LUND UNIVERSITY
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Master in Economic Demography

Multidimensionality of Socioeconomic Status and its Effect on Health Outcomes in Contemporary Estonia

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Abstract: Socioeconomic status (SES) and its effect on health outcomes for an individual is generally well researched, but the different mechanisms of different socioeconomic factors are yet still not fully understood. Using cross-sectional survey data for 50+ people in Estonia this thesis aims to analyse the multidimensional nature of different SES variables to see if the SES variables have an independent effect on health outcomes. In addition, this thesis examines whether SES variables have a weaker association with health outcomes in older age. To answer the questions, probit regressions are conducted. The results show a clear and significant association between SES variables and their outcome on self-rated health and two-year mortality where the effect is more pronounced and significant for self-rated health than two-year mortality. To some extend an independent effect for all SES variables studied in this thesis is found. Especially education is a persistent indicator where lower education leads to worse health outcomes also in older age. Furthermore, in the specific case of Estonia, income is a significant predictor of health outcomes. Additionally, my findings are consisted with the age-as-leveler hypotheses that states that in older ages SES variables have a less profound effect on health outcomes. The results obtained in this thesis show only associations and are not to be interpreted as causal. For future research, this thesis encourages scholars to study the multidimensionality of SES variables on health outcomes on different causes of death.

Key words: education, income, occupation, ethnicity, health, mortality, health behaviours

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1 Introduction

The impact of one's socioeconomic status on health outcomes is a widely discussed topic that dates back till the 19th century. The importance in understanding the different socioeconomic status dimensions is more actual than ever because researchers are now starting to understand that there are independent effects at play for different SES variables on health outcomes (Cutler, Lleras-Muney & Vogl, 2008). It is very important to understand the fundamental causes of different socioeconomic factors on health outcomes in order to properly address inequalities in health that remains strong in developed countries.

In this thesis, the aim is to analyse the multidimensional nature of SES and their effect on health outcomes, namely mortality and self-reported health, in a developed country. Estonia is the country studied and the approach in which the analysis is carried out is cross-sectional. Furthermore, this thesis is the first to analyse retired and not retired older people separately in Estonia to see whether socioeconomic status has a diminishing effect on older people as found by previous scholars (see for example Cutler, Lleras-Muney & Vogl, 2008; Robert et al., 2009).

This thesis uses data from 2011 based on the 50+ year old adult population of the *Survey of Health, Ageing and Retirement* in Europe (SHARE)[1] conducted in several European countries including Estonia.

Estonia is especially interesting to observe. First, the people analysed in this thesis have lived under two different political systems. Before 1991, by being part of the Soviet Union, and after a transition phase as part of the EU as a modern democracy. Furthermore, the previous research conducted on SES in Estonia mostly uses data from the time between 1991 – 2006 where Estonia was in a state of transition from being a former part of the Soviet Union to a developed country with high growth rate (see for example Leinsalu, 2002; Pärna & Ringmets, 2010; Reile & Leinsalu, 2017). In 2011, the economic landscape was significantly different, as Estonia recovered from a deep recession caused by the financial crisis (Purju, 2013). Among others, this thesis contributes to the literature by examining Estonia after the financial crisis to see whether the SES variables prevail compared to the years before the crisis.

Additionally, previous studies for Estonia usually focus on one specific SES variable like education or include more SES variables as controls whereas this thesis focuses on the independent effect of different SES variables on predicting mortality and self-rated health.

In recent history, new literature emerged that not only focuses on a fixed point in time but is rather interested in the development of SES factors over time (see for example Bengtsson and Dribe, 2011). This is especially of interest because scholars find that socioeconomic inequality in health outcomes persist over time, even though the average life expectancy increases (Bengtsson & van Poppel, 2011). Since this thesis is by construction cross-sectional organized, a comparison over time with the models presented in this thesis is not possible. However, the findings will be compared to older studies on SES

[1] This paper uses data from Share Waves 4 and 5 10.6103/SHARE.w4.610, 10.6103/SHARE.w5.610, see Börsch-Supan et al. (2013) for methodological details. In addition, see SHARE acknowledgement(s) in Appendix A

in Estonia. Furthermore, the newly emerged literature on early life conditions, in relation to socioeconomic status as a child, and their effect on health outcomes in adult age is not studied in this thesis. Last, the results obtained in this thesis have no causal interpretation and show associations between SES variables and health outcomes.

1.1 Research Question

This thesis aims to answer the following question: Does socioeconomic status influence the health outcomes in 50+ aged people in Estonia? If so, do the different SES variables have an independent effect on health outcomes and how is this independent effect deviating for two different adult age groups?

1.2 Outline of the Thesis

The next parts are structured as follows. In section 2 previous research on SES and health outcomes are presented and the theoretical framework for this thesis is developed. Furthermore, a context section about Estonia is provided. In section 3 the data used will be presented and in section 4 the method and econometric models are explained. In section 5 the results are presented and section 6 concludes. A final discussion is presented in section 7.

