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Navigating the Happiness Economics Landscape: Mapping the Influences on Life Satisfaction and Possible Interventions

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Abstract

This study explores factors that influence subjective well-being in low- and middle-income countries by analysing unique individual- and country-level data. The study focuses on several unexplored determinants including personality traits, economic shocks and cultural differences. Utilising World Bank's STEP household survey and WVS we find that extraversion, agreeableness and emotional stability are positively associated with well-being. Both conscientiousness and decision-making are shown to be negatively correlated with well-being. Furthermore, we find that women's subjective well-being is more negatively pronounced by increased conscientiousness compared to men, and the same relationship holds for grit. Additionally, we find that children experiencing economic shocks show a lower level of well-being later in life. From a policy perspective, we find a positive and significant relationship between access to health insurance and well-being. Indicating that having access to health insurance contributes to a, on average, higher level of subjective well-being. These findings can be of use to future policymakers but should also be further researched with the aim of causality.

Key Words: Happiness Economics, Personality traits, Life satisfaction, World Bank's STEP survey, WVS, Double-lasso, Forward selection

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All faults are our own.

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1 Introduction

Central values for an individual's well-being are self-actualisation and happiness (Veenhoven, 1996). Some philosophers argue that happiness should be considered the highest good and ultimate motivation for an individual (Diener, 1984). To measure the level of well-being, individuals are usually asked to evaluate their happiness based on subjective evaluations such as health, relationships, satisfaction with work, and life purpose. Therefore, to improve an individual's quality of life it is important to investigate an individual's subjective well-being (henceforth referred to as SWB) and its determinants [1]. Research suggests that a high degree of life satisfaction is associated with less healthcare expenses, economic prosperity, effective workers, social relations and societal benefits (Nikolova and Graham, 2021; Lyubomirsky, King, and Diener, 2005). Hence, this highlights the relevance from an economic point of view. Within economics, this field of research is called happiness economics.

Society and governments in themselves can be seen as a means to provide citizens with the necessities for high well-being (Veenhoven, 1996). However, it is very difficult to implement effective policies without a thorough understanding of the well-being determinants. The literature from developed countries has highlighted an individual's income, age, education, marital status, the number of children in the household, employment, health, and GDP per capita as key factors influencing SWB (see for example: Becchetti and Pelloni, 2012; Pittau, Zelli, and Gelman, 2010; Appleton and Song, 2008; Rodríguez-Pose and Maslauskaite, 2012). However, as nations grow, differences in well-being are less frequently due to income, other factors such as personality appear to influence individual well-being (Diener and Seligman, 2004; Boyce, Wood, and Powdthavee, 2013).

Historically, the lack of data in developing low- and middle-income countries (henceforth LMIC) has limited research on life satisfaction. Therefore, to contribute to the literature this thesis aims to identify factors determining life satisfaction in several LMIC through unique individual- and country-level data. In particular, we focus on several unexplored determinants: personality traits, economic shocks and cultural differences in a set of under-explored LMIC. These are areas and factors that are currently understudied and need more research in their influence on individual SWB. To study this, we use and append data from the World Bank's Skills Toward Employment & Productivity (STEP) Skills Measurement Household Survey (henceforth the

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[1]Here, subjective well-being is defined as in Mulligan (2015), where subjective well-being encompasses a variety of measures when it comes to well-being - life satisfaction, happiness, well-being. These are hereby used interchangeably.

STEP survey).

Furthermore, previous literature (see for example: Exton, Smith, and Vandendriessche, 2015; MacKerron, 2012; Diener and Ryan, 2009) seems to indicate that there is also cultural heterogeneity in how individuals perceive SWB. We, therefore, merge data from the World Value Survey (henceforth the WVS) into our final dataset to explore this possible relationship utilising two cultural indices.

The use of the STEP survey is motivated by its novel data collection regarding information gathering of cognitive, technical, and noncognitive skills in a large number of countries. Previous literature has mainly focused on one specific country and is often conducted in developed regions. In this study, we go beyond previous literature by utilising and merging data from the following countries: Armenia, Bolivia, Colombia, Georgia, Ghana, Kenya, Ukraine, Vietnam and Yunnan province in China (henceforth Yunnan province).

Whereas previous literature has controlled for individual traits through methods such as fixed effects due to a lack of data on personality traits, the STEP dataset allows us to investigate personal characteristics and their effects on SWB. From a policymakers' point of view, this area could be of use. Governments might provide assistance to improve individual SWB since previous research has shown empirical evidence that personality traits mediate the effect of income on SWB (Proto and Rustichini, 2015).

This paper aims to study the more unexplored determinants influencing life satisfaction in LMIC. One of these unexplored determinants within happiness economics is personality traits which need more empirical analysis. This area is particularly underexplored in LMIC, which brings us to our first research question:

1.What is the relationship between personality traits and life satisfaction?

Additionally, Costa, Terracciano, and Mccrae (2001) discuss the social role models of development and personality traits. The models assume that gender differences, primarily, result from perceived gender roles and social structural power differentials. Therefore, some theorists expect personality differences to be smaller in cultures with a higher gender egalitarianism. Some traits may be less desirable to have for women compared to men in a social behaviour context. Men, for instance, tend to score lower in traits such as neuroticism and agreeableness (Schmitt et al., 2017). We want to explore this further which brings us to our sub-question:

1.1 Does the relationship between personality traits and life satisfaction differ by gender?

In addition to personality traits, another potentially important factor is early life shocks.

Empirical findings suggest that economic shocks have a negative effect on poverty reduction, education, and later in life energy consumption (Lin and Okyere, 2022; Björkman-Nyqvist, 2013; Bui et al., 2014). There is no general consensus regarding the effect of economic shocks and later-life well-being. Some researchers find long-lasting effects of economic shocks on mental health disorders, as well as lower levels of life satisfaction, while others find no such effect and instead argue towards adaptation. To study this we utilise whether or not the individual surveyed has experienced economic shocks early in life. This leads us to our second research question:

2. Do economic shocks at an early stage in life have an associated relation with well-being later in life?

The next step is to understand the potential policies that can be used to improve SWB. The provided dataset contains information on whether or not an individual has access to health insurance and we can, therefore, evaluate if health insurance can help improve individual SWB. If so, this could be helpful knowledge from a policy perspective and a plausible policy solution. Moreover, as Diener and Seligman (2004) argue, desirable economic outcomes are often caused by well-being rather than the other way around. Their empirical findings indicate that part of the correlation between income and well-being is due to well-being causing higher incomes. Policymakers should therefore protect and promote social trust and well-being amongst their citizens (Mikucka, Sarracino, and Dubrow, 2017). This leads us to our third research question:

3. Does having access to health insurance correlate with an individual's perception of well-being?

These research questions are hypothesised with the top-down theory and adaptation theory and estimated utilising an OLS approach. We also run three additional models as robustness tests, where we utilise Ordered probit, Double-lasso, and Forward selection models. Our findings suggest that some personality traits have a significant relationship with SWB, both positive and negative. When examining the relationship between personality traits and life satisfaction, we find significant differences in personality traits by gender when it comes to conscientiousness, grit, and decision-making. Additionally, economic shocks early in life significantly influence individual well-being negatively. And third, access to health insurance is associated with higher well-being which could be used as a plausible policy solution to enrich individual SWB.

This thesis is structured as follows. The next section reviews previous literature. Section 3 reviews the main theoretical framework used to explain factors correlating to individual life

satisfaction and motivates our hypotheses. Section 4 describes our data, variables of interest and methodology. Section 5 discusses empirical strategy, section 6 empirical results, and section 7 provides a discussion and conclusions of our study along with policy implications, limitations, and further research suggestions.

2 Literature Review

This literature review will focus on previous literature exploring contributing factors to individual SWB. The literature review is structured as follows: first, we present literature regarding our covariates which have been the main focus in previous empirical research. We then review previous literature in terms of our first research question and sub-question: personality traits and gender. Moving into our second research question we touch upon what has been found regarding economic shocks and SWB. Finally, we go over the limited literature existing today regarding access to health insurance and SWB.

2.1 The demographics and societal norms influencing SWB

Existing research suggests that there are multiple factors influencing SWB, one of these key factors being income. Research studying income and SWB shows a small, but positive, relationship between the level of income and SWB (see for example: Charles, Wu, and Wu, 2019; Diener, 1984; Ngoo, Tey, and Tan, 2015).

There have, however, been discussions about whether the associated effect of income on SWB is decreasing with per capita income levels (i.e. there exists a concave utility function). Previous research in the US shows that while the income per capita almost doubled during the time period 1974-2002, the level of SWB on average showed no upward trend during this period of time (see for example: Easterlin, 1974; Diener, Wolsic, and Fujita, 1995). One plausible reason might be that income has a strong effect at extreme levels of poverty, but not once these basic needs are met. Another reason could be that the effect exists but is also dependent on social comparison (Diener, 1984).

On the other hand, later literature by Diener and Seligman (2004) shows that there are other factors that might affect SWB to a higher extent. Controlling for quality of government, health and human rights within a society, the effect of income on national well-being is shown to be non-significant.

Furthermore, another important factor influencing individual SWB is employment. Being employed has been proven to affect life satisfaction in a positive way (see for example: Clark and

Oswald, 1994; Pittau, Zelli, and Gelman, 2010; Appleton and Song, 2008; Rodríguez-Pose and Maslauskaite, 2012). One possible explanation as to why employment is considered to be crucial for SWB is highlighted by Akay, Karabulut, and Yilmaz (2021) who study this relationship. From a psychological point of view, individuals have a need for employment since it helps with time structure, social contact, social identity and activity. Meaning that not being able to fulfil these psychological functions during unemployment might lead to lower levels of SWB.

Another key factor associated with SWB has shown to be age. Empirical findings show a U-shaped relationship between SWB and age. SWB increases among younger individuals up to a certain level and then decreases later during middle age to finally increase again during later stages in life. For instance, Peiró (2006) and Dolan, Peasgood, and White (2008) argue that younger individuals are more satisfied with life compared to middle-aged individuals. One possible explanation could be that well-being means different things to different age ranges, (Piper, 2015). Younger individuals are shown to refer to "happiness" for SWB while older people refer to "peace" for their definition of SWB (Diener, 1984; Piper, 2015).

The associated effect of marital status on SWB has also been extensively documented in previous studies. For example, Clark and Oswald (1994) and Peiró (2006) show that married individuals are happier compared to single individuals, and single individuals are happier compared to those who are divorced. Appleton and Song (2008) also argue that marriage is associated with a higher level of life satisfaction.

There are some mixed findings when it comes to how education affects SWB. Education can affect SWB indirectly. An individual with a higher educational level has better opportunities to earn higher income and, in turn, score higher on the life satisfaction scale. On the other hand, education might raise an individual's expectations and if those expectations cannot be met they might decrease life satisfaction (Cunnado and De Gracia, 2012; Dolan, Peasgood, and White, 2008).

Previous literature connected to cultural differences highlights the possible presence of cultural heterogeneity when it comes to differences in SWB between countries. MacKerron (2012), for example, discusses that communist countries, historically, tend to have lower scores of well-being. Exton, Smith, and Vandendriessche (2015) investigate cross-country comparability of SWB scores and conclude that cultural differences can explain between 6% to 18% of the country-specific unexplained variance and that self-esteem and autonomy are found to be stronger correlates of life satisfaction in more individualistic cultures. Nevertheless, when comparing responses of individuals from different countries, consideration needs to be taken into

account regarding the meaning of happiness across countries (Becchetti and Pelloni, 2012).

2.2 Personality traits

Previous literature connected to our first research question regarding personality traits highlights the Big Five model as the dominant personality model within the psychology literature. The Big Five model includes five dimensions of an individual's personality: extraversion, openness to experience, agreeableness, neuroticism and conscientiousness. Our survey data allows us to add to these personality traits in the form of three socio-emotional skills - grit, hostile attribution bias, and decision-making - which all are related to the Big Five personality trait factors (Pierre et al., 2014). This goes beyond existing literature where only the Big Five has been used and primarily with data from developed countries. By studying this relationship in LMIC we can contribute to this field of study.

Proto and Rustichini (2015) investigate the relationship between life satisfaction and income by controlling for personality traits. The authors conclude neuroticism to be one of the Big Five personality traits affecting the relation between income and life satisfaction. They further establish whether or not the relationship between income and life satisfaction differs by gender; for male individuals, neuroticism affects the relationship between income and life satisfaction more strongly than for female individuals (Proto and Rustichini, 2015).

