine the prospective associations between sense of purpose and subsequent MVPA in HRS data, I estimated the following equation:

$$MVPA_{it} = \beta_0 + \beta_1 P_{i(t-1)} + \beta_2 MVPA_{i(t-1)} + \beta_3 P_{i(t-2)} + \beta_4 MVPA_{i(t-2)} + \delta_1 X_{i(t-2)} + \varepsilon_{it}$$

where  $MVPA_{i(t-1)}$  measures the average of self-reported levels of moderate and vigorous physical activity of person  $i$  at time  $t - 1$  (one-period lagged values) and  $P_{i(t-1)}$  denotes self-reported levels of sense of purpose in life for each individual  $i$  at time  $t - 1$  (one-period lagged values).  $MVPA_{i(t-2)}$  and  $P_{i(t-2)}$  measure physical activity and sense of purpose at their two-period lagged values for person  $i$ .  $X_{i(t-2)}$  is a vector for observed covariates (age, gender, race, marital status, education, income, labour status, health, BMI, smoking status, chronic disease, positive affect, negative affect) that include two-period lagged values of the variables. As described before, these covariates were chosen based on prior evidence that has linked them to physical activity and sense of purpose (Bauman et al., 2012; Feng et al., 2016; Amireault et al., 2013), which raised the possibility that they could confound the relationship of interest between sense of purpose and activity.  $\varepsilon_{it}$  is the error term which was clustered at the household level to account for potential correlation of the error term among the members of the same household. In this equation, the coefficient of interest is  $\beta_1$  which measures the prospective associations between sense of purpose and MVPA. The method was implemented in Stata software, version 15.1.

*MIDUS Analysis.* In MIDUS, two-period lagged values were not available because the dataset included only two waves. In the basic model, MVPA was

regressed on one-period lagged values of sense of purpose. Next, I gradually added i) one-period lagged values of MVPA, ii) sociodemographic, iii) health-related, and iv) psychosocial covariates. Adding the covariates in a stepwise fashion aimed to demonstrate how the coefficients and the explanatory power of the models changed as they were adjusted for new variables. In addition to the same set of covariates in HRS, the psychosocial covariates also included anxiety and depression.

**Table 2.** Summary Statistics for the Analysis of Sense of Purpose in Life and Physical Activity (Data: Midlife in the US 2004-2013)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
Purpose in Life	5.58	.96	1	7	2,546
MVPA	4.68	1.57	1	6	2,548
Age	55.53	11.21	30	84	2,552
Gender	0.56	0.50	0	1	2,552
White	0.93	0.26	0	1	2,544
Black/African American	0.03	0.18	0	1	2,544
Other Race	0.04	0.19	0	1	2,544
Married	0.72	0.45	0	1	2,552
Education	7.51	2.52	1	12	2,549
Household Income <sup>a</sup>	\$50,000	\$55,560	0	\$200,000	2,392
Out of Labour	0.73	0.44	0	1	2,552
Working	0.04	0.18	0	1	2,552
Retired	0.23	0.42	0	1	2,552
Perceived Health	3.70	0.94	1	5	2,551
BMI	27.79	5.71	16	82	2,453
Smoker	0.13	0.33	0	1	2,552
Chronic Disease	0.77	0.42	0	1	2,552
Positive Affect	3.62	0.74	1	5	2,547
Negative Affect	1.52	0.50	1	5	2,542
Anxiety	0.11	0.82	0	10	2,552
Depression	0.58	1.68	0	7	2,552

*Note:* All variables were measured in the baseline wave of MIDUS, which is 2004. <sup>a</sup>Median score is reported for the income instead of the mean. MVPA measures average scores for moderate and vigorous physical activity.

Please note that the current levels of sense of purpose were not included in the main analysis because previous studies have already shown contemporaneous associations between sense of purpose in life and activity (Holahan et al., 2011; Hooker & Masters, 2016) and the current study aimed to estimate longitudinal associations. The hypothesis in this study is about greater levels of baseline sense of purpose predicting changes in physical activity over time. In this hypothesis, baseline levels of sense of purpose are considered as a psychosocial resource upon which health behaviours like physical activity can build. Still, I provided estimates

for the coefficients in a model that includes current levels of sense of purpose as additional analysis and discuss the results for this specification.

All variables were measured in levels and continuous measures were standardised to have a mean of zero and a standard deviation of one. This was achieved by subtracting the mean of the variable from each score and then dividing it by the standard deviation. This way, the final observed values of the variable measure how many standard deviation units each value is above or below the mean. This standardisation is used to make measures with different response scales comparable. The coefficients of the association between two standardised variables provide an estimate of the number of standard deviation units of the outcome variable that is associated with one standard deviation increase or decrease in the independent variable. Similarly, when the predictor is a binary variable, the coefficient measures a standard deviation change in the outcome measure for a unit change in the independent variable. Hence, the coefficient estimates can be interpreted as standardised effect sizes.

Both datasets provided survey weights that can be used to improve the representativeness of the sample. Statistical evidence suggests that when survey weights are used in analyses for causal inference, they may lead to inefficient estimates (Solon et al., 2013). Given that the current methods also employ longitudinal data whereby i) variables within each model are measured at different waves for which there are distinct survey weights and ii) individuals were excluded from the analysis due to attrition, the application of survey weights could further complicate the inference in the current design. For these reasons, and in line with prior longitudinal studies in public health (Zwar et al., 2018), I included survey weights only in robustness analyses and discussed the differences in the estimates with or without the weights in the results section.

### **3.3. Results**

#### ***3.3.1. Descriptive Statistics in HRS***

62% of the participants were female, and 85% were White, 11% Black, and 4% Other Race. The average age was 66 [ $SD = 9$ ] at the initial wave. Scores for sense of purpose in wave 1 and wave 2 were strongly correlated ( $r = .61$ , 95% CI = [0.599, 0.627]). Scores for sense of purpose in wave 1 and wave 3 were moderately

correlated ( $r = .57$ , 95% CI = [0.555, 0.586]). However, there were also differences in sense of purpose across waves. An examination of raw data revealed that sense of purpose, on average, decreased during the four years from the baseline wave to the first follow-up ( $M_{\text{diff}} = -.04$ ,  $SD_{\text{diff}} = .01$ ,  $t(7,702) = -4.39$ ,  $p < .001$ ). During the second four years from the second to the third follow-up, average levels of sense of purpose continued to decline, but the size of the decline was of larger magnitude ( $M_{\text{diff}} = -.14$ ,  $SD_{\text{diff}} = .01$ ,  $t(6,991) = -14.64$ ,  $p < .001$ ). These decreases were aligned with previous findings that demonstrate a decreasing trajectory for sense of purpose in older ages (Springer et al., 2011).

Similarly, mean scores for MVPA were also moderately correlated across wave 1 and wave 2 ( $r = .54$ , 95% CI = [0.525, 0.556]) as well as wave 1 and wave 3 ( $r = .48$ , 95% CI = [0.458, 0.492]). An examination of raw data revealed that MVPA, on average, decreased during the four years from the baseline wave to the first follow-up ( $M_{\text{diff}} = -.14$ ,  $SD_{\text{diff}} = .01$ ,  $t(7,965) = -12.16$ ,  $p < .001$ ). During the second four years from the second to the third follow-up, average activity levels continued to decline ( $M_{\text{diff}} = -.16$ ,  $SD_{\text{diff}} = .01$ ,  $t(7,961) = -13.91$ ,  $p < .001$ ). These findings are also consistent with earlier studies where activity levels were shown to decline with age (DiPietro, 2001).

### **3.3.2. Sense of Purpose and Physical Activity in HRS**

To demonstrate how the associations between sense of purpose and MVPA changed across models, I introduced the covariates in a stepwise fashion. Column 1 in Table 3 shows the basic association between MVPA and one-period lagged levels of purpose ( $\beta = .22$ , 95% CI = [0.205, 0.242],  $p < .001$ ). The size of this association reduced significantly after controlling for lagged MVPA, as shown in Column 2 ( $\beta = .10$ , 95% CI = [0.083, 0.110],  $p < .001$ ). As indicated by the  $R^2$ , the explanatory power of the model increased substantially with the addition of lagged MVPA from .05 to .33. The inclusion of sociodemographic, health and psychosocial variables (Column 3) has decreased the size of the association between lagged levels of purpose and MVPA but the association was still positive and significant ( $\beta = .05$ , 95% CI = [0.030, 0.062],  $p < .001$ ). As a next step, the model was adjusted to two-period lagged values of purpose, activity, and covariates (Column 4, Table 3). The association between one-period lagged purpose and subsequent activity remained the same ( $\beta = .05$ , 95% CI = [0.023, 0.071],  $p < .001$ ).

As expected, one-period lagged MVPA had the largest magnitude of association with future MVPA ( $\beta = .42$ ). The coefficient for education was smaller than the coefficient of purpose in magnitude ( $\beta = .02$ ) and perceived health's coefficient was on par with sense of purpose ( $\beta = .07$ ). Being older, female, a smoker, and having higher BMI were all negatively associated with future MVPA. No significant associations were found between activity and two-period lagged values of positive or negative affect (Column 4). Though not reported in the tables, I also used one-period lagged values of affect measures with two-period lagged controls. Positive affect was still not a significant predictor ( $\beta = -.004$ , 95% CI = [-0.045, 0.035],  $p = .816$ ) but negative affect showed a significant association ( $\beta = -.053$ , 95% CI = [-0.089, 0.017],  $p = .004$ ).

As shown in the Appendix (Columns 1 and 2 in Table A2), the results continued to hold when I adjusted the model to anxiety (which had a large number of missing values) or to social support. Social support could affect both physical activity (Cotter & Lachman, 2010) and sense of purpose (Musich et al., 2018) and confound their relationship. Neither anxiety nor support predicted future MVPA significantly. Results were also maintained with survey weights that render the sample representative of the US population (Column 3, Table A2). Applying the complete case method instead of multiple imputation (Column 1, Table A3) and using the full sample from the first two waves of data which had lower levels of attrition (Column 2, Table A3) have not changed the results.

I conducted several analyses for robustness checks, the results of which are reported below but not in tables. The coefficient estimates for sense of purpose did not change in any meaningful way when I used maximum of the moderate or vigorous activity scores as an outcome ( $\beta = .06$ , 95% CI = [0.030, 0.085],  $p < .001$ ). To aid the interpretation of this association between sense of purpose and MVPA, I also coded activity engagement scores to represent '*days within a month*'. The response option of 'hardly ever or never' was coded as 0, '*one to three times a month*' as 2, '*once a week*' as 4, '*more than once a week*' as 10, and '*every day*' as 30. Based on this coding, the size of the association corresponded to 0.26 days in a month.

I also adjusted the model in Column 4 to a measure of sense of purpose that is assessed in the same period as the outcome variable. This contemporaneous measure of purpose was a significant predictor ( $\beta = .11$ , 95% CI = 0.087, 0.132],  $p <$

.001) while the one-period lagged measure for sense of purpose lost its practical and statistical significance ( $\beta = -.004$ , 95% CI = [-0.035, 0.027],  $p = .791$ ).

**Table 3.** Prospective Associations Between Sense of Purpose in Life and Moderate and Vigorous Physical Activity (MVPA) (Data: Health and Retirement Study 2006-2016)

	(1) MVPA	(2) MVPA	(3) MVPA	(4) MVPA
L1.Purpose in Life	0.22*** [0.205,0.242]	0.10*** [0.083,0.110]	0.05*** [0.030,0.062]	0.05*** [0.023,0.071]
L1.MVPA		0.56*** [0.544,0.573]	0.48*** [0.466,0.498]	0.42*** [0.395,0.442]
L2.Purpose in Life				0.01 [-0.016,0.034]
L2.MVPA				0.20*** [0.175,0.223]
L1.Age			-0.12*** [-0.138,-0.104]	-0.13*** [-0.156,-0.106]
Female (vs Male)			-0.15*** [-0.171,-0.119]	-0.10*** [-0.142,-0.068]
White (vs Black)			0.03 [-0.008,0.075]	0.02 [-0.034,0.082]
Other (vs Black)			0.08** [0.008,0.154]	0.06 [-0.046,0.163]
L1.Married			-0.01 [-0.042,0.019]	-0.02 [-0.063,0.022]
Education			0.04*** [0.026,0.054]	0.02* [-0.000,0.042]
L1.HH Income (log)			0.01 [-0.002,0.015]	-0.01 [-0.018,0.006]
L1.Not in Labour			-0.03 [-0.078,0.027]	-0.05 [-0.118,0.013]
L1.Retired			-0.00 [-0.036,0.034]	-0.04* [-0.090,0.002]
L1.Health			0.09*** [0.070,0.100]	0.07*** [0.045,0.088]
L1.BMI			-0.08*** [-0.092,-0.065]	-0.06*** [-0.078,-0.041]
L1.Smoker			-0.15*** [-0.192,-0.108]	-0.16*** [-0.217,-0.102]
L1.Chronic Disease			-0.04** [-0.083,-0.005]	-0.02 [-0.074,0.028]
L1.Positive Affect			0.03*** [0.017,0.050]	-0.00 [-0.026,0.023]
L1.Negative Affect			0.01 [-0.005,0.024]	0.01 [-0.013,0.031]
Constant	-0.08*** [-0.098,-0.057]	-0.11*** [-0.123,-0.097]	-0.08 [-0.188,0.021]	-0.08 [-0.182,0.028]
R-squared	0.05	0.33	0.36	0.41
Observations	15,936	15,936	15,936	7,968

*Note:* Three waves of data were drawn from two cohorts in the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). The prefix L1 indicates that the variable is assessed in the period preceding the outcome. L2 indicates two-period lags. In Model 4, all time-varying covariates were also lagged for two periods. The reference group for Not in Labour and Retired categories was Working. All continuous variables were standardised ( $M = 0$ ,  $SD = 1$ ) except for binary variables (gender, race, marital status, labour status, smoking status, and chronic disease). 95% confidence intervals were reported in parenthesis. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### 3.3.3. Descriptive Statistics in MIDUS

In MIDUS, 56% of the participants were female, and 93% were White, 3% Black, and 4% Other Race. The average age at the baseline was 56 ( $SD = 11$ ). Scores for sense of purpose were strongly correlated across waves ( $r = .64$ , 95% CI = [0.621, 0.667]). Sense of purpose showed a statistically significant decline ( $M_{diff} = -.13$ ,  $SD_{diff} = .02$ ,  $t(2,543) = -7.95$ ,  $p < .001$ ). Scores for MVPA were also correlated across waves although the magnitude of this correlation was lower than what was found in the HRS data ( $r = .36$ , 95% CI = [0.327, 0.399]). Average MVPA declined but the difference in activity scores was not statistically significantly different from zero ( $M_{diff} = -.04$ ,  $SD_{diff} = .04$ ,  $t(2,532) = -1.06$ ,  $p = .288$ ).

### 3.3.4. Sense of Purpose and Physical Activity in MIDUS

The results for the MIDUS data are demonstrated in Table 4. As shown in Column 1, the association between one-period lagged values of sense of purpose and subsequent MVPA was positive ( $\beta = .14$ , 95% CI = [0.102, 0.183],  $p < .001$ ). Adding the one-period lagged values of MVPA to this model in Column 2 reduced the magnitude of the association ( $\beta = .10$ , 95% CI = [0.059, 0.135],  $p < .001$ ). The size of the association continued to decline as I added controls for sociodemographic (Column 3), health (Column 4), and psychosocial factors (Column 5). The final model with all controls (Column 5) demonstrated a positive association between sense of purpose and subsequent MVPA, above and beyond baseline MVPA and covariates ( $\beta = .05$ , 95% CI = [0.007, 0.093],  $p = .024$ ).

Baseline MVPA had the largest magnitude of association with future MVPA ( $\beta = .27$ ) The association between baseline health and future MVPA ( $\beta = .06$ ) was similar in magnitude to the association with sense of purpose. Education was not a significant predictor of subsequent MVPA while baseline depression emerged as a significant predictor in MIDUS ( $\beta = -.05$ , 95% CI = [-0.088, -0.007],  $p = .022$ ). Being female, having high BMI, and smoking were all negatively related to MVPA. Neither positive affect nor negative affect had robust associations with MVPA. Though not reported in tables, adding the contemporary measures of sense of purpose to the model in Column 5 revealed this variable to be a significant predictor ( $\beta = .12$ , 95% CI = [0.030, 0.210],  $p = .009$ ) and made the lagged measures of purpose non-significant ( $\beta = .02$ , 95% CI = [-0.081, 0.110],  $p = .765$ ).

**Table 4.** Prospective Associations Between Sense of Purpose in Life and Moderate-Vigorous Physical Activity (MVPA) (Data: Midlife in the US 2004-2013)

	(1)	(2)	(3)	(4)	(5)
	MVPA	MVPA	MVPA	MVPA	MVPA
L.Purpose in Life	0.14*** [0.102,0.182]	0.10*** [0.059,0.135]	0.09*** [0.054,0.130]	0.07*** [0.031,0.107]	0.05** [0.007,0.093]
L.MVPA		0.35*** [0.308,0.390]	0.28*** [0.242,0.326]	0.27*** [0.226,0.311]	0.27*** [0.224,0.309]
Age			-0.18*** [-0.234,-0.135]	-0.19*** [-0.244,-0.145]	-0.20*** [-0.254, -0.154]
Female (vs Male)			-0.12*** [-0.191,-0.049]	-0.13*** [-0.205,-0.062]	-0.13*** [-0.198, -0.054]
White (vs Black)			0.17 [-0.070,0.406]	0.12 [-0.121,0.354]	0.14 [-0.098,0.381]
Other (vs Black)			0.18 [-0.139,0.505]	0.15 [-0.168,0.478]	0.16 [-0.160,0.489]
L.Married			0.03 [-0.065,0.119]	0.02 [-0.075,0.107]	0.01 [-0.079,0.102]
L.Education			0.04* [-0.005,0.078]	0.01 [-0.034,0.049]	0.01 [-0.029,0.055]
L.HH Income (log)			0.18 [-0.057,0.419]	0.13 [-0.097,0.365]	0.13 [-0.098,0.357]
L. Not in Labour			0.05 [-0.176,0.268]	0.04 [-0.177,0.263]	0.04 [-0.180,0.262]
L.Retired			-0.01 [-0.243,0.218]	-0.02 [-0.250,0.207]	-0.02 [-0.251,0.207]
L.Health				0.07*** [0.031,0.117]	0.06*** [0.019,0.107]
L.BMI				-0.08*** [-0.121,-0.034]	-0.07*** [-0.119, -0.031]
L.Smoker				-0.17*** [-0.287,-0.050]	-0.16*** [-0.276, -0.038]
L.Chronic Disease				-0.02 [-0.101,0.062]	-0.01 [-0.093,0.072]
L.Pos. Affect					0.04* [-0.000,0.090]
L.Neg. Affect					0.02 [-0.024,0.060]
L.Anxiety					0.01 [-0.021,0.050]
L.Depression					-0.05** [-0.088, -0.007]
Constant	-0.00 [-0.041,0.039]	-0.00 [-0.038,0.036]	-2.35 [-5.185,0.490]	-1.67 [-4.435,1.095]	-1.65 [-4.374,1.065]
R-squared	0.02	0.14	0.20	0.22	0.22
Observations	2,552	2,552	2,552	2,552	2,552

*Note:* The outcome MVPA (moderate and vigorous activity) was assessed in 2013. The prefix L indicates one-period lagged assessment, in 2004. The reference group for Not in Labour and Retired categories was Working. Errors were clustered at the household level. All continuous variables were standardised ( $M = 0$ ,  $SD = 1$ ) so the coefficients reflect standardised effect sizes. Categorical variables, gender, race, marital status, labour status, smoking status and chronic disease were not standardised. 95% confidence intervals were reported in parenthesis. \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

### 3.4. Discussion

As hypothesised, sense of purpose in life predicted a greater frequency of engagement in moderate and vigorous physical activity over time. Holding constant how active individuals were to begin with, those with a greater sense of purpose reported more frequent engagement in activity four years later. The size of the association was small (.05 standard deviations) but remained consistent across a large number of specifications and in two independent national datasets with different age profiles ( $M_{age} = 66$  and  $56$ ). These datasets also employed different measures of activity – leisure time activity, and a more comprehensive measurement concerning activity at work, home (i.e., chores) and leisure time. Furthermore, the size of the association between sense of purpose and activity was similar to the size of the associations between activity and perceived health, BMI or education.

Physical activity is a difficult behaviour to adopt and maintain, especially in older ages, when average activity levels tend to decline (DiPietro, 2001). The findings suggest that sense of purpose may be a unique protective factor against age-related declines in physical activity participation among older adults, helping highly active individuals maintain their engagement while others decrease. It is also possible that having a sense of purpose helps some people not only maintain but even increase their activity engagement. Future studies can demonstrate the role for sense of purpose in encouraging these specific behavioural patterns in detail.

Sense of purpose in life is considered an aspect of psychological well-being (Ryff, 1989b). Therefore, it is important to note that sense of purpose was uniquely associated with physical activity while controlling for positive and negative affect, which are widely accepted measures of well-being (Kahneman et al., 1999). In addition, sense of purpose predicted activity above and beyond anxiety and depression, suggesting that psychological well-being was distinct from ill-being, at least in predicting physical activity behaviours. The variables that measure well-being (positive affect) or mental health (anxiety) did not show consistent long-term associations with subsequent physical activity across models. Given the growing scholarly and policy interest in monitoring and promoting psychological well-being across the population (National Research Council, 2013), these findings highlight the importance of sense of purpose as a valuable, distinct aspect of psychological well-being.

Note that depression predicted physical activity in the MIDUS sample over the nine-year follow-up. Negative affect also showed some associations over the four-year follow-up in HRS in the model with two-period lagged controls (not reported in the tables). Future research should more directly examine the role of negative affect and depression for physical activity to understand the conditions under which these measures could be important for activity behaviours.

Past research has linked sense of purpose to health outcomes and longevity (Cohen et al., 2016; Kim et al., 2013), emphasizing the possibility of a behavioural mechanism to explain these relations. There is, however, limited longitudinal research on how sense of purpose may be related to long-term health behaviours (Kim et al., 2014). By showing robust associations between purpose and long-term physical activity, the current study points to sustained activity as a potential mechanism to explain why sense of purpose may be linked with long-term health and longevity. I acknowledge that other health behaviours like sleep (Hill et al., 2017) and biological pathways (Friedman & Ryff, 2012) may also be at play in driving these outcomes. Future studies can test the viability of these mechanisms.

As described in Chapter 2, several studies have found sense of purpose in life to be a modifiable factor. Researchers have shown significant improvements in self-reported sense of purpose in life over several months when young people were encouraged to reflect on and clarify their life goals (Bundick, 2011); or when they were prompted to use their personal skills and strengths in their work goals (Forest et al., 2012). Although research has yet to discover the means of achieving sustained and large-scale improvements in sense of purpose among older adults, the present results raise the possibility that such interventions may have modest impacts on activity engagement.

#### ***3.4.1. Limitations and Future Directions***

Due to the observational nature of the data, my ability to provide conclusive causal evidence was limited in this study. However, researchers have noted that significant improvements can be made in making causal inferences from observational data when multiples waves of longitudinal data are present (VanderWeele et al., 2016). The present research employed some of the most valid approaches to regression-based analysis in longitudinal data to achieve this aim. First, longitudinal data enabled me to include a temporally preceding measure of

sense of purpose, thereby alleviating some concerns about reverse causality. Importantly, I controlled for prior values of the outcome (activity) and exposure (sense of purpose), thereby, more strongly addressing the possibility of reverse causality driving the results (VanderWeele et al., 2016). Controlling for prior values also removed potential confounding influences from unobserved historical factors (Wooldridge, 2010). However, it is still possible that other unobserved factors simultaneously determine changes in physical activity and baseline sense of purpose and confound the results. Therefore, the current findings should be taken with caution in terms of their ability to enabling causal inference.

The current study found the associations between one-period lagged values of sense of purpose and subsequent physical activity to lose their practical and statistical significance when controlling for measures of sense of purpose that are assessed in the same period as activity. This concurrently assessed measure of sense of purpose remained significant. This finding suggests that the long-term associations between sense of purpose and activity could be explained by more proximal measures of sense of purpose. In other words, lagged values of sense of purpose could determine how purposeful people are in the future and through this channel, affect future activity participation. However, note that the coefficient estimates for subsequent levels of purpose may be biased because of the possibility of reverse causality – the potential effects on sense of purpose from the concurrently assessed physical activity measure.

Future studies may also investigate the psychological mechanisms through which sense of purpose may be linked to behavioural outcomes. Given the motivational underpinnings of sense of purpose (Frankl, 1984; McKnight & Kashdan, 2009), its relation to physical activity may be driven by an increased likelihood to endorse long-term activity and health goals and/or an ability to pursue those goals successfully. There were no measures to investigate these mechanisms in the current dataset. Future research may test the viability of these channels by incorporating measures for these proximal mechanisms in their design.

Another limitation of the current study is the self-report measurement of physical activity. Studies show that physical activity is generally over-estimated in self-reported data (Troiano et al., 2008). Yet, if the extent of over-reporting is stable across people, the estimates from the residualised change models would remain unbiased, and the measurement error in the dependent variable would only decrease

the precision of the current estimates. In addition, if misreporting is person-specific but stable over time, the inclusion of baseline physical activity should help to eliminate potential bias due to misreporting. Nonetheless, there remains the possibility that conditional on baseline physical activity, misreporting of future physical activity is correlated with baseline purpose. One possibility is that individuals with lower current levels of purpose are more likely to over-report future activity. If so, the results would underestimate the true magnitude of the association between purpose and future activity. Earlier work on the associations between sense of purpose and activity found very similar results in samples using either objective measures of activity with accelerometers or self-reports (Hooker & Masters, 2016). These lessen some of the concerns that the associations found in this study is driven by misreporting of activity.

### **3.5. Conclusion**

Physical activity is an important determinant of health and longevity, and widespread inactivity presents substantial risks to public health and economies (Ding et al., 2016; Lee et al., 2012). Furthermore, older age groups are at greater risk of sedentariness and ill health, while representing an increasingly larger share of the population across the world (Vincent & Velkoff, 2010). This study contributed to our understanding of activity participation, health, and well-being in older populations, by highlighting sense of purpose in life as a unique positive determinant of physical activity among older adults, above and beyond other key well-being measures. By employing two national, longitudinal panels, the study showed the promise of sense of purpose as a health asset that could help people maintain high levels of activity levels as they age.

Overall, these findings are suggestive of the potentially powerful role sense of purpose may play in driving people's actions and goals towards desirable outcomes. As described in Chapter 1, sense of purpose in life is accepted as a well-being measure but unlike other measures of well-being such as positive affect or life satisfaction, sense of purpose is closely related to goals and activities, and therefore, it has significant motivational implications. This chapter has shown that given the motivational underpinnings of sense of purpose, it is potentially a critical construct to understand long-term patterns in human behaviour. Specifically, sense of purpose

could be a valuable psychosocial resource for enabling behaviours that preserve and improve health and well-being among at-risk populations such as older adults.

As described in Chapter 2, despite the motivational implications of sense of purpose, only a few studies have investigated the potential of sense of purpose for understanding human behaviour in a longitudinal setting. The current study made one of the first attempts in the literature to shed light on the potential link between sense of purpose and long-term behavioural outcomes in the domain of health. To the extent that sense of purpose provides people with a motivation for living and/or improve their abilities to successfully pursue desired goals, we can expect people with sense of purpose to perform better on other long-term goals and behaviours that are difficult to adopt or maintain but lead to desirable outcomes. For instance, sense of purpose may improve and maintain people's motivation to fulfil work tasks which can affect financial outcomes. As studies advance this line of work using robust methodologies that can improve inference from observational data or through the application of experimental methods, we can discover if the behavioural implications of sense of purpose may apply outside the domain of health.

To the extent that sense of purpose is linked with such important and desirable behavioural outcomes, it becomes crucial to understand the drivers of sense of purpose. How does sense of purpose respond to contextual influences? What can people, practitioners, and policy-makers do to cultivate sense of purpose among people and tackle the factors that can potentially hinder sense of purpose? To address such questions, the next chapter aims to contribute to the literature on the determinants of sense of purpose in life. The next chapter will also expand the domain of study from health to work to test and show whether sense of purpose may be relevant for understanding people's well-being and behaviours in other important domains of life.

## **CHAPTER 4: The Effects of Retirement on Sense of Purpose in Life**

### **4.1. Introduction**

As described in Chapter 2, people with a stronger sense of purpose in life experience more favourable life outcomes in terms of physical health, well-being, and longevity. Chapter 3 has shown that sense of purpose is also linked with behaviours that may lead to these life outcomes. These studies point to the potential benefits of cultivating sense of purpose at the level of population or preventing the factors that may decrease sense of purpose. However, as is evident in the literature review in Chapter 2, we know very little about the determinants of having a sense of purpose in life. How does sense of purpose change as a function of the social and economic context? What are the effects of important life events and transitions on sense of purpose? Our knowledge on these topics is extremely scarce despite the important contributions that such investigations can make to science as well as policy and practice.

Foremost, understanding the factors that enhance or undermine sense of purpose can broaden our understanding of people's experiences of well-being by going beyond traditional happiness measures. Some contexts may have strong influences on people's motivational engagement with life, directly affecting their involvement in goals and activities and the overall meaning they make through life engagement. In such contexts, understanding how sense of purpose changes can help us evaluate how people are doing in life using a broader lens of well-being compared to only assessing positive feelings or life satisfaction. Given that sense of purpose may also affect people's behaviours and life outcomes, studying how sense of purpose changes in response to contextual influences can also shed light on the potential downstream consequences for these contexts on behaviours and life outcomes.

Work is one of the contexts that has close theoretical relevance to the experience of sense of purpose. It offers a promising avenue to investigate how the social and economic context may affect sense of purpose. Work gives structure to daily life and ties people to the larger society (Morse & Weiss, 1955). It determines what people do and how they relate to others on a day to day basis (Pratt & Ashforth, 2003). Work provides a context to pursue long-term goals such as progressing in our careers or fulfilling a social mission (Wrzesniewski et al., 1997). Indeed, among

college-graduate adults in the US, only 29% think of their jobs as a means for living, while 70% think of their jobs to be a source of identity (Riffkin, 2014). Americans are also more likely to mention their careers as a source of meaning in life than mention their health, spirituality or friends (Pew Research Centre, 2018). Hence, people's experiences at work, especially the processes whereby people enter into and leave work can have important effects on sense of purpose.

Despite this close theoretical link between work and sense of purpose in life, as the literature review in Chapter 2 has shown, investigations on the work-related antecedents of sense of purpose are lacking. One work-related context that may have a significant impact on sense of purpose is retirement. The idea that work increases sense of purpose provides a useful lens for understanding the psychological impact of retirement, which is characterised by psychological and behavioural withdrawal from work roles (Wang & Shi, 2014). An implication of the 'work-as-purpose' hypothesis is that losing the roles, goals, and structure provided by work may result in an existential vacuum during retirement and cause people to feel aimless and lost (Miller, 1965; Morse & Weiss, 1955).

Existing studies have tested this idea by investigating the relationship between retirement and sense of purpose in life (Hill & Weston, 2017; Pinguart, 2002). These studies, which are mostly cross-sectional, have found a negative link between retirement and a sense of purpose, thus lending support to the idea that retirement may be a psychologically challenging period. This initial evidence, however, can be challenged on several theoretical and methodological grounds, which motivate the current quasi-experimental study on the impact of retirement on sense of purpose.

First, several theoretical perspectives present retirement as positive life transition. Life course theories predict a positive developmental trajectory for post-retirement period and argue that the reduced responsibilities and activities of retirement are in line with the normative stages of ageing (Super, 1980; Wang, 2007). Hence, instead of feeling aimless and lost, retired people would enjoy and find meaning in the gradual decline of physical and social responsibilities that accompany withdrawal from work. Role-strain reduction theories also emphasise that work roles may begin to create physical and psychological burden in older ages due to diminished ability, mastery and value among older jobholders and even threaten self-esteem (Bleidorn & Schwaba, 2018; Kim & Moen, 2002). Therefore,

retirement can free people from work-related demands, physical challenges and stress and subsequently lead to higher sense of purpose and well-being.

In addition, retirement may provide an opportunity to engage in new social roles and activities (Caradec, 2008; Freund et al., 2009) which could result in a renewed sense of purpose in life. Psychologists argue that people construct and reconstruct meaning across the life span, and have an increased capability of meaning-making in older ages (Reker & Wong, 1988). In retirement, people may commit to roles and goals that are related to family, which is the most frequently endorsed source of meaning in life (Pew Research Centre, 2018). Or, they may engage in recreational or leisure activities that they are personally motivated for (Moreno-Agostino et al., 2019). These activities may cause people to experience a higher sense of purpose as a result.

Only a few empirical studies have tested these alternative theoretical propositions. Below I review these empirical studies on the link between retirement and sense of purpose in life as well as other measures of well-being to identify the gaps in this literature and motivate the current examination of retirement on sense of purpose in life.

#### ***4.1.1. Literature Review***

To date, only few studies have examined the relationship between retirement and sense of purpose in life, and to my knowledge, none has provided causal evidence on this topic. In a meta-analysis of age-related correlates of purpose in life, Pinquart reports a negative association between retirement and sense purpose (2002). The weighted average of the eight estimates that assessed the relationship between retirement and sense of purpose was negative ( $r = -.11$ ) and the size of the estimates did not differ much across studies. However, this meta-analysis included primarily unpublished research from books or dissertations. Furthermore, correlational estimates may be due to endogeneity. For instance, people with lower sense of purpose may suffer from poor physical and mental health (Windsor et al., 2015), which would increase their likelihood to retire. This would create a downward bias in the estimates. Sense of purpose has also been linked to a wide range of potentially unobservable factors that are specific to old age. Studies have shown a range of biological and neurological correlates of sense of purpose among adults and older

people (Ryff et al., 2004, 2016). Hence, it is likely that an omitted third factor confounds the relationship between sense of purpose and retirement.

The relationship between retirement and sense of purpose has also been examined in a longitudinal study where trajectories of change in sense of purpose can be tracked (Hill & Weston, 2017). The authors found that sense of purpose declined among those who retired throughout the eight years of the study; however, significant declines were also observed among participants who have consistently been retired or have been out of the labour force. Hence, the trajectories of decline in sense of purpose may not be an impact of retirement per se, but could be due to other factors that are emblematic of older ages and determine being out of work such as health and social losses (Freund et al., 2009).

While the literature on retirement and sense of purpose is nascent, a larger number of studies have investigated the link between retirement and subjective well-being, feeling positive (vs negative) and being satisfied with life (Diener et al., 2018). Most of these studies have employed growth models and documented inter-individual variability in trajectories of change in subjective well-being outcomes (Heybroek et al., 2015; Kim & Moen, 2002; Pinqart & Schindler, 2007; Wang, 2007). Others presented mixed results; showing that retirees feel happier, on average, when daily feelings are measured with day reconstruction method (Moreno-Agostino et al., 2019), or that only retirees with precarious working conditions are happier when using single-item positive and negative affect questions (Ryser & Wernli, 2017). To overcome the methodological limitations of the cross-sectional analyses, two economic studies have employed a quasi-experimental methodology in panel data and documented a positive overall impact of retirement on life satisfaction (Gorry et al., 2018), and a negative impact on depression and loneliness (Charles, 2004).

Emerging evidence on the positive effects of retirement on subjective well-being has begun to challenge the view that retirement may be an existential crisis and impediment to psychological well-being. However, positive feelings and life satisfaction capture only a limited aspect of overall wellbeing and activities and domains in life (National Research Council, 2013). Meaning and purpose, on the other hand, are accepted as complementary yet distinct measures of well-being and are particularly suited for understanding the psychological processes underlying retirement. Theoretical origins of meaning and purpose go back to centuries-old

philosophies that emphasise self-realisation as the ultimate goal in life while SWB measures represent philosophical traditions that emphasise the pursuit of pleasure (Ryff, 1989). Reflecting this theoretical distinction, while pleasure is present-oriented and related to leisure activities such as watching TV, meaning and purpose are more strongly related to work, and contemplations about self and identity (Baumeister et al., 2013; White & Dolan, 2009). Hence, studying sense of purpose in life in the context of retirement would uncover the key mechanisms underlying psychological adjustment to this life transition which is marked by existential concerns about identity, meaning, and motivation.

Furthermore, numerous studies have shown that sense of purpose in life independently predicts long-term health outcomes in late life (e.g., reduced risk of stroke, higher physical activity) and longevity, while positive and negative affect do not show such prospective associations (Hill & Turiano, 2014; Kim et al., 2013). Hence, focusing on sense of purpose can help understand downstream consequences of retirement on physical and mental health and longevity, outcomes that are particularly important for older populations (Coe et al., 2012; Fitzpatrick & Moore, 2018; Gorry et al., 2018).

Finally, extant studies have not provided a mechanistic explanation of the effects of retirement on well-being or present a theoretically-driven analysis of heterogeneity, despite suggestive evidence of inter-individual variability in the processes of retirement adjustment (Heybroek et al., 2015; Kim & Moen, 2002; Pinguat & Schindler, 2007; Wang, 2007). Hence, it is unclear, for whom retirement is a psychologically beneficial experience and why.

#### ***4.1.2. Current Study***

To address the above-mentioned gaps in the literature, the present research used a policy context as a natural experiment to estimate the causal impact of retirement on a sense of purpose in life. In the US, citizens first become eligible for social security (SS) retirement benefits when they turn the age of 62. While they can only collect partial benefits at this age, the full benefits can be received at around the ages of 65, depending on people's birth date. These policies introduce discrete jumps in retirement rates, which can be used to estimate the causal impact of retirement on important outcomes (Behncke, 2012; Charles, 2004; Gorry et al., 2018; Neuman,

2008). The current research tests the causal impact of retirement on sense of purpose by taking advantage of these SS-driven changes in retirement decisions in the US.

The data were again from the Health and Retirement Study, the nationally representative panel of Americans that was used in Chapter 3. Participants were surveyed every four years at three time points and asked validated questions about retirement status and sense of purpose in life (Ryff & Keyes, 1995). To estimate the causal effect of retirement on sense of purpose I first utilised the panel nature of the HRS and estimated an individual fixed-effects (FE) model. This allowed me to restrict the analysis to within-person changes over time and partial out any unobserved person-specific effects that do not vary over time (e.g., predisposed underlying health conditions, early life experiences, and stable components of personality or genetics) from biasing the true relationship between retirement and purpose. I then addressed other sources of bias from unobserved confounding and reverse causality by using an instrumental variables (IV) approach. This approach allowed me to first estimate the changes in retirement as a function of the SS age thresholds for pension eligibility (first stage model) and then use these estimates to test the causal impact of people's retirement decisions on sense of purpose.