2 Theory and Previous Research

There is a general understanding in the previous literature that SES factors play a crucial role in predicting someone's health. Therefore, the literature is vast, and the general interplay is mightily researched yet still not fully understood. Research is conducted by multiple scholars from fields such as economists, demographer, epidemiologists, and sociologists to name a few.

This section summarizes the most relevant previous literature on socioeconomic status and its effect on health outcomes. The part Theory and Previous Research covers the literature of SES on different health variables, with a particular focus on self-rated health and on mortality. The reason to analyse health and death simultaneously is due to their strong relation to each other where mortality can be seen as the most objective measurement of health (either you are alive, or you are dead).

Compared to other research areas the relation between SES and health outcomes has a long history of research and goes back till the 19th century. The work before the second world war was usually of explanatory nature and concerned mostly death rates for different groups of age gender or socioeconomic status (see for example Stocks (1938) or Whitney (1934)). Since this thesis is focusing on contemporary Estonia I will not go into further detail of the early research on health and SES variables before the second world war.

2.1 Poverty Threshold Model

After the second world war, as described by Adler and Ostrove (1999), a first theoretical model for the relation between socioeconomic status and health outcomes was established that focused on the

poorest people in a society. The idea behind the model is very simple. It states that, as long as you are below the poverty line the impact on your health will increase when you come closer to the poverty threshold. But as soon as you are above the threshold, your health status will not be significantly affected by the poverty indicator (for a review of the poverty threshold model see Alan, 1996).

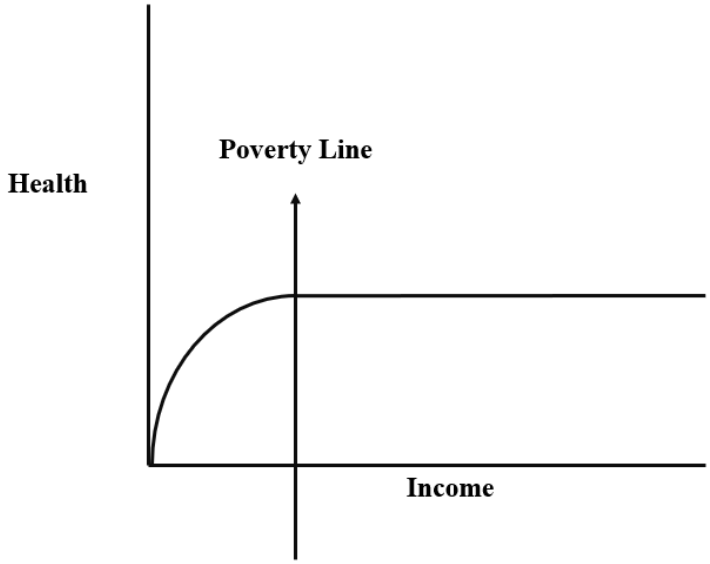

Figure 1 Threshold model of poverty Adler & Ostrove (1999)

At the same time to this emerge of poverty research, the research in general became more and more empirical. Furthermore, researchers started to study and analyse the determinants of health and disease conditions. As a result of this development the epidemiology research became more and more popular.

Although, Adler and Ostrove (1999) find that scholars used SES variables as controls because they have been aware of their strong effect on the variables of interest when not included, SES factors did not play a prominent role in this rise of empirical and epidemiological research as variables of interest until the mid-eighties. This started to change in the late eighties and scholars started to shift their attention towards socioeconomic status variables to describe their effect on health outcomes.

2.2 Social Health Gradient

During that time the poverty threshold theory was challenged by various scholars. There are several studies that show that in developed countries a socioeconomic status variable follows rather a gradient relationship with health than a logarithmic function (Adler et al., 1994; Link & Phelan, 1995; Marmot et al., 1978, 1991; Marmot, Shipley & Rose, 1984).

Out of these studies, the two “Whitehall studies” are the most important to mention where British civil servants where examined and questioned 20 years apart. The first Whitehall study was conducted in the late 60ties and the second in late 80ties. In the first Whitehall study the findings where striking because the people observed where not the poor people in a society but rather office workers. The findings show, even among these office workers, there still exists an inverse relationship between

socioeconomic status measured by employment grade and bad health outcomes. Furthermore, another influential finding was that the health gradient was hardly explained by the access to medical care (Marmot et al., 1978).

Where Whitehall I found strong connections for a gradient health relationship, Whitehall II seeked to find explanations for these findings. One major finding is that there exists a prevalence of SES variables on health outcomes over time. In addition, the second Whitehall study finds evidence that health-risk behaviour is linked to different social economic status. Furthermore they argue monotonous work, low job control, and work related stress caused by the job play an important role in explaining the social health gradient (Marmot et al., 1991). The findings are in line with the fundamental cause concept presented in the next section.