According to Steel and Ones (2002), several personality traits have been connected to individual happiness. The most highlighted traits with the most consistent findings are extraversion and neuroticism, where extraversion has been associated with increased happiness, while neuroticism has been associated with decreased happiness. This is in line with Diener and Ryan (2009) who find that personality factors correlate strongly with well-being variables and that demographic factors are typically less correlated with well-being. Therefore, personality factors may predispose individuals to experience different levels of SWB.

Not accounting for personality may lead to omitted variable bias. For instance, personality traits might explain some of the variation when estimating the relationship between life satisfaction and income (Boyce, Wood, and Powdthavee, 2013) Most research suggests that personality traits are relatively stable over time and that the change is marginal (Cobb-Clark and Schurer, 2012).

Recent research, however, has suggested that personality might not be as fixed as previously assumed. Boyce, Wood, and Powdthavee (2013) argue that personality changes as much as other economic factors (e.g. higher income, improved work status and marital status). Their empirical

findings indicate that personality does change for individuals and that the individual changes in personality are more predictive of life satisfaction changes compared to other economic factors. Additionally, Lachmann et al. (2017) finds significant results when it comes to personality traits and SWB, but note that the association between personality traits and overall life satisfaction is unexpectedly low compared to previous studies.

2.3 Gender differences

Existing literature connected to our first sub-question, where we investigate if personality traits differ by gender, has noted mixed findings regarding gender differences and subjective well-being. Rodríguez-Pose and Maslauskaite (2012) document a higher level of life satisfaction for women which is consistent with past empirical findings. Diener (1984) reports that women experience a greater negative effect on happiness in relation to men, but they also seem to experience greater joys.

However, more recent studies show that social role theory might not be as reliable as previously thought. Gender differences in most aspects of personality traits are larger, almost always at their largest, in cultures with more gender egalitarianism and therefore casts doubts (Schmitt et al., 2017). The authors, therefore, draw the conclusion that gender differences, at least in part, stem from evolved psychological adaptations where some are culturally universal and some might be more sensitive to local socio-ecological contexts.

Further, Nyhus and Pons (2005) explore interactions between personality traits and gender in regards to income. They find that agreeableness is negatively correlated with earnings for women and that conscientiousness has a positive impact for both genders at the beginning of an employment relation. In contrast, Ngoo, Tey, and Tan (2015) find no gender differential in life satisfaction. In regards to these mixed findings, we therefore further aim to explore this in the context of our sample data.

2.4 Economic shocks

Previous literature connected to our second research question regarding economic shocks looks at household shocks or so-called economic shocks for a household. Lin and Okyere (2022) note a long-lasting effect of economic shocks on mental disorders (e.g. depression, anxiety, stress and suicidal thoughts). In general, children experiencing hard-hit economic crises show a lower level of life satisfaction later in life. Further, Frijters, Johnston, and Shields (2011) investigate how major life events affect people in the form of life satisfaction later in life. Frijters, Johnston, and Shields (2011), however, show that the effect of an economic shock after two years is close to

zero and that some individuals with certain personality traits will be more prone to certain types of effects. Diener (1984) argues that an individual's reaction to life events, such as shocks, but also towards positive events, depends on the individual's feeling of control or lack thereof. Lack of control can lead to lower SWB, even for positive events. This motivates us to further explore the relationship between economic shocks and SWB as this relationship is still unclear.

2.5 Health insurance

Existing literature connected to our third research question regarding the associated effect of access to health insurance on life satisfaction remains scarce. This motivates us to further explore the possible relationship between access to health insurance and subjective well-being. A possible relationship could potentially be used as a policy means by governments in their aim to improve individual SWB. There are findings suggesting that having good health makes people happier, but few studies focus on whether having access to health insurance is associated with higher well-being.

Tran, Wassmer, and Lascher (2017) investigates the connection between life satisfaction and health insurance through US survey data. A big proportion of American individuals do not pursue health insurance in the US today due to costs and general health care access being limited. The authors note that lack of health insurance is associated with a greater likelihood of being less satisfied with life. Moreover, the authors reach the same conclusion as Graham (2011)'s study of happiness. Graham (2011) finds evidence that people can adapt to negative circumstances in life, but that they experience more trouble when faced with uncertainty. The absence of health insurance threatens an individual's well being because of the heightened stress from worrying about the consequences if they get sick. Nonetheless, some of the same factors that determine individual life satisfaction may endogenously determine a person's health insurance status (Tran, Wassmer, and Lascher, 2017).

To the best of our knowledge, the relationship between access to health insurance and SWB in LMIC is not well documented. Appleton and Song (2008) find that in urban China, being in possession of medical insurance has significant effects on subjective well-being. Individuals without medical insurance have a predicted 18% chance of being dissatisfied compared to a predicted 12% for individuals with state medical insurance. We, therefore, contribute to previous literature by exploring this relationship further.

2.6 Contribution to the literature

Altogether, life satisfaction and its determinants has been widely investigated, mostly in developed countries due to its importance for welfare analysis and public policy. A large number of empirical studies suggest that factors affecting life satisfaction are income, age, gender, education, employment and marital status.

Recently, economists have documented the importance of including personality traits into economic models. Therefore, to contribute to the literature this study aims to shed light on the relationship between personality traits and its associated effect on life satisfaction in LMIC using high-quality data from the World Bank's STEP survey. Most of the literature today ignores personality traits due to data limitations, and once used, the main focus area of personality traits is the Big Five. In this study we add additional personality traits that are commonly associated with socio-emotional skills - grit, hostile attribution bias, and decision-making - to contribute to the literature.

The previous literature has often accounted for individual personality traits through so-called individual fixed effects. (see for example: Becchetti and Pelloni, 2012; Nikolova and Graham, 2021; Headey, 2014). Individual fixed effects control for important time-invariant unobservable factors, but it does not allow one to assess which behavioural factors are important. Hence, with individual fixed effects you cannot understand the specific individual variation. Therefore, by using the STEP survey, this thesis distinguishes itself by being able to make these important variables a focus of the subjective well-being outcome as well as going beyond fixed effects by trying to understand the factors that are associated with individual variation.

Additionally, most of the literature within happiness economics is studied in developed countries (see for example: Pittau, Zelli, and Gelman, 2010; Proto and Rustichini, 2015). In this thesis we focus on LMIC. To the best of our knowledge this has not been done to a greater extent with multiple LMIC. We also add to the literature by shedding more light into the possible influence of cultural heterogeneity on SWB.

Research regarding happiness has widely focused on different explanatory variables affecting SWB independently; interactions between some key variables (e.g. gender and personality traits) have not received attention to the best of our knowledge. Hence, we aim to get a better understanding whether there exists gender differences in the relationship between personality traits and SWB, adding to the happiness economics literature.

The STEP survey has been used in previous research and in different fields. Lin and Okyere

(2022) use the STEP survey data to investigate whether childhood economic shocks can explain adulthood energy poverty in developing countries. Valerio et al. (2016) study if there are skills payoffs in LMIC when it comes to earnings. Tognatta et al. (2016) build upon Valerio et al. (2016) and further investigate whether or not cognitive and noncognitive skills can explain the gender wage gap in LMIC. To the best of our knowledge, this unique dataset has not been used to examine the proposed research questions.

3 Theory and Hypotheses

There are some existing theories widely used within academia that can help us in our study of the proposed research questions. These theories are highlighted in this section along with existing literature to guide us with our hypotheses. To the best of our knowledge, these theories have not been applied in LMIC to the same extent as this study aspires to.

3.1 Bottom-up and top-down theory

In this subsection, we present the bottom-up and top-down theories to help us answer the first research question regarding the relationship between personality traits and life satisfaction. Bottom-up and top-down theories of life satisfaction and their differences were originally studied by Diener (1984).

The top-down approach is based on the belief that SWB generally returns to a so-called baseline after bigger or life-changing events for an individual. There is a global propensity to experience things in a positive way, meaning that an individual will experience events positively if the individual is, in general, happy and not vice versa (Diener, 1984). Here, it is believed that personality traits affect an individual's SWB and that an individual is predisposed to experience and react to events differently from another individual (Brief et al., 1993; Headey, 2014).

Bottom-up, instead, is explained as the combination of multiple measures of satisfaction. Happiness is therefore described as derived from both pleasurable and non-pleasurable experiences and moments, which add up to an individual's overall happiness. This could be, as described above, domains such as marriage, family, income, and financial situation, as well as housing situation (Brief et al., 1993). Due to dataset limitations, we are not able to investigate the bottom-up theory since data were not collected in regard to multiple measures of satisfaction.

Some early empirical research on SWB found that objective conditions, such as income level and housing were shown to have a smaller effect on SWB compared to what was previously thought

(Headey, 2014). Personality traits have been shown to be at least as important as cognitive skills along with years of education and parental background when predicting labour market returns (Brunello and Schlotter, 2011).

Altogether, the top-down theory together with previous literature make us reach our first hypothesis.

Hypothesis 1: Personality traits such as extraversion, agreeableness, openness, consciousness, stability, grit, and decision are positively associated with an individual's subjective well-being, whereas the personality traits hostile attribution bias is negatively associated with an individual's subjective well-being.

As highlighted by the literature review, there are different conclusions from the empirical studies of happiness economics when it comes to gender differences. We, therefore, want to investigate if gender matters for our data sample. Heckman, Stixrud, and Urzua (2006) document gender differences in employability on soft skills. Schmitt et al. (2017) find that typically, men report higher levels of well-being than women. These differences are greater for more gender egalitarian cultures, even though all individuals in more egalitarian cultures reach, on average, higher levels compared to individuals in less egalitarian cultures. We, therefore, believe that there exist gender differences when it comes to personality traits and well-being. We form our second hypothesis.

Hypothesis 2: Gender significantly matters when it comes to personality traits and an individual's well-being.

3.2 Adaptation theory

In this subsection, we present adaptation theory to help us answer the second research question if economic shocks at an early stage in life have an associated relation with well-being later in life.

According to adaptation theory, individuals react either positively or negatively to events once they occur. However, over time these events will lose power in their effect on the individual (Diener, 1984). An individual will adapt to a negative situation and it will no longer evoke sadness or negativity and vice versa. Adaptation theory, therefore, states that an individual will be happy if current events are better than their standard. However, if these continue, adaptation will occur until the individual's standard rises to eventually match coming events.

This is also called hedonic neutrality. Diener and Ryan (2009) highlights that individual set points are not hedonically neutral and that individuals all have different set points. According

to them, external conditions are often weakly correlated with an individual's report on happiness. Previous research has shown a weak link between income, physical attractiveness, and objective health. Furthermore, Diener and Ryan (2009) highlights previous research where good and bad life events seem to only have a temporary effect on an individual's SWB. For example, emotional reactions to the death of a spouse also seem to eventually rebound, which shows empirical support towards adaptation. With the adaptation theory and previous literature regarding economic shocks as a framework, we formulate our third hypothesis with the aim of investigating if adaptation occurs.

Hypothesis 3: Negative economic shocks early in life will not have a negative impact on an individual's subjective well-being later in life.

4 Data

4.1 Data

In the following analysis, data from the World Bank's STEP survey for nine different countries have been appended. The STEP survey aims to provide policy-relevant data to give a broader understanding of education, skills acquisition, personality, and social background in a cross-sectional dataset. Each respondent represents a household member randomly selected among all household members, between the ages of 15 to 64 living in urban areas. The survey was done face-to-face and Table 4.1 shows an overview of the conducted surveys for each country. Table 9.1 in Appendix A shows summary statistics for the overall data sample. Summary statistics for each country can also be found in Appendix A, Tables 9.2 - 9.10.

Table 4.1: Survey Summary

Survey Country	Starting Date	End Date	Year	Observations	Data Collection Mode	Participation rate
Armenia	February	June	2013	2 992	F2F	32%
Bolivia	February	May	2012	2 433	F2F	43%
Colombia	May	July	2012	2 617	F2F	48%
Georgia	March	May	2013	2 996	F2F	62.6%
Ghana	February	April	2013	2 987	F2F	83.2%
Kenya	August	November	2013	3 894	F2F	91.8%
Ukraine	-	-	2012	2 389	F2F	60.4%
Vietnam	May	June	2012	3 405	F2F	62%
Yunnan Province	February	April	2012	2 017	F2F	98%

Several factors motivate us to use these datasets and combine the countries to create an appended dataset. First, the datasets and their structure are unique and give insight to

skills and noncognitive skills in LMIC which have not been previously available. The STEP survey collects information regarding an individual's educational and family background, life satisfaction, skills acquisition history, current work status and employment history as well as health. Information regarding economic shocks in youth is also collected. This provides us with a better understanding of an individual's life choices, history and skills to better evaluate subjective well-being.