I also explored why there may be a relationship between retirement and a sense of purpose in life. The resource-based dynamic model of retirement suggests that the psychological impact of retirement would be determined by changes in social, physical, and financial resources (Wang & Shi, 2014). To explore this idea, I tested whether retirement also impacted social engagement (e.g., cooking, spending time with children), household income (financial resources), perceptions of health (physical resources) within the same methodological framework. I also examined the impact of retirement on life satisfaction, positive and negative affect to test whether there are any differences in the current data in terms of the impact of retirement on these traditional well-being outcomes vs sense of purpose.

Furthermore, I examined the pre-retirement characteristics of the people for whom the effect of retirement was estimated for. An important characteristic of the instrumental variables analysis is that the effect it estimates is driven by people whose behaviour (retirement) is influenced by the instrument (SS age cut-offs). Hence, in the present research, I documented the characteristics of this complier population to describe for whom the causal estimates of the retirement apply and whose well-being would be impacted by retirement policies.

## **4.2. Methods**

### ***4.2.1. Sample***

This study used data from the Health and Retirement Study (HRS), the same dataset as in Chapter 3. HRS is a longitudinal panel of a nationally representative sample of older American adults that investigates psychosocial and economic factors related to ageing (Health and Retirement Study, 2006-2016). The initial sample also included i) the randomly chosen 50% of the full sample that were chosen to participate in an enhanced face-to-face interview in 2006 and responded to the lifestyle questionnaires that consisted of measures of sense of purpose, and ii) the remaining half of the sample who participated in the interview and the questionnaire in 2008. The 2006 cohort had a longitudinal follow-up in 2010 and 2014. The 2008 cohort had follow-ups in 2012 and 2016 (Sonnegg et al., 2014).

Following prior research (Gorry et al., 2018), 3,367 individuals who were out of the labour force, unemployed or disabled at any wave were excluded from the analysis. I also dropped observations that had missing data on sense of purpose or the labour force status variable: 2,400 individuals were missing data on these variables at all waves and were excluded from the analysis. Observations were also dropped if an individual used a proxy for their response in that wave (e.g., their spouse or child responded on their behalf), which led to the exclusion of 58 individuals who used proxies at all waves. Only participants with a minimum of two observations were retained for panel data analysis, yielding a final sample size of 8,113 individuals and 21,714 observations. The characteristics of the final sample are described in Table 5.

In the final analytic sample, 24% of the people had two-waves of data, while 76% of the sample had data on all three waves. As shown in Table 5, 68% of the sample were retired in the baseline wave. The differences in the baseline characteristics of this sample and those who were working at the baseline are described in Table A4.

### ***4.2.2. Measures***

*Purpose in Life.* Purpose in life was assessed by a widely used seven-item scale (Ryff & Keyes, 1995) which was identical to the measure of sense of purpose in Chapter 3. As before, respondents were asked to rate their agreement with

following statements on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*): i) ‘I enjoy making plans for the future and working to make them a reality’, ii) ‘My daily activities often seem trivial and unimportant to me’, iii) ‘I am an active person in carrying out the plans I set for myself’, iv) ‘I don't have a good sense of what it is I'm trying to accomplish in life’, v) ‘I sometimes feel as if I've done all there is to do in life’, vi) ‘I live life one day at a time and don't really think about the future’, vii) ‘I have a sense of direction and purpose in life.’ Following the guidelines (Smith et al., 2013), a final score of purpose in life was created by averaging the scores across items ( $\alpha = .76$ ). The variable was set to missing if more than three items were missing. The measure of sense of purpose was standardised ( $M = 0$ ,  $SD = 1$ ) in all analyses to report standardised effect sizes and improve the interpretability of the results.

*Retirement.* In HRS, individuals reported their labour status on different occasions throughout the survey. Based on these reports, RAND Institute for the Study of Aging (RAND HRS Longitudinal File 2016 (V1), 2006) classified individuals as i) working full-time (26% of the baseline sample), working part-time (5% of the baseline sample), being retired (56% of the baseline sample), or partially retired (12% of the baseline sample). In constructing this variable, the Rand Institute drew from more than a dozen questions in which the respondents reported about their employment status, and work hours in up to three jobs that they may currently be holding. In the final four-tier classification mentioned above, individuals were classified as working full time if they are working 35+ hours per week and below this was classified as part-time work status.

Following prior research (Gorry et al., 2018) and in line with definitions of retirement as withdrawal from work (Wang & Shi, 2014), I defined retirement as a change from full-time or part-time work to being fully or partly retired. As a robustness check, I also measured retirement as a shift from full-time work to being fully retired.

*Sociodemographic Factors.* Since the methods employed in this study account for person-fixed differences across individuals such as gender and race, I included only marital status as a sociodemographic variable as a covariate because it was not person-fixed and could change over time. Being married was coded as one if individuals reported being married or partnered and zero otherwise (divorced,

widowed, spouse absent, never married). Age was also used as a continuous measure, and for precision, it was measured in months.

*Economic Factors.* Household income equalled the sum of the earnings of the respondent and spouse from the last calendar year. It included pensions and annuities, social security disability and retirement, unemployment and workers' compensation, other government transfers and household capital income. Total wealth was calculated by subtracting the value of debts from the value of assets owned by the household. The value of total assets was calculated by the sum of the primary residence, other real estate, transportation vehicles, business, the net value of individual retirement accounts, stocks and mutual funds, checking and saving accounts, government bonds, other savings, and assets were summed. The value of debt was calculated as the sum of total mortgage, other home loans, any other debt (e.g., credit card balances, medical debts, life insurance policy). Earnings from one's job were calculated as the sum of respondent's wage/salary income, bonuses/overtime pay/commissions/tips, 2nd job or military reserve earnings, professional practice or trade income. Economic variables were cross-checked and imputed by the RAND Institute for the Study of Aging, and the methods of imputation are reported in detail in their codebook (RAND HRS Longitudinal File 2016 (V1), 2006).

*Work-Related Factors.* Occupation codes were based on 1980 US Census data. A respondent was coded as a white-collar employee if they worked in managerial and professional occupations or technical, sales and administrative support occupations in their job with the longest tenure. For a comprehensive assessment of job satisfaction, an average score was calculated from nine questions that assessed various aspects of the job (e.g., support, freedom, recognition, security) (1 = *strongly disagree*, 4 = *strongly agree*) ( $\alpha = .80$ ) (Karasek, 1979). Respondents reported whether their job involved much stress on a scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

*Perceived Health.* A global assessment of health was retrieved from perceived health ratings on a scale from 1 (*poor*) to 5 (*excellent*). Single item measures of health were shown to be related to objective physical health conditions (Pinquart, 2001), and the multi-item measurement of physical functioning (Mavaddat et al., 2011).

*Social Engagement.* Twenty questions assessed the frequency of social participation in various activities (e.g., activities with children, go to a sports club, read books and magazines, do gardening, work on a hobby or project, bake or cook, exercise) (Levasseur et al., 2010). Responses were rated on a scale from 1 (*never*) to 7 (*daily*) ( $\alpha = .72$ ). An average across all items was used as a measure of social engagement.

*Subjective Well-Being.* Life satisfaction was measured with a five-item Satisfaction with Life Scale that were rated on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale (Diener et al., 1985). The final score was an average of the items ( $\alpha = .89$ ). Positive affect was assessed by seven items where respondents rate how much of the time, during the past 30 days, they felt cheerful, in good spirits, extremely happy and so on, on a scale of 1 (*none of the time*) to 5 (*all the time*). For negative affect, questions refer to seven negative feelings such as worthlessness or nervousness. The final score was an average of the items for both positive ( $\alpha = .91$ ) and negative affect ( $\alpha = .86$ ).

#### **4.2.3. Statistical Analysis**

To examine the effects of retirement on sense of purpose in life, an instrumental variable approach was adopted in a fixed-effects regression model in panel data. The fixed-effects model controlled for time-invariant heterogeneity by assessing within-person changes over time. The IV approach, on the other hand, aimed to identify the causal impact of retirement on sense of purpose under the conditions that the variable induces an exogenous change in the key explanatory variable (relevance), and affects the dependent variable only through changes in the explanatory variable (validity) (Angrist & Pischke, 2008). Assuming the instrument is relevant and valid, the IV identifies the causal impact of retirement on purpose in life via a two-stage least square estimation. Formal notation of this estimation is provided below. Note that IV also accounts for the possibility of measurement error, which is exacerbated in a fixed-effects estimation (Griliches & Hausman, 1986).

*Instruments.* Following prior studies that examine the causal effect of retirement on health and subjective well-being outcomes (Bonsang et al., 2012; Charles, 2004; Coe et al., 2012; Coe & Lindeboom, 2008; Gorry et al., 2018; Neuman, 2008), the instruments in the current study are eligibility ages for Social Security retirement benefits in the US, which present exogenously determined

incentives to retire. At the earliest age for eligibility, which is 62, individuals can claim 80% of their retirement benefits. Or, they can claim all of their benefits and retire at their normal retirement age, which, depending on people's birth cohort vary between ages 65 and 67. Hence, there were two instruments: i) SS early retirement ages and ii) SS normal retirement ages.

**Table 5.** Summary Statistics for the Analysis of Retirement and Sense of Purpose in Life (Data: Health and Retirement Study 2006-2016)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
<i>Sociodemographic Factors</i>					
Age	67.43	9.16	31	95	8,113
Female	0.56	0.50	0	1	8,113
White	0.86	0.35	0	1	8,113
Black/African American	0.11	0.31	0	1	8,113
Another Race	0.03	0.18	0	1	8,113
College Graduate	0.31	0.46	0	1	8,113
Married	0.71	0.45	0	1	8,112
<i>Work-Related Factors</i>					
Retired <sup>a</sup>	0.68	0.47	0	1	8,113
Full-Time Work	0.26	0.44	0	1	8,113
Part-Time Work	0.05	0.23	0	1	8,113
Partly Retired	0.12	0.32	0	1	8,113
Fully Retired	0.56	0.50	0	1	8,113
Occupation = White-Collar	0.57	0.50	0	1	8,113
Job Satisfaction	2.91	0.49	1	4	2,571
<i>Economic Factors<sup>b</sup></i>					
Household Income	\$46,648	\$240,226	\$0	\$13,569,371	8,113
Wealth	\$265,000	\$1,073,320	-\$843,500	\$23,139,033	8,113
Full-Time Job Earnings	\$35,000	\$147,945	\$0	\$6,525,000	2,144
<i>Health and Well-Being</i>					
Purpose in Life	4.70	0.89	1	6	8,113
Perceived Health	3.37	1.01	1	5	8,108
Social Engagement	3.07	0.85	1	7	3,941
Life Satisfaction	5.14	1.41	1	7	8,036
Positive Affect	3.65	.71	1	5	8,069
Negative Affect	1.61	.57	1	5	8,069

*Note:* Data were drawn from two cohorts in the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). All variables were measured at the baseline wave.

<sup>a</sup>Retired variable was used as the main outcome variable in the analyses and was coded as one for those who were classified as partly or fully retired and zero for those who were classified as working full- or part-time by the Rand Institute (RAND HRS Longitudinal File 2016 (V1), 2006).

<sup>b</sup>Median scores were reported for economic factors in the column for means.

Earlier studies support the relevance of the instruments, showing that turning these pension eligibility ages are significant determinants of retirement behaviour in the US (Fitzpatrick & Moore, 2018; Gorry et al., 2018). There are also good reasons

to believe that the instruments are valid. First, the pension rules are non-discriminatory, and thus, unrelated to purpose in life. Second, there is no reason to expect a discrete jump in purpose in life at the specific age thresholds of pension eligibility after flexibly controlling for any non-linear general relationship between age and purpose, other than through changes in retirement. Further evidence for the relevance and validity of the instruments in current data is provided in the Results section.

*The models.* The first stage of the IV entailed the following equation:

$$R_{it} = \theta_0 + \theta_1 Z_{it} + \theta_2 age_{it} + \theta_3 age_{it}^2 + \theta_4 age_{it}^3 + \varphi_i + \omega_t + \gamma_{it} + \varepsilon_{it}$$

where  $R$  indicates retirement status and takes the value of 1 if an individual  $i$  is retired at a given time  $t$  and 0 otherwise;  $Z$  is the set of instruments (SS early and normal retirement ages), each of which equals one if an individual's age is equal to or greater than pension eligibility ages and zero otherwise;  $\varphi_i$  represents individual fixed effects which control for time-invariant person-specific determinants of sense of purpose; and,  $\omega_t$  represents year fixed effects which control for all time-variant determinants of purpose changes over time which are common to all individuals.  $age_{it}$  measures the age of person  $i$  at time  $t$  in months;  $age_{it}^2$  and  $age_{it}^3$  are included to model a flexible, non-linear (cubic) general relationship between age and sense of purpose.  $\gamma_{it}$  captures control variables which include marital status, logarithmically transformed household income, and perceived health ratings.  $\varepsilon$  represents the error term, which is clustered at the household level.

In the second stage, the predicted values of retirement from the first stage were used in a regression of sense of purpose in life on retirement:

$$P_{it} = \beta_0 + \beta_1 \hat{R}_{it} + \beta_2 age_{it} + \beta_3 age_{it}^2 + \beta_4 age_{it}^3 + \gamma_i + \delta_t + \gamma_{it} + \varepsilon_{it}$$

where  $P_{it}$  indicates self-reported levels of sense of purpose in life for each individual  $i$  at time  $t$ ;  $\gamma_i$  represents individual fixed effects, and  $\delta_t$  represents year fixed effects. I clustered the errors at the household level. Under the assumption that the instruments are valid, the  $\beta_1$  coefficient captures the causal effect of retirement on sense purpose, using variation in retirement age thresholds as instruments. The two-

stage method was implemented via `xtivreg2` command in Stata software, version 15.1.

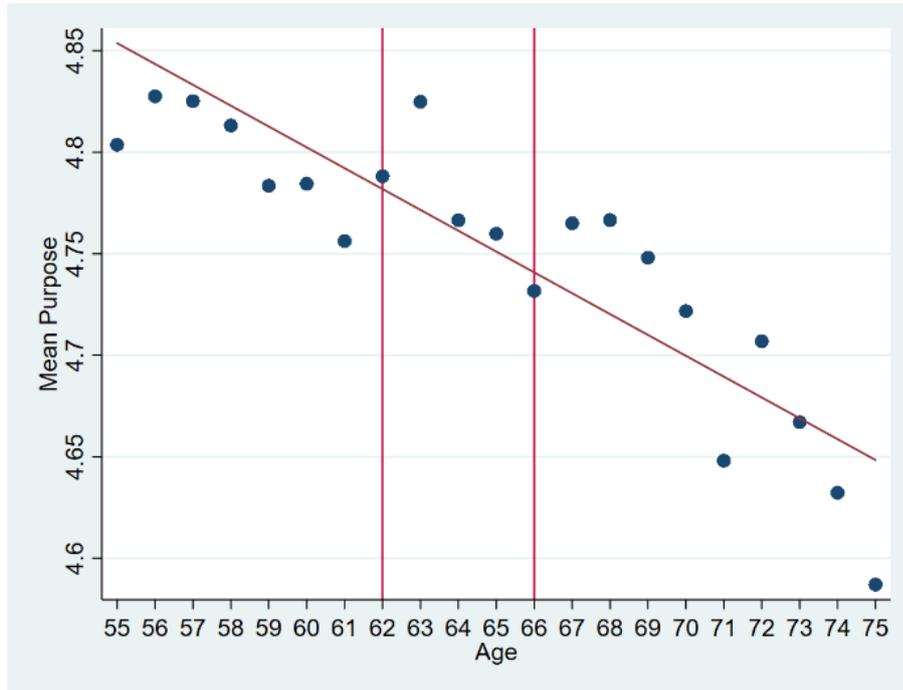
### 4.3. Results

#### 4.3.1. Retirement and Sense of Purpose in Life

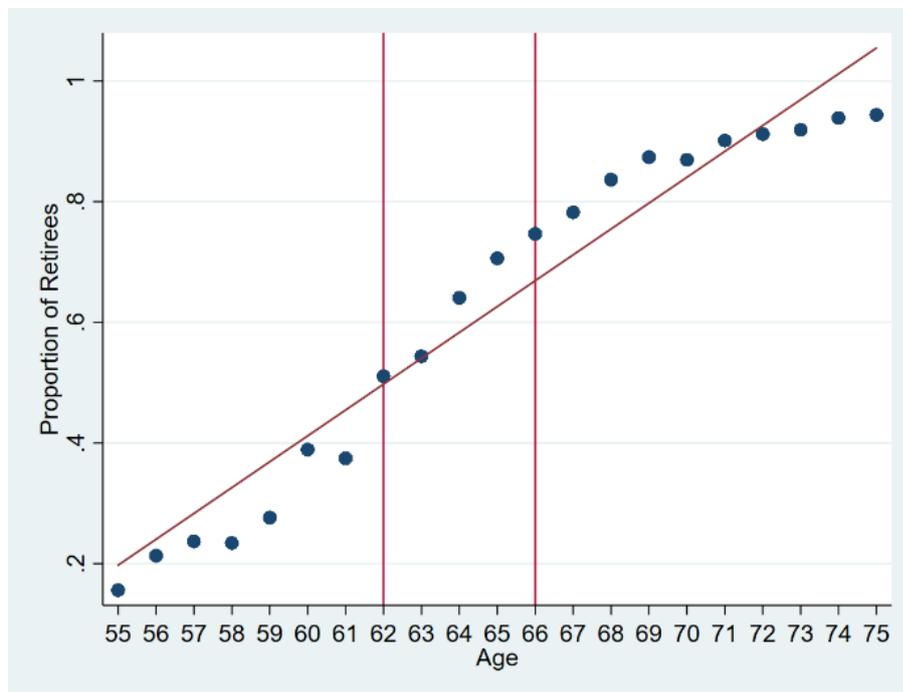
Does retirement increase or decrease a sense of purpose in life? To make the first pass at this question, Figures 2 and 3 document the relationship between (i) sense of purpose and age, and (ii) proportion of retirement and age in cross-sectional data respectively. These Figures are restricted to age groups that are closer to retirement age cut-offs to clearly illustrate the changes that occur at these ages. The Figures for the full sample are provided in the Appendix (Figure A1 and A2). Consistent with the previous findings on the relationship between sense of purpose and age (Springer et al., 2011), Figure 2 shows that sense of purpose declined as a function of age. However, we can see a sharp increase in sense of purpose around the SS age thresholds of 62 and approximately, 66. This is consistent with Figure 3 where we can observe an increase in the proportion of retirees around the SS age thresholds.

These Figures provide initial evidence that, although retirement tends to be associated with a lower sense of purpose, this negative relationship may have been confounded by the declining purpose-profile in age and that retirement may have a positive impact on the sense of purpose of the retirees.

To explore the relationship between retirement and sense of purpose more carefully, it is natural to look at a regression-adjusted coefficient on retirement. Table 6 shows the estimates from regression equations in which the dependent variable is sense of purpose. In the first column, I reported ordinary least squares (OLS) estimates that control only for age variables and year fixed effects. Consistent with the previous literature (Hill & Weston, 2017; Pinquart, 2002), the estimated coefficient on retirement, as shown in Column 1, was negative and statistically significantly different from zero ( $\beta = -.21$ , 95% CI = [-0.250, -0.172],  $p < .001$ ). A qualitatively similar result was obtained when we corrected for unobserved person-specific effects in Column 2; the FE estimates continued to produce a negative and statistically well-determined – albeit noticeably smaller – retirement coefficient ( $\beta = -.08$ , 95% CI = [-0.120, -0.350],  $p < .001$ ).



*Figure 2. Mean Levels of Sense of Purpose as a Function of Age*  
*Note. Data were from Health and Retirement Study (2006-2016).*



*Figure 3. Proportion of Retirees as a Function of Age*  
*Note. Data were from Health and Retirement Study (2006-2016).*

Given that the FE results could still be biased due to reverse causality or confounding effects from time-varying factors such as changes in health, we then turned to estimate the fixed-effects instrumental variables (FE-IV) model in the next

two columns. In Column 3, I report the first-stage FE-IV estimates of the SS age thresholds at 62 and 66 as the instruments for retirement, and in Column 4, I report the IV estimate of retirement on purpose.

Looking at Column 3, we can see that both SS age cut-offs strongly predict an increase in the rate of retirement. Hence, the age thresholds were used as instruments in our analyses, such that the model used changes in retirement that occurred as people reached and passed these ages. The FE-IV model in Column 4 showed a statistically significant, positive effect ( $\beta = .32$ , 95% CI = [0.072, 0.574],  $p = .012$ ) that remained robust as we included controls for time-varying measures (Column 5).

**Table 6.** The Impact of Retirement on Sense of Purpose in Life (Data: Health and Retirement Study 2006-2016)

	OLS	FE	First Stage	FE-IV	FE-IV
	(1)	(2)	(3)	(4)	(5)
	Purpose in Life	Purpose in Life	Retired	Purpose in Life	Purpose in Life
Retired	-0.21*** [-0.250,-0.172]	-0.08*** [-0.120, -0.035]	-	0.32** [0.072,0.574]	0.29** [0.043,0.541]
Age > 62	0.01 [-0.004,0.015]		0.17*** [0.141,0.191]		
Age > NRA	-0.00 [-0.000,0.000]		0.10*** [0.077,0.123]		
Age	-0.00 [-0.000,0.000]	0.00 [-0.012,0.015]	-0.01*** [-0.012, -0.003]	0.01 [-0.009,0.019]	0.00 [-0.009,0.018]
Age Squared		0.00 [-0.000,0.000]	0.00*** [0.000,0.000]	-0.00 [-0.000,0.000]	-0.00 [-0.000,0.000]
Age Cube		-0.00 [-0.000,0.000]	-0.00*** [-0.000, -0.000]	-0.00 [-0.000,0.000]	-0.00 [-0.000,0.000]
Married					0.03 [-0.026,0.088]
HH Income (log)					0.01* [-0.001,0.023]
Health					0.07*** [0.051,0.090]
Year FE	YES	YES	YES	YES	YES
Individual FE	NO	YES	YES	YES	YES
R-squared	0.03	0.04	0.20	-	-
Observations	21,714	21,714	21,704	21,714	21,692

*Note:* Three waves of data were drawn from two cohorts of the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). FE denotes fixed effects. Purpose in life and health measures were standardised ( $M = 0$ ,  $SD = 1$ ). Income was measured by total household income and logarithmically transformed. 95% confidence intervals were reported in parenthesis. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The results also held when i) individuals with part-time status in work or retirement were excluded to estimate a sharper shift from full-time work to full-time retirement, ii) survey weights were used to adjust the sample for representativeness, iii) individuals who returned to employment after retiring were excluded (2% of the

sample), iv) the model was adjusted for changes in spousal retirement status which was not included in the main analysis due to a large number of missing data, v) individuals younger than age 50 and older than age 80 were excluded to make the sample more representative of retiring adult populations, and vi) 163 individuals whose self-reported household income was above the 99<sup>th</sup> percentile or below the 1<sup>st</sup> percentile were excluded to make sure that the outliers in the household income variable did not bias the results (Table A5).

*Additional Analysis.* It is possible that the impact of retirement on sense of purpose is different for individuals who have been retired for shorter (less than four years) vs longer (between four and eight years) in the current data. The FE-IV approach makes it possible to test for the differential effects of being retired over these time horizons. Though not reported in Table 6, the analyses revealed that the effect was larger and statistically more precise for people who were retired for four years or less ( $\beta = .37$ , 95% CI = [0.081, 0.664],  $p = .012$ ) vs who were retired for more than four years ( $\beta = .20$ , 95% CI = [-0.148, 0.554],  $p = .257$ ).

#### **4.3.2. Retirement and Financial, Health and Social Resources**

Next, I explored whether retirement affected people's financial, health and social resources to explore whether such resource changes could provide some explanation to the effects of retirement on sense of purpose (Table 7). As shown in Column 1, there were no significant changes in household income (log) as a result of retirement ( $\beta = .39$ , 95% CI = [-0.137, 0.908],  $p = .148$ ). This held true even after I tackled outliers in the income measure by excluding individuals who reported above the top 99<sup>th</sup> or below the bottom 1<sup>st</sup> percentile of the values for the household income ( $\beta = .04$ , 95% CI = [-0.347, 0.425],  $p = .843$ ). Column 2 shows that retirement positively affected perceived health ( $\beta = .34$ , 95% CI = [0.099, 0.577],  $p = .006$ ). However, as described before, controlling for income and health did not change the estimates in any meaningful way (Column 5, Table 6). In Column 3, retirement had a positive impact on social engagement ( $\beta = .34$ , 95% CI = [0.036, 0.651],  $p = .029$ ). However, social engagement measure had a large number of missing values and significantly changed the sample size.

To examine whether social engagement could explain the results for sense of purpose, I tested whether adding social engagement to the main model where sense

of purpose is regressed on retirement would change the results. The impact of retirement on sense of purpose was no longer statistically significant when controlling for social engagement ( $\beta = .21$ , 95% CI = [-0.126, 0.539],  $p = .223$ ). However, when I excluded the observations with missing values on social engagement and tested the effects of retirement on sense of purpose in this sample (without controlling for social engagement), the estimates for retirement were not significant and not much different from the model with social engagement ( $\beta = .24$ , 95% CI = [-0.093, 0.572],  $p = .157$ ). This revealed that it may not be possible to attribute the changes in sense of purpose from retirement on social engagement.

**Table 7.** The Impact of Retirement on Resource Outcomes (Data: Health and Retirement Study 2006-2016)

	FE-IV (1) Household Income (log)	FE-IV (2) Perceived Health	FE-IV (3) Social Engagement
Retired	0.39 [-0.137,0.908]	0.34*** [0.099,0.577]	0.34** [0.036,0.651]
Age	0.01 [-0.015,0.040]	0.01 [-0.007,0.018]	-0.00 [-0.023,0.013]
Age Squared	-0.00 [-0.000,0.000]	-0.00 [-0.000,0.000]	0.00 [-0.000,0.000]
Age Cube	0.00 [-0.000,0.000]	0.00 [-0.000,0.000]	-0.00** [-0.000,-0.000]
Year FE	YES	YES	YES
Individual FE	YES	YES	YES
Observations	21,714	21,697	16,551

*Note:* Three waves of data were drawn from two cohorts of the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). FE denotes fixed effects. Perceived health and social engagement measures were standardised ( $M = 0$ ,  $SD = 1$ ). 95% confidence intervals were reported in parenthesis. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

#### 4.3.3. Retirement and Subjective Well-Being

Additional analyses showed similar patterns of change for happiness and life satisfaction (Table 8). The standardised effect for life satisfaction was positive and the largest in magnitude among well-being measures ( $\beta = .39$ , 95% CI = [0.116, 0.664],  $p < .001$ ). This was followed by positive affect which also had a positive effect ( $\beta = .34$ , 95% CI = [0.074, 0.606],  $p < .001$ ). The change in negative affect was negative but not statistically significant ( $\beta = -.20$ , 95% CI = [-0.468, 0.062],  $p = .134$ ).

**Table 8.** The Impact of Retirement on Happiness and Life Satisfaction (Data: Health and Retirement Study 2006-2016)

	FE-IV (1) Positive Affect	FE-IV (4) Negative Affect	FE-IV (5) Life Satisfaction
Retired	0.34** [0.074,0.606]	-0.20 [-0.468,0.062]	0.39*** [0.116,0.664]
Age	0.01 [-0.007,0.022]	0.01 [-0.008,0.021]	0.01 [-0.009,0.021]
Age Squared	-0.00 [-0.000,0.000]	-0.00 [-0.000,0.000]	-0.00 [-0.000,0.000]
Age Cube	-0.00 [-0.000,0.000]	0.00 [-0.000,0.000]	0.00 [-0.000,0.000]
Married	0.04 [-0.021,0.102]	-0.00 [-0.068,0.058]	0.09*** [0.030,0.154]
HH Income (log)	0.01* [-0.001,0.025]	-0.01 [-0.020,0.004]	0.01 [-0.005,0.019]
Health	0.10*** [0.075,0.116]	-0.10*** [-0.121,-0.082]	0.11*** [0.091,0.134]
Year FE	YES	YES	YES
Individual FE	YES	YES	YES
Observations	21,384	21,406	21,406

Note: Three waves of data were drawn from two cohorts of the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). FE denotes fixed effects. Outcome measures and health variable were standardised ( $M = 0$ ,  $SD = 1$ ). 95% confidence intervals were reported in parenthesis \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

#### 4.3.4. Who Drives the Effects of Retirement?

In the current analysis, the instrumental variable approach enabled me to test how sense of purpose changed among people who shifted from work to retirement as they reached SS age cut-offs. Another goal of this chapter was to shed light on the characteristics of these individuals. It is not technically possible to identify each individual who complied with the instrument (retirement age thresholds) and changed their retirement behaviour in response to the instrument. However, it is possible to calculate the relative likelihood that a complier has a certain characteristic (Angrist & Pischke, 2008). Given that the coefficients in the first stage regression measure the probabilities of retiring as a function of SS age thresholds in the full sample, estimating the first stage in a restricted sample (e.g., college graduates) provides the probabilities of retiring for that subgroup of the population. Based on this rationale, I calculated the relative likelihood that a complier has a certain characteristic by the ratio of the first stage estimates for that specific group and the first stage estimates for the full sample. These ratios are reported in Table 9.

**Table 9.** Complier Characteristics for the Instrumental Variable Analysis of Retirement and Sense of Purpose in Life (Instruments: Social Security Early and Normal Retirement Ages) (Data: Health and Retirement Study 2006-2016)

	<i>n</i>	SS Early Retirement Age	SS Normal Retirement Age
<i>Sociodemographic Factors</i>			
Female	4,507	0.93	1.20
Race = White	6,955	0.98	1.03
College Graduate	2,538	0.64	0.97
Married	5,769	1.03	0.96
<i>Work-Related Factors</i>			
Occupation = White-Collar	4,679	0.84	1.01
Job Satisfaction > Median	1,183	.56	1.00
<i>Economic Factors</i>			
Household Income > Median	3,976	0.94	1.01
Wealth > Median	4,024	0.81	0.95
Full-Time Job Earnings > Median	2,917	0.52	1.12
<i>Health and Well-Being</i>			
Purpose in Life > Median	9,830	1.00	1.09
Health > Median	10,540	1.00	0.95
Social Engagement > Median	5,080	0.75	0.90
Positive Affect > Median	10,768	1.11	0.93
Negative Affect > Median	9,261	0.87	0.78

*Note:* Statistics report the relative likelihood that a complier has the characteristic that is indicated at left. A participant is considered a complier if s/he changed retirement behaviour in response to the instrument (reaching Social Security retirement ages). Continuous measures were dichotomised using a median split to indicate high vs low group membership. Sample sizes (*n*) correspond to the number of individuals in the category indicated at left (e.g., college graduates at the baseline).

As outlined in Table 9, while compliers for SS normal retirement ages were not likely to differ much on baseline characteristics, those who complied with the early retirement incentives were likely to differ on a range of important characteristics. The most striking differences were in terms of socioeconomic status. The compliers were less likely to be college graduates, white-collar workers, have high wealth or high personal earnings from pre-retirement jobs. Importantly, compliers were less likely to have high job satisfaction in their pre-retirement jobs. Note that not everyone in the baseline data worked and reported on their job satisfaction, thus, dividing the retirement probability for high job satisfaction individuals to the retirement probability for the full sample may not be a fair comparison. To address this, I also used the retirement probabilities in the sample with non-missing job satisfaction ratings as the base and divided the retirement probability for high job satisfaction individuals to this number. The relative likelihood ratios were .84 and

.82 for early and normal retirement ages. Hence, compliers still differed on their job satisfaction ratings. It is also worth noting that there were no meaningful differences in terms of demographics, baseline sense of purpose, and health while compliers were less likely to have high social engagement and negative affect.

#### **4.4. Discussion**

Prior empirical studies have documented a declining profile for sense of purpose among retiring individuals compared to those who remain in the workforce (Hill & Weston, 2017). The current study utilised the same data as in the previous research (Hill & Weston, 2017) and applied an FE-IV variable approach to overcome the limitations of existing methodological approaches. In contrast to prior research, the impact of retirement on sense of purpose was positive. The size of the effect on sense of purpose was .29-.32 standard deviations, which is noteworthy given that purpose typically declines in older ages (Springer et al., 2011) and has shown a decremental profile in current data (Figure 2). It is important to note that the effects were stronger during the first four years after retirement vs the second four years.

The present analyses have also tested the resource-based dynamic model of retirement which postulates that psychological adjustment to retirement would be determined by changes in financial, social and health resources (Wang & Shi, 2014). In the current data, retirement increased health and social resources but controlling for these did not affect the effects of retirement on sense of purpose. There were no significant effects of retirement on financial resources. This evidence suggested that the resource changes may not explain the effects of retirement on sense of purpose. Hence, I did not find support for the resource-based dynamic model and the theories about social activities being a new source of purpose in older ages (Carstensen, 1992; Reker & Wong, 1988).

The current study also examined the effects of retirement on positive and negative affect and life satisfaction. Since several investigations have been conducted on these outcomes, these were not considered as the primary analyses in the current data. Consistent with prior studies that showed increases life satisfaction (Gorry et al., 2018) and decreases depression (Charles, 2004) after retirement, the current data also reported an increase in life satisfaction and positive affect. The findings for negative affect also were not statistically significant. These findings

suggest that despite the theoretical differences between these hedonic measures of subjective well-being and sense of purpose in life (National Research Council, 2013), in the current context of retirement as a critical life event, these measures of well-being mostly followed a similar trajectory of change.

A plausible explanation for the effects of retirement on sense of purpose and well-being could be related to pre-retirement characteristics of individuals for whom the effects of retirement were estimated. The analyses that examined the characteristics of the population under study showed that the positive effect of retirement on sense of purpose as well as other well-being variables is likely driven by people from lower socioeconomic status backgrounds, as indicated by their levels of education, occupation types and financial resources (earnings, wealth). Importantly, these individuals also reported lower job satisfaction, which corroborates prior evidence that lower job satisfaction in the pre-retirement period is a predictor of increased levels of happiness after retirement (Wang, 2007).

Altogether, these findings point to the pre-retirement work conditions as a mechanism for the psychological impact of retirement and provide support for role-strain reduction theories of retirement adjustment (Bleidorn & Schwaba, 2018; Kim & Moen, 2002). These theories highlight that the meaning of work would change during older ages because jobholders may begin to lose their abilities to fulfil their work roles (Bleidorn & Schwaba, 2018; Kim & Moen, 2002). This is also aligned with life-course theories which suggest that the reduced responsibilities of retirement are in line with the normative stages of ageing (Levinson, 1986; Super, 1980). An important contribution of the current findings was to highlight that, beyond the effects of aging, socioeconomic status was an important determinant of why work would become a burden in older ages and retirement could provide an opportunity to feel a sense of purpose and well-being.

It is worth noting that although I did not find financial resources to be an explanatory factor for increases in sense of purpose, past studies have found contradicting evidence about the role of financial resources. In one study, researchers have showed that retirees with higher income experience *greater* life satisfaction over 37 years (Pinquart & Schindler, 2007). Perhaps, financial resources become more important in the long-run in the post-retirement period, but, in the eight years of the current study. More research is needed to substantiate this point.

Past theories have also made a strong emphasis on the role of identity in the psychological impact of retirement. Some of these theories have described retirement as a crisis of identity (Miller, 1965) based on the premise that the occupational identity is more important than all other aspects of identity (e.g., one's identity as a friend, husband or father) and leisure activities would not be adequate to replace the loss of occupational identity. Others have argued that not everyone derives a strong sense of identity from work and many people can continue to identify with their work roles (e.g., as a teacher, railroader, etc.) well into retirement (Atchley, 1971). Such theories suggest a trajectory of continuity vs crisis in people's sense of identity during retirement, arguing that leisure activity can and would provide a strong sense of identity as work. The current findings do not seem to support either of these theories because, to the extent that sense of purpose may proxy for people's sense of identity, the current data revealed neither a stable or declining trajectory of sense of purpose in retirement.

Past theories have also highlighted that there may be different stages of psychological change after retirement and the initial stages may be characterised by a boost in well-being because of the novelty of engaging with new activities and roles (Atchley, 1971). It is possible that the effects observed in this study are evidence of this so-called honeymoon effect given that the effects on sense of purpose were stronger during the first four years after retirement vs the second four years. It is, thus, possible that the positive boost of well-being upon retirement may subside over longer periods and future studies with longer follow-up periods can examine this possibility.

#### ***4.4.1. Limitations and Future Directions***

The FE-IV method employed in this study is well-known to plausibly provide an internally valid estimate of causal effects. The arguments about causality are further supported by graphs (Figures 2 and 3) as well as statistical and substantive evidence highlighted in the Methods section in detail. However, the external validity of the method cautions against the generalisability of the results to high-SES populations. It is worth emphasizing that these SES-related differences in the complier population (e.g., lower education or wealth) are relatively stable attributes that are measured in the pre-retirement period; hence, they cannot explain the relationship between retirement and sense of purpose in an FE-IV model where

such person-specific differences are controlled for. Further, these SES variables are theoretically unfit to predict an increase in the sense of purpose over time as people age. Hence, the differences in the complier population are unlikely to affect the internal validity of the estimates provided in this analysis.

Despite the limitations regarding external validity, I believe the findings have provided new insights into the psychological impact of retirement in a large and policy-relevant population. It is estimated that at least a third of the U.S. population retires in response to SS incentives at the specific age thresholds used in the study (Fitzpatrick & Moore, 2018). A large number of countries worldwide use these age rules for retirement and are planning to increase these mandatory retirement ages to tackle the economic costs related to ageing populations. This research suggests that such policies may have adverse consequences on the well-being of groups who are already disadvantaged in terms of social and economic resources. An important avenue for future research is to study retirement's relation to well-being in diverse country contexts, especially in cultures with different work values than the US.