2.3 SES as Fundamental Cause Concept in a Dynamic System

During the nineties, scholars have started to pay increased attention on research between health and SES in order to find the reason for the prevalence of social class differences in health in a modern welfare state. Link and Phelan (1995) where among the first that promoted a new theoretical model that proposed that social factors are not merely proxies for true causes of a disease but can rather be the fundamental cause itself.

The main argument is that in developed countries, where a social welfare state is established, access to health care is accessible for everyone and infectious disease are no major issue anymore. Therefore, the persistence of health inequality must lay within the socioeconomic factors itself (Link & Phelan, 1995).

The fundamental idea is that the world itself is a dynamic system where nothing is stable and new diseases and treatments will eventually emerge and shift over time. Those that are most able to adapt to this changing environment by either taking advantage of new medicine or prevention against new diseases will more likely be healthier and as a result, hence have a higher life expectancy. Especially people with more socio-economic resources are thought to be able to adapt to changes in the environment due to their enhanced ability like knowledge, economic power or social connectedness. An important implication is that when addressing the fundamental cause not only one disease can be prevented but rather the impact can be of greater magnitude (Link & Phelan, 1995). For example, if a policy maker increases schooling level for a population, the population itself becomes more aware of diseases and reacts in general better with more awareness compared to a less educated population.

2.4 Life Course Theories

At the same time when the SES as fundamental cause theory emerged, scholars started to examine how socioeconomic status impacts health outcomes over different phases in life. In general, there are two theories that try to explain the changing impact of SES variables on one's life course. On the one hand, the cumulative advantage/disadvantage hypothesis. This hypothesis states that inequalities in SES

will accumulate over a life course and therefore increases health inequalities based on SES variables when becoming older (Ross & Wu, 1996).

On the other hand, the age-as-leveler hypothesis assumes that the SES variables have a less pronounced impact on health outcomes at oldest ages. House et al. (2013) argue that social and biological factors affect health outcomes differently and depending on the life phase, the social or biological factors are stronger or weaker. Therefore, in early life course, the impact of SES variables will overweight and accumulate, meaning the impact of SES variables will increase with age. This trend will be reversed at the point where biological infirmity outweighs or levels in the SES variables. As a result, SES variables have a weaker association in predicting health outcomes for oldest ages.

There are more reasons why in older age the SES variables might not predict health outcomes as pronounces as in younger ages. First House, Lantz, and Herd (2005) argue that the age-as-leveler hypothesis can be explained to some degrees by the fact that with older age, social, economic, and health policies are improved and act as a buffer for lower socioeconomic status. For example in Estonia during the financial crisis labour earrings were reduced while pensions did not change (Võrk et al., 2014).

Lastly, previous research has shown when studying and focusing in research on old or even oldest old individuals there is a selection process at work where socially disadvantaged individuals die earlier than the more advantaged individuals. This will eventually lead to less diverse cohorts in older age because of selective mortality and as a result the SES variables have a less pronounced effect on ones' health (Zajacova & Burgard, 2013).

Furthermore, newer research focuses on childhood conditions and its influence on adult health outcomes. the general conclusion so far is that childhood SES and conditions will persist during one's lifetime and act as strong predictors for health outcomes in later age (for further information on childhood conditions see for example Case, Lubotsky & Paxson, 2002; Cutler, Lleras-Muney & Vogl, 2008; Laaksonen et al., 2005; Preston, Hill & Drevenstedt, 1998).

2.5 Multidimensional Nature of SES

Nowadays, the predominant view of most scholars is that there is not a fundamental cause of socioeconomic status, rather different SES variables are affecting health outcomes through different channels. In addition, the different SES variables have similar but also different implications on the health outcomes of individuals and have to be studied individually, but simultaneously included in the same framework (Geyer et al., 2006; Torssander & Erikson, 2010).

As a generalisation in this thesis four different indicators of socioeconomic status are identified and addressed in the following sections and will later be analysed in this thesis: education, financial resources, social class and ethnicity. Next sections will discuss the four SES variables and their different mechanism on health outcomes is assessed.

2.5.1 Education

For many scholars, education is a favourable indicator of socioeconomic status since it is obtained in young adulthood and is usually widely accessible. Furthermore, compared to other SES variables education suffers less from reverse causation in adults and especially in the older population (Elo & Preston, 1996).

Of course there will be an interplay between these factors such as a better education will enable one to have a better occupation and occupation plays the role as an intermediate between education and good health (Galobardes et al., 2006; Martikainen, Blomgren & Valkonen, 2007).

The underlying cause of this effect is still studied and not fully displayed. One recent explanation is that better-educated people have better cognitive abilities that enables them to process information in a superior way. They can evaluate the situation better and choose the best option for them, for example not smoking since smoking is bad for someone's health (Cutler & Lleras-Muney, 2010). Furthermore, better-educated people tend to have a healthier social network which can in return help to boost one's health (Holt-Lunstad, Smith & Layton, 2010).