Second, since the STEP survey data collects information regarding cognitive, technical, and noncognitive skills it goes beyond other surveys regarding the measure of human capital. This allows us to control for further personality traits beyond existing literature in the form of traits such as risk aversion, hostile attribution bias, and decision-making.

4.2 Sample restriction

Following the previous literature, the sample is restricted to individuals aged between 18 to 64 years old to alleviate bias due to age-related confounders. Evidence show that personality traits among adults are more stable, and we therefore restrict our sample to this age range (Cobb-Clark and Schurer, 2012).

In the initial data collecting process, earnings per hour in USD were registered as missing "." if an individual did not have any earnings. This has been adjusted to "0" due to the loss of these observations otherwise. As previously mentioned in the literature review, employment has been empirically shown to have an effect on an individual's SWB. Another adjustment has also been made to the BMI variable where there were some clear outliers. These have been Winsorized to correct measurement errors.

4.3 Outcome variable

The dependent variable in this thesis is subjective well-being. The respondents of the survey were asked *"How satisfied are you at present with your life, all things considered? Respond on a scale from 1 (completely dissatisfied) to 10 (completely satisfied)."* There are different measurement methods used in the previous literature when it comes to life satisfaction where some studies have used scales 1 to 5, 1 to 7, 0 to 10, and 1 to 10 (see for example: Frijters, Johnston, and Shields, 2011; Proto and Rustichini, 2015; Piper, 2015; Charles, Wu, and Wu, 2019). There does not seem to be a general consensus as to which point scale to use. Therefore, in this study, we will proceed with a 10-point ordinal scale, from 1 (completely dissatisfied) to 10 (completely satisfied).
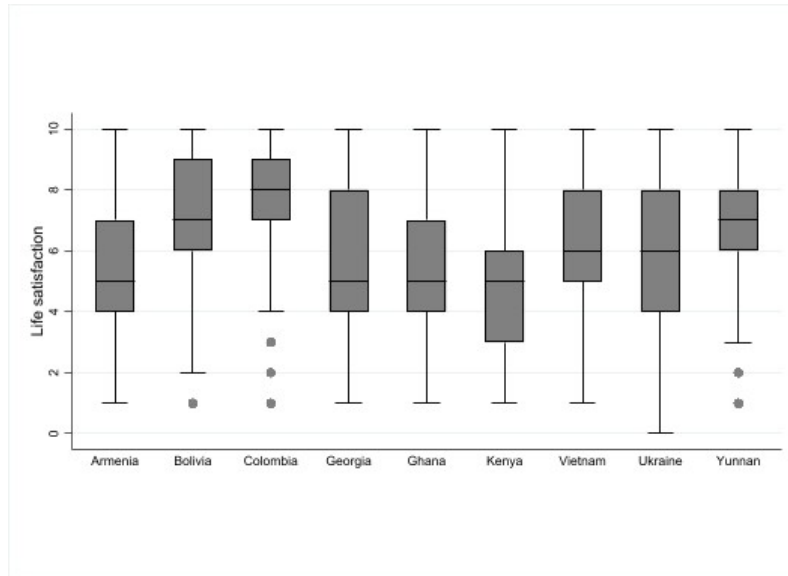
Figure 4.1: Life satisfaction by country

Figure 4.1 shows a boxplot of the life satisfaction scale for each country with a 95 percent confidence interval. We note that there are differences in dispersion among the different countries of the sample. For some countries like Georgia and Ukraine, we have great dispersion within the countries which can indicate that individuals within each country have quite different circumstances regarding SWB, while for countries such as Colombia and Yunnan province, there is less dispersion and perhaps more similar circumstances.

MacKerron (2012) argues that a single-item scale could be justified by the fact that the individual answering the survey might be best suited to aggregate all aspects of his or her own well-being. However, MacKerron (2012) underlines that single-item measures are argued to have poorer reliability compared to a questionnaire measuring different subgenres of life satisfaction. Another factor highlighted by MacKerron (2012) is the possible problem of timescales where respondents are asked about the 'vague present' regarding SWB. According to the author, the vague questions make room for interpretation regarding what exactly is to be assessed on the time dimension.

According to Kahneman and Thaler (2006), an individual's recollection and aggregation of experiences have been shown to be systematically distorted. In spite of these criticisms, MacKerron (2012) writes that it could be argued that recollected and aggregated assessment still could be a valid measure of SWB since individuals do not live exclusively in the immediate present. In addition, using the World Bank's STEP survey allows us to use this measure as a proxy for individual SWB. In line with MacKerron (2012) we see this as a suitable assessment measure.

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4.4 Variables of interest

To answer the first research question, where we explore the relationship between personality traits and life satisfaction, we use extraversion, openness to experience, agreeableness, neuroticism, conscientiousness, grit, hostile attribution bias, and decision-making as personality traits. Table 9.11 in Appendix A shows the definitions for each personality trait.

Personality traits

Personality traits and their associated effect on life satisfaction have long been studied within psychology. In recent years, it has become an important variable in economics as more data becomes available. Lack of accounting for this may lead to omitted variable bias. This might arise due to some personality traits being more inclined to predict certain big life events that could affect individual SWB (Cobb-Clark and Tan, 2011). For example, being outgoing and happy may lead to a greater probability of getting a job or getting married and, in turn, increase SWB. Welsch and Bonn (2008) emphasise personality traits as an important factor when it comes to life satisfaction due to unobserved heterogeneity across individuals otherwise.

In the World Bank's STEP survey, personality traits are measured by the Big Five and three additional socio-emotional characteristics [2]. Individuals scoring high on prosocial attitudes and achievement motivation will exhibit more favourable economic and life-satisfaction outcomes (Pierre et al., 2014). In the STEP survey, personality traits are assessed through different domains. These traits are rated on a four-point Likert scale from 1 (Almost never) to 4 (Almost always), and summary statistics are provided in Appendix A, Table 9.12.

Culture indices

To study culture we create two culture indices, Autonomy index and Equality index. Similar to Granato, Inglehart, and Leblang (1996), in this study we define culture as a form of system within a society with a set of common values. These values might be assumed to help shape the behaviour of individuals within a society and could, therefore, affect an individual's perception of SWB and outlook on life.

Exton, Smith, and Vandendriessche (2015) highlight that a number of studies have suggested that culture can influence the links or drivers of SWB. Previous research has shown that self-esteem and autonomy have a stronger correlation with life satisfaction when it comes to more individualistic cultures relative to cultures that would be deemed more collectivistic. MacKerron

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[2]In the STEP survey, neuroticism is defined in a reversed form due to survey reasons. Hereinafter, neuroticism will be described in its opposite form, stability, in the context of our empirical findings.

(2012), however, argues that there will be variation that is nonrandom in the answers to SWB due to linguistics and cultural differences. Since these subjectivities exist in the scores, he argues that it is impossible to determine how far cultural differences in scores reflect varying levels of actual, experienced SWB.

In this study, we aim to capture the possible relationship between culture and SWB with the help of two indices that are constructed and extracted on a national level. The World Value Survey (henceforth referred to as WVS) is a survey studying changing values and their impact on social and political life in countries all around the world starting in 1981 and still ongoing. The survey questionnaire is broad and informative regarding beliefs, values, and motivations of people throughout the world. In this thesis, we want to control for characteristics unique to each culture that might influence an individual's comprehension of SWB.

Using the WVS time-series dataset, one index can be extracted and one created on a national level for each of our countries of interest, assuming culture as being stable over time. The first one is the Autonomy index which is built upon the children's quality battery. Individuals are asked to identify important child qualities among a number of topics which children can be encouraged to learn at home. There are well-documented grounds that peoples' beliefs and cultural variation have an important role in economic development (Inglehart and Baker, 2000).

The list for the autonomy index includes four variables; religious faith, obedience, perseverance/independence, and determination. Depending on whether or not the individual mentions these they are assigned certain scores that make up the Autonomy index (Granato, Inglehart, and Leblang, 1996). For instance, the Autonomy index will take the value 2 if an individual value both determination and perseverance/independence but do not mention obedience or religious faith as important qualities. The other extreme, -2 is reached if the individual value both obedience and religious faith but does not mention determination and perseverance/independence. If all qualities are mentioned, the individual receives a score of 0. If one of four, then the individual receives either 1 or -1.

The second index is built by extracting three measures of equality from the WVS; equality at work, equality in politics, and equality in education. We then construct an equality index by following the STEP survey and WVS by taking the three questions' average. The country average for each index is calculated and merged into our final dataset. Due to low variation between values for the initial calculations, the equality index has been multiplied by ten in the analysis to allow for easier interpretation.
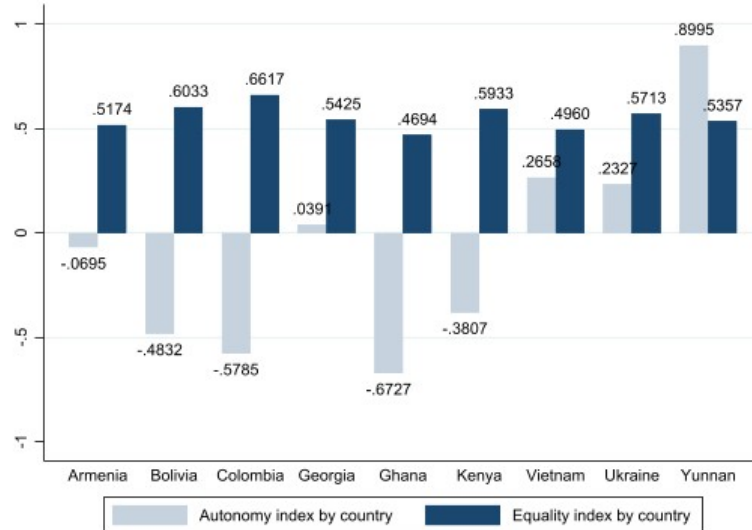
Figure 4.2: Indices

As Figure 4.2 shows, there seem to be cross-national differences. Such differences between nations might be explained by cultural differences. The country with the highest, on average, equality when it comes to work, politics, and education in our sample is Colombia followed by Bolivia. These are also the two countries with the highest average of individual SWB. Ghana reports the lowest level of equality in our sample.

Looking at the autonomy index average, we find the highest number in Yunnan which indicates that the country, on average, values determination and perseverance/independence. On the other end, Ghana receives the highest negative country average which indicates values more towards obedience and religious faith.

Economic shocks

To answer the second research question where we examine if there is an associated relation between economic shocks and subjective well-being, along with a set of covariates, we use a self-reported measure of economic shocks before the age of 15.

As previously stated in the literature review, economic shocks are an important factor to take into consideration when investigating individual SWB. Early life economic shocks are measured in the STEP survey through the question *"Before you reached the age of 15, was the household's financial situation significantly worsened because of these circumstances?"*. The circumstances include illness or death of a household member, a family breakup, bankruptcy or loss of employment, natural catastrophe, and similar situations. The variable is constructed as the sum of situations negatively affecting an individual's financial situation before reaching the age

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of 15. The range of the variable is between 0 (i.e. zero number of shocks) and 11 (i.e. eleven number of shocks).

There is no general consensus as to whether or not shocks in early life have an impact on an individual later in life, as seen in the literature review. The question regarding SWB on economic shocks has not previously been investigated with this novel dataset which makes this an important variable of interest. As Figure 4.3 shows, there seems to be a negative relationship between economic shocks and SWB. However, after 8 number of shocks, the mean SWB rises and this is believed to occur due to some possible outliers in our constructed dataset, as can be seen in the descriptive statistics of economic shocks, found in Appendix A, Table 9.13. We have high standard deviation for > 7 numbers of shocks and the last two numbers of shocks are single observations.
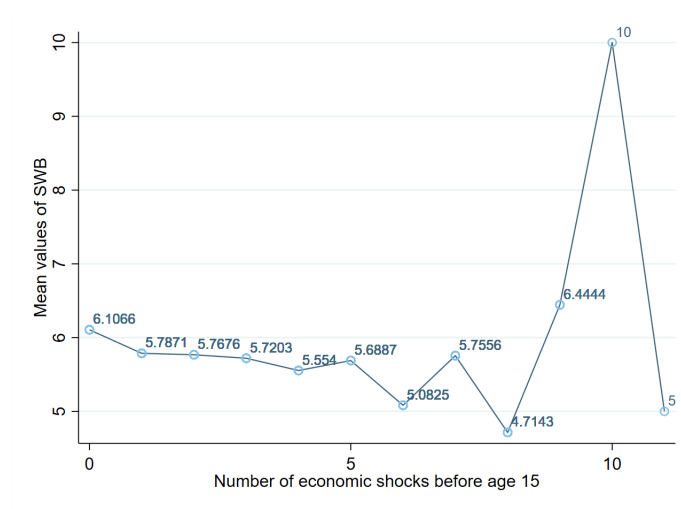
Figure 4.3: Mean values of SWB on number of shocks

Access to health insurance

To investigate a potential correlation between subjective well-being and health insurance, we utilise access to health insurance as a means of addressing the third research question. In our sample data, there are multiple ways to attain health insurance. Through the individual's work, through a household member's work, through a government program, through buying private insurance, a choice specified as 'other' or an individual without health insurance. In this study, the health insurance variable has been modified to a dummy variable taking the value of 1 if the individual possesses health insurance of any kind and 0 otherwise. As shown in Figure 4.4, having access to health insurance is shown in our dataset to skew normal SWB to the right.