#### **4.5. Conclusion**

The present findings contribute to an emerging literature which demonstrates that retirement, on average, increases well-being (Charles, 2004; Gorry et al., 2018). Sense of purpose is a distinct measure of psychological well-being that is closely related to meaning (George & Park, 2016) and identity (McKnight & Kashdan, 2009), and represents a motivation to engage in life in productive ways (Scheier et al., 2006). By focusing on sense of purpose, the current study shed light on the key psychological mechanisms underlying the potential benefits or costs of retirement, a transition that initiates a substantial reorganisation of one's life and identity.

Importantly, since sense of purpose is considered a component of judgements about meaning (George & Park, 2016), the current study also advanced the growing literature on how work contributes to meaning in life (Ward & King, 2017). Most people associate work with higher meaning and purpose, despite rating it low as a source of pleasure (White & Dolan, 2009). The current findings suggest that while work may be meaningful for many people, among older populations

and/or individuals with lower socioeconomic status who work under poor conditions, the meaning of work may be less pronounced.

As described in Chapter 2 and empirically shown in Chapter 3, sense of purpose in life is positively linked to positive health behaviours like physical activity and health outcomes such as a reduced risk of stroke, functional and cognitive disability, and depression and increased longevity (Hill & Turiano, 2014; Kim et al., 2013; Windsor et al., 2015). In fact, some times, these associations are even stronger and more consistent than the ones observed for positive affect, as shown in Chapter 3 and prior research (Hill & Turiano, 2014). Moreover, while life satisfaction and positive affect remain stable or increase in older ages (Blanchflower & Oswald, 2008; Carstensen et al., 2000), sense of purpose in life shows a strong trajectory of decline (Springer et al., 2011). Hence, the current findings suggest that through increased sense of purpose, retirement may also have a positive effect on individuals' health and longevity (Fitzpatrick & Moore, 2018; Gorry et al., 2018).

The number of Americans aged 65 and older is set to double and by 2060 will constitute 23% of the population, making retirement an increasingly important life transition. Existing evidence suggests that retirement impedes people's sense of purpose in life, providing support for policies that delay retirement. Using rigorous econometric techniques, the present research showed that retirement can increase people's sense of purpose in life, especially among lower socioeconomic status adults. These findings help to improve our understanding of retirement as a developmental transition and suggest that our understanding of the meaning of work and retirement may not be representative of older population groups with less access to socioeconomic resources. Importantly, the findings highlighted that these groups may be adversely impacted by policies that delay retirement, providing insights that are critical in the context of ageing global populations.

In this chapter, I aimed to advance the literature on the determinants of sense of purpose in life. To the extent that sense of purpose measures people's engagement with meaningful goals and activities, major life transitions that cause a shift in people's daily and long-term goals and activities are expected to create changes in people's sense of purpose. This strongly applies to the transitions within the work context because of the extent to which work dictates what people do in life. It is expected that transitions from work would create turmoil and lead to a psychologically challenging period where individuals do not know what to do with

their lives and therefore, lose their sense of purpose in life (Miller, 1965). This chapter highlighted that not all such transitions would cause a decline in sense of purpose. Instead, this research pointed out to the necessity to understand the social and economic dynamics that underlie these transitions. No matter how strongly a life activity (e.g., work) determines the structures for life, losing it may not imply a loss of direction and purpose if individuals are at a stage of life and/or a socioeconomic standing where their physical and psychological needs make this activity undesirable to engage with. Hence, this chapter raised the possibility that sense of purpose is not so much about the quantity of time people spend in a certain context, but more about the quality of that time and the socioeconomic factors that determine that quality.

These insights are aligned with some of the existing work described in Chapter 2, which showed how social and economic factors determine the relationship between sense of purpose in life and work. While men with higher levels of workload report a greater sense of purpose in life, for women being in paid work was negatively associated with sense of purpose (Lindfors et al., 2006). Sense of purpose also differed based on occupations such that teachers reported the greatest sense of purpose in life compared to other occupations (Srimathi & Kiran Kumar, 2010). These findings suggest that the effects of retirement and work on sense of purpose may differ along other dimensions that determine the quality of one's job, including how socially useful one's work is. Overall, coupled with the evidence presented in the current chapter, these findings suggest that the extent to which work contributes to a sense of purpose in life is context-dependent and future studies should more systematically examine these contextual influences.

The next chapter builds on the insights gained from the current findings and focuses on the sense that one's job is socially useful. As mentioned above, individuals who work in jobs that are socially useful (e.g., teachers) report a higher sense of purpose (Srimathi & Kiran Kumar, 2010). Chapter 2 also explained that researchers found positive correlations between sense of purpose and meaningful of work, which is in part measured by people's perceptions that their work makes a positive difference in the world (Steger et al., 2012). Building on this line of work, the next chapter is dedicated to understanding the contextual factors in the relationship between sense of purpose and work by examining how macroeconomic conditions may affect the associations between perceived social purpose in jobs and job satisfaction.

# **CHAPTER 5: Perceived Social Purpose and Job Satisfaction: A Cross-Country Analysis of Moderation by Economic Conditions**

## **5.1. Introduction**

As described in Chapter 3, work gives people a daily and long-term structure for living and a connection to the larger society (Morse & Weiss, 1955). It is, therefore believed that work provides people with a sense of purpose in life. Despite this proposition, Chapter 4 has shown that leaving work during retirement increases sense of purpose in life among lower socioeconomic status individuals who retire from dissatisfying jobs. Therefore, Chapter 4 has shown that the sense of purpose people would derive from work likely depends on contextual influences such as the stage of life people are at, their socioeconomic status, as well as the overall quality of their jobs. Such conditions may make other activities in life more meaningful and undermine the sense of purpose people may derive from work. In this chapter, I focus on the contextual influences on people's perceptions of social purpose in their jobs, the sense that one's job helps others and contributes to society.

Perceived social purpose in jobs is closely linked to having a sense of purpose in life. As described in Chapter 2, when people are instructed to spend money on others vs self, they report a higher sense of purpose (and meaning) in life (Klein, 2017). Sense of purpose (and meaning) in life is also positively associated with meaningful work, which is partly assessed by whether the job has a social purpose (Steger et al., 2012). Finally, people who work in jobs that are known to have a social purpose (e.g., teachers) also report a higher sense of purpose in life (Steger et al., 2012). Altogether, these findings suggest that by focusing on social purpose in the context of work, the current chapter will continue to advance our understanding of the determinants and consequences of sense of purpose in life.

Specifically, the current chapter will adopt a global approach and explore the macroeconomic moderators of the satisfaction people derive from having a sense of social purpose in their jobs. In other words, I will examine whether the contributions of perceived social purpose to overall job satisfaction may differ as a function of the economic conditions of the countries. There are several reasons to expect such moderation by macroeconomic conditions in this relationship.

Theories about how people cope with resource constraints suggest that when individuals perceive their financial resources to be constrained, they engage in ‘priority planning’ (Fernbach et al., 2015). This entails prioritising goals that alleviate perceived or real financial constraints and sacrificing goals that are not central or at odds with this pursuit. Since goal pursuit and fulfilment brings greater satisfaction and happiness (Sheldon & Kasser, 1998), we may expect financial constraints to increase the satisfaction people derive from financial aspects of their jobs and decrease the satisfaction they derive from other non-financial aspects of their job. Supporting this idea, studies have shown that individuals from more economically disadvantaged backgrounds experience more happiness from material purchases (vs experiential purchases) (Lee et al., 2018; Van Boven & Gilovich, 2003). Relatedly, psychologists have shown that satisfaction of needs related to autonomy and relatedness is more strongly related to well-being when the needs of safety and security are met (Tay & Diener, 2011).

Furthermore, as described in detail in the literature review below, there is a trade-off between the financial and social benefits of a job. This increases the likelihood that the priority planning will affect the satisfaction people derive from financial and social aspect of their jobs in contexts where financial constraints are prevalent. Studies have shown that employees who perceive a social purpose in their jobs are more willing to accept lower wages (Burbano, 2016; Chandler & Kapelner, 2013; Hu & Hirsh, 2017). Consistent with this, studies of actual labour markets have found a wage penalty associated with working in social purpose jobs (Frank, 1996; Johnston & Johnston, 2019). These findings suggest that from the perspective of the employees, making a social impact via work constitute an end that may be at odds with cumulating financial rewards. Therefore, in contexts where economic needs are more salient, employees may prioritise and derive less (more) satisfaction from social (financial) rewards in their jobs.

Cross-country differences in economic performance provide a lens to understand these contextual influences that are related to financial needs and beliefs. We can consider national economic performance as a useful proxy for residents’ experiences of financial constraints. If so, we would expect residents of countries with reduced macroeconomic performance to be more likely to prioritise the goal of making money in their jobs and forsake other goals that may not be as central to their financial goals such as making a social impact. As a result, the contributions of

social purpose on job satisfaction would decrease, and contributions of income on job satisfaction would increase in countries with poorer economic performance.

There is a large literature on how certain job characteristics contribute to overall job satisfaction. However, existing studies have mostly focused on ‘extrinsic rewards’ (e.g., pay, job security, promotion opportunities) or ‘intrinsic rewards’ (e.g., autonomy, challenge and relationships at work) (Andrade & Westover, 2018; Clark, 2010; Handel, 2005; Kalleberg, 1977; Westover, 2013). Only recently, researchers began to consider social purpose as a unique and important job characteristic that defines ‘meaningful work’ and contributes to job satisfaction above and beyond these intrinsic and extrinsic factors (Fairlie, 2011; Steger et al., 2012). The current study is among the first to examine social purpose as a determinant of job satisfaction with a global approach (Hu & Hirsh, 2017; De Neve, 2018).

Investigating job characteristics as a determinant of job satisfaction helps us understand the determinants of worker well-being in particular and societal well-being in general (Clark, 2010; De Neve, 2018). In addition, such an investigation can shed light on what constitutes a good quality job from a subjective perspective and therefore advance our knowledge of what workers value in a given job (Clark, 2015). As such, job satisfaction is also related to important labour market decisions such as the effort people put in a job or their decisions to quit (Clark, 2001). Hence, understanding the extent to which perceptions of social purpose (and income) can be linked to job satisfaction in a multi-country data can provide insights into the determinants of worker well-being and motivation as well as job quality across the world.

To my knowledge, no study has yet made a systematic investigation on macro-level moderators of the link between social purpose and job satisfaction. A few studies have measured social purpose as a ‘work value’ by directly asking people to rate the importance of this job characteristic and found that people’s endorsement of this value changed as a function of national indicators (e.g., GDP, income inequality) (Factor et al., 2013; Kaasa, 2011). However, these studies suffered from significant methodological limitations that are described in the literature review section below. By exploring the macroeconomic moderators of the link between social purpose and job satisfaction, the current study will inform our theories about what matters to people in a job and what promotes worker well-being.

The findings will also have implications for human resource management practices and labour market policies across the world, informing practitioners who are interested in applying the scientific insights to their local context.

In sum, in this chapter, my focus is to understand macroeconomic differences in the degree with which social purpose contributes to job satisfaction across the world. Below I present a review of the literature on social purpose to illustrate what we know about this concept and its relationship to job satisfaction and financial rewards in jobs. In addition, I overview a few existing cross-country studies on social purpose to identify the limitations and gaps in this literature that motivate the current study.

### ***5.1.1. Literature Review***

The idea that people can make a positive social impact via work can be traced back to the Protestant Reformation. For the majority of human history, work has been viewed in a negative light. Ancient Greeks thought of work as a curse that stood in humans' ways of engaging in deep, worthy philosophical and religious endeavours – a view that persisted throughout the Middle Ages (Hardy, 1990). It was during the Protestant Reformation that the idea of work as a source of meaning and purpose emerged. Martin Luther proposed that through productive work and sacrifice, individuals can contribute to the advancement of humankind and therefore, fulfil a divine role. He further argued that each individuals' unique God-given strengths made her/him useful for a special role in this world, something that s/he was born to do. These earlier theological propositions have given way to more secular conceptualisations of work as one's purpose and calling – the socially useful work that one is born to do (Dik et al., 2009; Wrzesniewski et al., 1997).

Although current definitions and measurements of calling lack a consensus (Dik et al., 2009), empirical studies have distinguished people who saw their work as a calling versus a career (i.e., a means for accomplishments), or a job (i.e., a means for making a living) (Wrzesniewski et al., 1997). Empirical research has found that individuals who have a calling report higher well-being and desired work-related outcomes (e.g., job commitment and satisfaction) no matter the source of their calling (secular or religious) (Cardador et al., 2011; Duffy et al., 2014). On the other hand, qualitative research suggests that thinking of work as a calling may also lead to costly behaviours. Bunderson and Thompson (2009) have interviewed

employees in zookeeping – a profession that involves long work hours, unpleasant tasks (e.g., cleaning animal faeces), but is yet occupied by highly educated individuals. The interviews revealed that the zookeepers who viewed their work as a calling found a deep meaning and purpose in their work. In addition, their work perceptions were intertwined with morality, and they saw it as their duty to sacrifice pay, time and comfort.

The idea that some individuals may perceive their jobs as a calling is strongly intertwined with perceiving a social purpose at work. It is not surprising that studies on calling have focused on prosocial occupations, such as nurses (Cardador et al., 2011) or zookeepers (Bunderson & Thompson, 2009). Because of this link, it would be fair to argue that studies on calling have introduced the idea that people have a preference for socially useful work and documented people's tendency to make sacrifices for it.

At the same time, scholars in organisational psychology have started to assess people's subjective perceptions that their jobs have a social purpose. In this line of work, perceived social purpose of one's job was assessed as part of the broader umbrella of the perceived meaningfulness of one's job (Fairlie, 2011; Lips-Wiersma & Wright, 2012; Steger et al., 2012). This is similar to the conceptualisation of purpose in life as a subcomponent of meaning in life, as described in Chapter 1. It is also important to note that this concept is broadly conceptualised as 'meaning in work' and distinguished from 'meaning at work' which entails the meaningfulness of an organisational community independent of the job that is being performed (Pratt & Ashforth, 2003).

Perceived meaning in work is typically described and assessed as a multi-faceted construct. According to Steger et al. (2012) meaningful work is one that contributes to one's life purpose, personal growth, understanding of the world, and serves a greater purpose. Fairlie (2011) also adopted a similar approach and described meaningful work as one that enables self-actualisation, positive social impact, fulfilment of one's purpose and sense of accomplishment. Finally, in their conceptualisation of meaningful work, Lips-Wiersma and Wright (2012) emphasise closely related dimensions: expressing one's full potential, serving and being unified with others, feeling inspired, and developing one's inner self. All of these conceptualisations share a social purpose component that emphasises the positive impact one's work makes on others.

Based on the above-mentioned conceptualisations, scales have been developed to assess meaningful work. Using these scales, the associations between meaningful work and work-related outcomes have been documented. Some quantitative studies have demonstrated that people who think their jobs are meaningful are more engaged at work (Geldenhuis et al., 2014; Steger et al., 2013), and more committed to their careers and organisations and report higher job satisfaction (Fairlie, 2011; Steger et al., 2012). A recent meta-analysis outlines that perceived meaningfulness of work has large associations ( $r = 0.70$ ) with job satisfaction, engagement, and commitment (Allan et al., 2019). The perceived meaning of work has also been linked to general well-being such as meaning in life, health, and life satisfaction and shown to be a protective factor against depression and withdrawal from work (Steger et al., 2012). The meta-analysis confirms these associations to be moderate to large (Allan et al., 2019). Finally, perceived meaningfulness of work has also been linked with organisational citizenship behaviour, self-rated job performance and negative affect. However, associations with these constructs were small to moderate in the meta-analytic review (Allan et al., 2019).

Using the perceived meaning of one's job as a framework, Hu and Hirsh conducted several studies to examine people's willingness to accept lower salaries for meaningful work (2017). In the first study, they asked people to report jobs that they think are personally meaningful or meaningless. The self-reported salaries people were willing to accept in the meaningful jobs were significantly lower. In a second study, the authors held job types constant and manipulated meaningfulness by asking people to think about how they can derive personal meaning from certain occupations. Individuals reported lower salaries only for being a lawyer, which had higher baseline salaries compared to other occupations (e.g., driver and teacher). In their third study, Hu and Hirsh employed a multi-country dataset and used a measure of job meaning as the average score for the extent to which job is useful for the society, helpful for others, and interesting. People who rated jobs' meaning higher were more likely to report that they would turn down a higher-paying job somewhere else. Their final study distinguished the meaningfulness of jobs vs organisations and showed the results replicated for both concepts.

Experimental studies in behavioural economics have also demonstrated that perceived social purpose of the labour tasks affects people's performance and

wages. First of all, researchers have focused on purpose more broadly, described as the general objective of a task, without specifying whether the purpose is social or not. Experimental evidence in behavioural economics has shown that when the relation of the work task to a general objective is made clear, productivity increases. In two studies by Ariely et al. (2008), for instance, tasks were made purposeful by making it clear to participants that their output accumulates for later use vs being destroyed. People's reservation wages (the wage at which they chose to stop) were significantly lower (up to 40%), and the number of outputs produced was significantly higher in the purposeful tasks. In another study, Fehrler and Kosfeld (2014) made a boring data entry task purposeful by notifying participants that their task serves an important purpose vs that the data are already entered. Communicating the purpose of the tasks had a 14% effect on productivity. By approaching purpose as the general objective of a task, these studies have shown the effects of perceived purpose on productivity and wages. However, since the control conditions in this study actively manipulated purposelessness, these studies could also be said to show how not perceiving the purpose of a task hampers performance and increase demands for wages.

Others have more directly intervened on the social purpose of labour tasks. In a natural field experiment, Chandler and Kapelner (2013) told workers that they are labelling tumour cells in medical images to help cancer researchers. The authors decreased the perceived social purpose of the tasks by telling the workers that their outputs will be destroyed. Compared to a condition that was given no context for the task, quantity (the number of images labelled) was higher in the social purpose condition while the quality (accuracy of labelling) was lower in the purposeless condition. The authors used a post-manipulation check and found that their method indeed increased the perceived meaning of tasks significantly. The social purpose condition, however, was confounded because participants were also thanked for their contribution, which could have triggered the mechanism of recognition. In another field experiment, researchers found that hearing about the social responsibility activities of jobs they are applying reduced wage requirements submitted by prospective candidates, especially among the highest performers (Burbano, 2016).

Recent studies have also shown that these preferences for accepting lower wages in prosocial jobs generalise to the market wages that are paid in real-world jobs. Frank

has shown that there is a negative association between wages and the social responsibility ratings of jobs in the U.S. (1996). Similarly, researchers demonstrated a wage penalty for working in the non-profit sector in the US (Johnston & Johnston, 2019), where jobs are more likely to contribute to the betterment of society. These studies suggest that there may be a generalisable premium associated with working in jobs that have a social purpose.

Finally, researchers have also studied people's perceptions of social purpose in the context of organisations. In this line of work social purpose is usually referred to as 'purpose' in general and researchers most often do not specifically highlight that their construct of interest is 'social purpose'. Defining purpose as a 'concrete goal or objective for the firm that reaches beyond profit maximisation', Henderson and Van den Steen proposed that one reason why firms should invest in costly purpose-promoting programs is that purpose may contribute positively to an employee's own identity and reputation and increase productivity (2015, p. 327). Gartenberg and colleagues, on the other hand, defined purpose as 'the meaning of a firm's work beyond quantitative measures of financial performance' (2019, p. 3)

Using a survey of 456,666 workers in 429 firms, Gartenberg and colleagues examined the performance associations of purpose (Gartenberg et al., 2019). They used employees' answers to the following questions as a measure of purpose: 'My work has a special meaning: this is not just a job', 'I feel good about the ways we contribute to the community', 'When I look at what we accomplish, I feel a sense of pride', and 'I'm proud to tell others I work here.' There were no associations between this measure of purpose and financial performance (return on assets and stock market performance). Authors then explored the link using a purpose-clarity measure derived from the questions 'Management makes its expectations clear' and 'Management has a clear view of where the organisation is going and how to get there.' Companies that are rated high in the purpose-clarity measure were found to have superior accounting and stock market performance. Hence, it is possible that although perceived social purpose may be linked with performance, these relationships may not be reflected in firm performance.

To summarise the literature that has been reviewed so far, studies have shown that although the perceived social purpose has been operationalised in various ways, there is a strong link between the perceived social purpose of the jobs and the satisfaction people derive from work, their performance and wages. Overall, this evidence makes a strong case that people care deeply about their jobs making a positive

difference in the lives of others and the world, and are willing to sacrifice financial rewards to be able to work in such jobs. There is, however, an important gap in this literature. It is unclear to what extent people's preference for social purpose in their jobs would change as a function of the social and economic context that people live in and whether such socioeconomic factors could explain any differences across countries.

In one study, researchers used a multi-country dataset and have shown negative associations between the perceived meaning of the job, which is measured by people's self-reports that job is interesting, helps others, contributes positively to the society, and their willingness to leave their jobs for higher pay (Hu & Hirsh, 2017). The authors argued that this result did not differ across countries and occupational categories. However, they did not present the results for this cross-country analysis. Nor did they specifically examine any moderating influences from country-level differences such as levels of economic development. Importantly, a major limitation of their analyses was the limited set of controls, which only included age, gender, and income. An important confounding factor, education, for instance, was omitted.

Chandler and Kapelner (2013) have also employed Indian vs American workers in their study where they tested the effects of the perceived social purpose of the labour tasks on performance and pay. The authors found that perceived social purpose did not impact performance differently across Indian vs American workers. These workers, however, comprised of a limited and selective sample of individuals participating in the same international labour market of MTurk ( $N = 2,471$ ). It was not clear whether their country of origin led them to differ on dimensions that are expected to differ across those countries (e.g., Indian workers prioritising financial compensation over social purpose).

As part of the Global Happiness Policy Report in 2018, researchers have examined a wide range of job characteristics in relation to job satisfaction in the dataset of 37 countries that was also used in the current study (De Neve, 2018). An index of 'Job helps others' and 'Job is useful' ratings measured overall perceived social purpose in jobs. Social purpose as a job attribute was found to be the tenth out of 12 job characteristics in terms of its contributions to overall job satisfaction. Other job characteristics involved pay, working hours, working hours mismatch, work-life balance, skills use, job security, physical and stressful work, opportunities for advancement, independence, interesting job, and interpersonal relationships. The job characteristic of pay was measured by ratings that 'income is high' in the current

job and this was the most important contributor to job satisfaction in the data. The extent to which social purpose contributed to job satisfaction was higher for employees vs self-employed, full-time workers vs part-time, and more educated vs less. There were no significant differences based on gender.

Another line of work has studied social purpose in the domain of work values. Using cross-country data, these studies measured the importance people attach to the social purpose of their job by asking ‘How important it is that a job allows someone to help other people?’ and ‘How important it is that a job is useful to society?’ (Factor et al., 2013; Kaasa, 2011). Among 11 Western countries (Canada, Czech Republic, Denmark, Germany, Hungary, New Zealand, Norway, Portugal, Sweden, UK, and USA), the levels of economic development of a country were negatively related to the importance of social purpose (Factor et al., 2013). In other words, individuals residing in wealthier nations reported attaching less importance to the social purpose of a job. Levels of inequality, on the other hand, were positively related to the importance of social purpose in jobs, such that individuals residing in countries with higher levels of inequality reported higher levels of endorsement of social purpose in jobs (Factor et al., 2013).

In other research, participants from 45 countries in the European Union were used to study the importance of social purpose in jobs. In this research, social purpose values were included as part of a broader set of measures that assess ‘intrinsic work values’ that comprised of the value people place on achievement, interesting job, or use of initiative (Kaasa, 2011). This measure was not significantly related to GDP per capita. Focusing on social purpose values only (grouped with valuing meeting people in one’s job), researchers found negative relationships with the country-level social capital (Kaasa, 2011). In other words, in countries where the social capital was lower, people valued social purpose in their jobs more. Social capital here was measured by the social trust (share of people reporting ‘people can be trusted’ vs not) and belonging to organisations.

These studies, however, suffered from several important methodological limitations. In all these studies, the authors used regression models whereby the dependent variable is measured at the individual level by respondents from multiple countries and the explanatory variable is a country-level macro indicator. There can be several reasons why such models can reveal biased findings. First, potential cross-country differences in average levels of individual-level factors could

confound the results. Respondents in each country may differ on a range of unobserved characteristics on average that could affect the individual-level analysis. For instance, there could be sociocultural events that affect the subjective ratings in certain countries, and there may be systematic differences in the ways people use the response scales. For instance, if social desirability concerns are more prevalent in certain countries, and this behaviour is also correlated with macro indicators, this would bias the results.

Similarly, there may be occupation-specific differences in the way people value or rate social purpose, and some of these differences may also be related to macro indicators. It is important to average out mean differences in scores across countries and occupations to prevent potential confounding channels. Such multi-level data where individuals are nested within countries and occupations also require the regression analysis to account for the dependency of error terms within each cluster, which was not implemented in the current studies. Furthermore, the authors use the macro indicators individually as a predictor in the regressions. However, it is preferred to control for several macro indicators within the same model to be able to attribute the changes to any single macro indicator.

The other limitation of the studies is related to their representativeness. The dataset by Factor and colleagues (2013) included only 11 Western and economically developed countries. The research by Kaasa and colleagues (2011) included only countries from the European Union. Hence, the generalisability of these findings to non-Western and less developed contexts remains in question. Overall, these methodological concerns prevent us from drawing any strong conclusions from this research about the moderators of how much people derive satisfaction from social purpose in their jobs. More rigorous research is needed on the topic of whether and how macroeconomic factors may affect the relationship between perceived social purpose and job-related attitudes and behaviours.

In sum, the review of this literature suggests that there is strong evidence that the perceived social purpose of one's job predicts overall job satisfaction (e.g., Fairlie, 2011; Steger et al., 2012). Perceived social purpose also affects behaviours that are related to job satisfaction such as accepting lower pay for one's labour (e.g., Burbano, 2016; Chandler & Kapelner, 2013). However, it continues to be imperfectly understood whether and how the relationship between social purpose

and job satisfaction may differ across countries with different levels of macroeconomic performance.

To the best of my knowledge, studies have not directly examined the role of country-level economic conditions in determining how social and financial aspects of jobs may contribute to overall job satisfaction. Several studies have focused instead on work values which asks respondents directly how much importance they attach to these aspects of their jobs (Factor et al., 2013; Kaasa, 2011). These studies have found mixed findings for GDP per capita as a determinant. In addition, as described above, they are methodologically limited to assess the potential effects of GDP per capita. Importantly, by directly asking people to rate the importance of social purpose in their jobs, research can only assess people's stated preferences which may not reflect the true preferences of individuals. By analysing the marginal contributions of job attributes on an independently assessed global measure of job satisfaction, we can more reliably determine people's true preferences; what they value and what makes them happy.

### ***5.1.2. Current Study***

Motivated the theoretical framework about the prioritization of financial goals under financial constraints (Fernbach et al., 2015), the main hypothesis in this study is that the positive relationship between perceived social purpose and job satisfaction will be less strong in countries with poorer macroeconomic performance where financial constraints are greater. My secondary hypothesis is that people's satisfaction with earnings will be a stronger determinant of job satisfaction in these same countries with poorer economic conditions. The reason to focus on subjective judgements vs monetary values of income is primarily driven by the fact that income measure was bracketed in the current data and the number of brackets differed significantly across countries. In addition, prior evidence has shown people's well-being to be less dependent on the current levels of their income vs their subjective judgements about their economic standing (Di Tella et al., 2010; Diener & Seligman, 2004). Hence, instead of current levels of income, I chose people's satisfaction with income as the main explanatory variable of interest in this study.

To assess the country-level economic performance, I focused on two macro-level indicators in the current chapter: i) levels of GDP per capita (referred to as GDP from hereafter), ii) standard deviation in the annual growth in GDP per capita

(referred as volatility from hereafter). It is natural to expect the levels of GDP to be a good proxy for average levels of financial constraints in a given country and a reliable comparative statistic to assess this across countries. In addition, recent studies that examine the role of individual-level differences in financial circumstances on psychological outcomes highlight the importance of assessing the volatility of income in addition to levels (Bøe et al., 2017). At the country level, one way of assessing the extent to which people experienced financial volatility would be to use the standard deviation in the annual changes in countries' levels of GDP. There is a plausible link between the booms and busts of a country in terms of economic growth and the perceived possibility of experiencing financial constraint among the residents of that country. It can be argued that macroeconomic volatility can capture people's beliefs about financial uncertainty in a given country. Hence, volatility was chosen as a second macroeconomic indicator to test the hypotheses in this chapter.

For other economic indicators like income inequality and growth, the theoretical link is less clear. Growth is not a valid measure of average levels of financial concerns since many highly developed countries show lower levels of growth despite having a larger share of their respondents being financially well-off. In line with this, previous studies have not found economic growth measures to be predictive of psychological outcomes (Haushofer, 2013). For this reason, growth measures were not chosen as the main variables of interest but only discussed as part of additional analysis. Economic inequality, on the other hand, is concerned with the distribution of income in the population vs average levels in income. It is, therefore, not a useful proxy for average levels of financial hardship/concern. Also, there is so far no conclusive evidence on whether and how country-level inequality would affect average levels of economic and social-psychological outcomes in the population (Powdthavee et al., 2017). Since the hypotheses in this study are based on differences across countries in terms of average levels of experienced financial scarcity or uncertainty, income inequality was also not chosen as a main measure of the moderator but used as a control variable in the analyses.

The sample included respondents from 36 countries ( $N = 12,183$ ) that vary along these economic dimensions and are located across all regions of the world. Participants were surveyed in 2015 as part of the International Social Survey Program's Work Orientations Module. Job satisfaction was assessed by a single-

item self-report question. Perceived social purpose was constructed by the average scores for two questions where respondents rated whether the current job helps others and useful to society. Individual-level ratings for whether income is high in the current job were used as a subjective assessment of income. Country statistics of GDP were drawn from World Bank data repositories. The analysis first identified the marginal contributions of social purpose (and income satisfaction) on job satisfaction in the current data. Next, moderation by economic indicators was investigated in a regression where social purpose and income satisfaction are included as explanatory variables in the model and interacted with macroeconomic indicators.

The analyses also controlled for interactions between the social purpose and income assessments and other country-level economic indicators (unemployment and inflation), to isolate the effects of economic measures of interest. In addition, although previous studies have not found individualism to be significantly related to valuing social purpose at work (Kaasa, 2011), I also inserted an interaction with individualism because there is a strong theoretical link between holding individualistic vs collectivistic values and caring about helping others (Chopik et al., 2017). The absence of evidence in prior studies may be due to the homogeneity of their sample (the sample included only European countries) or methodological limitations (the methods did not account for the multi-level nature of the data). Using the more representative sample and advanced methods in this study may overturn the existing findings for individualism.

## **5.2. Methods**

### ***5.2.1. Sample***

This study used data from the 2015 Work Orientation Module of the International Social Survey Program (ISSP). ISSP is a cross-national collaboration that has been conducting annual surveys on social science topics since 1985. ISSP data collection procedures are conducted by a voluntary association of research institutions across the world which apply identical surveys to representative samples of adult populations in respective countries (Jutz et al., 2018; Scholz et al., 2017). Researchers pay special attention to selecting questions that can be meaningful to respondents in all countries and agree on a 15-minute survey that is translated into

local languages (Joye & Sapin, 2017; Knudsen & Wærness, 2008). The methods of data collection vary and include various multistage random procedures (Joye & Sapin, 2017). These procedures are also monitored to make sure the study design and survey quality are maintained across countries. Detailed documentation and data are publicly available and can be accessed at the ISSP archive (<https://www.gesis.org/issp/home/>).

ISSP's 2015 Work Orientation Module included questions that specifically focused on understanding people's organisation of and attitudes towards their work life (Jutz et al., 2018). The 2015 Work Orientation Module included 37 countries: Australia, Austria, Belgium, Chile, China, Taiwan, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Hungary, Iceland, India, Israel, Japan, Latvia, Lithuania, Mexico, New Zealand, Norway, Philippines, Poland, Russia, Slovak Republic, Slovenia, South Africa, Spain, Suriname, Sweden, Switzerland, United Kingdom, United States, and Venezuela. The initial sample comprised 51,668 individuals and only 29,538 reported being employees currently working for pay. 547 individuals who chose the value of zero for personal income despite reporting working for pay were excluded from the analysis. 60% of the remaining sample reported working full time and/or working for 30 hours or more, which left a sample size of 17,360 individuals. 82% of this sample reported being an employee vs being self-employed or working for a family business, and only these employees were maintained for the analyses. Overall, there were 14,374 employees who are working full time in a paid job in the current data. Summary statistics for this full sample are presented in Table A6 in Appendix.

I excluded those who had missing data on key variables of interest in the analyses (12%). Data from Taiwan were also excluded since there were no reliable GDP measures for this country (4%). The final analytic sample included 12,183 individuals. The summary statistics for the analytic sample are presented in Table 10. Comparing these to the statistics for the full sample (Table A6) reveal that exclusions due to missing data have not changed the sample in any meaningful way. Both samples had the same average age ( $M = 42$ ,  $SD = 12$ ) and similar gender profile (44% female vs 43%). Average levels of job satisfaction, social purpose and income satisfaction were also identical in both samples.

### 5.2.2. Measures

*Job Satisfaction.* Respondents rated their job satisfaction with a single-item question: ‘All things considered, how satisfied are you with your main job?’ on a scale from 1 (*completely dissatisfied*) to 7 (*completely satisfied*). Distribution of the scores suggested that the majority rated their satisfaction 5 and above (Figure A3). The job satisfaction variable was standardised ( $M = 0$ ,  $SD = 1$ ) using within-country scores.

*Social Purpose.* Respondents provided ratings for their agreement with statements regarding their current jobs: ‘Job helps others’ and ‘Job is useful for the society’. The items were rated on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). An average of these items was used as a final measure of social purpose ( $\alpha = .73$ ). The ratings for each item were moderately correlated with each other ( $r = 0.572$ , 95% CI = [0.561, 0.583]). Distribution of the scores suggested that the majority scored three and above on this measure of social purpose (Figure A4). The variable was standardised ( $M = 0$ ,  $SD = 1$ ) using within-country scores. The analyses used variables that indicate helping others and social usefulness independently, and results did not differ (Table A14).

*Income Satisfaction.* Satisfaction with income was rated on a single item measure that asked people’s agreement with the statement ‘My income is high’ regarding their current job on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). The distribution of the scores for this variable was close to a normal distribution (Figure A5). The variable was standardised ( $M = 0$ ,  $SD = 1$ ) using within-country scores.

*Income.* Although the main independent variable of interest is income satisfaction, I also used monetary values of income as an exploratory variable. Income was measured as respondent’s monthly income before taxes. As part of the survey procedures, the income measure was bracketed. As shown in Figure A6, for the majority of the countries, the number of brackets were above ten, so the income variable was treated as continuous. To make the measurement scale of income identical between countries, the income variable was standardised ( $M = 0$ ,  $SD = 1$ ) using within-country scores.

*Sociodemographic Factors.* The models were adjusted to the sociodemographic factors that are related to job satisfaction, such as age, gender,

education, marital status and household size (De Neve, 2018). Gender was coded as one if the respondent is female and zero if male. Age was a continuous variable. Education was measured at seven levels: i) No formal education, ii) Primary school (elementary education), iii) Lower secondary, iv) Upper secondary, v) Post-secondary, non-tertiary, vi) Lower level tertiary, first stage, vii) Upper level tertiary (Master, Doctor). Individuals who reported being married or civil partnership was coded as one to denote marital status and zero otherwise. The number of people in the household was used as a continuous variable.

*Work-Related Factors.* Union membership was measured with a binary variable that equalled one if an individual is currently part of a union and zero otherwise. Supervisory role was also coded as a binary variable that equalled one if the respondent agreed to have a supervisory role at work and zero otherwise. Occupation was based on International Standard Classification of Occupations, ISCO-08. The categories included i) Managers, ii) Professionals, iii) Technicians and Associate Professionals, iv) Clerical Support Workers, v) Services and Sales Workers, vi) Skilled Agricultural, Forestry, and Fishery Workers, vii) Crafts and Related Trades Workers, viii) Plant and Machine Operators and Assemblers, ix) Elementary Occupations, x) Armed Forces Occupations.

Other job attributes that were included as controls were as follows. First, satisfaction with work hours was constructed from a question that asked people to choose if they wanted more/fewer hours to work, or they would keep their work hours the same. A binary variable was coded as one if people indicated wanting the same work hours and zero otherwise. Note that this is a theoretically more proximal measure as a determinant of job satisfaction compared to a numerical value of work hours because we would expect the number of work hours to be related to job satisfaction through people's subjective assessments of whether their number of work hours is desirable. Also note that the current sample were already restricted to people who work full-time. Further, the correlations between job satisfaction and work hours were smaller ( $r = -.04$ , 95% CI = [-0.058, -0.016]) than that of between work-hour satisfaction and job satisfaction ( $r = .09$ , 95% CI = [0.071, 0.113]). In fact, work hours were not a significant predictor of job satisfaction in the full model of job satisfaction with other job attributes and including it did not change the main results in any way; therefore, I included only work-hour satisfaction in the main analyses for the sake of parsimony.

As a measure of work-life balance, I used people's ratings of how often their job interferes with family life on a scale from 1 (*never*) to 5 (*always*). The scores were reverse coded so that higher scores indicate better work-life balance. Skill use was assessed with a question that asked how much respondents used past work experience and skills in the current job 1 (*almost none*) to 4 (*almost all*). Participants rated on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*) whether their job is interesting and secure, involves working independently, has high opportunities for advancement, and involves personal contact with other people. Participants also rated how often they do hard physical work in their jobs and find work stressful on a scale from 1 (*never*) to 5 (*always*). Finally, respondents reported the relationships between management and employees as well as relationships between workmates/colleagues using a scale from 1 (*very bad*) to 5 (*very good*).

*Macro Indicators:* The primary variables of interest in terms of macro indicators were GDP per capita and GDP volatility. Annual country-level measures of GDP per capita (in constant 2010 US\$) were acquired from the World Bank Database (World Bank, 2017). Values of GDP from 2014 was used since this was the year before the survey collection and using lagged values could address concerns about reverse causality.

Volatility was calculated as the standard deviation of annual growth rates in GDP per capita between the first year the data for GDP were available (1990) and 2014. Both variables were standardised ( $M = 0$ ,  $SD = 1$ ) to enable comparisons between variables using the same unit of analysis. Following prior research (Di Tella et al., 2003), I used levels of GDP for the main analysis. Additional analyses used logarithmically transformed values for both GDP and volatility (Table A9). Figure A17 visually examines countries as a function of GDP and volatility scores.