Elo and Preston (1996) find that education still predicts mortality in the US population, but the effect becomes weaker in old age. Scholars also find a clear positive association between higher education and self-rated health (Zavras et al., 2013).

Lastly, the reverse causation cannot be excluded because child health influences one's ability to reach higher education (Almond & Chay, 2006). To account for this problem scholars used instrumental variables to create a quasi-experimental set-up. A popular method to create a quasi-experimental setup is by using the increase of compulsory schooling laws. Lleras-Muney (2005) uses this instrumental variable model to estimate the effect of longer schooling for children in the US on mortality. Her result suggests a causal link between mortality and the time one spends in school. One major flaw with this model is that only the causal effect of those affected by the law is measured.

Research for Estonia follow previous research where an increase in one's education is associated with lower mortality risk (Leinsalu, 2004; Mackenbach et al., 2015). Furthermore, education seems to have a persistent positive effect on the self-rated health in Estonia where similar findings were obtained for data from 1996 and 2006 that higher education leads to better self-rated health (Leinsalu, 2002; Reile & Leinsalu, 2013).

2.5.2 Financial Resources

Unlike education, with financial resources it is harder to identify what causes what. There is clearly a correlational relationship at play but if it is health that influences the ability to have more financial resources or the other way around is hardly understood. Moreover, in a developed country like Estonia where healthcare is publicly funded, the financial resources should not play a crucial role in getting medical treatment. As Elo (2009) argues, financial resources reflect and are related to one's occupation and education.

Due to the strong connection between education and occupation, it is not surprising that the literature finds mixed results if income has a significant relationship for health outcomes when controlling for other SES variables.

On one side, Scholars do not find a significant relationship between financial resources and health when controlling for other SES variables. For example, Smith (2007) does not find a relationship between one's financial resources and health when controlling for education. Furthermore, Deaton and Lubotsky (2003) find that when controlling for race in the US the association between financial resources and mortality disappears. These findings suggest that, for adults in a developed country, financial resources do not seem to matter in predicting one's health outcomes when controlling for other SES factors that are the underlying cause of the relationship between income and health outcomes.

On the other hand, previous literature finds an effect of income even thought it was controlled for other SES variables. As expected the effects become undoubtedly weaker when controlling for other SES variables but still have a predictive power (Elo & Preston, 1996).

Previous findings for Estonia after it became independent in 1991 suggest a link between income and health outcomes. In the mid 00ers, income has been found to be a significant predictor of self-rated health among women in Estonia even after controlling for education and employment status (Kull, 2006). More recently Reile and Leinsalu (2017) find that the income in the year 1996 was a strong predictor of mortality in a 17-year follow-up study where the baseline interview from 1996 was linked with mortality data. They also controlled for other SES variables and yet still income was significant.

2.5.3 Social Class in Society

Probably one of the most debated topics in recent studies is whether a general health link between one's social class in a society and its effect on the individual's health exists. The definition of social class is harder to determine compared to education or financial resources and is rather an ambiguous term that can be constructed narrowly or spaciously. In addition, social class will also suffer from a similar problem as financial resources that it will be strongly influenced by other SES factors such as education, family background and so on. But still, as Torssander and Erikson (2010) show, a measure of social class is still favoured to include when controlling for health outcomes since there might be independent effects at play.

The most common indicator in previous research is occupational rank where a strong link between one's occupation and general health has been drawn. In England Marmot et al. (1999) find that the higher one's rank the lower one's morality is. The idea behind this is that a higher status position reduces stress and therefore reduces health problems (Marmot, 2004). This theory is inspired by the animal world where the lower ranked individuals are always exposed to immediate danger which eventually increases the risk of negative health reaction (McEwen, 1998; Sapolsky, 1993).

For Estonia, Reile and Leinsalu (2017) find week association between occupation and mortality for the interview year 1996 where they only find a relation between mortality and occupation for non-ethnic Estonian women.

2.5.4 Ethnicity

Ethnicity has been proven to have strong predictive power for health outcomes that are working through different mechanisms as by other SES variables (Williams & Collins, 1995).

Most studies so far have been interested in the health inequalities between black and whites in the US context. This setup has been studied with great interest and the general understanding is that black adults have significantly lower health outcomes compared to their white counterparts (see for example Collins & Williams, 1999; Kovesdy et al., 2015; Krieger et al., 2008). However, the unique set-up of the US is most likely not comparable to the European and Estonian set-up.

However, the previous literature for Europe on itself is vast and mostly studied in a national context.

In England and Wales, migrants have a higher all-cause mortality rate compared to non-migrants with the only exception of people who migrated to England or Wales from the Caribbean (Landman & Cruickshank, 2001). Similar results were obtained for the Netherlands but were only significant for the male population (Bos, 2004).

For some countries there where mixed effects. In Belgium, Deboosere and Gadeyne (2005) find lower mortality for ethnic groups originally from southern Europe, Turkey and Morocco and higher mortality if they are from France or Sub-Saharan countries.