The choice of including whether a household has access to health insurance comes from the belief that if there are social security nets available for the public, either provided by the state

or employer, there will be less concern regarding health (Tran, Wassmer, and Lascher, 2017; Graham, 2011). This, in turn, might affect individual SWB as indicated by the Figure in 4.4. In addition, including health insurance in the model allows us to study potential policies that can be implemented by governments to improve SWB.
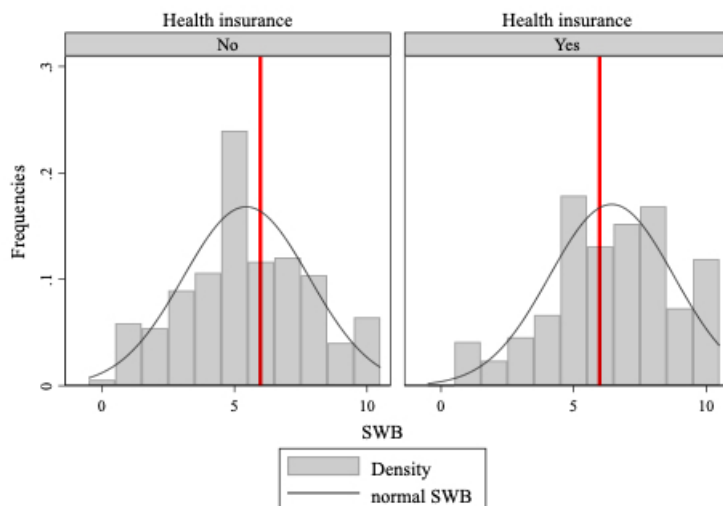
Figure 4.4: Access to health insurance

4.5 Covariates

Based on the results from the theoretical framework and previous empirical studies, the covariates used in this study include income, age, age squared, marital status, number of children under 6 years old in the household, educational level, cognitive skills (i.e. write, read, numerical, computer), employment status, socio-economic status at age 15, asset index quantiles, risk and health as a measure of chronic illness. Previous research often uses the logarithm of income, but due to a big sample of our data having an individual income of 0, this is not possible in our data.

5 Empirical Strategy

In this study, we follow previous literature and empirical analysis and use an OLS model. Since the dependent variable is ordinal, a convenient model specification could be an ordered probit model. However, previous literature shows a small difference between OLS and Ordered probit, and OLS is easier for interpretation purposes (see for example: Huang, Wu, and Deng, 2016; Nikolova and Graham, 2021).

With regard to research question one we want to investigate the association between personality traits and SWB, we estimate the following equation:

$$SWB_i = \gamma P_i + \theta I_i + \chi C_i + \epsilon_i : i = 1, ..., N \tag{5.1}$$

Where the dependent variable is subjective well-being, measured on an ordinal scale of 0-10. P_i is a vector of personality traits, more specifically (i.e. extraversion, openness to experience, agreeableness, stability, conscientiousness, grit, decision-making and hostility) and γ is the estimated parameter for each of the individual personality characteristics. Culture indices I_i, capture cultural differences by using the autonomy and equality index described previously in the data section. Furthermore, we control for a set of covariates C_i, which have previously been shown to matter in the literature. These are income (hourly earnings in USD), age, age squared, marital status (married, married - polyamorous, cohabitation, divorced, separated, widow/er, and never married), number of children under 6 years old in the household, educational level, socio-economic status at age 15, employment status, risk and health as a measure of chronic illness.

Additionally, throughout our models, we control for regional heterogeneity through continent variables to help us with variation between continents which our indices cannot account for. Here, we cannot use any variables that are country specific due to our country-level indices. We, therefore, opt to control for regional heterogeneity. The final dataset allows us to group the countries into specific continents with 2-3 countries for each continent. These continents are Europe, Asia, South America, and Africa. ϵ_i represents the error term.

With respect to the first sub-question, where we investigate if the relationship between personality traits and SWB differs for men and women, we estimate the following equation:

$$SWB_i = \gamma P_i + \theta I_i + \beta G_i + \delta P_i * G_i + \chi C_i + \epsilon_i : i = 1, ..., N \tag{5.2}$$

where G_i is a dummy variable for gender (female=1) and $P_i * G_i$ is the interaction term for gender and each personality trait. C_i controls for the same set of covariates as in equation (5.1).

With regards to research question two where we want to investigate if economic shocks early in life affect SWB in later years, we run the following regression:

$$SWB_i = \theta S_i + \chi C_i + \epsilon_i : i = 1, ..., N \tag{5.3}$$

where S_i contains information regarding economic shocks before an individual reaches the age of 15. C_i controls for the same set of covariates as in equation 5.1.

With respect to research question three where, from a policy perspective, we investigate if there exists a relationship between access to health insurance and SWB, we run the following regression:

$$SWB_i = \pi H_i + \chi C_i + \epsilon_i : i = 1, ..., N \tag{5.4}$$

where, H_i contains information regarding access to health insurance for an individual and π estimates the possible correlation between access to health insurance and SWB. Here we also include the same covariates as in equation (5.1) with the same reasoning for their importance, as highlighted by previous literature.

The model specifications in equations (5.1), (5.2), (5.3) and (5.4) will primarily focus on capturing the correlation between SWB and the explanatory variables. Our models might suffer from endogeneity issues which might arise from omitted variable bias, measurement error and simultaneity bias. We therefore need to be careful when interpreting our results as to not claim causality, rather we are interested in whether or not there exists an association between our independent variables and SWB. This is to get a better understanding of some of the possible components that encompass SWB and, in turn, could help policymakers in their aim for a higher level of well-being for society.

5.1 Robustness methods

We choose to also include three other types of methods, specifically one Ordered probit model and two machine learning methods. These machine learning methods are done with the aim of trying to lower the risk of overfitting, possible high correlation within our predictor variables, and order of parameter entry problems (Urminsky, Hansen, and Chernozhukov, 2016). Below are some unique benefits and disadvantages of each model highlighted.

The first machine learning method we use is the Double LASSO (the least absolute shrinkage and selection operator, henceforth DL) regression model, introduced by Urminsky, Hansen, and Chernozhukov (2016). By adding a constraint to the minimisation of squared-error loss, this method is used to shrink some of the irrelevant coefficients towards zero and select the most relevant predictor variables in order to estimate the model (Hirukawa et al., 2023). At the first stage, lasso regression is used to select the variables which have the strongest correlation with the outcome variable in a large sample of potential predictors. As a second stage, another lasso is conducted with the aim to select variables that are most strongly associated with the residual obtained from the first stage. Running a DL will help choose the most important variables,

helps with possible multicollinearity problems and help with improvements in accuracy when it comes to model predictions.

One of the main concerns when it comes to the OLS approach is the worry of researcher bias when compiling the model. Additionally, there might be a possibility of omitted variable bias, giving rise to specification error. This, in turn, artificially inflates the significance of the coefficients included in the model (Heckman, 1979). Therefore, the use of machine learning methods can avoid researcher bias and omitted variable bias, as the researcher is not responsible for selecting the chosen variables.

Failing to take into account regressors might also lead to a suppression effect (MacKinnon, Krull, and Lockwood, 2000). Therefore, the DL approach helps address this concern as described in the previous paragraph, as well as with some of the standard OLS regression issues (Chernozhukov, Hansen, and Belloni, 2013; Urminsky, Hansen, and Chernozhukov, 2016). We, therefore, believe that this could help improve the overall performance of our empirical analysis.

Previous studies utilising the DL touch upon a broad area of research and have shown to improve goodness of fit. The effect of workplace wellness programs (Jones, Molitor, and Reif, 2019), school-based, intensive learning camp evaluations (Hvidman et al., 2020), and exploring whether negotiation skills training can improve girls' educational outcomes in a low-resource environment, to name some examples (Ashraf et al., 2020).

The second machine learning method is the Forward selection model used as a final robustness check. This aims to also select the most relevant subset of predictor variables from a larger set of potential predictors. It starts as a null model and then the forward selection sequentially adds predictors to the model one by one based on their ability to improve the model fit. The first variable chosen is the predictor variable that provides the best fit when used alone, and then the following predictors added are those who provide the best improvement in the model fit. The model can have some disadvantages in the form of the issue of repeated testing of the same data, meaning multiple hypothesis testing, which is a problem for every stepwise method (Kuhn et al., 2013). The chosen predictors might also give misleading results when it comes to more narrow confidence intervals, smaller p-values and biased R^2 (Burnham and Anderson, 2004; Gary, 2018; Harrell et al., 2001).

The method is, however, commonly used within empirical analysis and remains popular. For instance, within happiness economics Abdallah, Thompson, and Marks (2008) utilise the forward selection method to explore determinants that can predict between-nation variation in subjective well-being across 178 countries. Hidaka et al. (2020) use a stepwise forward selection method

as a final model in their quest to study the associations between subjective happiness and combinations of housing tenure status and household structure among community-dwelling elderly people in Japan. Winkleby et al. (1992) look into which determinants of SES are the strongest for a sample in the US while also employing a forward selection approach, finding that education remains the strongest predictor of SES.

6 Empirical results and strategy

In this section, we present the output results from our regression models. Since the data collected is mainly from urban areas, the results presented in this section are representative for urban areas only, not in these countries' rural areas. Worth noting, however, is that for many of these countries, most of their population today live in urban areas.

6.1 Research question one: What is the relationship between personality traits and life satisfaction?

6.1.1 Main analysis

Table 6.1 shows the regression output for the first research question using the model specification from equation 5.1. In Model (1) we estimate the relationship between personality traits and SWB without including any covariates. In Model (2) we include covariates and we find that adjusted R-squared increases substantially (from 0.060 up to 0.254), implying that these covariates explain a significant proportion of SWB.

From Model (1) and (2) we can observe that extraversion is positively associated with subjective well-being, and the estimated effect is statistically significant. We further find a positive relationship between emotional stability and SWB. This is in line with previous literature, the most highlighted traits associated with increased happiness are extraversion and neuroticism (see for example: Steel and Ones, 2002; Diener and Ryan, 2009). Moreover, we find that agreeableness has a positive correlation with individual SWB. Both conscientiousness and decision traits are shown to be significantly negative at different levels. This is not in line with our initial hypothesis where we believed these traits to be positively correlated with individual SWB. In these initial models, we draw the conclusion that part of our hypothesis regarding personality traits and SWB is partially confirmed while rejections are made for the traits of conscientiousness and decision.

These initial findings support the top-down theory. That is, personality traits correlate with individual SWB, and an individual can experience a different level of SWB in comparison to

another individual with different personality characteristics.

6.2 Sub-question one: Does the relationship between personality traits and life satisfaction differ by gender?

6.2.1 Main analysis

Table 6.1, Model 3 shows the regression output for sub-question one regarding personality traits and gender using the model specification from equation (5.2). The table suggests that the relationship between some personality traits and SWB differs for men and women. For instance, the interaction term between gender and conscientiousness, suggests that women's subjective well-being is more negatively pronounced by increased conscientiousness compared to men. The same holds for the interaction between gender and grit, where women are negatively influenced by an increase on the Likert scale in grit for the case of their SWB, on average. Furthermore, a positive interaction term between gender and decision indicates that women's subjective well-being is positively influenced for each additional increase on the Likert scale in their decision-making ability compared to men.

From this model specification, we draw the conclusion that an increase in conscientiousness and grit have a negative affect on women's well-being in comparison to men. While an increase in decision-making ability for women indicates an increase in well-being, compared to men. These findings support parts of the hypothesis, in which gender differences in some aspects of personality traits exist in the context of SWB.