The control variables of unemployment rates (% of the total labour force) and inflation rates (Consumer Price Index, annual %), were also retrieved from the World Bank database for the year 2014. Both unemployment and inflation rates have previously been linked with subjective judgements of well-being (Clark & Oswald, 1994; Di Tella et al., 2003). These macroeconomic indicators were standardised ( $M = 0$ ,  $SD = 1$ ).

Gini Index was retrieved from the Standardised World Income Inequality Database, which draws its data from multiple sources to offer substantial coverage across countries and over time while maximizing comparability for cross-national

research (Solt, 2016). Gini measures of inequality in disposable (post-tax, post-transfer) income were used in this study where greater values denote greater income inequality. A Gini measure takes on the value of zero if all members of the population had the same income and a value of one if one member has all the income. Most Gini Indices are between the values of 0.2 and 0.65. Gini measures were multiplied by 100 to ease interpretability and standardised to be able to compare with other macro indicators ( $M = 0$ ,  $SD = 1$ ).

Individualism measure was based on Hofstede's cultural individualism scores where greater values indicate greater levels of individualistic values at the country level (Hofstede, Hofstede & Minkov, 1991). This variable was also standardised for comparability ( $M = 0$ ,  $SD = 1$ ).

In robustness checks, I also used measures of growth and mean levels of GDP per capita for all the available years. Growth was calculated as the mean of annual growth rates in GDP per capita from 1991 until 2014 ( $t-1$ ). Prior studies highlight that short-term growth measures could be less indicative of stable country-level characteristics (Haushofer, 2013). In the current study, I, therefore, used average measures of annual growth for the years GDP data were available (1990-2014).

For Taiwan, it was not possible to find reliable measures on GDP per capita that was aligned with the existing indicators; therefore, this country was excluded from the analyses. The Gini measures for India and Suriname for 2014 were absent in the database; hence, values from 2012 were used for India and values from 2005 were used for Suriname. The inflation measure for Georgia was acquired from the IMF database since it was absent in the World Bank database. Inflation measures for other countries in the IMF database matched the existing measures of inflation for the other countries that were acquired from the World Bank. Individualism scores did not exist for Georgia.

The respective values for the macro indicators for each country are demonstrated in Table A7 in the Appendix. As indicated by the histograms for each variable in Figures A7 to A12, there were outliers in some of these variables. China was an outlier in growth; Georgia was an outlier in volatility; South Africa in Gini; Venezuela in inflation; and South Africa and Spain were outliers in unemployment. In the main analyses, these outliers were maintained. Outliers for main macroeconomic variables of interest were excluded in robustness checks. The results

for robustness checks are provided in Appendix (Table A10) and discussed in the Results (Section 5.3).

**Table 10.** Summary Statistics for the Analysis of Social Purpose and Job Satisfaction (Data: International Social Survey Program 2015)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
<i>Main Variables</i>					
Job Satisfaction	5.32	1.15	1	7	12,183
Social Purpose	3.89	0.88	1	5	12,183
Job Helps Others	3.84	1.03	1	5	12,113
Job is Socially Useful	3.94	0.95	1	5	12,084
Income Satisfaction	2.87	1.09	1	5	12,183
<i>Sociodemographic Factors</i>					
Age	42.01	12.03	17	95	12,183
Gender	0.44	0.50	0	1	12,183
Education	3.71	1.48	1	7	12,183
Married	0.56	0.50	0	1	12,183
Household Size	3.05	1.57	0	18	12,183
<i>Occupation Type</i>					
Military	0.01	0.07	0	1	12,183
Manager	0.08	0.28	0	1	12,183
Professional	0.20	0.40	0	1	12,183
Technician	0.15	0.36	0	1	12,183
Clerical Support	0.08	0.28	0	1	12,183
Service-Sales Worker	0.16	0.37	0	1	12,183
Agriculture Worker	0.01	0.10	0	1	12,183
Crafts-Trade Worker	0.13	0.34	0	1	12,183
Operator-Assembler	0.08	0.27	0	1	12,183
Elementary Occupation	0.09	0.28	0	1	12,183
<i>Work-Related Factors</i>					
Union Member	0.28	0.45	0	1	12,183
Supervisor	0.28	0.45	0	1	12,183
Satisfied with Work Hours	0.58	0.49	0	1	11,595
Work Life Balance	3.69	1.08	1	5	12,044
Skill Use at Job	2.83	1.00	1	4	11,573
Independence in Job	3.74	1.12	1	5	12,136
Job Offers Advancement	2.84	1.13	1	5	12,025
Job is Interesting	3.85	0.99	1	5	12,136
Job Security	3.82	1.08	1	5	12,089
Job is Physical	2.68	1.33	1	5	12,149
Job is Stressful	3.20	1.04	1	5	12,130
Social Contact in Job	4.23	0.85	1	5	12,140
Relations with Managers	3.87	0.90	1	5	12,014
Relations with Colleagues	4.19	0.75	1	5	12,024

*Note:* Data were from the Work Orientation Module of the 2015 International Social Survey Program.

### 5.2.3. *Statistical Analysis*

First, to understand the main associations between job characteristics of interest in this study and job satisfaction, the job satisfaction ratings were regressed on each of these job attributes: i) income satisfaction and ii) social purpose. Ordinary least squares (OLS) estimation was used to identify the marginal contribution of each of these job characteristics. In a step-wise fashion, the initial regressions included only social purpose and income satisfaction as explanatory variables. Next, the regression models were adjusted for demographic variables that could confound the relationship between job attributes and job satisfaction. These included age, gender, education, marital status, and household size. In addition, the models were adjusted for individuals' status of union membership and supervisory role. As a next step, the models were adjusted for other job attributes that include satisfaction with work hours, work-life balance, skill use, independence, advancement opportunities, whether the job is interesting, whether the job is secure, whether the job is physical, job stress, social contact at work, satisfaction with relationships with managers, and satisfaction with relationships with colleagues. All regression models included dummy variables for occupation categories and countries. These dummy variables average out the mean levels of regressors in each category (occupation or country) from the equation thereby restricting the models to capture differences across individuals within each occupation or category and accounting for potential confounding influences due to the differences between occupations and countries.

The OLS estimation method treats the dependent variable of job satisfaction as a cardinal variable as if the differences between the ratings of 2 and 3 on the scale are the same as the difference between the ratings of 5 and 6. This assumption, however, may not be true, and people's responses may only be ordinally comparable (Ferrer-i-Carbonell & Frijters, 2004). To account for this possibility, I used an ordered logit model and estimated the marginal probabilities of being in each response category (e.g., 'Completely Satisfied') for each unit of change in social purpose and income satisfaction. The findings were qualitatively similar in the ordered logit model (Table A8).

After retrieving the estimates for the marginal associations between job satisfaction and job attributes, the next set of models examined the potential

moderating influences of country-level economic indicators: GDP and volatility. To assess the moderating role of these variables, the job attributes of social purpose and income satisfaction were interacted with each of these country-level variables. In the first model, job satisfaction was regressed on social purpose interacted with GDP. Within the same model, income satisfaction was also interacted with GDP. The coefficients of these interaction terms were analysed. Next, the model was adjusted for other job attributes. The same procedure was repeated for volatility. As a final step, the models were adjusted for other macro indicators: inequality, inflation, unemployment, and individualism. Each of these macro indicators was interacted with job attributes (social purpose and income satisfaction). Volatility and GDP interactions (with social purpose and income satisfaction) were included in this model simultaneously to control for one another. Note that the individual-level variables were assessed in a survey conducted in 2015. For macro indicators, one-year lagged values were used to address concerns about reverse causality. Errors were clustered at the country level in all analyses.

**The models.** The following equation was estimated to measure the interaction effects of GDP in the relationship between social purpose and job satisfaction:

$$JS_{ic} = \beta_0 + \beta_1 P_{ic} + \beta_2 (P_{ic} \times GDP_c) + \delta_1 X_{ic} + \varphi_i + \gamma_c + \varepsilon_{ic}$$

where  $JS$  measures job satisfaction for person  $i$  in a given country  $c$ ; and  $P_{it}$  measures self-reported levels of social purpose in a job for each individual  $i$  in country  $c$ .  $X_{ic}$  is a vector for observed covariates for individual  $i$  in country  $c$  (age, gender, education, marital status, household size, union membership, supervisory role).  $\varphi_i$  represents occupation fixed effects and  $\gamma_c$  represents country fixed effects,  $\varepsilon_{ic}$  represents the error term, which is clustered at the country level. The levels of GDP are not included as an independent explanatory variable because the main model uses within-country estimates and any variable that is constant for all individuals within countries and only differs across countries is dropped due to multicollinearity.

The coefficient of interest was  $\beta_2$  which measures the extent to which  $\beta_1$  differs as a function of  $GDP$ . The same model was used for testing economic

volatility as a moderator; GDP was replaced with country-fixed measures of economic volatility. I also adjusted the model to other job attributes by including the following as part of the list of observed covariates: work-hours satisfaction, work-life balance, skill use, independence, and advancement opportunities in the job, job interestingness, security, and stress, social contact in the job, relationships with managers and colleagues.

Next, I adjusted the above-mentioned model for other macro indicators and estimated the following equation:

$$JS_{ic} = \beta_0 + \beta_1 P_{ic} + \beta_2 (P_{ic} \times GDP_c) + (P_{ic} \times Macro_c) + \delta_1 X_{ic} + \varphi_i + \gamma_c + \varepsilon_{ic}$$

In this model,  $Macro_c$  measures rates of unemployment, inflation, income inequality (as measured by the Gini index), and individualism for each country  $c$ . Still, the coefficient of interest was  $\beta_2$  which measures the interaction effect. In all specifications, errors were clustered at the country level. The method was implemented in Stata software, version 15.1.

### 5.3. Results

#### 5.3.1. Relative Contributions of Income Satisfaction and Social Purpose to Job Satisfaction

The results for the OLS regression models for job satisfaction as a function of job attributes are shown in Table 11. As presented in Column 1, the association between social purpose and job satisfaction was significantly different from zero ( $\beta = .28$ , 95% CI = [0.259, 0.297],  $p < .001$ ). As presented in Column 2, the association between income satisfaction and job satisfaction was also significantly different from zero ( $\beta = .31$ , 95% CI = [0.294, 0.330],  $p < .001$ ). The respective associations for these variables reduced in magnitude as the models were adjusted for individual-level covariates in Column 3. Income satisfaction had a stronger association with job satisfaction ( $\beta = .28$ , 95% CI = [0.262, 0.299],  $p < .001$ ) compared to social purpose ( $\beta = .24$ , 95% CI = [0.224, 0.262],  $p < .001$ ). The differences between these coefficients were statistically significant ( $F(1, 12,129) = 7.03$ , Prob >  $F = .008$ ).

**Table 11.** Associations Between Job Satisfaction and Job Attributes in 36 Countries  
(Data: International Social Survey Program 2015)

	(1) Job Satisfaction	(2) Job Satisfaction	(3) Job Satisfaction	(4) Job Satisfaction
Social Purpose	0.28*** [0.259,0.297]		0.24*** [0.224,0.262]	0.06*** [0.037,0.076]
Income Satis.		0.31*** [0.294,0.330]	0.28*** [0.262,0.299]	0.09*** [0.075,0.114]
Age			0.00*** [0.003,0.006]	0.00*** [0.002,0.005]
Gender			-0.01 [-0.044,0.029]	-0.00 [-0.034,0.031]
Education			-0.04*** [-0.053,-0.023]	-0.03*** [-0.046,-0.018]
Married			0.02 [-0.012,0.062]	0.03 [-0.008,0.060]
Household Size			-0.00 [-0.015,0.010]	-0.00 [-0.017,0.007]
Union Member			-0.04** [-0.086,-0.001]	0.04** [0.006,0.083]
Supervisor			0.02 [-0.026,0.057]	0.03 [-0.006,0.068]
Work-Hours Satis.				0.02*** [0.009,0.039]
Work-Life Balance				0.11*** [0.093,0.128]
Skill Use				0.03*** [0.014,0.047]
Independence				0.02** [0.005,0.040]
Advancement				0.05*** [0.035,0.073]
Job is Interesting				0.26*** [0.239,0.284]
Job Security				0.07*** [0.052,0.088]
Job is Physical				0.01 [-0.012,0.026]
Job is Stressful				-0.09*** [-0.109,-0.074]
Social Contact				0.01 [-0.005,0.033]
Relation-Managers				0.24*** [0.216,0.258]
Relation-Colleagues				0.10*** [0.084,0.124]
Constant	0.00 [-0.123,0.123]	0.00 [-0.122,0.122]	-0.08 [-0.357,0.190]	0.03 [-0.183,0.246]
Occupation FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
R-squared	0.08	0.10	0.17	0.43
Observations	12,183	12,183	12,183	10,416

Note: Data were from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

In Column 4, other job attributes were included in the model as controls. The explanatory power of the model, as measured by the R-squared, increased from .17 to .43. This significantly reduced the size of the associations for social purpose ( $\beta = .06$ , 95% CI = [0.037, 0.076],  $p < .001$ ) as well as income satisfaction ( $\beta = .09$ , 95% CI = [0.075, 0.114],  $p < .001$ ). The differences between the coefficients were still statistically significant ( $F(1, 10,351) = 8.37$ , Prob  $> F = .004$ ). As a robustness check, I applied an ordered logit model which treats the outcome variable of job satisfaction as an ordinal variable. The results were qualitatively similar (Table A8).

Overall, there were fourteen job attributes in the final regression model in Column 4, and comparing the size of the associations, income satisfaction had the 7<sup>th</sup> largest coefficient (along with job stress), and social purpose had the 9<sup>th</sup> largest association in magnitude. Only social contact and physical work had no significant associations with job satisfaction; all other variables were significantly related to job satisfaction in a theoretically expected way.

Job satisfaction was positively related to age, but the size of the association was below .001 standard deviation units. Individuals with higher levels of education were less satisfied with their jobs after adjusting for covariates despite the raw correlations between education and job satisfaction being positive ( $r = .064$ , 95% CI = [0.043, 0.085]). This could be because after controlling for all job characteristics, educated people may have more expectations from their jobs despite having better work conditions. Union members reported lower levels of job satisfaction (Column 3), but after controlling for job attributes, the association became positive (Column 4). This is not as surprising since job attributes are expected to account for some of the associations between union membership and job satisfaction. Household size, being married and holding a supervisory role was not significantly related to job satisfaction.

### ***5.3.2. Moderation Analysis of Macroeconomic Indicators***

Next, the models assessed whether the marginal contributions of social purpose and income satisfaction on job satisfaction differed based on macroeconomic indicators. Table 12 reports the results of this moderation analysis. Column 1 investigates the role of GDP and reveals that the interaction term for social purpose and GDP was positive, but the coefficient estimates remained only marginally significant ( $\beta = .02$ , 95% CI = [-0.000, 0.046],  $p = .051$ ). The positive

association between job satisfaction and income satisfaction did not differ as a function of GDP levels ( $\beta = -.01$ , 95% CI = [-0.033, 0.020],  $p = .616$ ). As shown in Column 2, controlling for other job attributes increased the precision of the estimates for the interaction term between social purpose and GDP and increased the size of this association ( $\beta = .03$ , 95% CI = [0.002, 0.055],  $p = .038$ ).

Column 3 reports the results of the moderation analysis for cross-country differences in economic volatility. As predicted, the positive association between job satisfaction and social purpose was lower in countries with higher levels of volatility. The interaction term for volatility and social purpose were negative ( $\beta = -.04$ , 95% CI = [-0.051, -0.023],  $p < .001$ ). At the same time, the positive association between job satisfaction and income satisfaction increased in countries with higher levels of volatility ( $\beta = .04$ , 95% CI = [0.020, 0.052],  $p < .001$ ). In Column 4, the model for volatility was adjusted for other job attributes. The coefficients for the interaction term of volatility and social purpose remained identical ( $\beta = -.04$ , 95% CI = [-0.053, -0.028],  $p < .001$ ). Similarly, the interaction term for volatility and income satisfaction did not change in any meaningful way but only slightly reduced in size ( $\beta = .03$ , 95% CI = [0.018, 0.051],  $p < .001$ ).

In a final model, reported in Column 5, I included GDP and volatility measures simultaneously in the full model where other macro indicators are also interacted to explore whether their respective influences would hold when controlling for other macro indicators. Holding GDP levels constant, volatility remained an important moderator. The positive contribution of social purpose on job satisfaction decreased at higher levels of volatility ( $\beta = -.05$ , 95% CI = [-0.086, -0.018],  $p < .001$ ) and the positive contribution of income satisfaction increased ( $\beta = .05$ , 95% CI = [0.020, 0.074],  $p < .001$ ). On the other hand, holding constant country levels of volatility, the moderating effects of GDP changed signs for social purpose. As GDP increased, the positive contribution of social purpose on job satisfaction decreased ( $\beta = -.04$ , 95% CI = [-0.055, -0.020],  $p < .001$ ). This was not aligned with the theoretical predictions of this study.

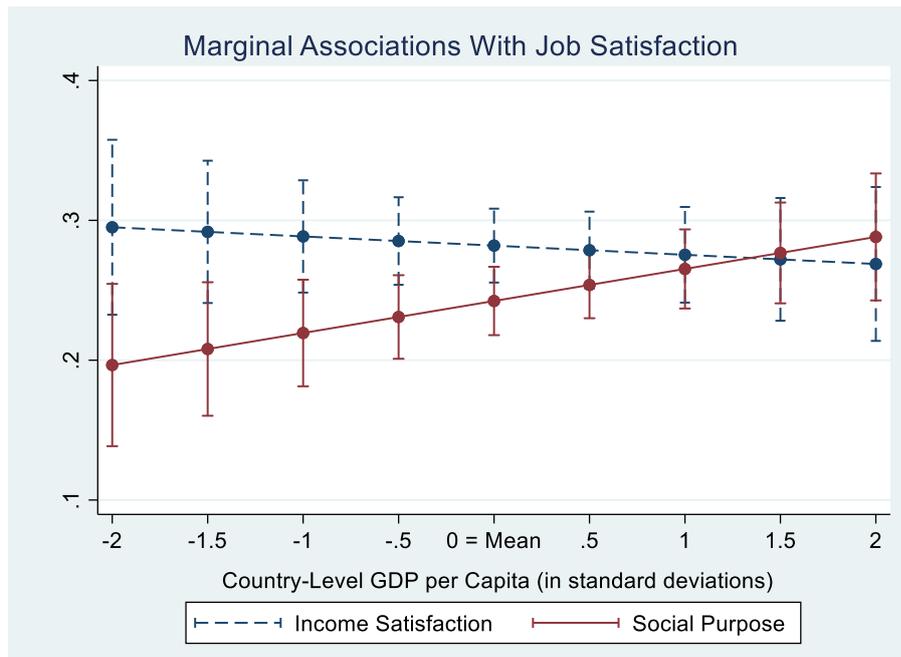
In Figure 4, the interaction effects for GDP and volatility are shown visually by plotting the coefficients between job satisfaction and job attributes (social purpose and income satisfaction) at different standard deviation units of country-level GDP and volatility. For GDP, there is a weak trend for an increasing

(decreasing) association for social purpose (income satisfaction) at higher levels of GDP. In contrast, the contribution of social purpose (income satisfaction) on job satisfaction clearly decreases (increases) at higher levels of volatility.

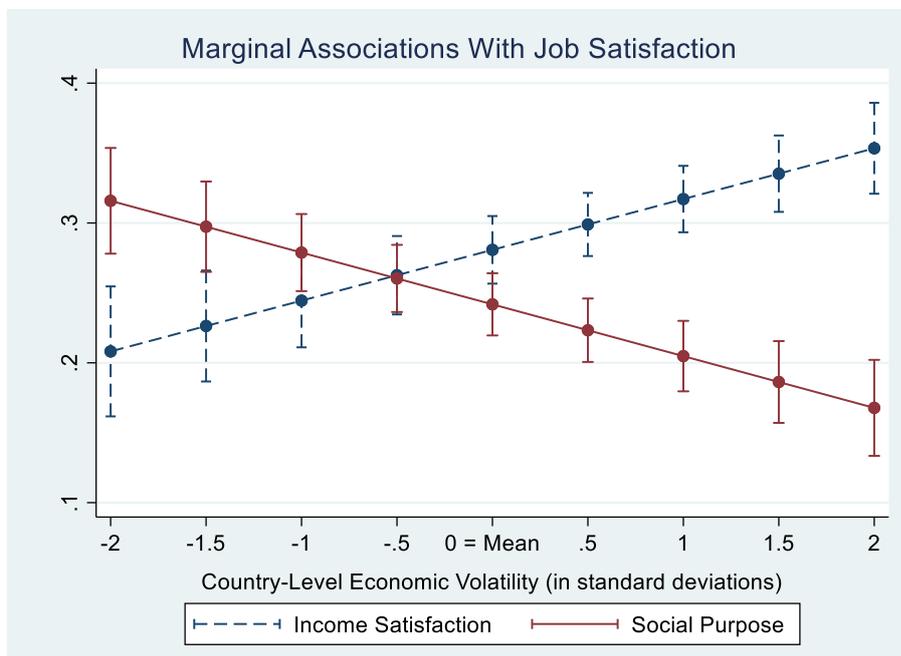
**Table 12.** Associations Between Job Satisfaction and Job Attributes in 36 Countries - Moderation Analysis by Country-Level Economic Indicators (Data: International Social Survey Program 2015)

	(1)	(2)	(3)	(4)	(5)
	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction
Social Purpose	0.24*** [0.218,0.267]	0.06*** [0.032,0.079]	0.24*** [0.220,0.264]	0.05*** [0.032,0.075]	0.24*** [0.223,0.261]
Income Satis.	0.28*** [0.256,0.308]	0.10*** [0.068,0.123]	0.28*** [0.257,0.305]	0.10*** [0.074,0.118]	0.28*** [0.260,0.304]
Inc Sat.#GDP	-0.01 [-0.033,0.020]	0.00 [-0.022,0.031]			0.01 [-0.026,0.044]
Purpose#GDP	0.02* [-0.000,0.046]	0.03** [0.002,0.055]			-0.04*** [-0.055,-0.020]
Inc Sat#Volatility			0.04*** [0.020,0.052]	0.03*** [0.018,0.051]	0.05*** [0.020,0.074]
Purpose#Volatility			-0.04*** [-0.051,-0.023]	-0.04*** [-0.053,-0.028]	-0.05*** [-0.086,-0.018]
Inc Sat#Inflation					-0.02*** [-0.031,-0.011]
Purpose#Inflation					0.00 [-0.007,0.014]
Inc Sat#Unemp.					0.00 [-0.013,0.020]
Purpose #Unemp.					0.01 [-0.008,0.028]
Inc Sat#Gini					-0.01 [-0.032,0.020]
Purpose#Gini					-0.05*** [-0.075,-0.029]
Inc Sat#Indiv.					-0.01 [-0.028,0.017]
Purpose#Indiv.					0.02* [-0.001,0.039]
Constant	-0.08 [-0.359,0.192]	0.04 [-0.132,0.206]	-0.11 [-0.389,0.174]	0.02 [-0.145,0.191]	-0.06 [-0.345,0.223]
Job Attributes	NO	YES	NO	YES	NO
Occupation FE	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES
R-squared	0.17	0.43	0.17	0.43	0.17
Observations	12,183	10,416	12,183	10,416	11,991

*Note:* The data (except for the macro variables) were from the Work Orientation Module of the 2015 International Social Survey Program. Indiv. measures individualism; unemp. measures unemployment rate; inc sat. measures income satisfaction. FE denotes fixed effects. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01



**Figure 4. Marginal Associations Between Job Satisfaction and Job Attributes (Social Purpose and Income Satisfaction) Based on GDP**  
*Note.* Coefficient estimates were regression adjusted based on the model in Table 12, Column 1. Bars represent %95 confidence intervals. Job-related data were from ISSP 2015. Data on GDP per capita in 2014 were from the World Bank Database.



**Figure 5. Marginal Associations Between Job Satisfaction and Job Attributes (Social Purpose and Income Satisfaction) Based on Country-Level Volatility in GDP**  
*Note.* Coefficient estimates were regression adjusted based on the model in Table 12, Column 2. Bars represent %95 confidence intervals. Job-related data were from ISSP 2015. Volatility was measured as standard deviation in annual changes in GDP per capita between 1990 and 2014. GDP measures were drawn from the World Bank Database.

What could explain the change of signs in the interaction effects of GDP when volatility is controlled for? It is possible that volatility measures strongly explain the theoretically relevant variation in financial experiences across countries and the variation in GDP, holding volatility constant, is picking up some other theoretically irrelevant effects. Indeed, GDP and volatility are somewhat correlated ( $r = -0.364$ , 95% CI = [-0.622, -0.035]) (also see Figure A17). Furthermore, as it becomes clear in the visual examination of these interactions (Figures 4 and 5), the moderating influences of GDP and volatility follow the same trend, but the coefficient slopes are stronger for volatility. Note that the change in coefficients cannot be due to the exclusion of Georgia from the analyses in the full model due to missing values in the individualism variable. The results were the same when I excluded individualism from the model to keep observations from Georgia (Table A10, Column 4).

As a robustness check, I used logarithmically transformed values of GDP and volatility (Table A9), excluded Venezuela from the analysis since it had unusually high job satisfaction and social purpose ratings (Table A10), used individual items that comprise of the average social purpose score ('job helps others' and 'job is useful for the society') (Table A14). In all these specifications, the results for social purpose and income satisfaction remained largely the same when interacted with volatility and GDP. Note that Georgia was an outlier in the volatility measures, but since Georgia also was missing individualism scores, it was excluded in the regressions above and its exclusion did not affect the results for volatility (Table 12, Column 5). Missing the observations for Georgia cannot explain the changes in the sign for GDP in this specification because even when I included Georgia (by excluding individualism) from the analysis, the sign for GDP remained the same (Table A10, Column 4).

It is possible that the moderating effects of volatility are driven by the differences in average levels of social purpose or job satisfaction across countries with different levels of volatility. For example, in a higher (lower) volatility country, individuals could have lower (higher) levels of social purpose and job satisfaction on average. At the same time, we may also expect each unit increase in social purpose to have a greater (smaller) contribution to job satisfaction when social purpose and/or job satisfaction are lower (larger) to begin with. If so, this would result in social purpose having an increased association with job satisfaction in high volatility

countries. This is not consistent with the findings observed in this data, and therefore, is unlikely to constitute an alternative explanation. Further, there did not exist a significant relationship between country-level mean social purpose ratings and volatility scores (Figure A13 in Appendix), or country-level mean job satisfaction ratings and volatility scores (Figure A14 in Appendix).

How about measures of GDP per capita? Can there be differences in average ratings in job-related variables as a function of GDP that can explain the findings? Applying the same logic to GDP, we would expect higher (lower) GDP countries to report greater (smaller) mean levels of job satisfaction and social purpose which would decrease (increase) the contribution of social purpose on job satisfaction. Indeed, there does seem to be a positive relationship between country-level mean social purpose ratings and GDP (Figure A15 in Appendix), and country-level mean job satisfaction ratings and GDP (Figure A16 in Appendix). This could partly explain why there may be a negative interaction effect for GDP after accounting for the effects of volatility. In other words, volatility may account for the effects of the financial scarcity and uncertainty channel, which GDP also captures but to a less extent. The variation that is left after this could be related to these high average ratings in social purpose and job satisfaction which would predict a negative interaction effect for GDP.

### **5.3.3. Additional Analysis**

In additional analyses, I used monetary values of income instead of income satisfaction (Table A11). As shown in Column 1, both social purpose and income significantly predicted job satisfaction controlling for demographics and job attributes in addition to country and occupation fixed effects. However, the marginal associations were larger for social purpose ( $\beta = .05$ , 95% CI = [0.030, 0.071],  $p < .001$ ) compared to income ( $\beta = .03$ , 95% CI = [0.016, 0.054],  $p < .001$ ). The relative importance of subjective judgements about income vs absolute values is aligned with prior evidence (Di Tella et al., 2010; Diener & Seligman, 2004) and provide further support for using subjective income measures as the main independent variable in this study.

Columns 2, 3 and 4 examined the moderation results for macroeconomic variables. Columns 2 and 3 included other job attributes, and Column 4 included other macro indicators as control variables. The coefficient for GDP interactions for

social purpose and income was close to null and non-significant in the model with job attributes (Column 2), but with other macro indicators (Column 4), the interaction with social purpose became negative and significant ( $\beta = -.05$ , 95% CI = [-0.073, -0.021],  $p = .001$ ) similar to the patterns observed in the main results. The interactions with volatility were largely the same as the main results in the model with job attributes (Column 3). Volatility decreased the positive relationship between job satisfaction and social purpose ( $\beta = -.04$ , 95% CI = [-0.059, -0.025],  $p < .001$ ) and boosted the positive relationship between job satisfaction and income ( $\beta = .03$ , 95% CI = [0.012, 0.039],  $p < .001$ ). When other macro variables were controlled for in Column 4, the magnitude and statistical significance of these interaction coefficients reduced. This held for both social purpose ( $\beta = -.04$ , 95% CI = [-0.096, 0.010],  $p = .105$ ) and income ( $\beta = .00$ , 95% CI = [-0.026, 0.029],  $p = .896$ ). This could be driven by the loss of observations associated with Georgia since individualism measures were missing for this country. Indeed, in Column 5, I excluded individualism as a control and the results were social purpose gained significance again ( $\beta = -.04$ , 95% CI = [-0.065, -0.022],  $p < .001$ ) although results for income remained below the significance level ( $\beta = .02$ , 95% CI = [-0.004, 0.034],  $p = .108$ ). The results for GDP remained largely the same with or without Georgia.

In another set of regressions, I used each macro indicator that was previously used as controls and examined their respective interactions with social purpose and income satisfaction in predicting overall job satisfaction (Table A12). The measures of unemployment did not reveal any significant interaction effects. Gini measures of inequality had a negative and statistically significant sign when interacted with social purpose ( $\beta = -.03$ , 95% CI = [-0.060, -0.005],  $p = .022$ ). Inflation also had a negative sign when interacted with social purpose ( $\beta = -.02$ , 95% CI = [-0.035, -0.002],  $p = .030$ ) as well as income satisfaction ( $\beta = -.01$ , 95% CI = [-0.022, -0.003],  $p = .011$ ). Individualism, on the other hand, had a positive sign when interacted with social purpose ( $\beta = .02$ , 95% CI = [0.002, 0.042],  $p = .034$ ). In other words, as the level of inequality and inflation increased, or as individualism decreased, the positive relationship between social purpose and job satisfaction weakened.

Note that only the coefficient for the Gini measure's interaction term with social purpose remained statistically significant in the full model that included all

variables (Column 5 Table 12). Similarly, the interaction term for inflation and income satisfaction was also significant in the full model (Column 5 Table 12). For income satisfaction, the consistent finding across models was the decreasing positive associations between income satisfaction and job satisfaction at higher levels of inflation. As shown in Table A13, the measures of economic growth did not reveal any significant interaction effects, and using the measures of mean levels of GDP per capita (between 1990 and 2014) did not change the main results for GDP.

#### **5.4. Discussion**

The present research has first shown that social purpose is an important contributor to overall job satisfaction in 36 countries across the world. This association remained robust across different specifications, including controlling for a large set of job attributes. Above and beyond other job attributes, the marginal associations of job satisfaction and social purpose (.06 standard deviations) were slightly smaller than that of income judgements (.09 standard deviations). This finding was aligned with prior research that has shown self-reported meaning and social purpose in jobs to predict job satisfaction (Fairlie, 2011; Steger et al., 2012) and willingness to receive lower payments (Burbano, 2016; Chandler & Kapelner, 2013; Hu & Hirsh, 2017).

Studying the determinants of job satisfaction enables us to better understand what makes a good job and enhance worker well-being (Clark, 2010). Thus, the current findings suggest that the social contributions people make with their jobs are almost as important for well-being and job quality as how much money people make. Importantly, however, caution should be paid in generalizing this finding across countries because the importance of social purpose for job satisfaction somewhat differs along with cross-country differences in macroeconomic performance.

In line with the hypotheses that guide this study, the contributions of social purpose to overall job satisfaction were smaller in countries with higher volatility in their annual changes of GDP per capita. At the same time, the contributions of income satisfaction to overall job satisfaction were larger in countries with higher economic volatility. This finding was robust across a range of specifications including an extensive set of controls for job attributes and other macro indicators such as the Gini measures of income inequality, inflation, unemployment, and

individualism. It is possible that indicators like inflation and unemployment constitute at least some of the channels through which volatility may impact the contributions of social purpose on job satisfaction. Previous studies have also made the case for inflation as a measure of a country's financial stability (Schwartz, 1995). However, the addition of these variables into the models did not affect the size or significance of the moderating influence by volatility. This suggests there may be other channels that volatility may operate through to affect the relationship between social purpose and job satisfaction. Or, volatility may have a direct impact on individual-level beliefs and preferences that are related to social purpose in jobs.

Further, as the contributions of social purpose to job satisfaction weakens, the contributions for income satisfaction gets strengthened as economic volatility increased in current data. As described in this chapter, there is a somewhat well-established trade-off between working in a job that creates social value or a job that pays well (Burbano, 2016; Chandler & Kapelner, 2013; Frank, 1996; Hu & Hirsh, 2017; Johnston & Johnston, 2019). To the extent that there is a trade-off between certain job characteristics and higher incomes, financial scarcity and/or uncertainty may boost people's need to prioritise financial rewards and undermine their preferences towards non-financial job characteristics. Psychological research describes these prioritisation effects as one of the main mechanisms for how financial beliefs about constraints affect people's decisions and well-being (Fernbach et al., 2015). Hence, assuming that economic volatility measures the uncertainty associated with financial resources in a given country, these findings can constitute supportive evidence of this prioritisation effect as it relates to job-related decisions and well-being.

This study has yielded mostly null results for GDP as a moderator of the relationship between social purpose and job satisfaction, suggesting that GDP may not affect the satisfaction people derive from the social purpose of their jobs. These null results were supported by graphical evidence as the GDP seemed to increase the contributions of social purpose on job satisfaction, as predicted by the hypotheses, but at a negligible rate. However, the sign of the interaction between GDP and social purpose changed when controlling for volatility measures and became negative. This was also the case when I controlled for other macro indicators in a regression model that uses logarithmically transformed values of GDP. This finding contradicted the

theoretical predictions in the study and suggested that increases in GDP weakened the contributions of social purpose on job satisfaction.

One explanation for the sign changes in GDP's interaction effects could be that economic volatility captures much of the variation in individual-level financial attitudes that could predict a theoretically meaningful weakening role of social purpose for job satisfaction. Above and beyond this, the variation that is left for GDP to explain may be driven by other factors unrelated to the mechanisms in this study. For example, both job satisfaction and social purpose ratings are higher in countries with higher GDPs which could mean the extent to which social purpose can contribute to job satisfaction is lower. This could be one source of variation that is left from volatility which GDP measures may be capturing.

GDP was also not a significant moderator for income satisfaction. Thus, the marginal contributions of income satisfaction on overall job satisfaction did not differ across countries with different levels of GDP. GDP did not yield significant moderating effects when I used monetary values of income instead of income satisfaction either. These findings may seem surprising at first since it is fair to assume that GDP represents the average levels of financial scarcity within the population and we can expect financial needs to predict how much financial satisfaction matters in a job. However, previous studies have found the relationship between country-level GDP and life satisfaction to be little to none above the \$10,000 levels in GDP per capita (Diener & Seligman, 2004). Similarly, within countries, there are diminishing returns to income in terms of happiness which plateau and even becomes negative at higher levels of income (Jebb et al., 2018). The fact that the majority of the countries in this data have above \$10,000 GDP per capita may explain why satisfaction with pay may not translate to satisfaction with one's job in the current analyses. It is also possible that although people living in richer countries do not need as high incomes in a job, they have the means to spend their income on more happiness-promoting experiences compared to the residents of lower-GDP countries (Jebb et al., 2018). This could also explain why the satisfaction they derive from pay is not less than people from more financially deprived countries.

In relation to the pre-existing research, this study is the first to investigate how macro-level factors impact the role of social purpose as a determinant of job satisfaction. However, few studies have examined the cross-country differences in

people's self-reported ratings of how much they value social purpose in their jobs (Factor et al., 2013; Kaasa, 2011). These studies have not focused on volatility but GDP and have presented mixed findings of the role of GDP for social purpose. In a sample of 11 Western developed nations, researchers found a negative association (Factor et al., 2013). In a sample 45 European countries, they found no associations (Kaasa, 2011) between GDP and the importance of social purpose. The current study employed 36 countries from across the world with varying levels of economic development and found mostly null results for GDP, which is aligned with findings from 45 European countries. Yet, when controlling for levels of volatility, GDP decreased the contributions of social purpose on job satisfaction, which is aligned with the findings from the all developed nations sample (Factor et al., 2013). Hence, it is not possible to draw firm conclusions about the role of GDP for social purpose at this point. Future research can use a larger sample of countries with more countries at the lower end of the GDP per capita to provide more evidence about whether and how the role of social purpose as a determinant of job satisfaction may differ depending on the levels of GDP.

The current findings also revealed that in countries with a more unequal distribution of income, social purpose becomes less important for satisfaction at work. Prior research has found contradicting evidence on this showing a positive correlation between country-level inequality and the importance of social purpose at work (Factor et al., 2013). This past research, however, did not control for other macro indicators or accounted for the multi-level structure of the data. Applying both of these in the current data, the results showed inequality to have a negative effect on the extent to which social purpose contributes to job satisfaction. This, however, may not be driven by a prioritisation of financial job attributes because income inequality did not affect the relationship between income and job satisfaction. One potential explanation could be related to lower social trust in more unequal countries (Jachimowicz et al., 2017, 2020) such that individuals living in unequal countries would derive less satisfaction from helping others through their jobs because they do not have strong trust and communal feelings towards other people in their countries. In addition, prior research found that individuals derived more satisfaction from their relative rank of their income (not from their absolute income) in more unequal countries (Macchia et al., 2019) whereas there were no effects of inequality on the link between income satisfaction and job satisfaction in

the current data. This may suggest that the subjective judgements of income do not capture people's perceptions of the rank of their income but only the absolute value.