Nevertheless, studies also found evidence for a mortality advantage of different ethnic groups compared with locals even though their socio-economic status is lower (Abraído-Lanza et al., 1999; Razum et al., 1998; Razum, Zeeb & Rohrmann, 2000).

This phenomenon is called the "healthy migrant effect." The main idea behind the healthy migrant effect is that only healthy and young migrants are able to migrate whereas the chronically ill and "weak" are unable to do so (Razum et al., 1998). Studies found also a persistent effect in differences in mortality between different ethnic groups that lasts over generations (Razum et al., 1998).

In the specific case of Estonia, Rahu et al. (2009) find a that Non-Estonians are more likely to die due to alcoholism compared to their Estonian counterparts even after controlling for the SES variable education. Leinsalu (2004) supports this finding that especially ethnic Russians are more likely to die earlier compared to their native counterparts. Not only mortality outcomes support the findings for Estonia that ethnic Russians are in general worse of but also studies on individual health outcomes support that claim. For data obtained between 2001-2003, Groenewold & van Ginneken (2011) assessed the health status of Russian minorities in former Soviet countries such as Estonia. Among the countries studied, they find only in Estonia and Kazakhstan that ethnic Russians have in general lower health compared to the majority population. One reason found in this study was that Russians at that time were more dissatisfied, compared to Estonians, with the access to health care.

2.6 Background Estonia

In order to put the findings into context this section briefly reviews the economic and social history of Estonia after 1990. After the Soviet Union collapsed Estonia had a remarkable transition from being

part of the Soviet Union to a modern democracy. Economically, Estonia had incredible economic growth that abruptly ended when the financial crisis in 2007 erupted. Estonia at that time was highly affected by it and fell in a deep recession. In 2011, in which year also the data used in this study was collected, unemployment peaked at its highest level. However the economy started to recover and Estonia came back on its path of economic growth (Purju, 2013).

During the time of the financial downturn the labour earnings did decline while pensions stayed at the same level and did not decline making pensioners financially less vulnerable compared to people in the labour market (Võrk et al., 2014).

The composition of Estonia is historically driven with a big Russian minority that became smaller after the Soviet Union collapsed. In 2011, the Russian minority was still very big and accounted for 25.2 % of the people permanently living in Estonia. Estonia itself is a small country with roughly 1.3 million permanent residents. In the year 2011 the population consist of 69.7 % ethnic Estonians. As before mentioned ethnic Russians are accountable for 25.2 % and the next minority is ethnic Ukrainians with 1.7% (Statistics Estonia, 2011).

In its short history Estonia has established a solid social welfare state with a pension system like other European countries and a solid health care system. The health care is centrally organised by an insurance fund and in its core is based on solidarity. This means that the insurance fund pays for the health care needed regardless of the cost and the amount payed by an individual (Pille, 2017).

However, 'out of pocket costs' exist in Estonia. Out of pocket costs are costs that an individual has to pay on his/her own and are not reimbursed by the insurance fund even though when insured. In Estonia this includes services that are not covered by the insurance fund, user charges to insurance fund and informal payments. To name a few examples the dental care is only partially covered and the insurance fund does not cover any costs if an individual goes directly to a specialist without referral (Võrk et al., 2014). Võrk and colleagues (2014) find that out of pocket costs for poor households is related to payment for medicine whereas richer households out of pocket costs consist more of payment for dental care.

2.7 Hypothesis

Following the presented theory, this thesis will test four Hypotheses. In order to be aligned with previous research, this thesis will recreate findings from previous research that SES variables do not follow a threshold model but are rather gradient (H1). Once that is confirmed this thesis focuses on the latest theory that SES factors affect health outcomes (in this thesis two-year mortality and self- rated health) through different channels (H2 and H3). H4 then tests if there is a diminishing effect of SES variables in the old sample. All hypothesises are stated below.

H1: There is no threshold relationship between SES factors and health outcomes and SES variables have a gradient relationship to health outcomes.

H2: When including all SES variables in the same model, education, occupation, and ethnicity have significant predictive power for health outcomes since they work through different channels in affecting health outcomes

H3: Incomes takes up the effect of other SES rather than having an effect on its own for adult people. Therefore, household income is expected to have no significant effect when controlling for education, occupation, and race.

H4: Previous research found a mixed effects of SES variables on health outcomes for older people. However, this thesis follows the age-as-leveler hypothesis where H4 states that SES variables have stronger predictive power on the younger samples (50-63) than the older sample (+64).

3 Data

For this thesis, the Share waves four (Börsch-Supan, 2018a, Malter & Börsch-Supan, 2013) of the *Survey of Health, Ageing and Retirement* in Europe (SHARE) is used and is merged with the end-of-life interview from wave 5 (Börsch-Supan, 2018b, Malter & Börsch-Supan 2015) in order to obtain the two-year mortality rate. SHARE is a multidisciplinary dataset. The dataset covers a cross-national random sample of more than 120'000 individuals over age 50 from 27 European countries and Israel. There are two years between Share wave 4, which was conducted in 2011, and Share wave 5 which was conducted in 2013.