Table 6.1: Regression results for Research Question 1

	Model 1	Model 2	Model 3
SWB	OLS	OLS	OLS
Extraversion	0.212***	0.0552**	0.0319
	(0.0270)	(0.0258)	(0.0386)
Agreeableness	0.343***	0.236***	0.249***
	(0.0298)	(0.0283)	(0.0416)
Openness	0.300***	-0.000832	0.0326
	(0.0318)	(0.0308)	(0.0456)
Conscientiousness	-0.292***	-0.193***	-0.0924**
	(0.0325)	(0.0307)	(0.0456)
Stability	0.311***	0.272***	0.310***
	(0.0255)	(0.0244)	(0.0377)
Grit	0.219***	0.129***	0.185***
	(0.0289)	(0.0274)	(0.0413)
Decision	-0.199***	-0.0475*	-0.155***
	(0.0300)	(0.0288)	(0.0434)
Hostile	-0.309***	-0.198***	-0.157***
	(0.0256)	(0.0246)	(0.0369)
Autonomy index	0.385***	1.387***	1.390***
	(0.0391)	(0.0706)	(0.0706)
Equality index	0.724***	-0.609***	-0.603***
	(0.0321)	(0.0555)	(0.0556)
Gender			0.759**
			(0.318)
Gender*Extraversion			0.0312
			(0.0505)
Gender*Agreeableness			-0.0249
			(0.0554)
Gender*Openness			-0.0450
			(0.0595)
Gender*Conscientiousness			-0.170***
			(0.0596)
Gender*Stability			-0.0305
			(0.0488)
Gender*Grit			-0.0933*
			(0.0541)
Gender*Decision			0.167***
			(0.0570)
Gender*Hostile			-0.0658
			(0.0484)
Covariates	No	Yes	Yes
Constant	0.150	8.906***	8.366***
	(0.240)	(0.397)	(0.446)
Observations	22,401	20,743	20,743
Adjusted R-squared	0.061	0.254	0.255

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included in Model (2) and Model (3) are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer.

6.2.2 Robustness

To test the robustness of the results from equation (5.1), we run an Ordered probit since our dependent variable is measured on an ordinal scale 0-10. From Table 6.2 we can observe that there is a marginal difference between the OLS and the Ordered probit, which is in line with previous empirical findings (Nikolova and Graham, 2021). The signs and the significance level can be compared directly from the output, while the magnitudes cannot be compared.

Table 6.2: Robustness Research Question 1

SWB	Model 1 OLS	Model 2 Ordered probit	Model 3 Double-lasso
Extraversion	0.0552**	0.0304**	0.0751***
	(0.0258)	(0.0130)	(0.0262)
Agreeableness	0.236***	0.118***	0.201***
	(0.0283)	(0.0143)	(0.0286)
Openness	-0.000832	-0.000394	0.0348
	(0.0308)	(0.0155)	(0.0313)
Conscientiousness	-0.193***	-0.0928***	-0.201***
	(0.0307)	(0.0155)	(0.0311)
Stability	0.272***	0.140***	0.261***
	(0.0244)	(0.0124)	(0.0251)
Grit	0.129***	0.0659***	0.152***
	(0.0274)	(0.0138)	(0.0277)
Decision	-0.0475*	-0.0238	-0.0597**
	(0.0288)	(0.0146)	(0.0291)
Hostile	-0.198***	-0.0970***	-0.189***
	(0.0246)	(0.0123)	(0.0249)
Autonomy index	1.387***	0.670***	
	(0.0706)	(0.0356)	
Equality index	-0.609***	-0.295***	
	(0.0555)	(0.0279)	
Covariates	Yes	Yes	Yes
Constant	8.906***		
	(0.397)		
Observations	20,743	20,743	19,839
Adjusted R-squared	0.254		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included in Model (1) and Model (2) are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer. The covariates included for Double-lasso in Model (3) can be seen in Appendix B, Table 10.1

For the second robustness check, we utilise DL regression to select covariates from a set of 41 variables that the STEP survey from each country provides. These include variables such as demographics, risk and time preferences, language, and family background. We run DL regression as this method allows us to select relevant covariates out of a large set, which leads to more accurate estimates of the standard errors (Chernozhukov, Hansen, and Belloni, 2013). Compared to Table 6.2 where we utilise the OLS approach, the DL model chooses 32 covariates out of 41. A comprehensive list of chosen variables can be found in Appendix B, Table 10.1. Our key variables of interest in Model (3) are slightly different in magnitude compared to the OLS approach. For example, extraversion is deemed to be of higher importance and magnitude by the DL, while agreeableness and stability shrink in magnitude.

To test the robustness of the results presented in Table 6.1 Model 3 we run an ordered probit model, see Appendix B Table 10.2. From the presented output we can observe a marginal difference between the OLS and the Ordered probit. The signs and the significance level can be compared directly from the output, while the magnitudes cannot be compared.

6.3 Research question two: Do economic shocks at an early stage in life have an associated relation with well-being later in life?

6.3.1 Main analysis

Table 6.3 shows the regression output regarding research question two using the model specification from equation (5.3). In Model (1) we estimate the relationship between the number of economic shocks at an early stage in life and an individual's subjective well-being without including any covariates. Furthermore, in Model (2) we include covariates and we find that adjusted R-squared increases, meaning that these covariates explain a statistically significant proportion of SWB. Both in Model (1) and (2) we find a statistically significant negative relationship between economic shocks and subjective well-being, indicating that children experiencing economic shocks show a lower level of subjective well-being later in life.

These findings are in line with previous literature (see for example: Lin and Okyere, 2022; Diener, 1984). However, these findings are not in line with adaptation theory and therefore we reject our third hypothesis regarding shocks having no long-lasting relation to individual SWB.

As discussed previously, to account for cultural heterogeneity throughout our models we utilise two cultural indices, more specifically autonomy index and equality index shown throughout the tables. As illustrated in Table 6.3 in Model (1) with no covariates included, we can observe a positive relationship between the autonomy index and SWB, meaning that there is cultural heterogeneity in how individuals perceive SWB. The same relationship holds for the equality index. However, in Model (2) where we include covariates, the estimated coefficient of the equality index changes direction. One possible explanation as to why this might be the case is due to large differences between continents which are now captured in our dataset. The continents are included in our model to help us with the variation between continents that seem to stem from our dataset since the indices are observed on a country-level basis.

From Model (1) and (2) in Table 6.3 we find culture differences to be highly significant, which is in line with MacKerron (2012) and Exton, Smith, and Vandendriessche (2015), while Becchetti and Pelloni (2012) find culture to be less relevant.

Table 6.3: Regression results for Research Question 2

SWB	Model 1 OLS	Model 2 OLS
Shocks	-0.172***	-0.111***
	(0.0149)	(0.0138)
Autonomy index	0.358***	1.348***
	(0.0375)	(0.0686)
Equality index	0.787***	-0.660***
	(0.0309)	(0.0529)
Covariates	No	Yes
Constant	1.794***	10.22***
	(0.170)	(0.366)
Observations	22,868	21,059
Adjusted R-squared	0.032	0.242

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included in Model (2) are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer.

6.3.2   Robustness

To test the robustness of the results, we utilise ordered probit since the outcome variable is measured on an ordinal scale of 0-10. In line with previous literature, OLS and ordered probit yield similar results, as can be seen from Table 6.4. The direction of the independent variable, shocks, is the same in both model specifications.

Table 6.4: Robustness Research Question 2

SWB	Model 1 OLS	Model 2 Ordered probit	Model 3 Double-lasso
Shocks	-0.111***	-0.0540***	-0.0896***
	(0.0138)	(0.00681)	(0.0142)
Autonomy index	1.348***	0.643***	
	(0.0686)	(0.0340)	
Equality index	-0.660***	-0.318***	
	(0.0529)	(0.0261)	
Covariates	Yes	Yes	Yes
Constant	10.22***		
	(0.366)		
Observations	21,059	21,059	19,839
Adjusted R-squared	0.242		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included in Model (1) and Model (2) are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer. The covariates included for Double-lasso in Model (3) can be seen in Appendix B, Table 10.1

For the second robustness check, we run a DL regression to reduce the risk of multicollinearity. The machine learning method selects 36 out of 48 independent variables, as can be seen in

Appendix B, Table 10.1. From Table 6.4 we can observe a significant relationship between the independent variable and the outcome variable, the magnitude of the estimated coefficient is less negative compared to the OLS approach. This might be due to DL putting less emphasis into this variable of interest compared to the OLS.

6.4 Research question three: Does having access to health insurance correlate with an individual's perception of well-being?

6.4.1 Main analysis

Table 6.5 shows the regression output regarding research question three using the model specification from equation (5.4). In Model (1) we estimate the associated relationship of access to health insurance and subjective well-being, without including covariates. In Model (2) with the covariates included, we can observe a significant positive relationship between access to health insurance and SWB. This in turn, indicates that having access to health insurance correlates with a, on average, higher level of SWB, which is in line with previous empirical findings (Tran, Wassmer, and Lascher, 2017).

Table 6.5: Regression results for Research Question 3

	Model 1	Model 2
SWB	OLS	OLS
Health insurance	1.118***	0.563***
	(0.0303)	(0.0314)
Autonomy index	0.463***	1.014***
	(0.0361)	(0.0703)
Equality index	0.806***	-0.430***
	(0.0296)	(0.0530)
Covariates	No	Yes
Constant	0.987***	8.755***
	(0.165)	(0.364)
Observations	22,904	21,080
Adjusted R-squared	0.079	0.251

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included in Model (2) are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer.

6.4.2 Robustness

To test the robustness of the results presented above, we again utilise the ordered probit approach. The output is presented in Table 6.6. In line with previous empirical findings, the OLS and the ordered probit yield similar results, and the direction of the estimated coefficients are the same for both approaches.

Table 6.6: Robustness Research Question 3

SWB	Model 1 OLS	Model 2 Ordered probit	Model 3 Double-lasso
Health insurance	0.563***	0.281***	0.438***
	(0.0314)	(0.0158)	(0.0333)
Autonomy index	1.014***	0.479***	
	(0.0703)	(0.0353)	
Equality index	-0.430***	-0.203***	
	(0.0530)	(0.0265)	
Covariates	Yes	Yes	Yes
Constant	8.755***		
	(0.364)		
Observations	21,080	21,080	19,839
Adjusted R-squared	0.251		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included in Model (1) and Model (2) are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer. The covariates included for Double-lasso in Model (3) can be seen in Appendix B, Table 10.1

For the second robustness check, a DL regression is utilised to help us identify the most important covariates in a large dataset that contribute to the outcome variable. The use of DL generates a selection of 36 covariates out of 48. The full list of variable selection is provided in Appendix B, Table 10.1. From Table 6.6, we can see that access to health insurance is positively associated with SWB, and the magnitude of the coefficient is somewhat smaller compared to the OLS approach. This might be due to DL putting less emphasis on this variable of interest compared to the OLS.

As a final robustness check, we run a forward selection model as another way to check for omitted variable bias. The model selects the most relevant subset of predictor variables out of the full sample provided by our merged dataset. The results are presented in Table 6.7 as a simplified version, and the full table can be found in Appendix B, Table 10.3.

The table, like the DL regressions, shows that our baseline model might suffer from omitted variable bias due to both machine learning models adding covariates into the regressions. DL and forward selection choose similar sets of covariates to add to the determinants of SWB.

Table 6.7: Foward selection - Simplified

SWB	(1)
Agreeableness	0.205***
	(0.0284)
Conscientiousness	-0.198***
	(0.0309)
Decision	-0.0524*
	(0.0285)
Extraversion	0.0777***
	(0.0261)
Grit	0.157***
	(0.0271)
Hostile	-0.187***
	(0.0248)
Stability	0.263***
	(0.0251)
Shocks	-0.0936***
	(0.0141)
Health insurance	0.444***
	(0.0329)
Autonomy index	1.103***
	(0.0745)
Equality index	-0.544***
	(0.0575)
Covariates	Yes
Additionally selected covariates:	
Bank account	-0.216***
	(0.0317)
Social assistance	0.493***
	(0.0849)
Additional certificate	0.199***
	(0.0508)
Unable to carry out activities	-0.000528**
	(0.000258)
Training courses	0.0722*
	(0.0435)
Young sisters at age 12	0.0234*
	(0.0135)
Constant	7.417***
	(0.426)
Observations	19,839
Adjusted R-squared	0.268

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer.

6.4.3 Final model

As our robustness checks have shown, our initial model might suffer from omitted variable bias. These additional covariates chosen by the robustness tests could be plausible also from an objective point of view. Some of the chosen variables were previously believed to be represented in the initial covariates chosen for our initial model specification. However, this seems to not have been the case, and we, therefore, add these additional covariates into a final model.