Overall, the present research has shown that the contributions of income satisfaction on job satisfaction do not change in response to most of the macro indicators used in this study (GDP, inequality, unemployment, individualism). However, income contributed less to job satisfaction at higher levels of inflation and it contributed more to job satisfaction at higher levels of volatility. This is aligned with some earlier studies that have found income to be a context-independent, universal contributor to job satisfaction upon investigating the moderating effects by cultural values (Hauff et al., 2015). Others showed that income's contribution to job satisfaction was higher among countries with lower levels of welfare state safety net provisions, as measured by macroeconomic indicators such as the proportion of public debt, government revenue/expenditure in total GDP per capita or income inequality (Westover, 2012). Coupled with the present findings, existing evidence suggests that although income's relation to job satisfaction may be independent of cultural values, there are important macroeconomic variables that affect this relationship but stronger theoretical frameworks are needed to understand what each of these macroeconomic variables captures at the individual-level to be able to interpret the growing evidence on this topic.

#### ***5.4.1. Limitations and Future Directions***

A critical limitation in the current analysis is that the cross-country data that had measures of social purpose was only cross-sectional. The analyses, therefore, could not tackle potential issues like reverse causality (job satisfaction determining social purpose) and unobserved heterogeneity at the individual level. Unobserved heterogeneity would occur if an unobserved factor such as a personal disposition affects both perceptions of social purpose and job satisfaction. If such effects are positive, the main associations between social purpose and job satisfaction could be overestimated in the current analysis. Also, in the current cross-country data, job satisfaction was only assessed with a single item, which could affect the reliability of the measure. Hence, future studies can improve upon these aspects of research where possible.

In addition, the theoretical predictions in this study rest on the assumption that volatility is a proxy for the levels of financial uncertainty among the public.

Although there is a clear theoretical link between economic volatility at the country level and individual-level financial uncertainty, this assumption has not been empirically tested. Besides, there is an increasing number of related macroeconomic indicators that are related to work-related values and preferences (Westover, 2012). An important avenue for future research is, therefore, to understand whether and how each of these macro indicators, importantly volatility, is related to specific individual-level financial attitudes and behaviours such as feelings of uncertainty or scarcity that can predict important outcomes at work and beyond. Future research can continue to investigate the implications of this measure of volatility for other important psychological outcomes such as psychological well-being and social/financial preferences outside the work domain.

It is also important to note that the perceived social purpose of the jobs may capture social contributions at different levels. For instance, people may rate their jobs' social purpose highly if their day to day job makes a direct positive impact on other people's lives (e.g., caring for sick or the elderly) or if their job has a less direct and immediate yet significant and broad societal impact (e.g., advancing scientific knowledge). Although I used occupation fixed effects, these categories are not as detailed, so this would leave quite a bit of variation across job descriptions to determine the social purpose. People may also be rating their organisation's mission when answering questions about jobs' social purpose (Gartenberg et al., 2019; Henderson & Van den Steen, 2015). It is unclear which one of these people are considering when answering the questions about social purpose in this study. Future studies can tease out these measurement issues by including more detailed and directed questions about social purpose. Researchers can also examine the determinants of these rather global measures of social purpose to better understand the experiences that are captured by social purpose questions.

It is becoming increasingly important that social studies utilise samples that are representative of the global population since the majority of behavioural research rely on WEIRD (Western, educated, industrialised, rich and democratic) populations that represent only a small portion of the world (Henrich et al., 2010; Rad et al., 2018). This study has shown that the economic conditions that characterise people's lives across the world differentially affect their social and financial preferences in the work context. Despite providing more variation in terms of economic development and regional representation compared to existing studies related to this

topic (Factor et al., 2013; Kaasa, 2011), the representativeness of the countries in this data was still limited since developed and Western societies were still overrepresented. Hence, including an even larger dataset with more countries that underperform economically can be useful in future research. If the decreasing trend in the importance of social purpose for job satisfaction would generalise to more economically underdeveloped countries, we may find the true effect size to be larger and more robust than that was found in this data.

## **5.5. Conclusion**

Researchers in recent years have begun to think of work as more than just a means of making a living, acknowledging the various psycho-social benefits that people derive from work including a sense of meaning and purpose in life (Cassar & Meier, 2018; Ward & King, 2017). Furthermore, one of the critical components of meaning and purpose in the context of work is that work serves a greater purpose (Steger et al., 2012; Fairlie, 2011), that is, work makes a positive contribution to others and the broader society. Prior research has shown that perceived social purpose in a job is also linked with greater job satisfaction (Steger et al., 2012; Fairlie, 2011) and a willingness to make financial sacrifices for one's work (Burbano, 2016) even among people from across the world who live in distinct socio-cultural and economic environments (Chandler & Kapelner, 2013; Hu & Hirsh, 2017). However, there may be important macro-level moderators in the extent to which the link between social purpose and job satisfaction generalise across the world. To investigate this proposition, this study has made the first systematic examination of country-level differences in the degree with which social purpose matters for job satisfaction.

Based on the theoretical framework that financial constraints lead people to prioritise financial pursuits and sacrifice other goals (Fernbach et al., 2015) and the overwhelming evidence that people need to trade off financial rewards in jobs to work in jobs with a social purpose (Burbano, 2016; Chandler & Kapelner, 2013; Frank, 1996; Hu & Hirsh, 2017; Johnston & Johnston, 2019), the guiding hypothesis for this study was that in countries with poorer macroeconomic performance, people would derive less satisfaction from the social purpose in their jobs. Findings were supportive of this hypothesis for country-level differences in economic volatility. Furthermore, economic volatility also increased the contributions of subjective

evaluations of income on job satisfaction which provides support for the theoretical mechanisms of the hypothesis. The findings for GDP per capita were mixed.

Overall, the findings in this research demonstrate that how people define a good job and what contributes to worker's sense of meaning and well-being may differ depending on the economic context of a country. Hence, our theories about how much people value and benefit from social purpose in the work domain should account for the financial costs of pursuing social purpose and how this would interact with the diverse economic circumstances for people around the world. In the context of this thesis, the current findings complement and further support the empirical findings from Chapter 4 where the effects of retirement on sense of purpose were examined. By showing the positive impact of retirement on sense of purpose for the socioeconomically disadvantaged sections of the population, Chapter 4 had shown that the meaning of work (and retirement) could be different than what theories would predict depending on one's socioeconomic status. It is fair to say that the current chapter has demonstrated similar findings at the macro level using cross-country differences in economic status.

The findings in this chapter also have several important practical and policy implications. First, if we believed that all workers are equally motivated by social purpose and are willing to make financial sacrifices for social purpose in their jobs, this provides an incentive for managers and labour policies to fundamentally gear the way jobs are designed towards social purpose vs financial rewards. This, however, would come at a cost for the well-being of people who are living in country settings struck by financial uncertainty. Social purpose may also not work as strong as an incentive in such country settings, and hence, these policies may not have their intended effects to begin with. Similarly, the growing public discourse about the value and benefits of social purpose in the work context should also be taken with caution because the pay is still a significant driver of job satisfaction and not all people can afford to pursue social purpose at work.

In the next and final chapter, I overview all the findings in this thesis and discuss broader implications.

## **CHAPTER 6: Conclusion**

There is a growing interest in the concept of purpose in life as a topic of scientific inquiry (Figure 1). Specifically, researchers increasingly focus on understanding what gives people a sense of purpose in life and at work and whether sense of purpose in life is predictive of important outcomes that people care about. This thesis aimed to contribute to this growing literature by drawing upon multiple disciplines in its theoretical and methodological framework and uncovered new insights about determinants and consequences of sense of purpose in life and at work.

What does it mean to have a sense of purpose in life? Chapter 1 attempted to answer this question by reviewing prominent theoretical approaches in psychology. Since the scientific literature on meaning and purpose is struck by conceptual ambiguity (Bronk, 2014; Martela & Steger, 2016; Ratner et al., 2019), this chapter was crucial in motivating and building the foundation for the empirical studies presented in the following chapters. Although the theoretical and clinical approaches to the construct of purpose in life have long existed in psychology, only a few decades ago, empirical research on the construct of purpose has begun to gain pace. In addition to qualitative approaches, a good part of this growth in the science of sense of purpose can be attributed to the quantification of this construct. Hence, Chapter 1 also discussed how different theoretical approaches to the construct of purpose in life has been quantified and empirically studied in psychological and behavioural sciences.

By clarifying these theoretical and methodological approaches, Chapter 1 identified several conceptualisations and operationalisations of purpose: i) early clinical approaches to purpose in life, ii) sense of purpose in life as a measure of well-being, iii) purpose as a motivational component of identity and character, and iv) contextualised operationalisations of purpose as the end goals associated with activities (e.g., school work, labour tasks). Among these approaches, the concept of sense of purpose in life emerged as a theoretically well-founded, valid measure of well-being that is distinct from existing measures. Thus, in Chapter 3 and 4 of the current thesis, I presented an empirical analysis of determinants (Chapter 4) and consequences (Chapter 3) of sense of purpose in life. To further motivate this

empirical research, Chapter 2 included a review of the literature on sense of purpose in life as a well-being measure.

As a motivational component of well-being, sense of purpose in life has been described as the extent to which people have goals and aims that give their lives meaning and direction (Ryff, 1989b). This concept of purpose has been assessed with multi-item scales that ask people to provide ratings on their beliefs about their selves and lives (e.g., 'I have a sense of direction in life'). In the last decade, scientists have used these scales to uncover associations between purpose and desirable life outcomes (e.g., physical and mental health, longevity) and to discover some antecedents of purpose. Chapter 2 reviewed this literature and set the stage for upcoming empirical work that examined the determinants and consequences of purpose. Importantly, Chapter 2 made it clear that although past decade has witnessed a surge in the evidence for the link between sense of purpose and health outcomes and longevity, there has been limited research on the implications of sense of purpose for health behaviours. Health behaviours could be the key mechanism for how sense of purpose may contribute to health outcomes. Furthermore, given how difficult yet how beneficial it is to promote health behaviours, it is important to understand whether and how sense of purpose may predict a higher engagement in health behaviours.

Motivated by these reasons, Chapter 3 investigated whether sense of purpose in life can predict higher levels of engagement in moderate and vigorous activity over time. Being physically active is a well-established path for a healthy, happy and long life. Yet, activity levels are low across the population and tend to decrease as people age. This study conducted a prospective analysis of purpose in life and moderate and vigorous physical activity in two nationally representative longitudinal panel of adults. To address concerns about reverse causality and some sources of unmeasured confounding, the analyses controlled for one- and two-period lagged measures of the dependent variable of physical activity as well as sense of purpose. The findings highlighted sense of purpose as a unique psychological determinant of participation in physical activity and a potential route for health and well-being over the life course.

Importantly, in Chapter 3, sense of purpose predicted future physical activity above and beyond traditional measures of well-being, positive and negative affect, as well as mental health outcomes like depression and anxiety. Furthermore, these

constructs have not shown consistent associations with future changes in physical activity. This finding further supports the unique value of purpose as a motivational component of psychological well-being for understanding long-term patterns in human behaviour.

A great deal of research in behavioural science is focused on identifying the means to change people's behaviours to maximise well-being (Dolan et al., 2012). The findings presented in Chapter 3 highlight the possibility that behaviours may be changed in the desired direction if we instead focused on maximizing well-being. It would be especially useful to focus on aspects of well-being such as sense of purpose in life which may potentially be more conducive for bringing about long-term changes in behaviours. However, the size of this impact may be modest. To the extent that sense of purpose determines multiple behaviours and outcomes, targeting sense of purpose instead of behaviours would also be more beneficial and effective overall. This approach may also overcome concerns about paternalism in the behavioural change agenda since it does not involve direct involvement with people's choices and preserves people autonomy in decision-making. Of course, all of these rest upon our success in cultivating a sense of purpose, which was addressed in Chapter 4.

Another important gap in the literature of sense of purpose, as described in Chapter 2, is that we know very little about the determinants of sense of purpose in life. Advancing this knowledge is crucial not only to inform our theories about how sense of purpose may develop but also to help people experience the potential benefits of having a sense of purpose in life by understanding the means of cultivating it. Because work provides people with goals and activities in life, there is a close theoretical link between work and sense of purpose in life. This calls for attention in understanding how work-related factors may determine sense of purpose. To address this gap, Chapter 4 contributed to the relatively nascent literature on the determinants of sense of purpose and investigated the impact of retirement on sense of purpose in life.

Retirement is characterised by a reorganisation of life and identity but its implications for sense of purpose remain unclear. As people withdraw from work, do they experience an existential vacuum or find a renewed sense of purpose in their retirement activities? This study exploited the variation caused by eligibility ages for Social Security retirement benefits in the US to estimate the impact of retirement on

people's sense of purpose in life. It used a multi-cohort longitudinal data from a nationally representative sample of American adults. Contrary to existing empirical evidence, results revealed a sizable positive impact of retirement on sense of purpose in life as well as positive affect and life satisfaction. The effect was driven by people who, despite having less economic resources for retirement, benefited from transitioning from restraining work roles.

The findings in Chapter 4 have provided critical insights that inform our understanding of how sense of purpose develops. Some activities in life such as work endow people's lives with goals and a structure which is expected to lead to a greater sense of purpose in life. Relatedly, transitions out of these contexts are expected to undermine sense of purpose. Chapter 4 showed, in a naturalistic setting, that these predictions do not always hold. What activities are meaningful for people seem to be determined by contextual factors (e.g., socioeconomic status) that drive physical, social and psychological needs. These factors yield stronger influences on people's sense of purpose in life than how strongly an activity determines the structure and goals people pursue on a day to day or long-term basis. In other words, the quality of people's experience seems to be more influential for sense of purpose than the structure and quantity of their experience. This chapter also has shed light on the psychological impact of an important life transition with significant policy implications in the current context of ageing populations. Importantly, the findings suggest socioeconomically disadvantaged people may be adversely impacted by policies that delay mandatory retirement ages.

In sum, Chapter 4 contributed to the nascent literature on work-related determinants of sense of purpose in life and highlighted the contextual influences that determine how transitions from work may impact sense of purpose. Chapter 5 continued this inquiry into the contextual influences on sense of purpose in the domain of work. In Chapter 5, the conceptual focus has shifted to social purpose in the context of work by studying people's perceptions that their work makes a positive impact on other people's lives and society. As described in Chapter 2, social purpose at work is closely linked to a sense of purpose in life and such contextualised approaches to the study of purpose enable us to understand people's experiences of sense of purpose in day to day experiences and specific life domains such as work.

Building on these motivations, Chapter 5 presented an empirical study on the satisfaction people derive from perceiving a social purpose in their jobs in cross-country data. Importantly, the chapter explored whether differences between countries in terms of macroeconomic performance could moderate the relationship between social purpose and job satisfaction. Residents living in countries with poorer economic performance could experience more financial uncertainty and hardship, which could shift their priorities to seek material vs social benefits in a job. These hypotheses were tested in a large dataset of individuals from 36 countries from around the world. The analysis revealed that country-level measures of economic volatility (measured by the standard deviation in annual changes in GDP per capita over the last two decades) reduced the positive association between social purpose and job satisfaction and increased the positive association between income satisfaction and job satisfaction. The findings for GDP per capita were mixed.

Similar to Chapter 4, the findings in Chapter 5 also demonstrated the importance of understanding the socioeconomic context to refine our theories of the value and benefits of sense of purpose. Altogether, these findings advance the burgeoning literature on the determinants of sense of purpose in the work context as described in detail in Chapter 2. Importantly, both Chapter 4 and 5 highlight the significance of examining boundary conditions related to socioeconomic differences. Growing levels of inequality in our modern world make these findings relevant and timely. These findings highlight the need to equally represent all sections of the public within and across countries in our theories and studies. Paying special attention to those with little access to social and economic resources can help us draw the right conclusions about what contributes to human well-being and how we can design public life to promote the well-being of everyone.

### ***Limitations and Future Directions***

Overall, the studies presented in this thesis has built on the foundational evidence that the well-being measure of sense of purpose in life is a critical psychosocial determinant of beneficial life outcomes. As evidenced by the longitudinal associations between purpose and physical activity presented in Chapter 3, sense of purpose is a motivational construct with important implications for human behaviour. Prior research has uncovered associations between other aspects of well-being like overall happiness and life satisfaction and behavioural outcomes such as

fruit and vegetable consumption (Blanchflower et al., 2012), risky behaviour (Goudie et al., 2011) and productivity (Oswald et al., 2015). Future studies can continue to establish the links between sense of purpose in life and these alternative behavioural outcomes and explore proximal mechanisms through which sense of purpose may impact behaviours (e.g., a greater value attached to beneficial outcomes, or better skills for goal management and pursuit). In addition, the behavioural measures of physical activity that were used in this study were self-reported, which potentially affected the precision of the estimates. Hence, future studies can also benefit from using more objective measurement tools for assessing behavioural outcomes associated with sense of purpose.

Surprisingly, as the literature review in Chapter 2 demonstrated, only a limited number of studies have examined the financial consequences of having a sense of purpose in life. One possibility is that researchers have failed to find as robust associations between sense of purpose and economic outcomes. Indeed, the associations between purpose in life and proximal mechanisms for financial success such as impulsivity were relatively small (Burrow & Spreng, 2016). This may be because there is a more direct link between having a sense of purpose in life, which indicates a motivation for living and preserving life via health-promoting means. Yet, having a sense of purpose in life may not motivate people to cumulate financial resources as strongly. Future studies can examine how having a sense of purpose shifts people's priorities in life and whether it makes certain life goals more important than others. Studies can also continue this line of research by focusing on activities that could constitute mechanisms for economic success, such as performance at work and career choices. Furthermore, a promising future research direction on the predictions of sense of purpose is to investigate how people with a sense of purpose in life perform in their social relationships. Evidence on this topic is severely lacking, and there is a strong need for future studies to fill this gap in the literature.

However, it is important to note that almost all studies on the outcomes of sense of purpose rely on observational data which limits researchers' ability to provide causal inference. Only a few studies have employed randomised experiments by priming people to write about their purpose in life (Burrow et al., 2014). Although useful, this method can only be used to measure short-term influences. Going forward, it is important that studies adopt experimental and quasi-

experimental methods in examining the outcomes of having a purpose in life. Interventions may build on existing studies that showed increases in sense of purpose as a result of life goal reflections (Bundick, 2011) or strength use (Forest et al., 2012). Assessing behavioural outcomes in health, work, or social domains in these interventions can answer whether sense of purpose causally determines beneficial behaviours.

Chapter 2 demonstrated that our knowledge of the determinants of sense of purpose is extremely limited and there are various promising research directions on this front. First, evidence does not seem to support racial and gender disparities in sense of purpose but there seem to be significant differences in sense of purpose by levels of education. Future research can examine the mechanisms through which education can enhance sense of purpose. Does education amplify the opportunities for choosing the goals and activities that one values? Or does it prevent the limiting factors such as health-related or economic problems? Studies can also examine what types of education are more conducive to increasing sense of purpose among youth. Some curriculums may be more geared towards understanding one's self and goals in life increasing people's chances of identifying and committing to personally meaningful goals and activities. Furthermore, the question of how social environment affects sense of purpose is largely unexamined. Hence, significant advances can be made in future studies that focus on the social determinants of sense of purpose.

The current thesis also presented evidence that despite a downward trajectory in sense of purpose over the life course (Springer et al., 2011), sense of purpose can be enhanced among older adults at the population level. Empirical support for this proposition is provided by the quasi-experimental evidence of an increase in sense of purpose in life over retirement, as presented in Chapter 4. Hence, it seems possible to increase sense of purpose in life through policies and practices, and potentially bring about the behavioural and life outcomes of sense of purpose outlined above. However, this research on policy-related determinants of purpose in life is extremely nascent. Studies that assess how other labour or education policies may affect population levels of sense of purpose would provide useful insights for policy in the future. Labour policies related to job loss due to automation and education policies related to social and emotional learning at schools present some

theoretically relevant policy changes in the future that may impact sense of purpose at scale.

Another remaining question on determinants of sense of purpose is that we have little knowledge of the time horizons during which sense of purpose can be changed. Does sense of purpose in life have a set-point such that whatever changes people experience, their levels of sense of purpose go back to its baseline levels? In well-being research, many empirical studies have supported the set-point theory (Clark et al., 2019), but researchers in sense of purpose rarely focus on the dynamic outcomes. Chapter 4 presented evidence that the retirement-related changes in sense of purpose tend to somewhat phase out over eight years. It is important that future studies examine dynamic changes in sense of purpose in other contexts over long time horizons.

The current thesis also highlighted how the concept of sense of purpose has been contextualised and studied in relation to work with a special focus on jobs with a social purpose in Chapter 5. This chapter highlighted the importance of adopting an international lens in the study of social purpose in the context of work and to pay special attention to macroeconomic differences across countries in drawing conclusions from research. The psycho-social drivers of performance and compensation at work is a relatively new agenda and there is growing interest in the specific role of social motivation in this literature (Besley & Ghatak, 2018; Cassar & Meier, 2018). A strong inter-disciplinary collaboration is needed to progress on this topic since psychological, economic and organisational factors all play a role. There are also important questions to be answered in terms of generational differences in attitudes and preferences for social purpose at work and the many factors that can affect selection into jobs with a social purpose including personality, gender, and socioeconomic status.

A limitation of the empirical study in Chapter 5 was that despite drawing from 36 countries with varying levels of economic performance, this data could still be improved through the inclusion of more countries with lower economic performance. In addition, the dataset was cross-sectional although having longitudinal panel data could significantly reduce concerns about potential biases in the estimates for the relationship between job characteristics. It would be beneficial for future studies to use longitudinal data and samples that are representative of broader sections of the world in the study of social purpose in jobs. However, such

datasets are limited. Perhaps, the growing interest in these topics may highlight the importance of having quality global data on job characteristics such as social purpose and motivate future data collection initiatives.

All studies in the current thesis adopted a subjective approach for the assessment of purpose. In recent years, the subjective approach to well-being has gained significant traction, since studies have shown that people's thoughts and judgements about their lives and selves have empirical validity (Diener et al., 2018; Oswald & Wu, 2010). Furthermore, some argue that focusing on subjective judgements is a relatively more democratic approach than making assumptions about what is good for people (Diener et al., 2009). Yet, reliance on self-reports also have limitations, potentially giving rise to positivity or social desirability bias (Diener et al., 2018). It is also unclear whether different groups of people are using the rating scales in the same way. Although I undertook several measures to tackle these concerns, for instance, by using within-person or within-country estimates, it is not possible to guarantee that such measures would tackle all measurement issues that would arise in self-report data. Hence, the existing studies may suffer from these limitations.

What is striking about the scientific study on sense of purpose is that it has progressed in parallel across multiple social and behavioural science disciplines including psychology, public health, education, economics, and management. By drawing upon these multiple disciplines in its theoretical and methodological framework, the current thesis reflected this multi-disciplinary focus. Overall, the empirical work was theoretically grounded in psychology and used economic tools for analyses. These theories and methods were applied to topics in the domains of health and work, addressing timely and relevant issues such as physical activity, retirement, and jobs with a social purpose. Therefore, the studies in this thesis also drew from and contributed to scientific literatures in public health, economics, and management. As a limitation of adopting this inter-disciplinary approach, the studies may diverge from the discipline-specific theoretical and methodological tools. However, I hope that the discoveries made using this inter-disciplinary approach can also inspire more future studies to draw from insights and tools across disciplines.

### ***Implications for Policy and Practice***

In parallel to the scientific research on sense of purpose, interest in promoting a sense of purpose has been growing among policy-makers and practitioners. During the last decades, policy-makers have been exploring ways to measure citizens' happiness and satisfaction with life in an effort to develop the right policies to improve people's lives (Durand, 2013). These policy efforts are informed by cutting edge scientific research which suggests that well-being does not only entail feeling good and being satisfied with life but also involves having a meaning and purpose in life (National Research Council, 2013). Attesting to this shift in our understanding of well-being, OECD recommended the statistical offices of countries to include questions on purpose into national surveys along with questions on satisfaction with life and happiness (Durand, 2013). In the UK, as a result of the initiatives by the Office of National Statistics, the questions on worthwhileness of one's activities in life are included in national surveys (Dolan & Metcalfe, 2012). Practitioners in public health are also exploring ways to cultivate sense of purpose at scale, especially among older people who are at a greater risk for lacking a sense of purpose and for experiencing health problems (Milken Institute, 2016). Social enterprises such as Encore, for instance, are working towards this vision by helping retired individuals to find opportunities for volunteering.

In education, too, sense of purpose has become an important paradigm. In his seminal book, *Path to Purpose*, William Damon, has made a compelling case for focusing on youth purpose to alleviate rising levels of boredom and despair among students and to promote healthy development (Damon, 2008). With a rising interest in positive education, many educational institutions worldwide started to incorporate insights from positive psychology into their curriculum, with special attention paid to sense of purpose (Helliwell, 2018). For instance, the Project on Purpose and Values in Education (PAVE) is organising co-curricular activities at 24 colleges in the US, including Harvard and Stanford universities, where students can reflect on big questions about life, focusing especially on meaning, value, and purpose. Similarly, the Institute of Positive Education in Australia has trained educators from a thousand schools across the globe on integrating positive purpose to their programme. In Mexico, too, a university with 52,000 students defines itself as the Positive University and commits to 'preparing people with a purpose in life'.

Finally, social purpose has emerged as a new buzzword in business. In the last few years, the largest professional services firms, including Ernst and Young, Deloitte, and PricewaterhouseCoopers, have all participated in initiatives to investigate and promote the role of social purpose in business. There was even a roundtable meeting on purpose at the 2016 World Economic Forum. More and more, consultancies are helping managers understand and communicate the social missions of their work to motivate their employees and appeal to their customers (PwC, 2016). There is even a growing industry of coaching for training leaders in global corporations to gain a better understanding of their leadership purpose and become more motivated and effective leaders (Craig & Snook, 2014).

Sociologists have attempted to explain why purpose have come to the forefront of scholarly research and the public psyche in recent years (Keyes, 2011). First, people live longer lives and experience a great deal of uncertainty about their future. This might have caused people to seek new ways to spend the added years to their life in a meaningful way and to find stable goals and ideals that can reduce the feelings of uncertainty. Second, the ‘gradual un-scripting of social life’ has brought more flexible and diverse social norms about marriage and childbirth which might have left people with more personal responsibility about how to live as well as question their purpose in life (Keyes, 2011, p. 283). The third reason is concerned with modern institutions like government, work, and schools. Within the last decades, these institutions have excessively prioritised short-term and materially-oriented aspirations and they have given rise to several scandals of governance or adverse societal outcomes (e.g., inequality). All the while, an increasingly greater share of people’s lives is spent at work or school. These factors could have increased people’s need for purpose.

It is important to note that this cultural interest in purpose may be more prevalent in the developed, Western world. Researchers did not find a spike in the mentions of purpose in resources written in Spanish, French and Chinese or even in British English (Grant, 2017). This suggests that the US might be driving this cultural emergence of purpose. Yet, as described above, purpose seems to be spreading through the global networks of knowledge and business and has become an important paradigm across the world.

In sum, there is tremendous interest in the construct of purpose from a range of social and economic institutions across the world. Some even claim that the world

is 'entering an age of purpose' (Grant, 2017, p. 1). The current thesis presented a scientific inquiry on this topic by focusing on people's experiences of sense of purpose in life and at work. Through an in-depth exploration of theoretical foundations and three extensive empirical investigations that used diverse quantitative methodologies, this thesis advanced our understanding of the determinants and consequences of having a sense of purpose in life and at work. The findings shed light on why sense of purpose matters and how it can be cultivated. Importantly, the findings highlighted whether and how social and economic contexts may affect sense of purpose and for whom. As elusive as it may sound, it is now possible to conduct rigorous empirical studies on people's experiences of sense of purpose. This research agenda has the promise to result in substantial benefits in terms of individual and societal well-being in near future.

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## Appendix

**Table A1.** Summary Statistics for the Analysis of Sense of Purpose in Life and Physical Activity for Individuals Who Were Lost to Follow-Up (Data: Health and Retirement Study 2006-2016)

	<i>M</i>	<i>SD</i>
Purpose in Life	4.42	0.96
MVPA	2.32	1.11
Age	71.64	11.16
Gender	0.57	0.50
White	0.82	0.38
Black/African American	0.14	0.35
Other Race	0.04	0.20
Married	0.61	0.49
Education	12.15	3.23
Household Income <sup>a</sup>	\$31,504	\$76,103
Out of Labour	0.12	0.33
Working	0.19	0.39
Retired	0.69	0.46
Perceived Health	2.90	1.10
BMI	32.95	8.00
Smoker	0.14	0.35
Chronic Disease	0.89	0.31
Positive Affect	3.49	0.77
Negative Affect	1.76	0.69
Anxiety	1.65	0.63

*Note:* Three waves of data were drawn from two cohorts in Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). All variables were measured in the baseline wave. MVPA measures average scores for moderate and vigorous physical activity. <sup>a</sup>Median household income is reported in the column for mean.

**Table A2.** Prospective Associations Between Sense of Purpose in Life and Moderate and Vigorous Physical Activity (MVPA) – Robustness Checks (Data: Health and Retirement Study 2006-2016)

	(1) MVPA	(2) MVPA	(3) MVPA
L1. Purpose in Life	0.05*** [0.027,0.080]	0.05*** [0.026,0.079]	0.06*** [0.024,0.089]
L1. MVPA	0.46*** [0.436,0.488]	0.46*** [0.437,0.489]	0.46*** [0.430,0.493]
L2. Positive Affect	-0.01 [-0.034,0.021]	-0.00 [-0.028,0.027]	0.00 [-0.027,0.036]
L2. Negative Affect	0.01 [-0.013,0.041]	0.01 [-0.019,0.031]	0.01 [-0.019,0.036]
L2. Anxiety	-0.01 [-0.033,0.020]	0.05***	
L2. Positive Support		-0.00 [-0.024,0.020]	
L2. Negative Support		0.01 [-0.011,0.036]	
<i>Other controls (L2)</i>			
Purpose	YES	YES	YES
MVPA	YES	YES	YES
Demographic Controls	YES	YES	YES
Health controls	YES	YES	YES
R-squared	0.41	0.41	-
Observations	7,875	7,968	8,594

*Note:* The prefix L1 indicates that the variable is assessed in the period preceding the outcome. L2 indicates two-period lags. Anxiety was included as a control in Model 1 and social support variables were included in Model 2. Survey weights were applied in Model 3, for representativeness. MVPA measures average scores for moderate and vigorous physical activity. Errors were clustered at the household level. All continuous variables were standardised ( $M = 0$ ,  $SD = 1$ ) so the coefficients reflect standardised effect sizes. Data were drawn from two cohorts in Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A3.** Prospective Associations Between Sense of Purpose in Life and Moderate and Vigorous Physical Activity (MVPA) – Robustness Checks with Complete Case Data (Data: Health and Retirement Study 2006-2016)

	(1) MVPA	(2) MVPA
L. Purpose in Life	0.05*** [0.025,0.075]	0.05*** [0.027,0.068]
L.MVPA	0.42*** [0.399,0.448]	0.45*** [0.435,0.473]
L2. Positive Affect	-0.00 [-0.026,0.025]	0.05*** [0.028,0.071]
L2. Negative Affect	0.01 [-0.009,0.036]	0.03*** [0.014,0.053]
<i>Other controls (L2)</i>		
Purpose	YES	NA
MVPA	YES	NA
Demographic Controls	YES	YES
Health controls	YES	YES
R-squared	0.41	0.34
Observations	7,457	10,486

*Note:* The prefix L indicates that the variable is assessed in the period preceding the outcome. L2 indicates two-period lags. MVPA measures average scores for moderate and vigorous physical activity. Model 1 uses complete case data from all three waves of Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016) and imputation was not applied. Model 2 uses complete case data from the first two waves of HRS between 2006-2010, and 2008-2012. Errors were clustered at the household level. All continuous variables were standardised ( $M = 0$ ,  $SD = 1$ ) so the coefficients reflect standardised effect sizes. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A4.** Comparative Summary Statistics for Retired vs Working Subsamples (Data: Health and Retirement Study 2006-2016)

	<i>Retired at Baseline</i>		<i>Working at Baseline</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	71.15	7.54	59.44	6.94
Female	0.55	0.50	0.57	0.49
White	0.86	0.34	0.84	0.36
Black/African American	0.11	0.31	0.10	0.30
Another Race	0.03	0.16	0.05	0.23
College Graduate	0.28	0.45	0.39	0.49
Married	0.68	0.47	0.77	0.42
Occupation = White-Collar	0.55	0.50	0.61	0.49
Purpose in Life	4.64	0.89	4.84	0.86
Perceived Health	3.25	1.02	3.62	0.95
Social Participation	3.07	0.88	3.06	0.79

*Note:* Data were drawn from two cohorts (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016).

**Table A5.** Fixed Effects-Instrumental Variables (FE-IV) Models for The Effects of Retirement on Sense of Purpose in Life - Robustness Checks

	FE-IV (1) Purpose in Life	FE-IV (2) Purpose in Life	FE-IV (3) Purpose in Life	FE-IV (4) Purpose in Life	FE-IV (5) Purpose in Life	FE-IV (6) Purpose in Life
Retired	0.31** [0.019,0.611]	0.38** [0.047,0.717]	0.32** [0.066,0.568]	0.41** [0.060,0.758]	0.36** [0.056,0.670]	0.31** [0.064,0.563]
Spouse Ret				-0.09** [-0.169, -0.008]		
Age	YES	YES	YES	YES	YES	
Age Sq	YES	YES	YES	YES	YES	
Age Cube	YES	YES	YES	YES	YES	
Married						0.03 [-0.026,0.088]
Income log						0.01* [-0.003,0.030]
Health						0.07*** [0.052,0.090]
Year FE	YES	YES	YES	YES	YES	YES
Indiv. FE	YES	YES	YES	YES	YES	YES
Observations	17,582	21,098	21,300	12,312	19,343	21,254

Note: Data were drawn from two cohorts of the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). In Model 1, the dependent variable was coded as one if the respondent was fully retired and zero if the respondent was working full-time. Individuals with part-time retirement and work status were excluded. In Model 2, sample weights were applied to improve the representativeness of the sample for the US population. In Model 3, individuals who returned to work after reporting being retired at one wave were excluded. Model 4 added spouse retirement status as a control variable. This variable (Spouse Ret.) had a large no of missing values, so it was not included in the main results. In Model 5, individuals below the age of 50 and above the age of 80 were excluded. In Model 6, individuals whose self-reported household income were above the 99th percentile or below the 1<sup>st</sup> percentile were excluded. 95% confidence intervals were reported in parenthesis \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A6.** Summary Statistics for the Analysis of Social Purpose and Job Satisfaction – For the Full Sample Before Exclusions (Data: International Social Survey Program 2015)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
Job Satisfaction	5.32	1.14	1.00	7.00	14,141
Social Purpose	3.89	0.86	1.00	5.00	14,129
Job Helps Others	3.85	1.00	1.00	5.00	14,047
Job is Socially Useful	3.94	0.94	1.00	5.00	14,014
Income Satisfaction	2.87	1.09	1.00	5.00	14,083
Age	42.03	12.16	17.00	95.00	14,325
Gender	0.43	0.50	0.00	1.00	14,367
Education	3.67	1.48	0.00	6.00	14,240
Married	0.56	0.50	0.00	1.00	14,109
Household Size	3.11	1.62	0.00	18.00	14,158
Union Member	0.27	0.45	0.00	1.00	14,053
Supervisor	0.27	0.45	0.00	1.00	14,167

**Table A7.** Country-Level Summary Statistics in International Social Survey Program 2015 and Macro Indicators

	<i>N</i>	GDP / Capita (\$)	Volatility	GINI	Inflation	Unemploy- ment	Indivi- dualism
AT-Austria	471	44,247	0.017	28.10	1.61	5.62	55
AU-Australia	272	43,672	0.014	33.10	2.49	6.08	90
BE-Belgium	524	41,345	0.016	25.60	0.34	8.52	75
CH-Switzerland	265	57,218	0.017	28.90	-0.01	4.83	68
CL-Chile	261	22,014	0.026	44.80	4.72	6.67	23
CN-China	359	12,725	0.021	41.10	1.92	4.60	20
CZ-Czech Republic	485	29,120	0.040	25.30	0.34	6.11	58
DE-Germany	537	43,667	0.022	29.10	0.91	4.98	67
DK-Denmark	379	45,057	0.020	25.90	0.56	6.59	74
EE-Estonia	415	27,113	0.064	33.50	-0.11	7.35	60
ES-Spain	486	31,195	0.023	34.10	-0.15	24.44	51
FI-Finland	342	39,018	0.037	25.20	1.04	8.66	63
FR-France	379	37,576	0.014	29.80	0.51	10.29	71
GB-Great Britain	454	38,419	0.019	33.00	1.45	6.11	89
GE-Georgia	197	8,767	0.145	38.60	3.10	14.62	.
HR-Croatia	407	20,365	0.038	28.90	-0.22	17.29	33
HU-Hungary	413	24,163	0.029	27.90	-0.23	7.73	80
IL-Israel	378	31,927	0.020	36.20	0.49	5.89	54
IN-India	139	5,378	0.021	47.30	6.35	2.77	48
IS-Iceland	387	42,775	0.034	24.80	2.05	4.90	60
JP-Japan	478	37,337	0.019	31.40	2.76	3.60	46
LT-Lithuania	389	26,258	0.056	35.10	0.10	10.70	60
LV-Latvia	343	22,172	0.061	35.20	0.62	10.85	70
MX-Mexico	199	17,150	0.031	45.20	4.02	4.81	30
NO-Norway	624	63,419	0.018	25.30	2.04	3.48	69
NZ-New Zealand	296	34,608	0.023	32.90	1.23	5.75	79
PH-Philippines	175	6,559	0.025	40.50	3.60	3.60	32
PL-Poland	571	24,355	0.029	31.00	0.05	8.99	60
RU-Russia	573	25,285	0.072	34.10	7.82	5.16	39
SE-Sweden	358	44,214	0.027	25.70	-0.18	7.95	71
SI-Slovenia	316	28,410	0.042	25.20	0.20	9.67	27
SK-Slovak Rep.	398	27,285	0.034	24.70	-0.08	13.18	52
SR-Suriname	296	15,159	0.032	52.00	3.38	6.94	47
TW-Taiwan	537	.	.	.	.	.	.
US-United States	495	52,081	0.016	38.10	1.62	6.17	91
VE-Venezuela	199	17,131	0.063	37.00	62.17	6.95	12
ZA-South Africa	577	12,388	0.023	60.00	6.14	24.90	65

*Note:* N represents the number of observations for each country in the Work Orientation Module of the 2015 International Social Survey Program. GDP per capita, inflation and unemployment rates for 2014 was taken from the World Bank Database. Volatility was calculated as the standard deviation in yearly changes in GDP between 1990 and 2014. Gini measures were taken from the Standardised World Income Inequality Database and individualism scores were from Hofstede's index for cultural values (Hofstede et al. 1991).