3.1 Sample

Before starting with the analysis, there were some variables that had to be excluded. A summary of the excluded variables is presented in Table 1.

Table 1: Sample size

Reason for removal	*Count*	*Left in sample*
Original sample		6864
No data on household income	864	6000
Household income >20'000 EUR monthly	28	5972
Age in 2011 below 50	82	5890
No data on Occupation	25	5865

In this thesis Financial Resources are proxied by household income. Since 864 observations have been deleted because there is no data on their household income the question arises if these individuals are missing completely at random. To determine if the variables excluded are missing completely at random, a probit regression is carried out to see if some covariates have predictive power. Missing completely at random means the variable of income for the dropped observations neither depends on

other factors (such as for example occupation) or on itself. The probit regression shows income is not completely at random since other factors have significant explanatory power in predicting if someone reports his/her income. Especially occupation and gender seem to matter. For occupation, the more advantaged have a higher probability not to report the income. As for gender, the results show that females are more likely to give information on income (see results obtained in Appendix B).

This means that the missing variables are either missing at random where income depends on other variables such as occupation but not on itself or missing not at random where respondents for example with high income are less likely to report income. As a result, the estimates might be biased. To see the effect when excluding all the missing variables for household income Model 1 and 2 are run without the income variable (see Appendix C). First, Model 1 and Model 2 are run when including the dropped income observations (unrestricted) and a second time without (restricted). When comparing the results obtained no major change in the variables of interest are found. The results suggest no major change in the variables concluding the models do not suffer from major bias when omitting the variables.

To answer H4 the sample is split into a younger and older sample. The cut-off age is set at 63 which is also the retirement age for Estonia. In order to see if that cut-off age is valid plus separates the sample in working and retired, the distribution of working people and retired people are graphically plotted in Figure 2.

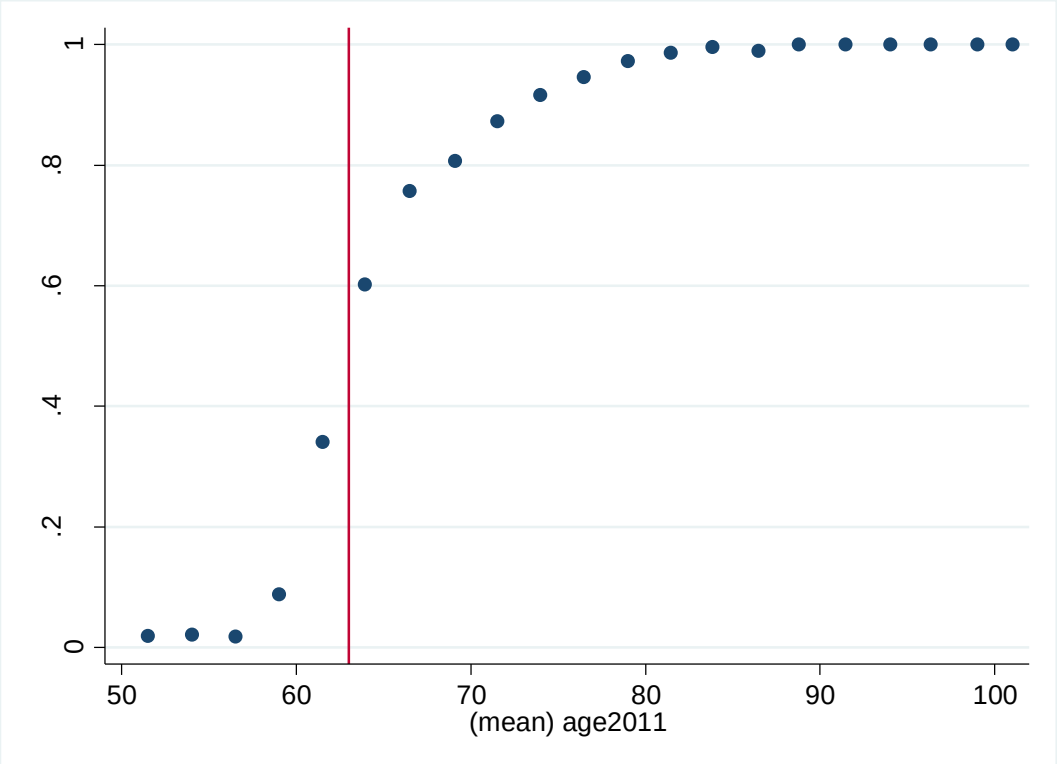

Figure 2 Cut-off age for retirement (own illustration)

On the x-axis is age and on the y-axis the distribution of being retired. Even though not all people seem to retire at age 63, and some retire before 63, the transition of becoming retired is clearly around 63.