As can be seen in Table 6.8, DL chooses covariates such as having access to a bank account with a formal institution, participation of any training courses by the individual in the last 12 months and social assistance. These variables may matter for the individual in the sense that

having access to a bank account with a formal institution indicates some form of institutional stability in the country. Participation in any training courses in the last 12 months might be due to individuals feeling some form of fulfillment or achievement by participating, leading to higher well-being. Social assistance having a positive relation to SWB could, similar to access to health insurance in the sense that some of the uncertainty regarding household income is relieved.

The choice of adding the covariates chosen by DL instead of Forward selection stems from the Forward selection model having more disadvantages than the DL, as highlighted in section 5.1. The DL specification also allows us to specify variables of interest for each research question, which makes model specification easier. For example, covariates such as additional certificate and training courses are not chosen for our second research question by the DL. The three final models can be seen in Table 6.8 along with the additional DL selected covariates.

Table 6.8: Regression with double-lasso selected variables

SWB	RQ1 OLS	RQ2 OLS	RQ3 OLS
Extraversion	0.0783***	0.0680***	0.0787***
	(0.0262)	(0.0256)	(0.0262)
Agreeableness	0.204***	0.205***	0.204***
	(0.0285)	(0.0281)	(0.0285)
Openness	0.0289	0.0279	
	(0.0313)	(0.0306)	
Conscientiousness	-0.202***	-0.206***	-0.203***
	(0.0311)	(0.0306)	(0.0310)
Stability	0.241***	0.243***	0.242***
	(0.0247)	(0.0242)	(0.0247)
Grit	0.153***	0.147***	0.153***
	(0.0276)	(0.0272)	(0.0276)
Decision	-0.0549*		
	(0.0290)		
Hostile	-0.190***	-0.186***	-0.190***
	(0.0249)	(0.0244)	(0.0249)
Autonomy index	1.093***	0.974***	1.094***
	(0.0776)	(0.0756)	(0.0758)
Equality index	-0.535***		-0.534***
	(0.0632)		(0.0632)
Shocks	-0.0929***	-0.0902***	-0.0924***
	(0.0141)	(0.0137)	(0.0141)
Health insurance	0.442***	0.500***	0.441***
	(0.0333)	(0.0324)	(0.0333)
Covariates	Yes	Yes	Yes
Additionally selected covariates:			
Bank account	-0.215***	-0.219***	-0.214***
	(0.0317)	(0.0314)	(0.0317)
Additional certificate	0.202***		0.203***
	(0.0522)		(0.0522)
Training courses	0.0791*		0.0810*
	(0.0434)		(0.0434)
Maximum of parents' education	-0.00896	-0.00257	
	(0.0155)	(0.0150)	
Mother tongue	-0.00431	-0.0119	-0.00547
	(0.0245)	(0.0242)	(0.0244)
Unable to carry out activities	-0.000510**		-0.000524**
	(0.000260)		(0.000260)
Younger brothers at age 12	0.00831	0.00732	0.00879
	(0.0101)	(0.0121)	(0.0101)
Pensions	0.0500	0.0573	
	(0.0386)	(0.0381)	
Social assistance	0.493***	0.494***	0.494***
	(0.0851)	(0.0848)	(0.0851)
Lived with mother and father at age 12		-0.0110	
		(0.0366)	
Old sisters		-0.00134	
		(0.0133)	
Younger sisters at age 12		0.0246*	
		(0.0144)	
Constant	7.406***	7.503***	7.461***
	(0.457)	(0.443)	(0.450)
Observations	19,896	20,624	19,899
Adjusted R-squared	0.268	0.267	0.268

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The covariates included are age, age squared, continents, socioeconomic status, employment, marital status, earnings per hour in USD, years of education, BMI, chronic illness, risk, number of children under 6 years old in the household, asset quantile index, write, read, numerical, computer.

As can be seen by the output, we have similar yielding results for all three of our research questions when comparing this and our initial models. Looking at our first research question we see that some personality traits have increased in magnitude whilst their significance level remains the same, while some have decreased in magnitude, such as agreeableness. DL also chooses to include shocks and access to health insurance which we previously did not have in our model to answer research question one. Some of the additionally selected covariates are shown to be highly significant, such as access to a bank account (coded 1 for yes and 2 for no) and social assistance from the government. Training courses and some hindrances in daily activities are also shown to be significant. Some of the chosen variables by the DL are not shown to be significant for our sample.

For research question two we can see that DL also recommend us to consider some personality traits and, for our sample, some of these are highly significant. DL also chooses additional covariates that are shown, for our sample, to be non-significant. However, access to bank account, social assistance, and having younger sisters in the household at age 12 are shown to be significant to different degrees. Our main variable of interest, economic shocks, is still highly significant but has decreased in magnitude which might imply that some of the extra chosen variables by the DL explain some information that was previously captured in the shock variable.

For research question three, regarding access to health insurance, DL again chooses to include some personality traits as well as economic shocks before age 15. The personality traits chosen indicate high significance to our model which might indicate omitted variable bias in our baseline model. Access to health insurance is still as significant as previously, but diminishes in size. This could be due to the additional covariates explaining some information that was previously captured in the health insurance variable.

All in all, since our initial model might suffer from omitted variable bias we choose to base our discussion regarding our results on the output provided by Table 6.8. This new model does not affect the rejection or confirmation of our hypotheses which remains the same.

7 Discussion

7.1 Results

In this study, we have aimed to answer three research questions. In our first research question, our focus was to answer which personality traits might have a correlation with an individual's SWB. Running the models for research question one our results showed that all personality traits, without any covariates included, significantly correlate with individual SWB. Whereas we do not have statistical significance for the personality trait *"Openness"* while including covariates, see Model (2) in Table 6.1. This holds the same while running our final model with the additional covariates chosen by DL, however, some personality traits such as extraversion diminish in size.

Our findings indicate a negative relationship between decision-making, conscientiousness and SWB, leading us to partially reject our first hypothesis. The negative relationship between these two personality traits and SWB may be due to the questions included in the definition of the traits. For example, decision-making as defined by Table 9.11 in Appendix A, includes the question *"Do you think about how the things you will do will affect you in the future?"*. An individual who scores high on this question might be more careful and aware of the loss of opportunities and long-term consequences, leading to more stress and anxiety. This, in turn, might lead to a negative relationship in regards to SWB.

Since this study is among the first to explore the relationship between personality traits and subjective well-being in LMIC, limited empirical support exists for this association. Previous research has mainly focused on personality traits and their correlation to labour market success, income, relative income, schooling and marital status where empirical findings show that there are significant differences in these fields depending on different personality traits. According to Nyhus and Pons (2005), most of the Big Five traits have shown a correlation to income, highlighting their importance when it comes to economic outcomes.

Our findings for research question one are partly reflective of, and in line with, studies performed by Steel and Ones (2002) who find a significant positive relationship of extraversion and SWB and a negative relationship with neuroticism. They do not, like us, find a correlation between Openness and broader measures of SWB, pointing to a rather orthogonal relationship. This might as well be a possible explanation in our case. In addition, Appleton and Song (2008) control for personality traits through a covariate of *"amiability"* and find that having high

amiability reduces the probability of feeling dissatisfied. Lachmann et al. (2017), however, indicate in their empirical findings that the association between personality traits and SWB are unexpectedly low compared to previous studies which indicates the importance of further research in the field of happiness economics towards consensus. Even so, our findings suggest that personality traits have a significant association with SWB.

In our second research question, we looked at whether economic shocks early in life have an associated relation with well-being later in life. Our findings suggest that economic shocks have a negative relation with subjective well-being, as shown by all of our regressions. In this question, both personality traits and access to health insurance are shown to be important factors in the aim to explain this relationship, as shown in our final model. Since this topic has not reached a general consensus in regard to previous literature, we hope that our findings can provide some additional empirical evidence. Adaptation theory has been widely discussed with mixed findings. For instance, Diener and Ryan (2009) notes that adaptation theory is not as strong as many researchers have previously believed, however, they still argue its importance in further research and its possible help in explaining smaller effects of events on happiness. The authors also note that people, in general, are happy which indicates that the baseline of happiness is rather positive than neutral.

Our third research question addressed the topic of whether there exists a correlation between having access to health insurance and an individual's perception of well-being. This is a second step to investigate possible improvements to individual SWB in the form of policy implementations. Our findings show that an individual, on average display a positive relationship between having access to health insurance and their SWB. These findings are considered to be helpful information from a policymaker's point of view to improve individual SWB in a society, both for individual well-being reasons but also for desirable economic outcome purposes (Diener and Seligman, 2004).

This thesis is the first to utilise STEP survey data and WVS data to explore the theoretical research area of happiness economics. Happiness economics in itself has been widely discussed in the sense of the definition of the interpretation of 'happiness'. As discussed throughout this thesis, the definition of well-being is subjective in these kinds of survey questionnaires. Nikolova and Graham (2021) emphasize this in the context of the SWB measure being imperfect. Research has shown that depending on which response mode is used, in which mode the participant is in or other external factors present can distort the answers to SWB questions. As discussed further in the section regarding limitations, this is somewhat mitigated due to pilot studies before launch

(Pierre et al., 2014). Therefore, steps have been taken to account for this type of problem. This, together with survey sizes of the STEP survey and the WVS, versatility in gathering of individual information such as cognitive and non-cognitive skills and social and educational background, all add to the overall importance and contributions to the field of happiness economics and LMIC.

7.2 Policy implications

In this subsection, we will discuss policy implications based on this study's findings in relation to previous empirical findings. The findings of this study highlight the negative relationship between childhood economic shocks and subjective well-being later in life. As a result, these discoveries provide a basis for potential policy interventions, such as offering economic assistance aimed at enhancing individual SWB. Moreover, in this study, we also emphasise the importance of access and need to health insurance in regard to SWB. Thus, policymakers should further investigate and deepen their understanding of this relationship to help society achieve a higher level of SWB.

First, the findings of this study suggest that childhood economic shocks are linked with lower levels of well-being. This is in line with previous findings, for instance, Lin and Okyere (2022) reference WHO in their claim that children hard-hit by economic crises experience more mental health disorders and that these shocks or crises have a long-lasting effect on children into their adulthood. Furthermore, their empirical findings show that childhood economic shocks are linked with reduced life satisfaction and that the more economic shocks individuals experience, the more unsatisfied they are when it comes to life satisfaction. Worsened economic circumstances may lead to both degenerated adulthood outcomes and lesser economic returns due to these early life shortcomings. Therefore, these findings can be helpful knowledge for policymakers and give ground to policy prospects, such as economic aid, as soon as events occur to help improve individual SWB to assist those who suffer from shocks.

Second, the findings of this study emphasise a positive relationship between access to health insurance and SWB. Empirical results indicate the importance of access to health insurance for SWB, both in developed countries and LMIC. For instance Tran, Wassmer, and Lascher (2017) describe uninsured adults in the US as being almost twice as likely to report having fair or poor health compared to individuals with insurance. The authors additionally reference a meta-analysis, concluding that objective and subjective measures of health accounted for 8–14% of the variance in SWB as well as the Earth Institute finding both excellent and good health to increase an individual's life satisfaction score significantly. Furthermore, the authors indicate

that it is rather the psychological and financial uncertainty placed upon an individual without access to health insurance that causes these lower levels of SWB. Our research suggests the need for wider access to health insurance. Therefore, we propose policymakers to further investigate this relationship to deepen their understanding and its possible aid in helping society achieve a higher level of SWB.

7.3 Limitations and further research

Some limitations need to be taken into consideration in the evaluation of this thesis. As highlighted by Brief et al. (1993) single-item survey questions have gained some criticism since the variance gained due to specific wording cannot be averaged out, and some components might be lost in the single-item survey question.

Nikolova and Graham (2021) bring up the issue regarding when in the questionnaire the life satisfaction question is asked, or how it is framed, as this has been shown to influence a respondent in their answer. This is, to some extent, mitigated in this survey provided by the World Bank since pilot studies have been made prior to the STEP survey. These studies were performed to analyse and find any possible problems with the structure of the survey and, according to Pierre et al. (2014), certain care and reframing of questions were done before the release of the full survey.

Another limitation of this study is issues claiming causality. We cannot draw any conclusive inferences regarding the causality of the relationship among all variables which is further brought up by for example Appleton and Song (2008), Brereton, Clinch, and Ferreira (2008), and MacKerron (2012). One of the main reasons for us not to claim causality is due to the cross-sectional dataset. Some studies try to control for reverse causality by controlling for fixed effects. However, fixed effects is not enough, according to Becchetti and Pelloni (2012). Nonetheless, investigating and understanding correlations are still important within happiness economics. This is because correlation studies can provide insight into the identification of possible relationships and their directions as well as insight as to why changes in one variable might affect another. Additionally, correlation studies can provide information for policymakers to identify key drivers associated with higher levels of well-being.