**Table A8.** Associations Between Job Satisfaction and Job Attributes in 36 Countries – Results from an Ordered Logit Model (Data: International Social Survey Program 2015)

	(1) Job Satisfaction
Social Purpose	0.16*** [0.109,0.204]
Income Satisfaction	0.27*** [0.225,0.322]
Age	0.01*** [0.005,0.013]
Gender	0.01 [-0.073,0.091]
Education	-0.09*** [-0.121,-0.051]
Married	0.05 [-0.035,0.136]
Household Size	-0.01 [-0.039,0.021]
Union Member	0.09* [-0.003,0.188]
Supervisor	0.09* [-0.005,0.182]
Work-Hours Satisfaction	0.03* [-0.003,0.072]
Work-Life Balance	0.28*** [0.235,0.322]
Skill Use	0.08*** [0.038,0.120]
Independence	0.06*** [0.017,0.104]
Advancement Opportunities	0.14*** [0.094,0.190]
Job is Interesting	0.66*** [0.606,0.718]
Job Security	0.16*** [0.119,0.207]
Job is Physical	0.02 [-0.026,0.069]
Job is Stressful	-0.24*** [-0.281,-0.193]
Social Contact	0.05** [0.007,0.099]
Relationship with Managers	0.61*** [0.562,0.664]
Relationship with Colleagues	0.29*** [0.238,0.333]
Occupation FE	YES
Country FE	YES
Pseudo R-squared	.21
Observations	10,416

*Note:* Data were drawn from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A9.** Associations Between Job Satisfaction and Job Attributes in 36 Countries  
- Moderation Analysis by Country-Level Economic Indicators (Log Transformed)

	(1)	(2)	(3)	(4)	(5)
	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction
Social Purpose	-0.32 [-0.781,0.132]	-0.64** [-1.194,-0.082]	-0.01 [-0.148,0.129]	-0.20*** [-0.335,-0.062]	0.72*** [0.203,1.234]
Income Satisfaction	0.36 [-0.202,0.925]	-0.03 [-0.660,0.593]	0.51*** [0.346,0.668]	0.30*** [0.132,0.459]	0.19 [-0.580,0.965]
Inc Sat.#GDP Log	-0.01 [-0.062,0.047]	0.01 [-0.047,0.072]			0.03 [-0.040,0.104]
Purpose #GDP Log	0.06** [0.011,0.099]	0.07** [0.014,0.121]			-0.07*** [-0.124,-0.021]
Inc Sat#Volatility Log			0.06*** [0.017,0.109]	0.06** [0.011,0.100]	0.07** [0.015,0.119]
Purpose#Volatility Log			-0.07*** [-0.108,-0.033]	-0.07*** [-0.108,-0.033]	-0.08*** [-0.128,-0.024]
Inc Sat.#Inflation					-0.02*** [-0.029,-0.007]
Purpose#Inflation					0.00 [-0.010,0.010]
Inc Sat.#Unemp.					0.00 [-0.015,0.019]
Purpose#Unemp.					0.02* [-0.002,0.033]
Inc Sat.#Gini					-0.00 [-0.033,0.029]
Purpose#Gini					-0.06*** [-0.082,-0.029]
Inc Sat.#Indiv.					-0.01 [-0.032,0.019]
Purpose#Indiv.					0.02 [-0.008,0.038]
Constant	-0.08 [-0.357,0.193]	0.04 [-0.131,0.206]	-0.10 [-0.382,0.178]	0.03 [-0.143,0.193]	-0.06 [-0.342,0.224]
Job Attributes	NO	YES	NO	YES	NO
Occupation FE	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES
R-squared	0.17	0.43	0.17	0.43	0.17
Observations	12,183	10,416	12,183	10,416	11,991

*Note:* Data (except for the macro variables) were drawn from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A10.** Associations Between Job Satisfaction and Job Attributes in 36 Countries - Moderation Analysis by Country-Level Economic Indicators (Testing Potential Biases due to Outliers)

	(1)	(2)	(3)	(4)
	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction
Social Purpose	0.05*** [0.032,0.075]	0.06*** [0.032,0.079]	0.24*** [0.226,0.260]	0.24*** [0.224,0.262]
Income Satisfaction	0.10*** [0.074,0.118]	0.10*** [0.068,0.123]	0.29*** [0.267,0.312]	0.28*** [0.259,0.304]
Inc Sat. # Volatility	0.03*** [0.018,0.051]		0.04** [0.008,0.072]	0.04*** [0.027,0.058]
Purpose # Volatility	-0.04*** [-0.053,-0.028]		-0.05*** [-0.091,-0.018]	-0.04*** [-0.062,-0.027]
Inc Sat. # GDP		0.00 [-0.022,0.031]	0.00 [-0.036,0.040]	0.00 [-0.024,0.031]
Purpose # GDP		0.03** [0.002,0.055]	-0.04*** [-0.059,-0.018]	-0.02** [-0.042,-0.003]
Inc Sat. # Inflation			0.05 [-0.055,0.159]	-0.02*** [-0.027,-0.010]
Purpose # Inflation			0.01 [-0.100,0.129]	-0.00 [-0.011,0.004]
Inc Sat. # Unemp.			0.01 [-0.010,0.028]	0.00 [-0.014,0.019]
Purpose # Unemp.			0.01 [-0.010,0.032]	0.01 [-0.007,0.033]
Inc Sat. # Gini			-0.02 [-0.065,0.017]	-0.01 [-0.033,0.016]
Purpose # Gini			-0.06*** [-0.096,-0.015]	-0.05*** [-0.072,-0.020]
Inc Sat. # Individ.			-0.00 [-0.025,0.024]	
Purpose # Individ.			0.02* [-0.002,0.042]	
Constant	0.02 [-0.145,0.191]	0.04 [-0.132,0.206]	-0.07 [-0.358,0.214]	-0.10 [-0.373,0.174]
Job Attributes	YES	YES	NO	NO
Occupation FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
R-squared	0.43	0.43	0.17	0.17
Observations	10,416	10,416	11,829	12,183

*Note:* Data (except for the macro variables) were drawn from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects. Model 1, 2 and 3 exclude Venezuela. Model 4 includes the full sample but excludes the individualism measure which meant that observations for Georgia were kept in the analysis. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A11.** Associations Between Job Satisfaction and Job Attributes in 36 Countries - Moderation Analysis by Country-Level Economic Indicators (Models Use Income Instead of Income Satisfaction)

	(1)	(2)	(3)	(4)	(5)
	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction
Social Purpose	0.05*** [0.030,0.071]	0.05*** [0.022,0.072]	0.05*** [0.023,0.069]	0.26*** [0.239,0.291]	0.26*** [0.241,0.287]
Income	0.03*** [0.016,0.054]	0.04*** [0.013,0.060]	0.04*** [0.014,0.057]	0.08*** [0.056,0.110]	0.09*** [0.058,0.112]
Income#GDP		-0.02* [-0.035,0.001]		-0.03 [-0.077,0.019]	-0.02 [-0.052,0.020]
Purpose#GDP		0.03* [-0.002,0.054]		-0.05*** [-0.073,-0.021]	-0.04*** [-0.060,-0.013]
Income#Volatility			0.03*** [0.012,0.039]	0.00 [-0.026,0.029]	0.02 [-0.004,0.034]
Purpose#Volatility			-0.04*** [-0.059,-0.025]	-0.04 [-0.096,0.010]	-0.04*** [-0.065,-0.022]
Income#Inflation				-0.00 [-0.012,0.006]	-0.01*** [-0.015,-0.003]
Purpose#Inflation				0.00 [-0.012,0.014]	-0.00 [-0.011,0.005]
Income#Unemp.				0.01 [-0.005,0.020]	0.01 [-0.004,0.024]
Purpose#Unemp.				0.02* [-0.000,0.033]	0.02** [0.002,0.035]
Income#Gini				-0.01 [-0.037,0.017]	-0.00 [-0.030,0.022]
Purpose#Gini				-0.06*** [-0.088,-0.028]	-0.05*** [-0.085,-0.024]
Income#Indiv.				0.01 [-0.015,0.042]	
Purpose#Indiv.				0.02 [-0.011,0.041]	
Constant	0.01 [-0.221,0.250]	0.01 [-0.155,0.172]	0.01 [-0.159,0.169]	-0.03 [-0.324,0.270]	-0.04 [-0.316,0.236]
Job Attributes	YES	YES	YES	NO	
Occupation FE	YES	YES	YES	YES	
Country FE	YES	YES	YES	YES	
R-squared	0.43	0.43	0.43	0.10	0.10
Observations	8,948	8,948	8,948	10,256	10,448

*Note:* Data (except for the macro variables) were drawn from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A12.** Associations Between Job Satisfaction and Job Attributes in 36 Countries - Moderation Analysis by Macro Indicators

	(1) Job Satisfaction	(2) Job Satisfaction	(3) Job Satisfaction	(4) Job Satisfaction
Social Purpose	0.24*** [0.220,0.267]	0.24*** [0.218,0.269]	0.24*** [0.217,0.269]	0.25*** [0.222,0.270]
Inc Sat	0.28*** [0.257,0.307]	0.28*** [0.255,0.307]	0.28*** [0.254,0.307]	0.28*** [0.252,0.304]
Inc Sat # Gini	-0.01 [-0.028,0.007]			
Purpose#Gini	-0.03** [-0.060,-0.005]			
Inc Sat#Inflation		-0.01** [-0.022,-0.003]		
Purpose#Inflation		-0.02** [-0.035,-0.002]		
Inc Sat # Unemp.			0.00 [-0.015,0.022]	
Purpose#Unemp.			-0.00 [-0.018,0.014]	
Inc Sat#Indiv.				-0.00 [-0.022,0.015]
Purpose#Indiv.				0.02** [0.002,0.042]
Constant	-0.07 [-0.345,0.198]	-0.08 [-0.357,0.197]	-0.08 [-0.360,0.195]	-0.06 [-0.352,0.236]
Occupation FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
R-squared	0.17	0.17	0.17	0.17
Observations	12,183	12,183	12,183	11,991

*Note:* Data (except for the macro variables) were drawn from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A13.** Associations Between Job Satisfaction and Job Attributes in 36 Countries - Moderation Analysis by Macro Indicators of Growth and Mean GDP

	(1) Job Satisfaction	(2) Job Satisfaction
Social Purpose	0.24*** [0.217,0.269]	0.24*** [0.218,0.266]
Income Satisfaction	0.28*** [0.255,0.306]	0.28*** [0.255,0.308]
Inc Sat. # Growth	0.01 [-0.012,0.033]	
Purpose # Growth	-0.01 [-0.039,0.018]	
Inc Sat. # GDP (Mean)		-0.01 [-0.035,0.018]
Purpose # GDP (Mean)		0.02** [0.000,0.048]
Constant	-0.09 [-0.365,0.189]	-0.09 [-0.361,0.191]
Occupation FE	YES	YES
Country FE	YES	YES
R-squared	0.17	0.17
Observations	12,183	12,183

*Note:* Data (except for the macro variables) were drawn from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects.

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A14.** Associations Between Job Satisfaction and Job Attributes in 36 Countries - Moderation Analysis by Country-Level Economic Indicators (Models Use Job Helps Others and Job is Useful Variables Instead of Social Purpose)

	(1) Job Satisfaction	(2) Job Satisfaction
Income Satisfaction	0.28*** [0.262,0.306]	0.29*** [0.266,0.310]
Job Helps Others	0.22*** [0.199,0.232]	
Inc Sat # Volatility	0.05*** [0.018,0.073]	0.04*** [0.018,0.072]
Job Helps # Volatility	-0.04*** [-0.070, -0.015]	
Inc Sat # GDP	0.01 [-0.025,0.045]	-0.00 [-0.040,0.032]
Job Helps # GDP	-0.03*** [-0.048,-0.021] [0.010,0.048]	
Job is Useful		0.21*** [0.191,0.230]
Job Useful # Volatility		-0.05*** [-0.087,-0.014]
Job Useful # GDP		-0.03** [-0.055,-0.003]
Constant	-0.06 [-0.351,0.225]	-0.10 [-0.390,0.196]
Other Macro Indicators	YES	YES
Occupation FE	YES	YES
Country FE	YES	YES
R-squared	0.16	0.16
Observations	11,922	1,1894

*Note:* Data (except for the macro variables) were drawn from the Work Orientation Module of the 2015 International Social Survey Program. FE denotes fixed effects. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A15.** Correlation Table for the Variables in Health and Retirement Study (2006-2016) (Supporting Material for Chapter 3)

<i>Variable 1</i>	<i>Variable 2</i>	<i>r</i>	<i>95% CI</i>	
			<i>Lower Limit</i>	<i>Upper Limit</i>
Purpose	MVPA	0.223	0.208	0.239
Purpose	Age	-0.072	-0.088	-0.056
Purpose	Gender	0.006	-0.01	0.022
Purpose	White	-0.038	-0.054	-0.022
Purpose	Black	0.054	0.038	0.07
Purpose	Other_Race	-0.016	-0.032	0
Purpose	Education	0.187	0.172	0.203
Purpose	Income_Household	0.076	0.06	0.092
Purpose	Out_of_Labor	-0.041	-0.058	-0.025
Purpose	Working	0.1	0.084	0.116
Purpose	Retired	-0.07	-0.086	-0.054
Purpose	Health	0.285	0.27	0.3
Purpose	BMI	-0.081	-0.096	-0.065
Purpose	Smoker	-0.084	-0.1	-0.068
Purpose	Chronic_Disease	-0.09	-0.106	-0.074
Purpose	Positive_Affect	0.547	0.536	0.558
Purpose	Negative_Affect	-0.362	-0.376	-0.348
Purpose	Anxiety	-0.344	-0.358	-0.33
Purpose	Positive_Support	0.275	0.26	0.29
Purpose	Negative_Support	-0.196	-0.212	-0.181
MVPA	Age	-0.094	-0.11	-0.078
MVPA	Gender	-0.126	-0.142	-0.11
MVPA	White	0.071	0.055	0.087
MVPA	Black	-0.083	-0.099	-0.067
MVPA	Other_Race	0.002	-0.014	0.018
MVPA	Education	0.206	0.19	0.221
MVPA	Income_Household	0.082	0.066	0.098
MVPA	Out_of_Labor	-0.049	-0.065	-0.033
MVPA	Working	0.077	0.061	0.093
MVPA	Retired	-0.044	-0.06	-0.028
MVPA	Health	0.339	0.325	0.353
MVPA	BMI	-0.187	-0.203	-0.172
MVPA	Smoker	-0.081	-0.096	-0.065
MVPA	Chronic_Disease	-0.13	-0.146	-0.114
MVPA	Positive_Affect	0.239	0.224	0.254
MVPA	Negative_Affect	-0.142	-0.157	-0.126
MVPA	Anxiety	-0.152	-0.167	-0.136
MVPA	Positive_Support	0.073	0.057	0.089
MVPA	Negative_Support	-0.035	-0.051	-0.019
Age	Gender	-0.048	-0.064	-0.032

Age	White	0.096	0.08	0.112
Age	Black	-0.045	-0.061	-0.029
Age	Other_Race	-0.101	-0.117	-0.085
Age	Education	-0.101	-0.117	-0.085
Age	Income_Household	-0.106	-0.122	-0.09
Age	Out_of_Labor	-0.095	-0.111	-0.079
Age	Working	-0.518	-0.53	-0.506
Age	Retired	0.538	0.526	0.549
Age	Health	-0.069	-0.085	-0.053
Age	BMI	-0.129	-0.144	-0.113
Age	Smoker	-0.181	-0.197	-0.166
Age	Chronic_Disease	0.261	0.246	0.276
Age	Positive_Affect	0.008	-0.008	0.024
Age	Negative_Affect	-0.032	-0.048	-0.016
Age	Anxiety	-0.029	-0.045	-0.013
Age	Positive_Support	0.077	0.061	0.093
Age	Negative_Support	-0.244	-0.259	-0.229
Gender	White	-0.054	-0.07	-0.038
Gender	Black	0.063	0.047	0.079
Gender	Other_Race	-0.002	-0.018	0.014
Gender	Education	-0.059	-0.075	-0.043
Gender	Income_Household	-0.045	-0.061	-0.029
Gender	Out_of_Labor	0.133	0.118	0.149
Gender	Working	-0.037	-0.053	-0.021
Gender	Retired	-0.041	-0.057	-0.025
Gender	Health	-0.008	-0.025	0.008
Gender	BMI	-0.14	-0.155	-0.124
Gender	Smoker	0.002	-0.014	0.018
Gender	Chronic_Disease	0.011	-0.005	0.027
Gender	Positive_Affect	0.007	-0.009	0.023
Gender	Negative_Affect	0.089	0.073	0.105
Gender	Anxiety	0.077	0.061	0.093
Gender	Positive_Support	0.113	0.097	0.129
Gender	Negative_Support	0.04	0.024	0.056
White	Black	-0.829	-0.834	-0.824
White	Other_Race	-0.498	-0.51	-0.485
White	Education	0.139	0.124	0.155
White	Income_Household	0.056	0.04	0.072
White	Out_of_Labor	-0.043	-0.059	-0.027
White	Working	-0.019	-0.035	-0.003
White	Retired	0.042	0.026	0.058
White	Health	0.146	0.13	0.161
White	BMI	-0.1	-0.116	-0.084
White	Smoker	-0.063	-0.079	-0.047
White	Chronic_Disease	-0.025	-0.041	-0.009
White	Positive_Affect	0.002	-0.014	0.018

White	Negative_Affect	-0.043	-0.059	-0.027
White	Anxiety	-0.114	-0.13	-0.098
White	Positive_Support	-0.012	-0.029	0.004
White	Negative_Support	-0.126	-0.142	-0.11
Black	Other_Race	-0.073	-0.089	-0.057
Black	Education	-0.105	-0.121	-0.089
Black	Income_Household	-0.057	-0.073	-0.041
Black	Out_of_Labor	0.009	-0.007	0.025
Black	Working	-0.01	-0.026	0.006
Black	Retired	0.004	-0.012	0.02
Black	Health	-0.129	-0.144	-0.113
Black	BMI	0.113	0.097	0.128
Black	Smoker	0.065	0.049	0.081
Black	Chronic_Disease	0.045	0.029	0.061
Black	Positive_Affect	0.006	-0.01	0.022
Black	Negative_Affect	0.027	0.011	0.044
Black	Anxiety	0.093	0.077	0.109
Black	Positive_Support	0.023	0.007	0.039
Black	Negative_Support	0.097	0.081	0.113
Other_Race	Education	-0.086	-0.102	-0.07
Other_Race	Income_Household	-0.012	-0.028	0.004
Other_Race	Out_of_Labor	0.063	0.047	0.079
Other_Race	Working	0.049	0.033	0.065
Other_Race	Retired	-0.081	-0.097	-0.065
Other_Race	Health	-0.06	-0.076	-0.044
Other_Race	BMI	0.004	-0.012	0.02
Other_Race	Smoker	0.012	-0.004	0.029
Other_Race	Chronic_Disease	-0.026	-0.042	-0.01
Other_Race	Positive_Affect	-0.013	-0.029	0.003
Other_Race	Negative_Affect	0.035	0.018	0.051
Other_Race	Anxiety	0.059	0.043	0.075
Other_Race	Positive_Support	-0.013	-0.029	0.003
Other_Race	Negative_Support	0.074	0.058	0.09
Education	Income_Household	0.157	0.141	0.172
Education	Out_of_Labor	-0.116	-0.132	-0.1
Education	Working	0.15	0.135	0.166
Education	Retired	-0.074	-0.09	-0.058
Education	Health	0.288	0.273	0.303
Education	BMI	-0.073	-0.088	-0.057
Education	Smoker	-0.084	-0.1	-0.068
Education	Chronic_Disease	-0.101	-0.117	-0.085
Education	Positive_Affect	0.159	0.143	0.174
Education	Negative_Affect	-0.083	-0.099	-0.067
Education	Anxiety	-0.163	-0.179	-0.147
Education	Positive_Support	0.017	0.001	0.033
Education	Negative_Support	-0.058	-0.074	-0.042

Income_Household	Out_of_Labor	-0.018	-0.034	-0.002
Income_Household	Working	0.122	0.106	0.137
Income_Household	Retired	-0.103	-0.119	-0.087
Income_Household	Health	0.107	0.091	0.123
Income_Household	BMI	-0.028	-0.044	-0.012
Income_Household	Smoker	-0.042	-0.058	-0.026
Income_Household	Chronic_Disease	-0.068	-0.084	-0.052
Income_Household	Positive_Affect	0.063	0.047	0.079
Income_Household	Negative_Affect	-0.051	-0.067	-0.035
Income_Household	Anxiety	-0.072	-0.088	-0.056
Income_Household	Positive_Support	0.012	-0.004	0.028
Income_Household	Negative_Support	-0.006	-0.022	0.01
Out_of_Labor	Working	-0.183	-0.199	-0.168
Out_of_Labor	Retired	-0.397	-0.41	-0.383
Out_of_Labor	Health	-0.065	-0.081	-0.049
Out_of_Labor	BMI	-0.003	-0.019	0.013
Out_of_Labor	Smoker	0.042	0.026	0.058
Out_of_Labor	Chronic_Disease	-0.002	-0.018	0.014
Out_of_Labor	Positive_Affect	-0.05	-0.066	-0.034
Out_of_Labor	Negative_Affect	0.059	0.042	0.075
Out_of_Labor	Anxiety	0.068	0.052	0.084
Out_of_Labor	Positive_Support	0.007	-0.009	0.023
Out_of_Labor	Negative_Support	0.051	0.035	0.067
Working	Retired	-0.83	-0.835	-0.825
Working	Health	0.166	0.151	0.182
Working	BMI	0.024	0.008	0.04
Working	Smoker	0.054	0.038	0.07
Working	Chronic_Disease	-0.228	-0.243	-0.213
Working	Positive_Affect	0.036	0.02	0.052
Working	Negative_Affect	-0.031	-0.047	-0.014
Working	Anxiety	-0.046	-0.062	-0.03
Working	Positive_Support	-0.035	-0.051	-0.019
Working	Negative_Support	0.101	0.085	0.117
Retired	Health	-0.119	-0.134	-0.103
Retired	BMI	-0.021	-0.037	-0.005
Retired	Smoker	-0.075	-0.09	-0.059
Retired	Chronic_Disease	0.214	0.199	0.229
Retired	Positive_Affect	-0.005	-0.021	0.011
Retired	Negative_Affect	-0.005	-0.021	0.011
Retired	Anxiety	0.005	-0.011	0.021
Retired	Positive_Support	0.029	0.013	0.045
Retired	Negative_Support	-0.123	-0.139	-0.108
Health	BMI	-0.196	-0.211	-0.18
Health	Smoker	-0.113	-0.129	-0.097
Health	Chronic_Disease	-0.275	-0.29	-0.26
Health	Positive_Affect	0.349	0.335	0.363

Health	Negative_Affect	-0.29	-0.305	-0.276
Health	Anxiety	-0.345	-0.359	-0.331
Health	Positive_Support	0.133	0.117	0.149
Health	Negative_Support	-0.15	-0.166	-0.135
BMI	Smoker	-0.075	-0.091	-0.059
BMI	Chronic_Disease	0.132	0.117	0.148
BMI	Positive_Affect	-0.063	-0.079	-0.047
BMI	Negative_Affect	0.044	0.028	0.06
BMI	Anxiety	0.037	0.02	0.053
BMI	Positive_Support	-0.063	-0.079	-0.047
BMI	Negative_Support	0.084	0.068	0.1
Smoker	Chronic_Disease	-0.033	-0.049	-0.017
Smoker	Positive_Affect	-0.085	-0.101	-0.069
Smoker	Negative_Affect	0.08	0.064	0.096
Smoker	Anxiety	0.092	0.076	0.108
Smoker	Positive_Support	-0.051	-0.067	-0.035
Smoker	Negative_Support	0.084	0.068	0.1
Chronic_Disease	Positive_Affect	-0.075	-0.091	-0.059
Chronic_Disease	Negative_Affect	0.083	0.067	0.099
Chronic_Disease	Anxiety	0.102	0.086	0.117
Chronic_Disease	Positive_Support	-0.027	-0.044	-0.011
Chronic_Disease	Negative_Support	0.005	-0.011	0.021
Positive_Affect	Negative_Affect	-0.412	-0.425	-0.398
Positive_Affect	Anxiety	-0.403	-0.416	-0.389
Positive_Affect	Positive_Support	0.335	0.32	0.349
Positive_Affect	Negative_Support	-0.241	-0.256	-0.226
Negative_Affect	Anxiety	0.55	0.539	0.562
Negative_Affect	Positive_Support	-0.21	-0.226	-0.195
Negative_Affect	Negative_Support	0.352	0.338	0.366
Anxiety	Positive_Support	-0.173	-0.189	-0.157
Anxiety	Negative_Support	0.31	0.295	0.324
Positive_Support	Negative_Support	-0.325	-0.339	-0.31

*Note:* Two cohorts of data were drawn from the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). The sample was restricted to individuals from the analytic sample in HRS in Chapter 3. Missing values were handled with listwise deletion resulting in 22,169 observations. Upper and lower limits of the 95% confidence interval are listed in columns 4 and 5. MVPA measures average scores for moderate and vigorous activity.

**Table A16.** Correlation Table for The Variables in Midlife in the US – For the Analytic Sample in Chapter 3

<i>Variable 1</i>	<i>Variable 2</i>	<i>r</i>	<i>95% CI Lower Limit</i>	<i>95% CI Upper Limit</i>
Purpose_2003	MVPA_2003	0.115	0.074	0.155
Purpose_2003	MVPA_2014	0.133	0.093	0.174
Purpose_2003	Age_2003	0.033	-0.008	0.074
Purpose_2003	Gender	-0.008	-0.049	0.034
Purpose_2003	White	0.018	-0.023	0.059
Purpose_2003	Black	0.018	-0.023	0.059
Purpose_2003	Other_Race	-0.041	-0.081	0.001
Purpose_2003	Education	0.147	0.107	0.187
Purpose_2003	Income_Household_2003	0.141	0.101	0.181
Purpose_2003	Out_of_Labour_2003	0.021	-0.02	0.062
Purpose_2003	Working_2003	0.036	-0.005	0.077
Purpose_2003	Retired_2003	-0.038	-0.079	0.003
Purpose_2003	Health_2003	0.244	0.205	0.282
Purpose_2003	BMI_2003	-0.088	-0.128	-0.047
Purpose_2003	Smoker_2003	-0.116	-0.156	-0.075
Purpose_2003	Chronic_Conditions_2003	-0.121	-0.161	-0.08
Purpose_2003	Positive_Affect_2003	0.514	0.483	0.543
Purpose_2003	Negative_Affect_2003	-0.388	-0.422	-0.352
Purpose_2003	Anxiety_2003	-0.166	-0.206	-0.126
Purpose_2003	Depression_2003	-0.213	-0.252	-0.173
MVPA_2003	MVPA_2014	0.364	0.327	0.399
MVPA_2003	Age_2003	-0.178	-0.218	-0.138
MVPA_2003	Gender	-0.095	-0.135	-0.054
MVPA_2003	White	0.051	0.010	0.092
MVPA_2003	Black	-0.050	-0.091	-0.009
MVPA_2003	Other_Race	-0.022	-0.063	0.019
MVPA_2003	Education	0.196	0.157	0.236
MVPA_2003	Income_Household_2003	0.19	0.15	0.229
MVPA_2003	Out_of_Labour_2003	0.124	0.083	0.164
MVPA_2003	Working_2003	0.014	-0.027	0.055
MVPA_2003	Retired_2003	-0.137	-0.177	-0.096
MVPA_2003	Health_2003	0.192	0.152	0.231
MVPA_2003	BMI_2003	-0.097	-0.137	-0.056
MVPA_2003	Smoker_2003	-0.103	-0.143	-0.062
MVPA_2003	Chronic_Conditions_2003	-0.049	-0.090	-0.008
MVPA_2003	Positive_Affect_2003	0.073	0.032	0.114
MVPA_2003	Negative_Affect_2003	0.005	-0.036	0.046
MVPA_2003	Anxiety_2003	-0.025	-0.066	0.017
MVPA_2003	Depression_2003	-0.029	-0.07	0.012
MVPA_2014	Age_2003	-0.276	-0.313	-0.237

MVPA_2014	Gender	-0.098	-0.139	-0.057
MVPA_2014	White	0.028	-0.013	0.069
MVPA_2014	Black	-0.036	-0.077	0.006
MVPA_2014	Other_Race	-0.005	-0.046	0.036
MVPA_2014	Education	0.168	0.127	0.207
MVPA_2014	Income_Household_2003	0.230	0.190	0.268
MVPA_2014	Out_of_Labour_2003	0.209	0.170	0.248
MVPA_2014	Working_2003	-0.019	-0.061	0.022
MVPA_2014	Retired_2003	-0.212	-0.251	-0.172
MVPA_2014	Health_2003	0.214	0.174	0.253
MVPA_2014	BMI_2003	-0.125	-0.166	-0.085
MVPA_2014	Smoker_2003	-0.094	-0.135	-0.053
MVPA_2014	Chronic_Conditions_2003	-0.119	-0.16	-0.079
MVPA_2014	Positive_Affect_2003	0.091	0.050	0.132
MVPA_2014	Negative_Affect_2003	-0.019	-0.060	0.022
MVPA_2014	Anxiety_2003	-0.021	-0.062	0.02
MVPA_2014	Depression_2003	-0.078	-0.118	-0.037
Age_2003	Gender	-0.02	-0.061	0.021
Age_2003	White	0.049	0.007	0.089
Age_2003	Black	-0.053	-0.094	-0.012
Age_2003	Other_Race	-0.016	-0.057	0.025
Age_2003	Education	-0.125	-0.165	-0.084
Age_2003	Income_Household_2003	-0.406	-0.44	-0.371
Age_2003	Out_of_Labour_2003	-0.601	-0.626	-0.574
Age_2003	Working_2003	0.114	0.073	0.154
Age_2003	Retired_2003	0.582	0.554	0.608
Age_2003	Health_2003	-0.082	-0.123	-0.041
Age_2003	BMI_2003	0.006	-0.035	0.047
Age_2003	Smoker_2003	-0.105	-0.145	-0.064
Age_2003	Chronic_Conditions_2003	0.183	0.143	0.223
Age_2003	Positive_Affect_2003	0.156	0.116	0.196
Age_2003	Negative_Affect_2003	-0.208	-0.247	-0.169
Age_2003	Anxiety_2003	-0.064	-0.105	-0.023
Age_2003	Depression_2003	-0.112	-0.152	-0.071
Gender	White	-0.025	-0.066	0.016
Gender	Black	0.028	-0.013	0.069
Gender	Other_Race	0.008	-0.033	0.049
Gender	Education	-0.140	-0.180	-0.099
Gender	Income_Household_2003	-0.125	-0.165	-0.084
Gender	Out_of_Labour_2003	-0.006	-0.047	0.035
Gender	Working_2003	0.014	-0.027	0.055
Gender	Retired_2003	0.001	-0.041	0.042
Gender	Health_2003	-0.024	-0.065	0.017
Gender	BMI_2003	-0.040	-0.081	0.001

Gender	Smoker_2003	0.036	-0.005	0.077
Gender	Chronic_Conditions_2003	0.100	0.059	0.141
Gender	Positive_Affect_2003	-0.021	-0.062	0.020
Gender	Negative_Affect_2003	0.081	0.040	0.122
Gender	Anxiety_2003	0.087	0.046	0.128
Gender	Depression_2003	0.137	0.097	0.177
White	Black	-0.661	-0.683	-0.637
White	Other_Race	-0.728	-0.747	-0.708
White	Education	0.028	-0.014	0.069
White	Income_Household_2003	0.051	0.010	0.092
White	Out_of_Labour_2003	-0.020	-0.061	0.021
White	Working_2003	-0.008	-0.049	0.033
White	Retired_2003	0.024	-0.017	0.065
White	Health_2003	0.062	0.021	0.103
White	BMI_2003	-0.086	-0.127	-0.045
White	Smoker_2003	-0.032	-0.073	0.009
White	Chronic_Conditions_2003	0.002	-0.039	0.043
White	Positive_Affect_2003	-0.034	-0.075	0.007
White	Negative_Affect_2003	-0.04	-0.081	0.001
White	Anxiety_2003	-0.033	-0.074	0.008
White	Depression_2003	-0.014	-0.055	0.027
Black	Other_Race	-0.034	-0.075	0.007
Black	Education	-0.003	-0.044	0.038
Black	Income_Household_2003	-0.042	-0.083	-0.001
Black	Out_of_Labour_2003	0.031	-0.011	0.072
Black	Working_2003	-0.005	-0.046	0.036
Black	Retired_2003	-0.03	-0.071	0.011
Black	Health_2003	-0.058	-0.099	-0.017
Black	BMI_2003	0.101	0.06	0.141
Black	Smoker_2003	0.000	-0.041	0.041
Black	Chronic_Conditions_2003	-0.024	-0.065	0.018
Black	Positive_Affect_2003	0.044	0.003	0.085
Black	Negative_Affect_2003	0.026	-0.015	0.068
Black	Anxiety_2003	0.030	-0.012	0.071
Black	Depression_2003	0.007	-0.034	0.048
Other_Race	Education	-0.034	-0.075	0.007
Other_Race	Income_Household_2003	-0.03	-0.071	0.012
Other_Race	Out_of_Labour_2003	-0.002	-0.043	0.039
Other_Race	Working_2003	0.015	-0.026	0.056
Other_Race	Retired_2003	-0.005	-0.046	0.036
Other_Race	Health_2003	-0.03	-0.071	0.011
Other_Race	BMI_2003	0.023	-0.019	0.064
Other_Race	Smoker_2003	0.042	0.001	0.083
Other_Race	Chronic_Conditions_2003	0.019	-0.022	0.06

Other_Race	Positive_Affect_2003	0.005	-0.036	0.046
Other_Race	Negative_Affect_2003	0.029	-0.012	0.07
Other_Race	Anxiety_2003	0.017	-0.024	0.058
Other_Race	Depression_2003	0.012	-0.029	0.053
Education	Income_Household_2003	0.318	0.28	0.354
Education	Out_of_Labour_2003	0.074	0.033	0.114
Education	Working_2003	0.049	0.007	0.09
Education	Retired_2003	-0.099	-0.139	-0.058
Education	Health_2003	0.240	0.200	0.278
Education	BMI_2003	-0.145	-0.185	-0.105
Education	Smoker_2003	-0.157	-0.196	-0.116
Education	Chronic_Conditions_2003	-0.059	-0.1	-0.018
Education	Positive_Affect_2003	0.035	-0.006	0.076
Education	Negative_Affect_2003	-0.049	-0.09	-0.008
Education	Anxiety_2003	-0.099	-0.139	-0.058
Education	Depression_2003	-0.050	-0.091	-0.009
Income_Household_2003	Out_of_Labour_2003	0.447	0.413	0.479
Income_Household_2003	Working_2003	-0.102	-0.142	-0.061
Income_Household_2003	Retired_2003	-0.425	-0.459	-0.391
Income_Household_2003	Health_2003	0.193	0.153	0.232
Income_Household_2003	BMI_2003	-0.068	-0.109	-0.027
Income_Household_2003	Smoker_2003	-0.093	-0.133	-0.052
Income_Household_2003	Chronic_Conditions_2003	-0.151	-0.191	-0.11
Income_Household_2003	Positive_Affect_2003	0.019	-0.022	0.06
Income_Household_2003	Negative_Affect_2003	-0.01	-0.051	0.032
Income_Household_2003	Anxiety_2003	-0.041	-0.082	0
Income_Household_2003	Depression_2003	-0.067	-0.108	-0.026
Out_of_Labour_2003	Working_2003	-0.325	-0.361	-0.287
Out_of_Labour_2003	Retired_2003	-0.909	-0.916	-0.901
Out_of_Labour_2003	Health_2003	0.089	0.048	0.13
Out_of_Labour_2003	BMI_2003	-0.001	-0.042	0.04
Out_of_Labour_2003	Smoker_2003	0.075	0.034	0.116
Out_of_Labour_2003	Chronic_Conditions_2003	-0.145	-0.185	-0.105
Out_of_Labour_2003	Positive_Affect_2003	-0.087	-0.128	-0.046
Out_of_Labour_2003	Negative_Affect_2003	0.104	0.063	0.144
Out_of_Labour_2003	Anxiety_2003	0.032	-0.009	0.073
Out_of_Labour_2003	Depression_2003	0.035	-0.006	0.076
Working_2003	Retired_2003	-0.099	-0.14	-0.059
Working_2003	Health_2003	-0.005	-0.046	0.036
Working_2003	BMI_2003	-0.011	-0.052	0.03
Working_2003	Smoker_2003	-0.024	-0.065	0.017
Working_2003	Chronic_Conditions_2003	0.031	-0.01	0.072
Working_2003	Positive_Affect_2003	0.048	0.006	0.089
Working_2003	Negative_Affect_2003	-0.032	-0.073	0.009

Working_2003	Anxiety_2003	-0.002	-0.043	0.039
Working_2003	Depression_2003	0.004	-0.037	0.045
Retired_2003	Health_2003	-0.092	-0.132	-0.051
Retired_2003	BMI_2003	0.006	-0.035	0.047
Retired_2003	Smoker_2003	-0.068	-0.109	-0.027
Retired_2003	Chronic_Conditions_2003	0.139	0.098	0.179
Retired_2003	Positive_Affect_2003	0.071	0.03	0.112
Retired_2003	Negative_Affect_2003	-0.095	-0.136	-0.054
Retired_2003	Anxiety_2003	-0.032	-0.073	0.009
Retired_2003	Depression_2003	-0.039	-0.08	0.002
Health_2003	BMI_2003	-0.295	-0.332	-0.257
Health_2003	Smoker_2003	-0.146	-0.186	-0.106
Health_2003	Chronic_Conditions_2003	-0.248	-0.286	-0.209
Health_2003	Positive_Affect_2003	0.301	0.263	0.338
Health_2003	Negative_Affect_2003	-0.241	-0.279	-0.202
Health_2003	Anxiety_2003	-0.126	-0.166	-0.085
Health_2003	Depression_2003	-0.194	-0.233	-0.154
BMI_2003	Smoker_2003	-0.058	-0.098	-0.017
BMI_2003	Chronic_Conditions_2003	0.150	0.109	0.19
BMI_2003	Positive_Affect_2003	-0.117	-0.158	-0.076
BMI_2003	Negative_Affect_2003	0.079	0.038	0.119
BMI_2003	Anxiety_2003	0.064	0.023	0.105
BMI_2003	Depression_2003	0.058	0.017	0.099
Smoker_2003	Chronic_Conditions_2003	0.008	-0.033	0.049
Smoker_2003	Positive_Affect_2003	-0.111	-0.151	-0.07
Smoker_2003	Negative_Affect_2003	0.121	0.081	0.162
Smoker_2003	Anxiety_2003	0.079	0.038	0.12
Smoker_2003	Depression_2003	0.146	0.106	0.186
Chronic_Conditions_2003	Positive_Affect_2003	-0.128	-0.168	-0.087
Chronic_Conditions_2003	Negative_Affect_2003	0.154	0.113	0.194
Chronic_Conditions_2003	Anxiety_2003	0.074	0.033	0.115
Chronic_Conditions_2003	Depression_2003	0.128	0.088	0.169
Positive_Affect_2003	Negative_Affect_2003	-0.47	-0.501	-0.437
Positive_Affect_2003	Anxiety_2003	-0.188	-0.227	-0.148
Positive_Affect_2003	Depression_2003	-0.311	-0.348	-0.273
Negative_Affect_2003	Anxiety_2003	0.342	0.305	0.378
Negative_Affect_2003	Depression_2003	0.372	0.336	0.406
Anxiety_2003	Depression_2003	0.35	0.313	0.385

*Note:* Data were drawn from Midlife in the US Study (MIDUS). The sample was restricted to individuals from the analytic sample in MIDUS in Chapter 3. Missing values were handled with listwise deletion resulting in 2,273 observations. Upper and lower limits of the 95% confidence interval are listed in columns 4 and 5. MVPA measures average scores for moderate and vigorous activity.