3.2 Variables

This section describes the variables used in this thesis. Moreover, for some variables, a detailed description of the variable creation process is discussed.

3.2.1 Mortality Variable

The mortality variable was obtained by using the end-of-life interview from wave 5 in 2013. In the end-of-life interview, dead is confirmed by a proxy respondent that among others reported the date and the main cause of death (Bergmann et al., 2017).

In total from the sample of 5'865, 304 people were confirmed dead which yields a mean two-year mortality of 5.18 %. Because Estonia did first participate in wave 4, in 2011, every person that is in the end-of-life interview of wave 5, and from Estonia, died in between the two years of 2011 to 2013. Therefore, this thesis uses two-year mortality as its measure for mortality.

Last but not least, the end-of-life interview might not reflect the true mortality rate. This issue with the SHARE data is studied and results show that mortality is slightly underestimated (Solé-Auró et al., 2015). In section 7.1 this issue is addressed in further detail.

3.2.2 Self-Rated Health

The construction of this variable is easier since we do not need to rely on another wave because the information is already included in wave 4. In order to obtain this information, people were asked to rate their health status on a 5-step scale from 1-5 where 1 is excellent health and 5 is poor health (see Table 2). In order to create a binary health code 1, 2 and 3 were combined to good/excellent self-rated health and variable code -2, -1, 4 and 5 were combined to fair/poor self-rated health. The reason why *Refusal* (1 person) and *Don't know* (10 people) are included in fair/poor self-rated health is that people with good health would know that they are in good health. The explanation for the person that refused to give an answer might be that he/she is ashamed of his/her health status which is usually the case when not feeling well. However, as a robustness check, the model is run without the mentioned individual and the results do not change notably therefore, the 11 individuals are included.

Compared to mortality, self-rated health is a multidimensional variable that covers not only physical but also emotional and personal factors and is usually influenced by multiple variables such as gender (Lahelma et al., 1999). Self-rated health is used frequently and is considered one of the most used health measurements there is. Furthermore, self-rated health has been studied deeply and there is a general agreement that it can reflect the state of one's actual health status (see for example Jylhä, 2009).

Last, Fair/Poor self-rated health in this thesis will be used interchangeably with morbidity which is defined as a "state of being ill, diseased or disabled" (Thomas, 2016, p.12).

Table 2: Health Code

Code	Self-rated health
-2	Refusal
-1	Don't know
1	Excellent
2	Very good
3	Good
4	Fair
5	Poor

3.2.3 Creating the Education Variable

To make country-by-country comparison easier, SHARE uses the International Standard Classification of Education (ISCED) from 97 that allows for standardised classification of education. The Levels of educations are presented in Table 3 (UNESCO, 1997).

Low*er Secondary or Lower* education includes no schooling (ISCED-97 code 0), primary education (ISCED-97 code 1), and lower secondary education (ISCED-97 code 2). *Upper & Post-Secondary* education includes upper secondary education (ISCED-97 code 3) and post-secondary non-tertiary education (ISCED-97 code 4). *Tertiary* education includes first stage of tertiary education (ISCED-97 code 5) and second stage of tertiary education (ISCED-97 code 6).

Table 3: ISCED – 97 Level of Education

Code	Level of Education
0	Pre-primary Level of Education
1	Primary Level of Education
2	Lower Secondary Level of Education
3	Upper Secondary Level of Education
4	Post-Secondary, Non-Tertiary Education
5	First Stage of Tertiary Education
6	Second Stage Tertiary Education

3.2.4 Creating a Social Class Variable

In this thesis, occupation is used to represent the social class in society which is one of the most widely used variables in research to determine an individual's class in society.

The SHARE data has information of a workers' current occupation and for the retired people information on the last occupation before retirement. Occupation is classified in Table 4 according to

the International Classification of Occupation scheme also known as ISCO-88 by the International Labour Organization (International Labour Office, 1990).

Based on this classification this thesis uses the same methodology as Hoven, Wahrendorf and Siegrist (2015) where they created a measure for occupational class based on the Erikson/Goldthorpe/Portocarero typology (EGP) to compute social class indices. In table Table 5 Goldthorpe's class scheme is presented (Erikson & Goldthorpe, 1992). This thesis also regrouped the 10 initial ISCO-88 categories into four categories using the EGP typology.

The first occupational category is *Very Disadvantaged* manual supervisors, skilled and unskilled manual workers (EGP IVc, VI, V, VIIb) and includes skilled agricultural or fishery worker, craft and related trades worker, plant and machine operator or assembler, elementary occupation and armed forces. The second occupational category is *Disadvantaged* routine non-manuals and small proprietors (EGP IIIa, IIIb,) and includes Clerks and Service workers and shop and market sales workers. The third occupational category is *Advantaged* lower service class (EGP II) and includes technicians or associate professionals. The fourth category is *Very Advantaged* upper service class (EGP I) and includes managers and professionals.