We can potentially argue that the economic shocks are exogenous and that they might help with identification. However, causality has been discussed in previous papers. Becchetti and Pelloni (2012) discusses exogenous changes such as tsunamis and their effects on income, winning the lottery, and similar papers which all find significant impacts of these income shocks on life satisfaction.

In this study, data is utilised from different LMIC across the globe, giving a wide range of countries. Nonetheless, since the data obtained is cross-sectional survey data, one of its main limitations is the challenge of distinguishing between responses based on temporary or long-term conditions. As highlighted by Boyce, Wood, and Powdthavee (2013), if personality traits are not as fixed as previously assumed, then one of the main drawbacks is that there is no panel data available to account for these changes in characteristics.

Further research should explore the relationship between economic shocks early in life, their implication in life on individual SWB, and whether this negative relationship can be subdued with the help of aid from institutions. If so, which investments and interventions would be the most cost-effective for institutions to implement. Additionally, some of the research investigating the topic of economic shocks in early childhood and their implications later in life remains helpful but severely limited due to data not being collected in between these periods (Almond, Currie, and Duque, 2018). Therefore, this is a highly relevant field for further research.

Moreover, the STEP survey performed by the World Bank and the WVS is continuously growing. At the time of this study, STEP data was only available for waves one and two while waves three and four have yet to be published in full. Further research can therefore explore happiness economics in broader data samples and, hopefully, also through multiple waves for each country.

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9 Appendix A

Table 9.1: Summary Statistics - All countries

Variable name	Mean	SD	Min	Max	N
Age	37.712	13.0849	18	64	24 300
Age squared	1593.4013	1056.7506	324	4096	24 300
Gender	.6102	.4877	0	1	24 300
Earnings per hour in USD	2.7182	19.6427	0	1547.7397	24 300
Employment	.6135	.487	0	1	24 300
Marital status	3.1854	2.6344	1	7	24 300
Years of education	11.3896	4.4126	0	23	24 200
BMI	24.5042	4.6076	16.5000	40.4	22 700
Chronic illness	.1849	.3999	0	1	24 300
Health insurance	.5392	.4985	0	1	24 300
Shocks	.6797	1.1552	0	11	24 200
Risk	1.7507	1.1773	1	4	24 000
Children	.3896	.674	0	7	24 300
Asset quintiles	2.9037	1.4096	1	5	24 300
Extraversion	2.817	.6168	1	4	23 100
Agreeableness	3.0513	.576	1	4	23 100
Openness	3.0401	.5714	1	4	23 100
Conscientiousness	3.1353	.534	1	4	23 100
Socioeconomic status	1.96	.65	1	3	24 137
Stability	2.6061	.636	1	4	23 100
Grit	2.8429	.6053	1	4	23 100
Decision	3.1014	.5761	1	4	23 100
Hostile	1.8487	.649	1	4	23 100
Write	.9965	.9179	0	3	24 100
Read	1.6814	1.1369	0	3	24 000
Numeracy	1.5222	.8357	0	3	24 300
Computer	1.2894	1.3665	0	3	24 300
Autonomy index	-.0918	.4413	-0.6727	.8995	22 900
Equality index	5.554	.5454	4.6936	6.6171	22 900

Table 9.2: Summary Statistics - Armenia

Variable name	Mean	SD	Min	Max	N
Age	39.92	13.47	18.00	64	2 607
Age squared	1775.24	1109.22	324.00	4096	2 607
Gender	.73	.44	0.00	1	2 607
Earnings per hour in USD	2.83	45.56	0.00	1547.74	2 607
Employment	.36	.48	0.00	1	2 607
Marital status	2.92	2.63	1.00	7	2 607
Years of education	13.15	3.06	0.00	21	2 568
BMI	24.97	4.72	16.50	40.4	2 568
Chronic illness	.18	.39	0.00	1	2 607
Health insurance	.13	.33	0.00	1	2 607
Shocks	.35	.75	0.00	9	2 607
Risk	1.59	1.06	1.00	4	2 604
Children	.35	.64	0.00	4	2 607
Asset quintiles	2.98	1.38	1.00	5	2 607
Extraversion	3.03	.59	1.00	4	2 607
Agreeableness	3.24	.53	1.33	4	2 607
Openness	3.25	.48	1.33	4	2 607
Conscientiousness	3.25	.5	1.33	4	2 607
Socioeconomic status	2.32	.62	1	3	2 605
Stability	2.31	.63	1.00	4	2 607
Grit	3.14	.57	1.33	4	2 607
Decision	3.21	.53	1.00	4	2 607
Hostile	1.67	.64	1.00	4	2 607
Write	1.01	1	0.00	3	2 592
Read	1.69	1.21	0.00	3	2 572
Numeracy	1.41	.75	0.00	3	2 604
Computer	1.78	1.35	0.00	3	2 607
Autonomy index	-.07	0	-0.07	-.07	2 607
Equality index	5.17	0	5.17	5.17	2 607

Table 9.3: Summary Statistics - Bolivia

Variable name	Mean	SD	Min	Max	N
Age	34.55	12.3	18.00	64	2 105
Age squared	1344.98	952.13	324.00	4096	2 105
Gender	.58	.49	0.00	1	2 105
Earnings per hour in USD	4.37	17.69	0.00	696.53	2 105
Employment	.79	.41	0.00	1	2 105
Marital status	3.89	2.64	1.00	7	2 105
Years of education	11.73	4.27	0.00	23	2 105
BMI	25.63	5.08	16.50	40.4	2 037
Chronic illness	.21	.4	0.00	1	2 105
Health insurance	.35	.48	0.00	1	2 105
Shocks	1.4	1.65	0.00	10	2 105
Risk	1.99	1.24	1.00	4	2 102
Children	.5	.76	0.00	7	2 105
Asset quintiles	3.02	1.45	1.00	5	2 105
Extraversion	3	.7	1.00	4	2 105
Agreeableness	3.07	.63	1.00	4	2 104
Openness	3.2	.56	1.00	4	2 105
Conscientiousness	3.16	.51	1.33	4	2 105
Socioeconomic status	1.80	.61	1	3	2 105
Stability	2.43	.7	1.00	4	2 105
Grit	2.97	.63	1.00	4	2 105
Decision	3.05	.62	1.00	4	2 105
Hostile	1.93	.69	1.00	4	2 105
Write	1.44	.96	0.00	3	2 102
Read	2.16	1.02	0.00	3	2 103
Numeracy	1.96	.83	0.00	3	2 105
Computer	1.41	1.33	0.00	3	2 105
Autonomy index	-.48	0	-0.48	-.48	2 105
Equality index	6.03	0	6.03	6.03	2 105

Table 9.4: Summary Statistics - Colombia

Variable name	Mean	SD	Min	Max	N
Age	37.6	13.1	18.00	64	2 369
Age squared	1585.71	1044.74	324.00	4096	2 369
Gender	.58	.49	0.00	1	2 369
Earnings per hour in USD	3.65	9.68	0.00	191.32	2 369
Employment	.7	.46	0.00	1	2 369
Marital status	4.28	2.35	1.00	7	2 369
Years of education	10.1	3.88	0.00	20	2 369
BMI	24.53	3.95	16.50	40.4	2 293
Chronic illness	.19	.39	0.00	1	2 369
Health insurance	1	0	1.00	1	2 369
Shocks	.9	1.21	0.00	9	2 369
Risk	1.57	1.04	1.00	4	2 369
Children	.34	.62	0.00	6	2 369
Asset quintiles	2.86	1.4	1.00	5	2 369
Extraversion	3	.67	1.00	4	2 369
Agreeableness	3.21	.57	1.33	4	2 369
Openness	3.2	.53	1.00	4	2 369
Conscientiousness	3.33	.49	1.67	4	2 369
Socioeconomic status	1.78	.65	1	3	2 369
Stability	2.51	.73	1.00	4	2 369
Grit	3	.59	1.00	4	2 369
Decision	3.12	.59	1.00	4	2 369
Hostile	1.74	.62	1.00	4	2 369
Write	1.14	.84	0.00	3	2 369
Read	1.83	1.02	0.00	3	2 369
Numeracy	1.68	.83	0.00	3	2 369
Computer	1.27	1.36	0.00	3	2 369
Autonomy index	-.58	0	-0.58	-.58	2 369
Equality index	6.62	0	6.62	6.62	2 369

Table 9.5: Summary Statistics - Georgia

Variable name	Mean	SD	Min	Max	N
Age	40.57	13.35	18.00	64	2 802
Age squared	1824.17	1103.73	324.00	4096	2 802
Gender	.68	.47	0.00	1	2 802
Earnings per hour in USD	1.42	5.47	0.00	179.5	2 802
Employment	.34	.47	0.00	1	2 800
Marital status	2.98	2.62	1.00	7	2 802
Years of education	14.67	2.91	0.00	21	2 800
BMI	25.86	5.23	16.50	40.4	2 793
Chronic illness	.2	.4	-3.00	1	2 802
Health insurance	.65	.48	0.00	1	2 802
Shocks	.29	.65	0.00	6	2 802
Risk	1.66	1.14	1.00	4	2 782
Children	.35	.64	0.00	6	2 802
Asset quintiles	2.69	1.39	1.00	5	2 802
Extraversion	2.55	.53	1.00	4	2 789
Agreeableness	3.16	.53	1.00	4	2 785
Openness	3.01	.52	1.00	4	2 787
Conscientiousness	3.15	.55	1.00	4	2 789
Socioeconomic status	2.30	.61	1	3	2 799
Stability	2.56	.7	1.00	4	2 788
Grit	2.8	.61	1.00	4	2 788
Decision	3.35	.48	1.00	4	2 783
Hostile	1.79	.69	1.00	4	2 780
Write	.52	.82	0.00	3	2 743
Read	1.73	1.24	0.00	3	2 699
Numeracy	1.6	.86	0.00	3	2 801
Computer	1.77	1.35	0.00	3	2 802
Autonomy index	.04	0	0.04	.04	2 802
Equality index	5.42	0	5.42	5.42	2 802

Table 9.6: Summary Statistics - Ghana

Variable name	Mean	SD	Min	Max	N
Age	32.77	11.37	18.00	64	1 989
Age squared	1203.29	874.63	324.00	4096	1 989
Gender	.52	.5	0.00	1	1 989
Earnings per hour in USD	2.58	9.26	0.00	196.73	1 989
Employment	.75	.44	0.00	1	1 989
Marital status	4.01	2.83	1.00	7	1 989
Years of education	10.64	4.22	0.00	22	1 989
BMI	24.87	5.03	16.50	40.4	1 257
Chronic illness	.08	.27	0.00	1	1 989
Health insurance	1	0	1.00	1	1 989
Shocks	.73	1.04	0.00	8	1 989
Risk	1.68	1.1	1.00	4	1 989
Children	.52	.79	0.00	5	1 989
Asset quintiles	3.27	1.33	1.00	5	1 989
Extraversion	2.54	.61	1.00	4	1 610
Agreeableness	3.05	.65	1.00	4	1 597
Openness	3.08	.59	1.00	4	1 602
Conscientiousness	3.23	.58	1.00	4	1 603
Socioeconomic status	2.04	.65	1	3	1 982
Stability	2.72	.56	1.00	4	1 592
Grit	2.81	.59	1.00	4	1 598
Decision	3.05	.63	1.00	4	1 594
Hostile	2.22	.75	1.00	4	1 587
Write	1.08	.81	0.00	3	1 979
Read	1.49	1.03	0.00	3	1 973
Numeracy	1.76	.71	0.00	3	1 989
Computer	.74	1.17	0.00	3	1 989
Autonomy index	-.67	0	-0.67	-.67	1 989
Equality index	4.69	0	4.69	4.69	1 989