**Table A17.** Correlation Table for the Variables in Health and Retirement Study (2006-2016) (Supporting Material for Chapter 4)

<i>Variable 1</i>	<i>Variable 2</i>	<i>r</i>	<i>95% CI Lower Limit</i>	<i>95% CI Upper Limit</i>
Purpose_in_Life	Retired	-0.009	-0.046	0.027
Purpose_in_Life	Social_Engagement	0.256	0.222	0.29
Purpose_in_Life	Age	0.03	-0.007	0.066
Purpose_in_Life	Gender	0.00	-0.036	0.037
Purpose_in_Life	White	-0.025	-0.062	0.011
Purpose_in_Life	Black	0.034	-0.002	0.071
Purpose_in_Life	Other_Race	-0.006	-0.042	0.031
Purpose_in_Life	College_Graduate	0.118	0.081	0.153
Purpose_in_Life	Married	0.064	0.027	0.1
Purpose_in_Life	White_Collar	0.089	0.053	0.125
Purpose_in_Life	Job_Stressful	-0.027	-0.064	0.009
Purpose_in_Life	Job_Satisfaction	0.33	0.297	0.362
Purpose_in_Life	Income_Household	0.133	0.097	0.169
Purpose_in_Life	Wealth	0.131	0.095	0.167
Purpose_in_Life	Earnings	0.089	0.052	0.125
Purpose_in_Life	Health	0.258	0.224	0.292
Purpose_in_Life	Life_Satisfaction	0.355	0.323	0.387
Purpose_in_Life	Positive_Affect	0.57	0.544	0.594
Purpose_in_Life	Negative_Affect	-0.354	-0.386	-0.322
Retired	Social_Engagement	0.048	0.011	0.084
Retired	Age	0.255	0.22	0.288
Retired	Gender	-0.01	-0.047	0.026
Retired	White	0.019	-0.017	0.056
Retired	Black	0.002	-0.035	0.038
Retired	Other_Race	-0.034	-0.07	0.003
Retired	College_Graduate	-0.012	-0.048	0.025
Retired	Married	-0.049	-0.086	-0.013
Retired	White_Collar	0.016	-0.021	0.052
Retired	Job_Stressful	-0.171	-0.207	-0.136
Retired	Job_Satisfaction	0.096	0.06	0.132
Retired	Income_Household	-0.004	-0.041	0.033
Retired	Wealth	0.058	0.022	0.095
Retired	Earnings	-0.136	-0.172	-0.1
Retired	Health	-0.028	-0.064	0.009
Retired	Life_Satisfaction	0.03	-0.007	0.066
Retired	Positive_Affect	0.023	-0.013	0.06
Retired	Negative_Affect	0.009	-0.027	0.046
Social_Engagement	Age	-0.013	-0.05	0.023
Social_Engagement	Gender	0.176	0.141	0.212
Social_Engagement	White	0.019	-0.018	0.055
Social_Engagement	Black	-0.016	-0.052	0.021
Social_Engagement	Other_Race	-0.009	-0.046	0.027

Social_Engagement	College_Graduate	0.215	0.18	0.25
Social_Engagement	Married	-0.003	-0.04	0.033
Social_Engagement	White_Collar	0.157	0.122	0.193
Social_Engagement	Job_Stressful	0.032	-0.004	0.069
Social_Engagement	Job_Satisfaction	0.133	0.097	0.169
Social_Engagement	Income_Household	0.101	0.065	0.137
Social_Engagement	Wealth	0.093	0.057	0.13
Social_Engagement	Earnings	0.04	0.003	0.076
Social_Engagement	Health	0.223	0.188	0.257
Social_Engagement	Life_Satisfaction	0.134	0.098	0.17
Social_Engagement	Positive_Affect	0.307	0.274	0.34
Social_Engagement	Negative_Affect	0.028	-0.009	0.064
Age	Gender	-0.164	-0.199	-0.128
Age	White	0.048	0.012	0.084
Age	Black	-0.019	-0.055	0.018
Age	Other_Race	-0.052	-0.089	-0.016
Age	College_Graduate	-0.067	-0.103	-0.03
Age	Married	-0.159	-0.194	-0.123
Age	White_Collar	0.103	0.067	0.139
Age	Job_Stressful	-0.163	-0.198	-0.127
Age	Job_Satisfaction	0.158	0.122	0.194
Age	Income_Household	-0.021	-0.058	0.015
Age	Wealth	0.07	0.034	0.107
Age	Earnings	-0.11	-0.146	-0.074
Age	Health	-0.037	-0.074	-0.001
Age	Life_Satisfaction	0.008	-0.029	0.044
Age	Positive_Affect	0.053	0.017	0.09
Age	Negative_Affect	-0.022	-0.059	0.014
Gender	White	-0.08	-0.116	-0.043
Gender	Black	0.08	0.044	0.116
Gender	Other_Race	0.02	-0.017	0.056
Gender	College_Graduate	-0.067	-0.103	-0.031
Gender	Married	-0.235	-0.269	-0.2
Gender	White_Collar	0.156	0.12	0.191
Gender	Job_Stressful	0.086	0.05	0.122
Gender	Job_Satisfaction	-0.081	-0.117	-0.045
Gender	Income_Household	-0.115	-0.151	-0.079
Gender	Wealth	-0.11	-0.146	-0.074
Gender	Earnings	-0.113	-0.149	-0.077
Gender	Health	0.029	-0.008	0.065
Gender	Life_Satisfaction	0.002	-0.035	0.038
Gender	Positive_Affect	-0.014	-0.05	0.023
Gender	Negative_Affect	0.084	0.047	0.12
White	Black	-0.789	-0.802	-0.774
White	Other_Race	-0.548	-0.573	-0.522
White	College_Graduate	0.096	0.06	0.132

White	Married	0.114	0.078	0.15
White	White_Collar	0.153	0.117	0.188
White	Job_Stressful	0.06	0.023	0.096
White	Job_Satisfaction	0.086	0.05	0.122
White	Income_Household	0.126	0.09	0.162
White	Wealth	0.126	0.09	0.162
White	Earnings	0.053	0.017	0.089
White	Health	0.118	0.082	0.154
White	Life_Satisfaction	0.063	0.026	0.099
White	Positive_Affect	-0.019	-0.055	0.018
White	Negative_Affect	0.03	-0.007	0.066
Black	Other_Race	-0.082	-0.118	-0.045
Black	College_Graduate	-0.086	-0.122	-0.05
Black	Married	-0.136	-0.171	-0.1
Black	White_Collar	-0.14	-0.175	-0.104
Black	Job_Stressful	-0.043	-0.08	-0.007
Black	Job_Satisfaction	-0.095	-0.131	-0.058
Black	Income_Household	-0.113	-0.149	-0.077
Black	Wealth	-0.118	-0.154	-0.082
Black	Earnings	-0.053	-0.089	-0.017
Black	Health	-0.103	-0.139	-0.066
Black	Life_Satisfaction	-0.115	-0.151	-0.079
Black	Positive_Affect	0.014	-0.023	0.05
Black	Negative_Affect	-0.027	-0.064	0.009
Other_Race	College_Graduate	-0.038	-0.075	-0.002
Other_Race	Married	-0.001	-0.038	0.035
Other_Race	White_Collar	-0.058	-0.094	-0.021
Other_Race	Job_Stressful	-0.038	-0.075	-0.002
Other_Race	Job_Satisfaction	-0.011	-0.047	0.026
Other_Race	Income_Household	-0.051	-0.087	-0.014
Other_Race	Wealth	-0.044	-0.081	-0.008
Other_Race	Earnings	-0.014	-0.05	0.023
Other_Race	Health	-0.052	-0.089	-0.016
Other_Race	Life_Satisfaction	0.054	0.018	0.091
Other_Race	Positive_Affect	0.012	-0.025	0.048
Other_Race	Negative_Affect	-0.011	-0.047	0.026
College_Graduate	Married	0.048	0.011	0.084
College_Graduate	White_Collar	0.273	0.239	0.306
College_Graduate	Job_Stressful	0.13	0.094	0.165
College_Graduate	Job_Satisfaction	0.096	0.06	0.132
College_Graduate	Income_Household	0.264	0.229	0.297
College_Graduate	Wealth	0.208	0.173	0.243
College_Graduate	Earnings	0.295	0.261	0.328
College_Graduate	Health	0.198	0.162	0.233
College_Graduate	Life_Satisfaction	0.131	0.095	0.167
College_Graduate	Positive_Affect	0.129	0.093	0.165

College_Graduate	Negative_Affect	0.016	-0.02	0.053
Married	White_Collar	-0.019	-0.055	0.018
Married	Job_Stressful	0.054	0.018	0.091
Married	Job_Satisfaction	0.045	0.009	0.082
Married	Income_Household	0.214	0.179	0.248
Married	Wealth	0.14	0.104	0.176
Married	Earnings	0.061	0.025	0.098
Married	Health	0.056	0.019	0.092
Married	Life_Satisfaction	0.132	0.096	0.167
Married	Positive_Affect	0.057	0.021	0.093
Married	Negative_Affect	-0.066	-0.102	-0.029
White_Collar	Job_Stressful	0.088	0.052	0.124
White_Collar	Job_Satisfaction	0.125	0.089	0.161
White_Collar	Income_Household	0.169	0.133	0.204
White_Collar	Wealth	0.148	0.112	0.183
White_Collar	Earnings	0.099	0.063	0.135
White_Collar	Health	0.172	0.136	0.207
White_Collar	Life_Satisfaction	0.116	0.079	0.151
White_Collar	Positive_Affect	0.133	0.097	0.168
White_Collar	Negative_Affect	-0.013	-0.05	0.023
Job_Stressful	Job_Satisfaction	-0.243	-0.277	-0.208
Job_Stressful	Income_Household	0.07	0.034	0.106
Job_Stressful	Wealth	0.021	-0.016	0.057
Job_Stressful	Earnings	0.143	0.107	0.178
Job_Stressful	Health	-0.072	-0.108	-0.036
Job_Stressful	Life_Satisfaction	-0.071	-0.107	-0.035
Job_Stressful	Positive_Affect	-0.082	-0.119	-0.046
Job_Stressful	Negative_Affect	0.185	0.149	0.22
Job_Satisfaction	Income_Household	0.152	0.116	0.188
Job_Satisfaction	Wealth	0.156	0.12	0.191
Job_Satisfaction	Earnings	0.036	-0.001	0.072
Job_Satisfaction	Health	0.258	0.223	0.291
Job_Satisfaction	Life_Satisfaction	0.356	0.323	0.387
Job_Satisfaction	Positive_Affect	0.398	0.367	0.428
Job_Satisfaction	Negative_Affect	-0.299	-0.332	-0.266
Income_Household	Wealth	0.567	0.542	0.592
Income_Household	Earnings	0.491	0.462	0.518
Income_Household	Health	0.162	0.126	0.197
Income_Household	Life_Satisfaction	0.161	0.126	0.197
Income_Household	Positive_Affect	0.139	0.103	0.175
Income_Household	Negative_Affect	-0.05	-0.086	-0.013
Wealth	Earnings	0.137	0.101	0.172
Wealth	Health	0.149	0.113	0.184
Wealth	Life_Satisfaction	0.177	0.141	0.212
Wealth	Positive_Affect	0.122	0.086	0.158
Wealth	Negative_Affect	-0.064	-0.101	-0.028

Earnings	Health	0.133	0.097	0.169
Earnings	Life_Satisfaction	0.083	0.047	0.119
Earnings	Positive_Affect	0.082	0.045	0.118
Earnings	Negative_Affect	-0.035	-0.072	0.001
Health	Life_Satisfaction	0.311	0.278	0.344
Health	Positive_Affect	0.345	0.313	0.377
Health	Negative_Affect	-0.224	-0.259	-0.189
Life_Satisfaction	Positive_Affect	0.469	0.44	0.497
Life_Satisfaction	Negative_Affect	-0.382	-0.412	-0.35
Positive_Affect	Negative_Affect	-0.394	-0.425	-0.363

*Note:* Two cohorts of data were drawn from the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). The sample was restricted to individuals from the analytic sample in HRS in Chapter 4. Missing values were handled with listwise deletion resulting in 2,881 observations. Upper and lower limits of the 95% confidence interval are listed in columns 4 and 5.

**Table A18.** Correlation Table for the Variables in International Social Survey Program 2015 (Supporting Material for Chapter 5)

<i>Variable 1</i>	<i>Variable 2</i>	<i>r</i>	<i>95% CI Lower Limit</i>	<i>95% CI Upper Limit</i>
Job_Satisfaction	Social_Purpose	0.303	0.283	0.321
Job_Satisfaction	Income_Satisfaction	0.333	0.314	0.351
Job_Satisfaction	Income_Standardised	0.115	0.094	0.136
Job_Satisfaction	Age	0.054	0.033	0.075
Job_Satisfaction	Gender	-0.012	-0.033	0.009
Job_Satisfaction	Education	0.064	0.043	0.085
Job_Satisfaction	Married	0.035	0.014	0.056
Job_Satisfaction	Household_Size	-0.017	-0.038	0.004
Job_Satisfaction	Union_Membership	0.035	0.014	0.056
Job_Satisfaction	Supervisor	0.089	0.068	0.109
Job_Satisfaction	Work_Hours	-0.037	-0.058	-0.016
Job_Satisfaction	Satisfied_with_Work_Hours	0.092	0.071	0.113
Job_Satisfaction	Work_Life_Balance	0.208	0.188	0.228
Job_Satisfaction	Skill_Use_at_Job	0.187	0.167	0.207
Job_Satisfaction	Independence_in_Job	0.308	0.289	0.327
Job_Satisfaction	Job_Offers_Advancement	0.344	0.326	0.363
Job_Satisfaction	Job_is_Interesting	0.505	0.489	0.52
Job_Satisfaction	Job_Security	0.312	0.293	0.331
Job_Satisfaction	Job_Physical	-0.142	-0.163	-0.122
Job_Satisfaction	Job_is_Stressful	-0.216	-0.236	-0.196
Job_Satisfaction	Social_Contact_in_Job	0.198	0.178	0.218
Job_Satisfaction	Relations_with_Management	0.496	0.48	0.512
Job_Satisfaction	Relations_with_Colleagues	0.398	0.381	0.416
Social_Purpose	Income_Satisfaction	0.123	0.102	0.144
Social_Purpose	Income_Standardised	0.04	0.019	0.061
Social_Purpose	Age	0.072	0.051	0.093
Social_Purpose	Gender	0.114	0.093	0.134
Social_Purpose	Education	0.139	0.118	0.159
Social_Purpose	Married	0.038	0.017	0.059
Social_Purpose	Household_Size	-0.014	-0.035	0.007
Social_Purpose	Union_Membership	0.115	0.095	0.136
Social_Purpose	Supervisor	0.08	0.059	0.101
Social_Purpose	Work_Hours	-0.032	-0.053	-0.011
Social_Purpose	Satisfied_with_Work_Hours	0.051	0.03	0.072
Social_Purpose	Work_Life_Balance	-0.002	-0.023	0.019
Social_Purpose	Skill_Use_at_Job	0.193	0.173	0.213
Social_Purpose	Independence_in_Job	0.313	0.294	0.331
Social_Purpose	Job_Offers_Advancement	0.222	0.202	0.242
Social_Purpose	Job_is_Interesting	0.434	0.417	0.451
Social_Purpose	Job_Security	0.263	0.243	0.282

Social_Purpose	Job_Physical	-0.04	-0.061	-0.019
Social_Purpose	Job_is_Stressful	0.023	0.002	0.044
Social_Purpose	Social_Contact_in_Job	0.451	0.435	0.468
Social_Purpose	Relations_with_Management	0.188	0.168	0.208
Social_Purpose	Relations_with_Colleagues	0.174	0.153	0.194
Income_Satisfaction	Income_Standardised	0.362	0.344	0.38
Income_Satisfaction	Age	-0.025	-0.046	-0.004
Income_Satisfaction	Gender	-0.106	-0.126	-0.085
Income_Satisfaction	Education	0.196	0.176	0.216
Income_Satisfaction	Married	0.053	0.033	0.074
Income_Satisfaction	Household_Size	-0.004	-0.025	0.017
Income_Satisfaction	Union_Membership	0.05	0.029	0.07
Income_Satisfaction	Supervisor	0.183	0.163	0.203
Income_Satisfaction	Work_Hours	0.061	0.04	0.082
Income_Satisfaction	Satisfied_with_Work_Hours	0.106	0.085	0.127
Income_Satisfaction	Work_Life_Balance	-0.024	-0.045	-0.003
Income_Satisfaction	Skill_Use_at_Job	0.163	0.142	0.183
Income_Satisfaction	Independence_in_Job	0.267	0.248	0.287
Income_Satisfaction	Job_Offers_Advancement	0.496	0.48	0.511
Income_Satisfaction	Job_is_Interesting	0.35	0.332	0.368
Income_Satisfaction	Job_Security	0.331	0.312	0.349
Income_Satisfaction	Job_Physical	-0.19	-0.21	-0.17
Income_Satisfaction	Job_is_Stressful	-0.014	-0.035	0.007
Income_Satisfaction	Social_Contact_in_Job	0.102	0.081	0.123
Income_Satisfaction	Relations_with_Management	0.205	0.185	0.225
Income_Satisfaction	Relations_with_Colleagues	0.169	0.149	0.189
Income_Standardised	Age	0.127	0.106	0.147
Income_Standardised	Gender	-0.17	-0.19	-0.149
Income_Standardised	Education	0.306	0.287	0.325
Income_Standardised	Married	0.143	0.123	0.164
Income_Standardised	Household_Size	0.041	0.02	0.062
Income_Standardised	Union_Membership	0.038	0.017	0.059
Income_Standardised	Supervisor	0.249	0.229	0.269
Income_Standardised	Work_Hours	0.13	0.109	0.15
Income_Standardised	Satisfied_with_Work_Hours	0.074	0.053	0.095
Income_Standardised	Work_Life_Balance	-0.078	-0.099	-0.057
Income_Standardised	Skill_Use_at_Job	0.152	0.131	0.172
Income_Standardised	Independence_in_Job	0.099	0.078	0.12
Income_Standardised	Job_Offers_Advancement	0.168	0.148	0.188
Income_Standardised	Job_is_Interesting	0.158	0.138	0.179
Income_Standardised	Job_Security	0.068	0.047	0.089
Income_Standardised	Job_Physical	-0.237	-0.256	-0.217
Income_Standardised	Job_is_Stressful	0.076	0.056	0.097
Income_Standardised	Social_Contact_in_Job	0.068	0.047	0.089

Income_Standardised	Relations_with_Management	0.05	0.029	0.07
Income_Standardised	Relations_with_Colleagues	0.039	0.018	0.06
Age	Gender	-0.018	-0.039	0.003
Age	Education	-0.022	-0.043	-0.001
Age	Married	0.271	0.251	0.29
Age	Household_Size	-0.142	-0.163	-0.122
Age	Union_Membership	0.129	0.108	0.15
Age	Supervisor	0.073	0.052	0.094
Age	Work_Hours	-0.039	-0.06	-0.018
Age	Satisfied_with_Work_Hours	0.107	0.086	0.128
Age	Work_Life_Balance	0.023	0.002	0.044
Age	Skill_Use_at_Job	0.133	0.112	0.153
Age	Independence_in_Job	0.039	0.018	0.06
Age	Job_Offers_Advancement	-0.16	-0.18	-0.139
Age	Job_is_Interesting	0.031	0.01	0.052
Age	Job_Security	0.007	-0.014	0.027
Age	Job_Physical	-0.08	-0.101	-0.059
Age	Job_is_Stressful	-0.038	-0.058	-0.017
Age	Social_Contact_in_Job	0.047	0.026	0.068
Age	Relations_with_Management	0.007	-0.014	0.028
Age	Relations_with_Colleagues	-0.006	-0.027	0.015
Gender	Education	0.097	0.077	0.118
Gender	Married	-0.093	-0.113	-0.072
Gender	Household_Size	-0.039	-0.059	-0.018
Gender	Union_Membership	0.018	-0.003	0.039
Gender	Supervisor	-0.099	-0.12	-0.079
Gender	Work_Hours	-0.167	-0.188	-0.147
Gender	Satisfied_with_Work_Hours	0.042	0.021	0.063
Gender	Work_Life_Balance	0.026	0.005	0.046
Gender	Skill_Use_at_Job	-0.011	-0.032	0.01
Gender	Independence_in_Job	-0.008	-0.028	0.013
Gender	Job_Offers_Advancement	-0.056	-0.077	-0.036
Gender	Job_is_Interesting	0.01	-0.011	0.031
Gender	Job_Security	0.008	-0.013	0.029
Gender	Job_Physical	-0.136	-0.156	-0.115
Gender	Job_is_Stressful	0.031	0.01	0.051
Gender	Social_Contact_in_Job	0.071	0.05	0.092
Gender	Relations_with_Management	0.013	-0.008	0.034
Gender	Relations_with_Colleagues	-0.021	-0.041	0
Education	Married	0.034	0.013	0.055
Education	Household_Size	-0.067	-0.088	-0.046
Education	Union_Membership	0.144	0.123	0.164
Education	Supervisor	0.186	0.165	0.206
Education	Work_Hours	-0.071	-0.091	-0.05

Education	Satisfied_with_Work_Hours	0.126	0.105	0.147
Education	Work_Life_Balance	-0.093	-0.114	-0.072
Education	Skill_Use_at_Job	0.196	0.176	0.216
Education	Independence_in_Job	0.13	0.109	0.15
Education	Job_Offers_Advancement	0.108	0.087	0.129
Education	Job_is_Interesting	0.225	0.205	0.245
Education	Job_Security	0.099	0.079	0.12
Education	Job_Physical	-0.356	-0.375	-0.338
Education	Job_is_Stressful	0.087	0.066	0.108
Education	Social_Contact_in_Job	0.159	0.138	0.179
Education	Relations_with_Management	0.021	0	0.042
Education	Relations_with_Colleagues	0.06	0.039	0.08
Married	Household_Size	0.292	0.273	0.311
Married	Union_Membership	0.074	0.053	0.095
Married	Supervisor	0.102	0.081	0.123
Married	Work_Hours	0.043	0.022	0.064
Married	Satisfied_with_Work_Hours	0.06	0.039	0.081
Married	Work_Life_Balance	-0.063	-0.084	-0.042
Married	Skill_Use_at_Job	0.056	0.036	0.077
Married	Independence_in_Job	0.006	-0.015	0.027
Married	Job_Offers_Advancement	-0.009	-0.03	0.012
Married	Job_is_Interesting	0.032	0.011	0.053
Married	Job_Security	0.02	0	0.041
Married	Job_Physical	-0.058	-0.079	-0.037
Married	Job_is_Stressful	-0.001	-0.022	0.02
Married	Social_Contact_in_Job	0.022	0.001	0.043
Married	Relations_with_Management	0.004	-0.017	0.025
Married	Relations_with_Colleagues	-0.006	-0.027	0.015
Household_Size	Union_Membership	-0.032	-0.053	-0.011
Household_Size	Supervisor	-0.002	-0.023	0.018
Household_Size	Work_Hours	0.081	0.061	0.102
Household_Size	Satisfied_with_Work_Hours	-0.043	-0.064	-0.022
Household_Size	Work_Life_Balance	-0.054	-0.075	-0.034
Household_Size	Skill_Use_at_Job	-0.072	-0.093	-0.051
Household_Size	Independence_in_Job	-0.051	-0.072	-0.03
Household_Size	Job_Offers_Advancement	0.039	0.018	0.06
Household_Size	Job_is_Interesting	-0.02	-0.041	0.001
Household_Size	Job_Security	-0.039	-0.059	-0.018
Household_Size	Job_Physical	0.034	0.013	0.055
Household_Size	Job_is_Stressful	-0.004	-0.025	0.017
Household_Size	Social_Contact_in_Job	-0.038	-0.059	-0.017
Household_Size	Relations_with_Management	0	-0.021	0.021
Household_Size	Relations_with_Colleagues	-0.004	-0.025	0.017
Union_Membership	Supervisor	0.025	0.005	0.046

Union_Membership	Work_Hours	-0.087	-0.108	-0.066
Union_Membership	Satisfied_with_Work_Hours	0.105	0.085	0.126
Union_Membership	Work_Life_Balance	-0.074	-0.095	-0.053
Union_Membership	Skill_Use_at_Job	0.088	0.067	0.109
Union_Membership	Independence_in_Job	0.08	0.059	0.1
Union_Membership	Job_Offers_Advancement	0.027	0.006	0.048
Union_Membership	Job_is_Interesting	0.102	0.082	0.123
Union_Membership	Job_Security	0.08	0.059	0.101
Union_Membership	Job_Physical	-0.056	-0.077	-0.035
Union_Membership	Job_is_Stressful	0.072	0.051	0.092
Union_Membership	Social_Contact_in_Job	0.1	0.079	0.121
Union_Membership	Relations_with_Management	-0.074	-0.095	-0.053
Union_Membership	Relations_with_Colleagues	0.027	0.006	0.048
Supervisor	Work_Hours	0.082	0.061	0.103
Supervisor	Satisfied_with_Work_Hours	0.066	0.045	0.087
Supervisor	Work_Life_Balance	-0.158	-0.179	-0.138
Supervisor	Skill_Use_at_Job	0.163	0.143	0.184
Supervisor	Independence_in_Job	0.137	0.116	0.157
Supervisor	Job_Offers_Advancement	0.166	0.146	0.187
Supervisor	Job_is_Interesting	0.16	0.14	0.18
Supervisor	Job_Security	0.083	0.062	0.103
Supervisor	Job_Physical	-0.064	-0.085	-0.043
Supervisor	Job_is_Stressful	0.123	0.103	0.144
Supervisor	Social_Contact_in_Job	0.138	0.117	0.158
Supervisor	Relations_with_Management	0.053	0.032	0.074
Supervisor	Relations_with_Colleagues	0.046	0.026	0.067
Work_Hours	Satisfied_with_Work_Hours	-0.084	-0.105	-0.064
Work_Hours	Work_Life_Balance	-0.16	-0.181	-0.14
Work_Hours	Skill_Use_at_Job	-0.026	-0.047	-0.005
Work_Hours	Independence_in_Job	-0.031	-0.051	-0.01
Work_Hours	Job_Offers_Advancement	0.043	0.022	0.064
Work_Hours	Job_is_Interesting	-0.033	-0.053	-0.012
Work_Hours	Job_Security	-0.037	-0.058	-0.016
Work_Hours	Job_Physical	0.104	0.084	0.125
Work_Hours	Job_is_Stressful	0.1	0.079	0.121
Work_Hours	Social_Contact_in_Job	-0.03	-0.051	-0.009
Work_Hours	Relations_with_Management	-0.018	-0.039	0.003
Work_Hours	Relations_with_Colleagues	-0.045	-0.066	-0.024
Satisfied_with_Work_Hours	Work_Life_Balance	-0.003	-0.024	0.018
Satisfied_with_Work_Hours	Skill_Use_at_Job	0.113	0.092	0.133
Satisfied_with_Work_Hours	Independence_in_Job	0.087	0.066	0.108
Satisfied_with_Work_Hours	Job_Offers_Advancement	0.02	-0.001	0.041
Satisfied_with_Work_Hours	Job_is_Interesting	0.097	0.076	0.118
Satisfied_with_Work_Hours	Job_Security	0.067	0.046	0.088

Satisfied_with_Work_Hours	Job_Physical	-0.13	-0.151	-0.109
Satisfied_with_Work_Hours	Job_is_Stressful	-0.011	-0.032	0.01
Satisfied_with_Work_Hours	Social_Contact_in_Job	0.084	0.063	0.105
Satisfied_with_Work_Hours	Relations_with_Management	0.029	0.008	0.05
Satisfied_with_Work_Hours	Relations_with_Colleagues	0.055	0.034	0.076
Work_Life_Balance	Skill_Use_at_Job	-0.039	-0.06	-0.019
Work_Life_Balance	Independence_in_Job	0.011	-0.01	0.032
Work_Life_Balance	Job_Offers_Advancement	0.02	-0.001	0.041
Work_Life_Balance	Job_is_Interesting	0.027	0.006	0.048
Work_Life_Balance	Job_Security	0.083	0.062	0.103
Work_Life_Balance	Job_Physical	-0.139	-0.16	-0.119
Work_Life_Balance	Job_is_Stressful	-0.37	-0.388	-0.352
Work_Life_Balance	Social_Contact_in_Job	-0.052	-0.072	-0.031
Work_Life_Balance	Relations_with_Management	0.199	0.178	0.219
Work_Life_Balance	Relations_with_Colleagues	0.111	0.09	0.131
Skill_Use_at_Job	Independence_in_Job	0.209	0.189	0.229
Skill_Use_at_Job	Job_Offers_Advancement	0.134	0.114	0.155
Skill_Use_at_Job	Job_is_Interesting	0.286	0.267	0.305
Skill_Use_at_Job	Job_Security	0.117	0.096	0.137
Skill_Use_at_Job	Job_Physical	-0.106	-0.126	-0.085
Skill_Use_at_Job	Job_is_Stressful	0.043	0.022	0.064
Skill_Use_at_Job	Social_Contact_in_Job	0.182	0.162	0.203
Skill_Use_at_Job	Relations_with_Management	0.104	0.083	0.124
Skill_Use_at_Job	Relations_with_Colleagues	0.125	0.105	0.146
Independence_in_Job	Job_Offers_Advancement	0.266	0.246	0.285
Independence_in_Job	Job_is_Interesting	0.433	0.416	0.45
Independence_in_Job	Job_Security	0.245	0.225	0.264
Independence_in_Job	Job_Physical	-0.138	-0.159	-0.118
Independence_in_Job	Job_is_Stressful	-0.062	-0.083	-0.042
Independence_in_Job	Social_Contact_in_Job	0.227	0.207	0.246
Independence_in_Job	Relations_with_Management	0.213	0.192	0.232
Independence_in_Job	Relations_with_Colleagues	0.209	0.189	0.229
Job_Offers_Advancement	Job_is_Interesting	0.399	0.381	0.416
Job_Offers_Advancement	Job_Security	0.324	0.305	0.342
Job_Offers_Advancement	Job_Physical	-0.104	-0.125	-0.083
Job_Offers_Advancement	Job_is_Stressful	-0.033	-0.054	-0.012
Job_Offers_Advancement	Social_Contact_in_Job	0.121	0.1	0.141
Job_Offers_Advancement	Relations_with_Management	0.271	0.251	0.29
Job_Offers_Advancement	Relations_with_Colleagues	0.181	0.16	0.201
Job_is_Interesting	Job_Security	0.287	0.268	0.306
Job_is_Interesting	Job_Physical	-0.18	-0.2	-0.16
Job_is_Interesting	Job_is_Stressful	-0.029	-0.049	-0.008
Job_is_Interesting	Social_Contact_in_Job	0.319	0.3	0.338
Job_is_Interesting	Relations_with_Management	0.285	0.266	0.304

Job_is_Interesting	Relations_with_Colleagues	0.281	0.261	0.3
Job_Security	Job_Physical	-0.102	-0.123	-0.081
Job_Security	Job_is_Stressful	-0.091	-0.112	-0.07
Job_Security	Social_Contact_in_Job	0.184	0.164	0.204
Job_Security	Relations_with_Management	0.236	0.216	0.256
Job_Security	Relations_with_Colleagues	0.19	0.169	0.21
Job_Physical	Job_is_Stressful	0.157	0.137	0.178
Job_Physical	Social_Contact_in_Job	-0.074	-0.095	-0.053
Job_Physical	Relations_with_Management	-0.109	-0.129	-0.088
Job_Physical	Relations_with_Colleagues	-0.11	-0.131	-0.089
Job_is_Stressful	Social_Contact_in_Job	0.092	0.071	0.113
Job_is_Stressful	Relations_with_Management	-0.215	-0.235	-0.195
Job_is_Stressful	Relations_with_Colleagues	-0.15	-0.17	-0.129
Social_Contact_in_Job	Relations_with_Management	0.106	0.085	0.127
Social_Contact_in_Job	Relations_with_Colleagues	0.15	0.129	0.17
Relations_with_Management	Relations_with_Colleagues	0.516	0.501	0.531

*Note.* Data were drawn from the Work Orientation Module of International Social Survey Program 2015. The sample was restricted to individuals from the analytic sample in HRS in Chapter 5. Missing values were handled with listwise deletion resulting in 8,771 observations. Income variable measured monthly income using different number of brackets for participants in each of the 36 countries in the data. Therefore, I used standardized values of income within each country ( $M = 0$ ,  $SD = 1$ ). Upper and lower limits of the 95% confidence interval are listed in columns 4 and 5.

**Table A19.** Correlation Table for Macro Indicators (Supporting Material for Chapter 5)

<i>Variable 1</i>	<i>Variable 2</i>	<i>r</i>	<i>95% CI</i>	
			<i>Lower Limit</i>	<i>Upper Limit</i>
GDP_2014	Volatility_2014	-0.364	-0.622	-0.035
GDP_2014	Inflation_2014	-0.252	-0.54	0.089
GDP_2014	Gini_2014	-0.640	-0.802	-0.39
GDP_2014	Unemployment_2014	-0.213	-0.51	0.13
GDP_2014	Individualism	0.617	0.357	0.788
GDP_2014	Growth_Mean_2014	-0.427	-0.665	-0.109
GDP_2014	GDP_Mean_2014	0.987	0.975	0.994
Volatility_2014	Inflation_2014	0.365	0.036	0.622
Volatility_2014	Gini_2014	-0.013	-0.345	0.321
Volatility_2014	Unemployment_2014	0.081	-0.259	0.404
Volatility_2014	Individualism	-0.364	-0.622	-0.035
Volatility_2014	Growth_Mean_2014	0.236	-0.105	0.528
Volatility_2014	GDP_Mean_2014	-0.407	-0.652	-0.085
Inflation_2014	Gini_2014	0.201	-0.142	0.501
Inflation_2014	Unemployment_2014	-0.066	-0.391	0.273
Inflation_2014	Individualism	-0.436	-0.672	-0.121
Inflation_2014	Growth_Mean_2014	-0.149	-0.459	0.194
Inflation_2014	GDP_Mean_2014	-0.206	-0.505	0.137
Gini_2014	Unemployment_2014	0.185	-0.158	0.488
Gini_2014	Individualism	-0.293	-0.57	0.045
Gini_2014	Growth_Mean_2014	0.178	-0.165	0.483
Gini_2014	GDP_Mean_2014	-0.613	-0.786	-0.351
Unemployment_2014	Individualism	0.004	-0.329	0.337
Unemployment_2014	Growth_Mean_2014	-0.043	-0.371	0.295
Unemployment_2014	GDP_Mean_2014	-0.179	-0.483	0.164
Individualism	Growth_Mean_2014	-0.256	-0.543	0.085
Individualism	GDP_Mean_2014	0.59	0.32	0.772
Growth_Mean_2014	GDP_Mean_2014	-0.523	-0.729	-0.23

*Note:* The sample was restricted to the 36 countries from the ISSP 2015 that were used in Chapter 5. GDP per capita, inflation and unemployment rates for 2014 was taken from the World Bank Database. Volatility was calculated as the standard deviation in yearly changes in GDP between 1990 and 2014. Gini measures were taken from the Standardised World Income Inequality Database and individualism scores were from Hofstede's index for cultural values (Hofstede et al. 1991). Upper and lower limits of the 95% confidence interval are listed in columns 4 and 5.