Table 9.7: Summary Statistics - Kenya

Variable name	Mean	SD	Min	Max	N
Age	30.1	9.72	18.00	64	3 724
Age squared	1000.64	717.69	324.00	4096	3 724
Gender	.52	.5	0.00	1	3 724
Earnings per hour in USD	2.26	8.28	0.00	260.57	3 724
Employment	.65	.48	0.00	1	3 720
Marital status	3.63	2.86	1.00	7	3 724
Years of education	9.39	4.74	0.00	22	3 698
BMI	24.4	4.06	16.50	40.4	3 540
Chronic illness	.05	.22	0.00	1	3 724
Health insurance	.23	.42	0.00	1	3 724
Shocks	1.14	1.47	0.00	11	3 716
Risk	1.68	1.14	1.00	4	3 716
Children	.52	.73	0.00	4	3 724
Asset quintiles	2.95	1.41	1.00	5	3 724
Extraversion	2.86	.59	1.00	4	3 677
Agreeableness	2.86	.57	1.00	4	3 675
Openness	3	.56	1.00	4	3 676
Conscientiousness	3.22	.52	1.33	4	3 676
Socioeconomic status	1.85	.58	1	3	3 696
Stability	2.69	.5	1.00	4	3 675
Grit	2.72	.6	1.00	4	3 675
Decision	3.12	.53	1.25	4	3 674
Hostile	1.96	.64	1.00	4	3 675
Write	1.1	.97	0.00	3	3 709
Read	1.71	1.2	0.00	3	3 702
Numeracy	1.33	.8	0.00	3	3 716
Computer	.85	1.2	0.00	3	3 712
Autonomy index	-.38	0	-0.38	-.38	3 724
Equality	5.93	0	5.93	5.93	3 724

Table 9.8: Summary Statistics - Vietnam

Variable name	Mean	SD	Min	Max	N
Age	39.73	12.77	18.00	64	3 122
Age squared	1741.17	1036.12	324.00	4096	3 122
Gender	.6	.49	0.00	1	3 122
Earnings per hour in USD	3.91	27.83	0.00	1367.86	3 122
Employment	.74	.44	0.00	1	3 122
Marital status	2.71	2.61	1.00	7	3 122
Years of education	11.18	3.96	0.00	20	3 122
BMI	21.72	2.94	16.50	40.4	3 121
Chronic illness	.23	.42	0.00	1	3 122
Health insurance	.61	.49	0.00	1	3 122
Shocks	.53	.96	0.00	8	3 122
Risk	1.99	1.31	1.00	4	3 122
Children	.4	.66	0.00	4	3 122
Asset quintiles	2.92	1.41	1.00	5	3 122
Extraversion	2.75	.51	1.00	4	3 121
Agreeableness	3.02	.51	1.33	4	3 121
Openness	2.82	.6	1.00	4	3 121
Conscientiousness	2.79	.48	1.00	4	3 121
Socioeconomic status	1.77	.57	1	3	3 120
Stability	2.85	.55	1.00	4	3 121
Grit	2.74	.52	1.00	4	3 121
Decision	2.92	.59	1.00	4	3 121
Hostile	1.77	.51	1.00	4	3 121
Write	1.05	.84	0.00	3	3 121
Read	1.73	1.03	0.00	3	3 119
Numeracy	1.45	.81	0.00	3	3 122
Computer	1.34	1.4	0.00	3	3 122
Autonomy index	.27	0	0.27	.27	3 122
Equality index	4.96	0	4.96	4.96	3 122

Table 9.9: Summary Statistics - Ukraine

Variable name	Mean	SD	Min	Max	N
Age	42.75	13.9	18.00	64	2 273
Age squared	2020.75	1177.79	324.00	4096	2 273
Gender	.67	.47	0.00	1	2 273
Earnings per hour in USD	1.71	3.15	0.00	63	2 273
Employment	.57	.5	0.00	1	2 270
Marital status	2.47	1.95	1.00	6	2 273
Years of education	13.05	2.15	0.00	22	2 272
BMI	26.08	4.98	16.50	40.4	2 201
Chronic illness	.42	.56	0.00	7	2 273
Health insurance	.12	.32	0.00	1	2 273
Shocks	.29	.65	0.00	5	2 245
Risk	1.68	1.16	1.00	4	2 130
Children	.23	.51	0.00	3	2 273
Asset quintiles	2.8	1.39	1.00	5	2 273
Extraversion	2.68	.61	1.00	4	2 273
Agreeableness	2.92	.58	1.00	4	2 272
Openness	3.08	.54	1.00	4	2 272
Conscientiousness	3.02	.5	1.00	4	2 272
Socioeconomic status	1.98	.60	1	3	2 210
Stability	2.54	.65	1.00	4	2 271
Grit	2.76	.62	1.00	4	2 272
Decision	3.12	.55	1.00	4	2 272
Hostile	1.79	.64	1.00	4	2 270
Write	1	.84	0.00	3	2 235
Read	1.58	1.03	0.00	3	2 207
Numeracy	1.51	.87	0.00	3	2 266
Computer	1.44	1.36	0.00	3	2 271
Autonomy index	.23	0	0.23	.23	2 273
Equality index	5.71	0	5.71	5.71	2 273

Table 9.10: Summary Statistics - Yunnan Province in China

Variable name	Mean	SD	Min	Max	N
Age	41.85	11	18.00	64	1 946
Age squared	1872.61	930.56	324.00	4096	1 946
Gender	.54	.5	0.00	1	1 946
Earnings per hour in USD	2.55	6.68	0.00	177.95	1 946
Employment	.65	.48	0.00	1	1 941
Marital status	1.88	1.98	1.00	7	1 946
Years of education	11.98	3.58	0.00	20	1 946
BMI	22.78	3.13	16.50	36.2	1 945
Chronic illness	.14	.35	0.00	1	1 946
Health insurance	.95	.21	0.00	1	1 946
Shocks	.37	.82	0.00	8	1 945
Risk	2.08	1.3	1.00	4	1 935
Children	.13	.34	0.00	2	1 946
Asset quintiles	2.93	1.44	1.00	5	1 946
Extraversion	2.95	.5	1.33	4	1 941
Agreeableness	2.97	.49	1.00	4	1 941
Openness	2.81	.55	1.00	4	1 941
Conscientiousness	3.12	.47	1.67	4	1 941
Socioeconomic status	1.79	.61	1	3	1 945
Stability	2.82	.43	1.00	4	1 941
Grit	2.65	.51	1.00	4	1 941
Decision	2.93	.57	1.00	4	1 940
Hostile	1.92	.56	1.00	4	1 941
Write	1.01	.86	0.00	3	1 927
Read	1.76	1.06	0.00	3	1 910
Numeracy	1.28	.87	0.00	3	1 946
Computer	1.56	1.38	0.00	3	1 946
Autonomy index	.9	0	0.90	.9	1 946
Equality index	5.36	0	5.36	5.36	1 946

Table 9.11: Personality traits - Definitions

Variable name	Definition
Extraversion*	"Are you talkative?"
	"Do you like to keep your opinions to yourself?"
	"Are you outgoing and sociable, for example, do you make friends very easily?"
Conscientiousness*	"When doing a task, are you very careful?"
	"Do you prefer relaxation more than hard work?"
	"Do you work very well and quickly? "
Openness*	"Do you come up with ideas other people haven't thought of before?"
	"Are you very interested in learning new things?"
	"Do you enjoy beautiful things, like nature, art and music?"
Stability*	"Are you relaxed during stressful situations?"
	"Do you tend to worry?"
	"Do you get nervous easily?"
Agreeableness*	"Do you forgive other people easily?"
	"Are you very polite to other people?"
	"Are you generous to other people with your time or money?"
Grit*	"Do you finish whatever you begin?"
	"Do you work very hard? For example, do you keep working when others stop to take a break?"
	"Do you enjoy working on things that take a very long time (at least several months) to complete?"
Hostile Attribution Bias*	"Do people take advantage of you?"
	"Are people mean/not nice to you?"
Decision-making*	"Do you think about how the things you do will affect you in the future?"
	"Do you think carefully before you make an important decision?"
	"Do you ask for help when you don't understand something?"
	"Do you think about how the things you will do will affect others?"

*The average of questions

Table 9.12: Summary Statistics - Personality traits

	Mean	SD	Min	Max	N
Extraversion	2.817	.6168	1	4	23 100
Agreeableness	3.0513	.576	1	4	23 100
Openness	3.0401	.5714	1	4	23 100
Conscientiousness	3.1353	.534	1	4	23 100
Stability	2.6061	.636	1	4	23 100
Grit	2.8429	.6053	1	4	23 100
Decision	3.1014	.5761	1	4	23 100
Hostile	1.8487	.649	1	4	23 100

Table 9.13: Average life satisfaction on number of shocks

Number of shocks	Mean	SD	N
0	6.1066	2.3555	15 300
1	5.7871	2.4434	4 659
2	5.7676	2.4924	2 448
3	5.7203	2.4732	969
4	5.554	2.4857	435
5	5.6887	2.474	212
6	5.0825	2.7412	97
7	5.7556	2.8055	45
8	4.7143	3.1803	21
9	6.4444	3.3582	9
10	10	.	1
11	5	.	1

10 Appendix B

Table 10.1: Variable selection- double-lasso

VARIABLES	RQ1	RQ2	RQ3
Continent	x	x	x
Age	x	x	x
Age squared	x	x	x
Gender	x	x	
Marital status	x	x	x
Agreeableness	o	x	x
Stability	o	x	x
Conscientiousness	o	x	x
Hostile	o	x	x
Extraversion	o	x	x
Grit	o	x	x
Openness	o	x	
Risk	x	x	x
Autonomy index	x	x	x
Equality index	x		x
Bank account	x	x	x
Certificate			x
Additional certificate	x		x
Training courses	x		x
Number of children under 6 years old		x	
BMI	x		x
Chronic illness	x	x	x
Health insurance	x	x	o
Shocks	x	o	x
Computer	x	x	x
Numeracy	x		x
Write	x	x	x
Read	x	x	x
Years of education	x	x	x
Employment	x	x	x
Maximum of parents' education	x	x	
Lived with mother and father at age 12		x	
Mother tongue	x	x	x
Unable to carry out usual activities	x		x
Younger brothers at age 12	x	x	x
Younger sisters at age 12		x	
Old sisters		x	
Pensions	x	x	
Socioeconomic status	x	x	x
Asset quintiles	x	x	x
Social assistance	x	x	x

Table 10.2: Robustness for sub-question 1.1

SWB	Model 1 Ordered probit
Extraversion	0.0182
	(0.0194)
Agreeableness	0.125***
	(0.0209)
Openness	0.0175
	(0.0231)
Conscientiousness	-0.0421*
	(0.0229)
Stability	0.157***
	(0.0190)
Grit	0.0946***
	(0.0207)
Decision	-0.0779***
	(0.0219)
Hostile	-0.0782***
	(0.0185)
Gender	0.376**
	(0.161)
Autonomy index	0.672***
	(0.0357)
Equality index	-0.292***
	(0.0280)
Gender * Extraversion	0.0166
	(0.0255)
Gender * Agreeableness	-0.0132
	(0.0279)
Gender * Openness	-0.0246
	(0.0299)
Gender * Conscientiousness	-0.0862***
	(0.0299)
Gender * Stability	-0.0121
	(0.0247)
Gender * Grit	-0.0475*
	(0.0272)
Gender * Decision	0.0841***
	(0.0289)
Gender * Hostile	-0.0306
	(0.0243)
Covariates	Yes
Observations	20,743

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10.3: Foward selection

SWB	(1)
Asia	-0.138**
	(0.0554)
South America	2.941***
	(0.101)
Africa	-0.107
	(0.0753)
Computer	0.132***
	(0.0142)
Autonomy index	1.103***
	(0.0745)
Health insurance	0.444***
	(0.0329)
Socioeconomic status	0.375***
	(0.0253)
Asset quintiles	0.153***
	(0.0116)
Stability	0.263***
	(0.0251)
Equality index	-0.544***
	(0.0575)
Age	-0.121***
	(0.00865)
Marital status	-0.0900***
	(0.00646)
Age squared	0.00131***
	(0.000107)
Employment	0.290***
	(0.0333)
Agreeableness	0.205***
	(0.0284)
Chronic illness	-0.311***
	(0.0410)
Hostile	-0.187***
	(0.0248)
Bank account	-0.216***
	(0.0317)
Shocks	-0.0936***
	(0.0141)
Social assistance	0.493***
	(0.0849)
Conscientiousness	-0.198***
	(0.0309)
Grit	0.157***
	(0.0271)
Gender	0.151***
	(0.0305)
Risk	0.0489***
	(0.0122)
Additional certificate	0.199***
	(0.0508)
Read	0.0370**
	(0.0164)
Extraversion	0.0777***
	(0.0261)
Unable to carry out activities	-0.000528**
	(0.000258)
Decision	-0.0524*
	(0.0285)
Training courses	0.0722*
	(0.0435)
Young sisters	0.0234*
	(0.0135)
Write	0.0333*
	(0.0192)
Constant	7.417***
	(0.426)
Observations	19,839
R-squared	0.268

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1