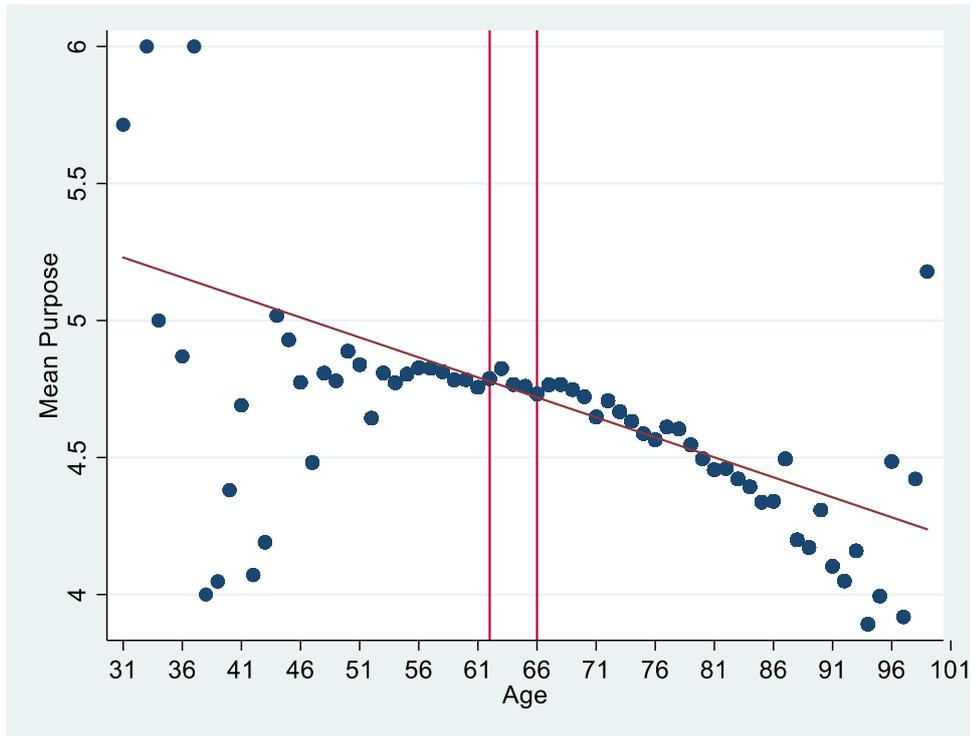


Figure A1. Mean Levels of Sense of Purpose as a Function of Age (Data: Health and Retirement Study, 2006-2016)

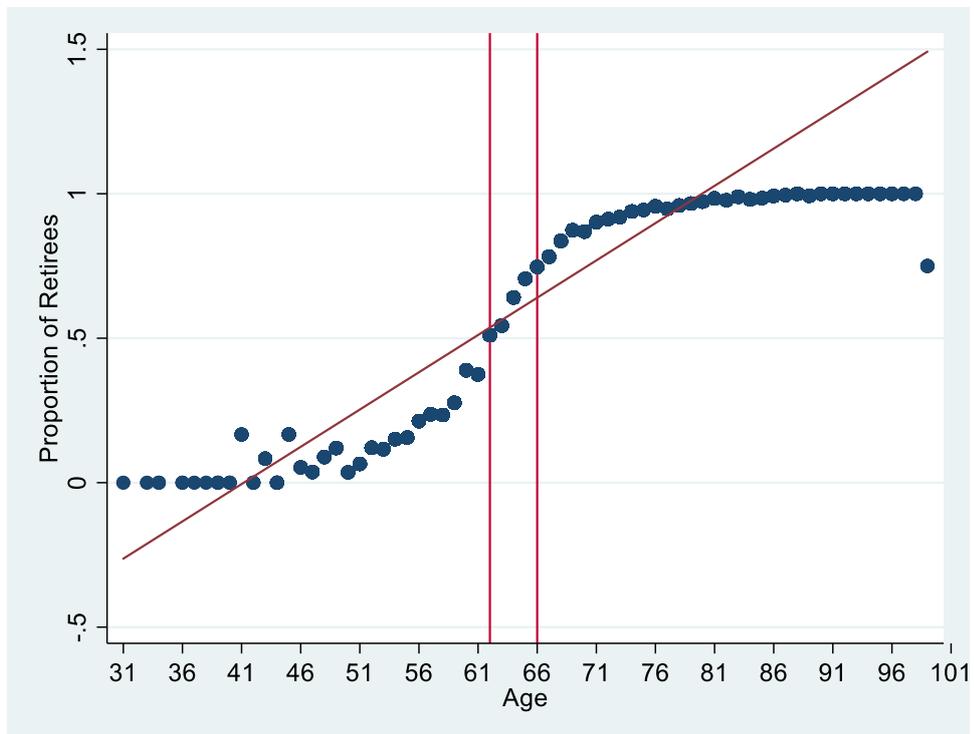
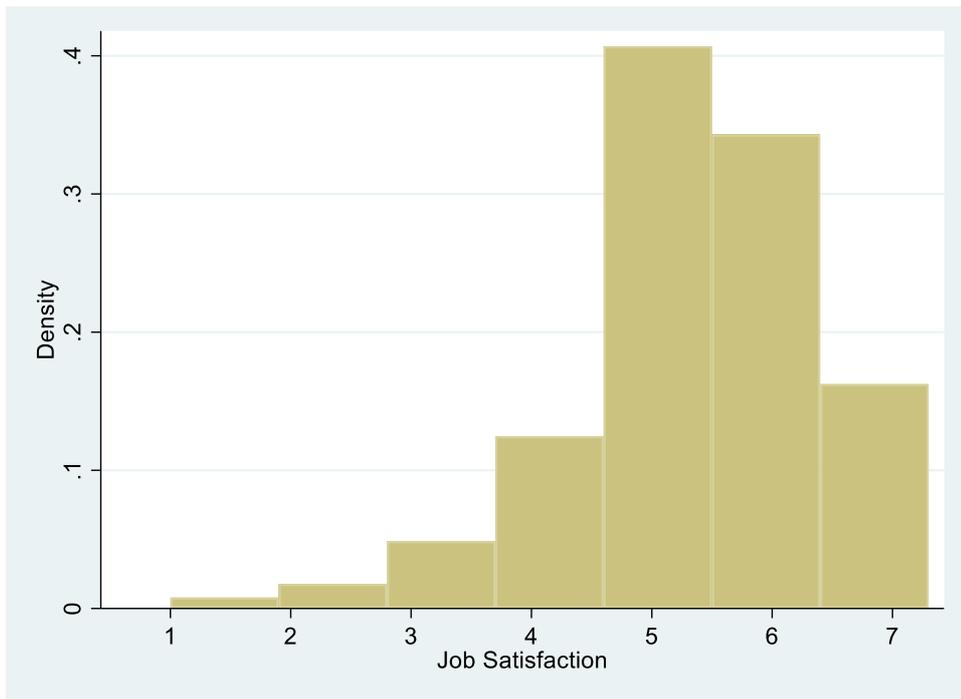
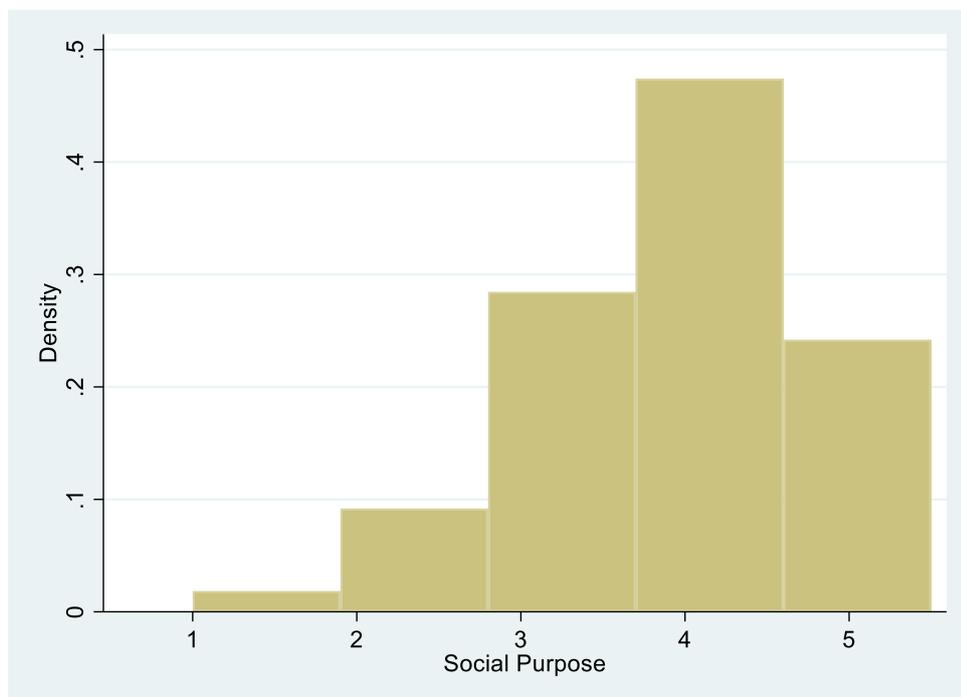


Figure A2. Proportion of Retirees as a Function of Age (Data: Health and Retirement Study, 2006-2016)



*Figure A3.* Distribution of the Scores for the Job Satisfaction Variable (Data: International Social Survey Program 2015)



*Figure A4.* Distribution of the Scores for the Social Purpose Variable (Data: International Social Survey Program 2015)

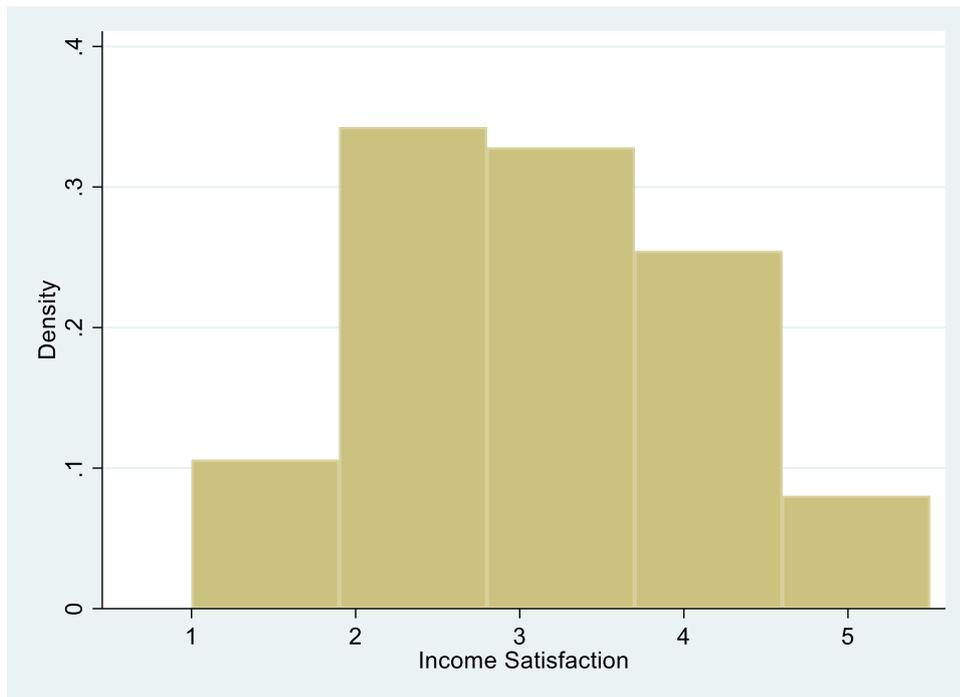


Figure A5. Distribution of the Scores for the Income Satisfaction Variable (Data: International Social Survey Program 2015)

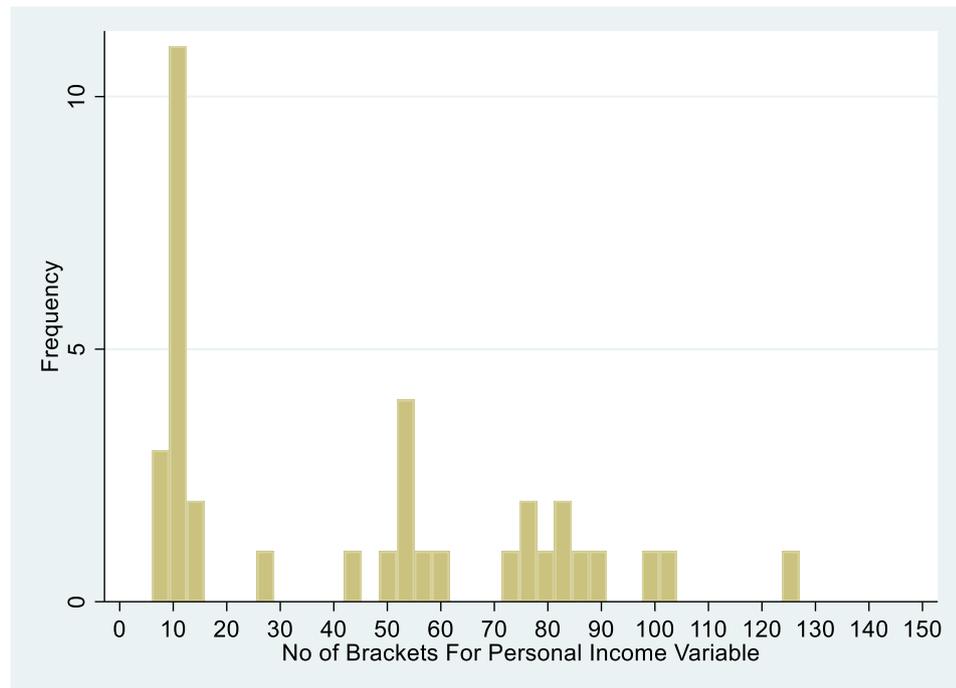


Figure A6. Frequency Distribution of Countries for the Number of Brackets in the Personal Income Variable (Data: International Social Survey Program 2015)

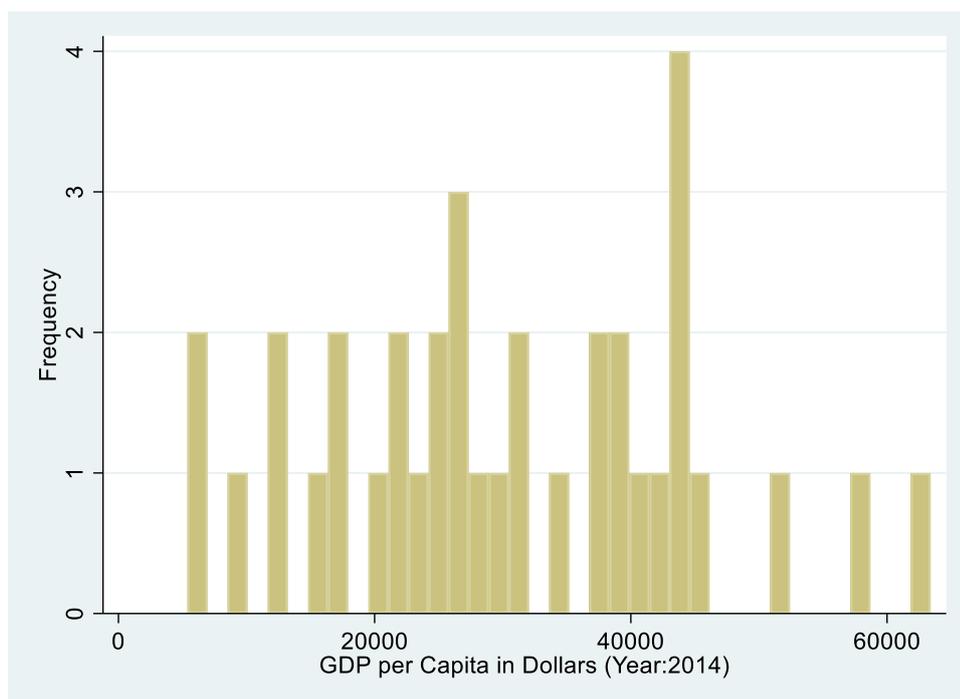


Figure A7. GDP per Capita in Dollars for 2014 (Data were drawn from World Bank for the 37 countries in the ISSP 2015 Work Module)

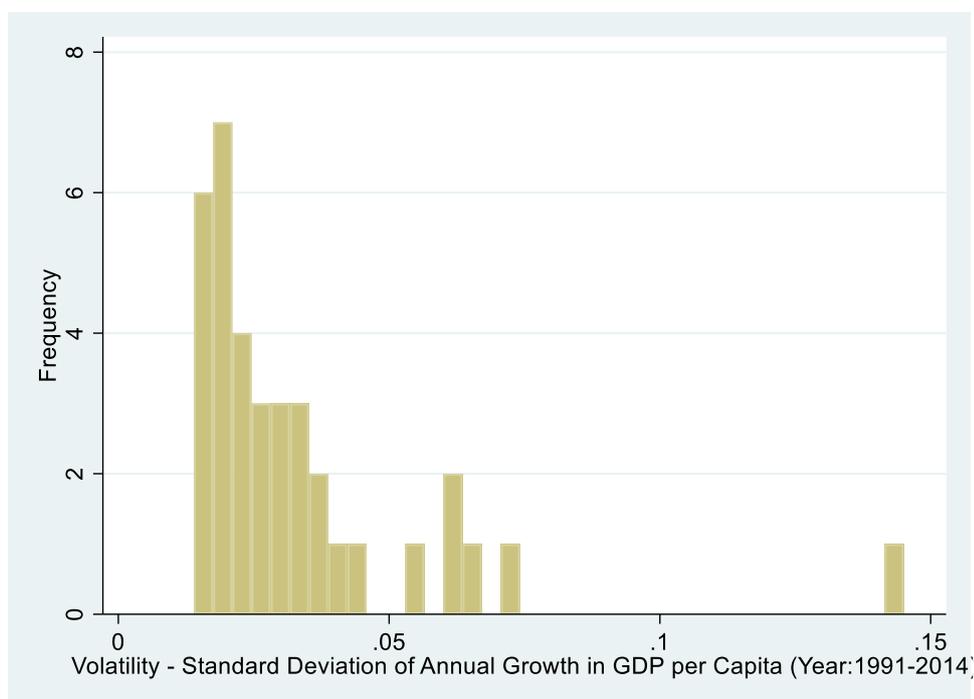
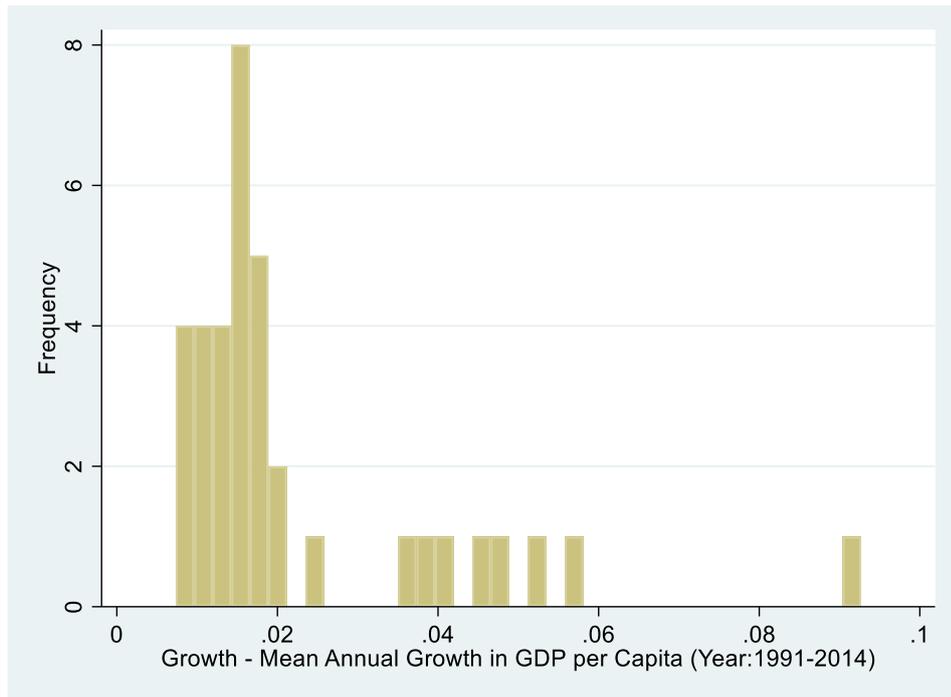
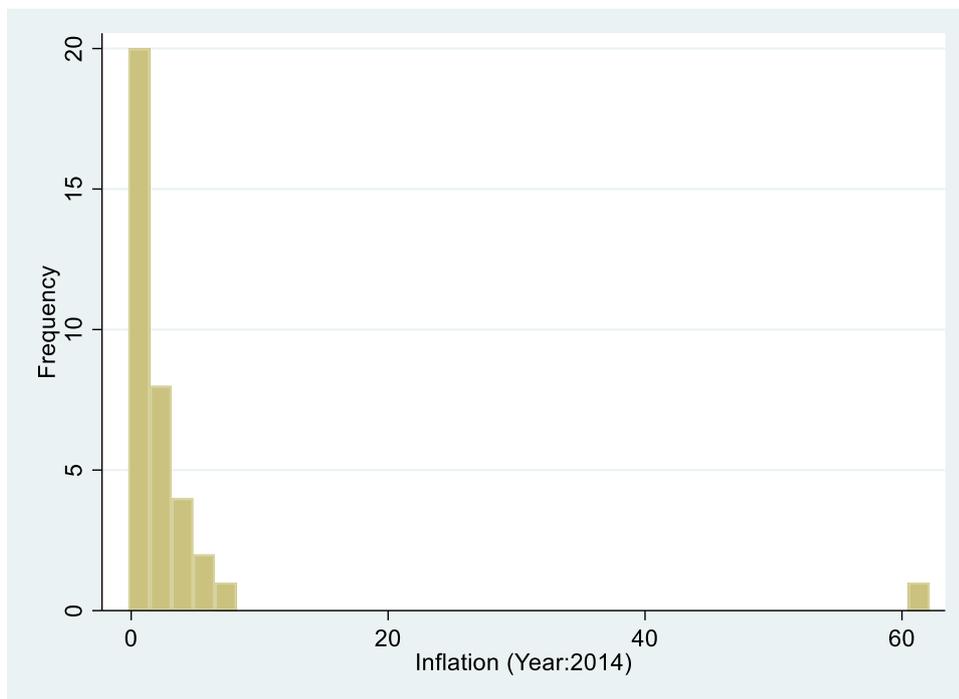


Figure A8. Economic Volatility (Data were drawn from World Bank for the 37 countries in the ISSP 2015 Work Module)

Note. Volatility was calculated as the standard deviation in the annual rate of growth in country-level GDP per capita between 1990 and 2014.



*Figure A9.* Economic Growth (Data were drawn from World Bank for the 37 countries in the ISSP 2015 Work Module)



*Figure A10.* Inflation rates for year 2014 (Data were drawn from IMF for the 37 countries in the ISSP 2015 Work Module)

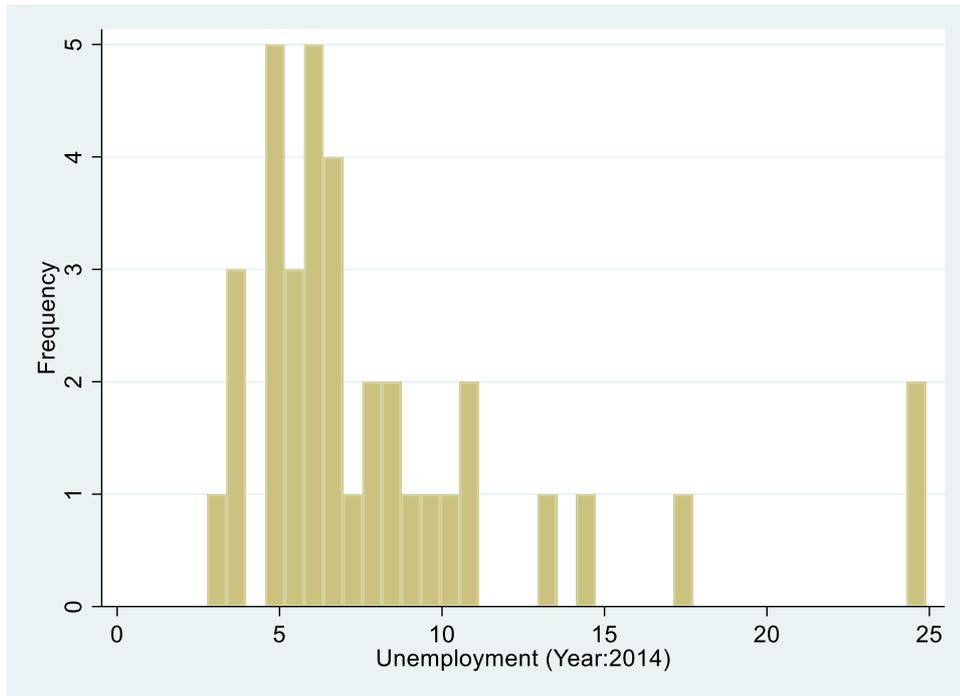


Figure A11. Unemployment rates for year 2014 (Data were drawn from World Bank for the 37 countries in the ISSP 2015 Work Module)

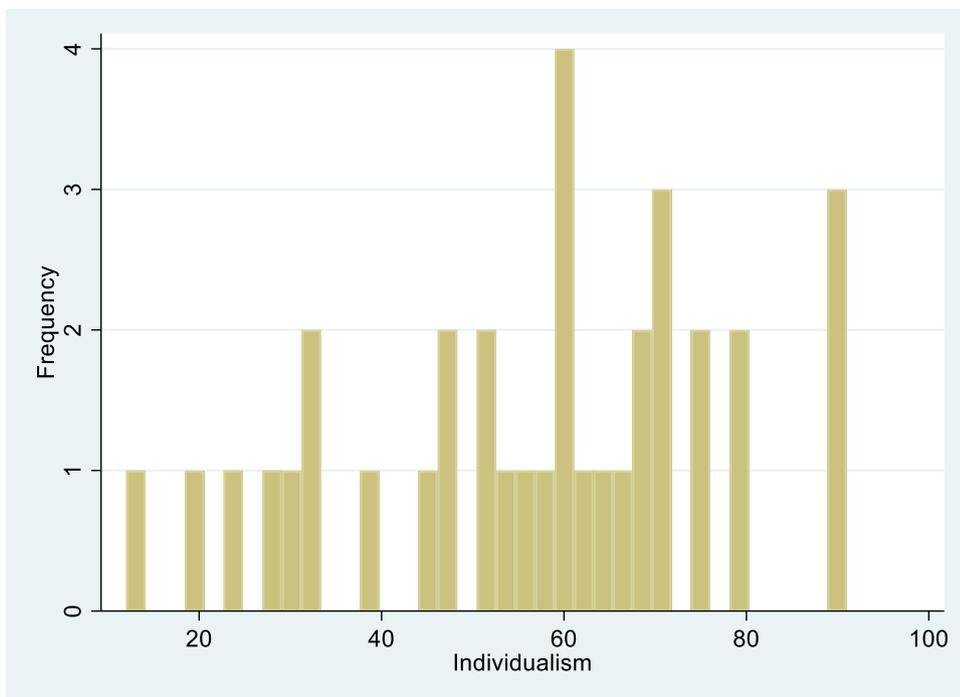
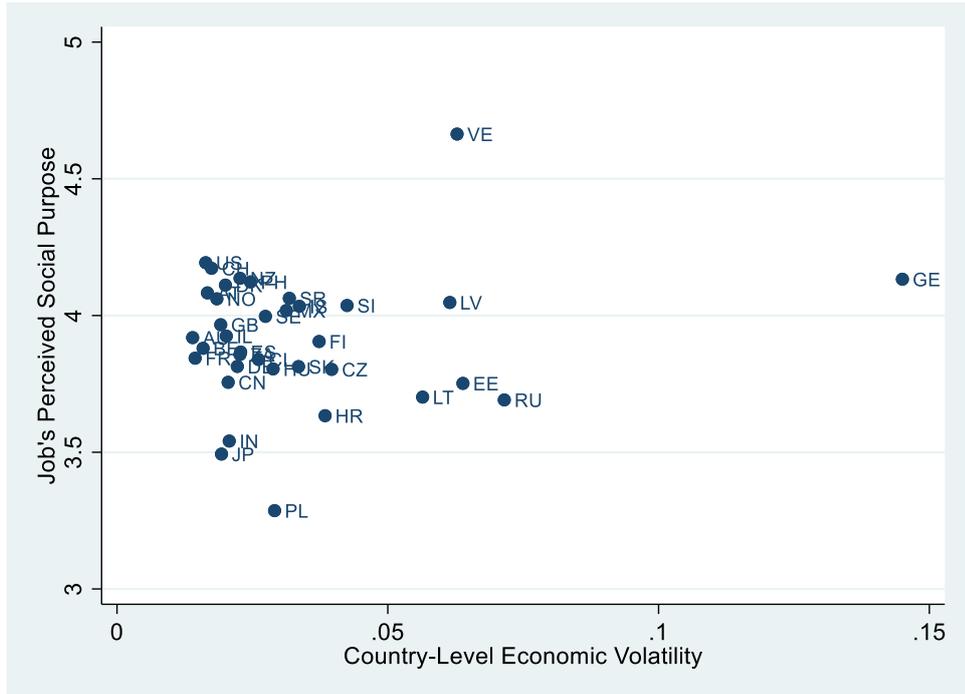
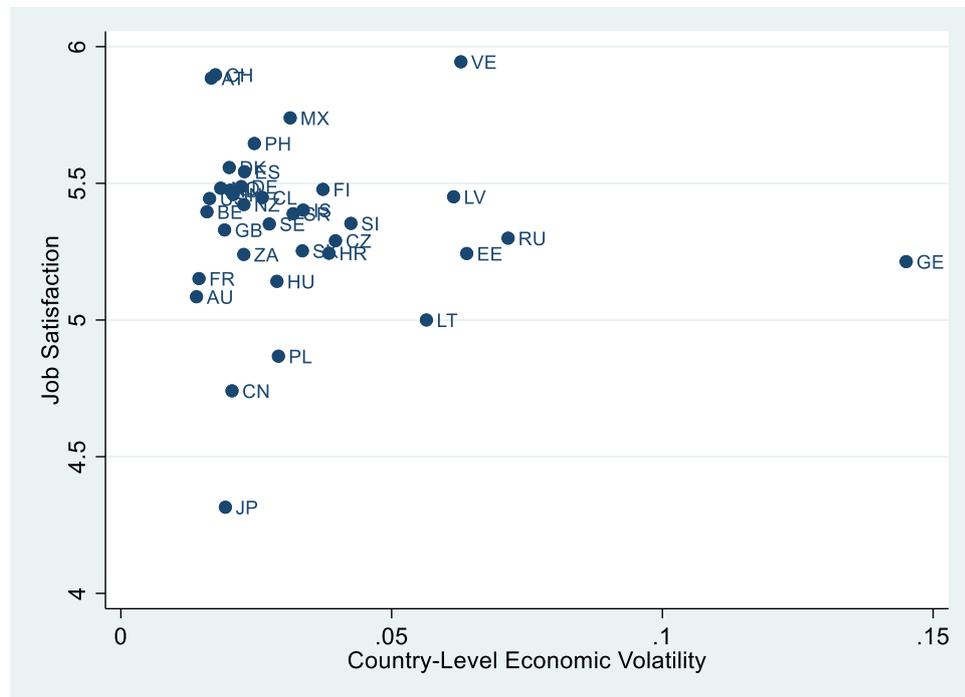


Figure A12. Hofstede Individualism Scores for the 36 Countries (excluding Georgia) in the ISSP 2015 Work Module



*Figure A13.* Mean Level Ratings for Perceived Social Purpose in Jobs from ISSP 2015 and Economic Volatility based on GDP Values in World Bank Database

*Note.* Volatility was calculated as the standard deviation in the annual rate of growth in country-level GDP per capita between 1990 and 2014.



*Figure A14.* Mean Level Ratings for Job Satisfaction from ISSP 2015 and Economic Volatility based on GDP Values in World Bank Database

*Note.* Volatility was calculated as the standard deviation in the annual rate of growth in country-level GDP per capita between 1990 and 2014.

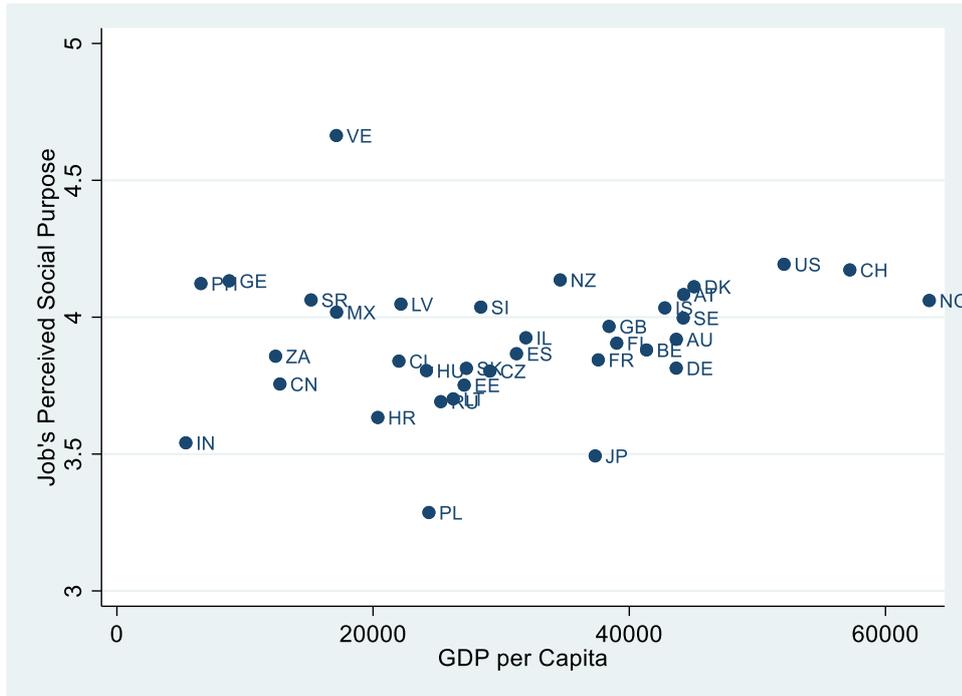


Figure A15. Mean Level Ratings for Perceived Social Purpose in Jobs from ISSP 2015 data and country-level GDP per capita in 2014 from the World Bank Database

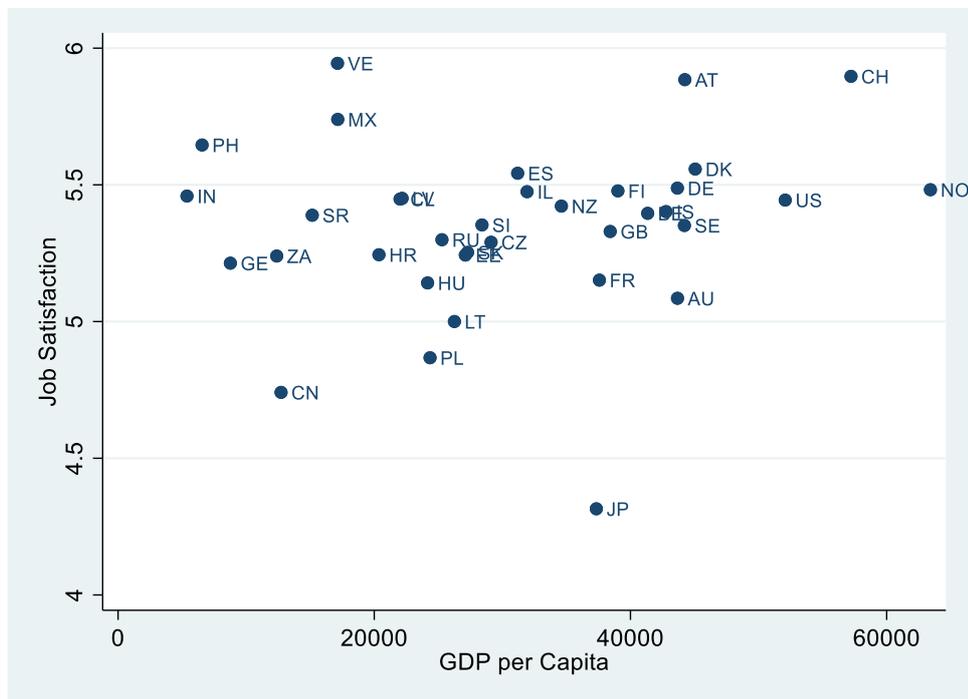


Figure A16. Mean Level Ratings for Perceived Job Satisfaction in ISSP 2015 and GDP per Capita for 2014 from the World Bank Database

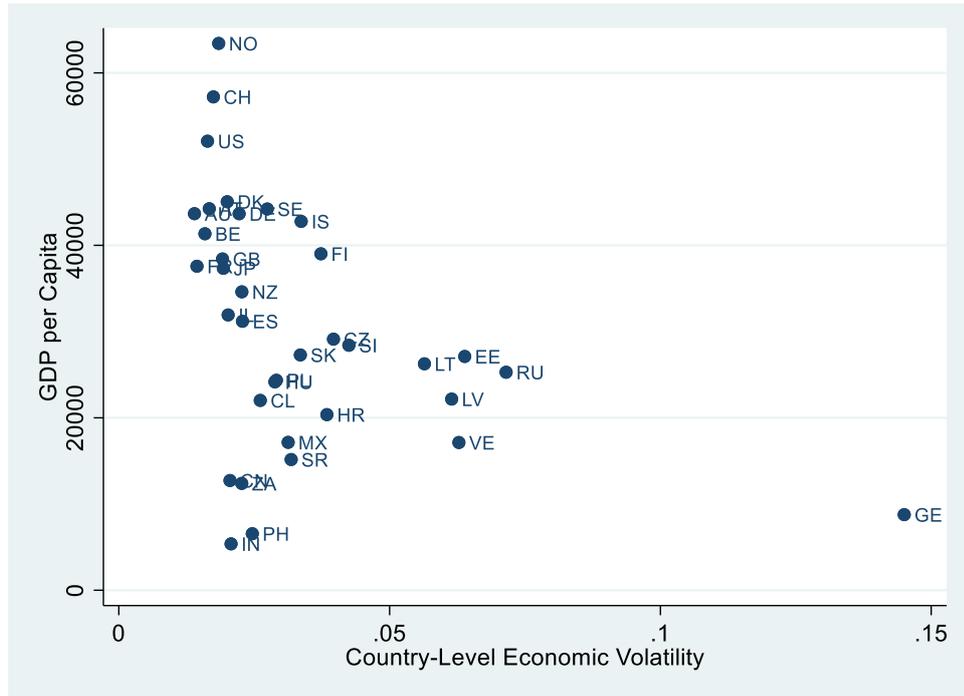


Figure A17. Country Level GDP per Capita for 2014 and Economic Volatility Based on GDP Between 1990 and 2014 (Data: World Bank)