Table 4: ISCO – 88 Major Groups

Code	Group
1	Legislator, Senior Officials, and Manager
2	Professionals
3	Technicians and Associate Professionals
4	Clerks
5	Service Workers and Shop and Market Sales Workers
6	Skilled Agricultural and Fishery Workers
7	Craft and Related Trade Workers
8	Plant and Machine Operators and Assemblers
9	Elementary Occupations
0	Armed Forces

Table 5: Erikson/Goldthorpe typology (EGP)

EGP	Description
I	*Service Class I* (higher-grade professionals, administrators, and officials; managers in large industrial establishments; large proprietors).
II	*Service Class II* (lower-grade professionals, administrators, and officials; higher grade technicians; managers in small industrial establishments; supervisors of non-manual employees.
IIIa	*Routine non-manual* (routine non-manual employees, higher grade – administration and commerce). Intermediate class.
IIIb	*Routine non-manual employees*, lower grade (sales and services).
Iva	*Self-empl. with employees* (small proprietors, artisans, etc., with employees).
IVb	*Self-empl with employees* (small proprietors, artisans, etc, with no employees).
IVc	*Self-empl. Farmers etc.* (farmers and smallholders; other self-employed workers in primary production).
V	*Manual supervisors/Lower grade technicians* (lower grade technicians; supervisors of manual workers).
VI	*Skilled workers*. Working class
VIIa	*Unskilled workers* (not in agriculture, etc.)
VIIb	*Farm labours* agricultural and other workers in primary production

3.2.5 Creating the Ethnicity Category

To obtain the ethnicity of an individual this thesis takes advantage of the variable if someone was born in the country or not. 4319 people were born in Estonia and therefore labeled as *Estonian* and 1546 people were born outside Estonia. From the people born outside Estonia 1243 where born in Russia or Belarus and are newly coded as *Russian*. the remaining 303 are too small to create a separate category for and are therefore bundled into the category *Other*. In the category *Other* the three biggest groups are Ukraine (133), not codable (41) and Latvia (25).

3.3 Descriptive Statistics

After excluding some observations and the creation process of new variables this section gives an overview of the descriptive statistics. The variables are presented in Table 6 where the standard error for continuous variables and distribution for categorical variables is given in column (2) for 50-63 and column (4) for 64+ respectively. There are a few interesting things worth mentioning.

First and foremost, in the sample 50-63 the two-year mortality is only 2.1 % and contains only 48 people that died. This will later lead to problems when estimating the probit model since in that time period no one died that is labeled as *other* in the categorical variable ethnicity which eventually leads to the exclusion of these observations as seen in Table 7 section A. For 64+ the two-year mortality is 7.1 % and 256 people died.

Not surprisingly the younger sample feels on average healthier where 38.6 % feel in good or excellent health and only 20.0 % of the older sample feel that way.

Another important factor is the extremely positive skewness of the household income as seen in the high standard deviation of 2.1 TSD EUR per month compared to the mean of 1.2 TSD EUR. This issue was already addressed by excluding the extremely high monthly household income over 20’000 but still remains an issue.

The last eye-catcher in the descriptive is over-representation of women in the sample. However, this can partially be addressed by the fact that women have a higher survival rate in older age and therefore will be over-represented in these samples. This observation seems to be true since the young sample has roughly 43% males where their share in the older sample drops to 39%.

Table 6: Variable means and distribution split by age

		Sample I	Sample II	
	(1)	(2)	(3)	(4)
Variable	50-63	Distribution / SD	64+	Distribution / SD
Alive				
Yes	2229	97.9 %	3332	92.9 %
No	48	2.1 %	256	7.1 %
Self-Rated Health				
Good/Excellent Health	878	38.6 %	718	20.0%
Fair/Poor Health	1399	61.4 %	2870	80.0 %
Average Monthly Household Income in TSD EUR	1.2	2.1	1.0	1.7
Education				
Low Secondary or Lower	421	18.5 %	1463	40.8 %
Upper & Post-Postsecondary	1347	59.2 %	1448	40.3 %
Tertiary	509	22.3 %	677	18.9 %
Occupation				
Very Disadvantaged	1215	53.4 %	1968	54.9 %
Disadvantaged	424	18.6 %	540	15.1 %
Advantaged	369	16.2 %	647	18.0 %
Very Advantaged	269	11.8 %	433	12.0 %
Ethnicity				
Estonians	1796	78.9 %	2523	70.3 %
Russians	352	15.5 %	891	24.8 %
Other	129	5.6 %	174	4.9 %
Gender				
Male	969	42.6 %	1391	38.8 %
Female	1308	57.4 %	2197	61.2 %
Average Age	57.3	3.8	73.9	6.6
Marital status				
Married/ Married like Relationship	1502	66.0 %	2108	58.7
Divorced or Married but living Separated	417	18.3 %	343	9.6
Widowed	132	5.8 %	929	25.9
Never married	226	9.9 %	208	5.8
Observations	2’277		3’588	

4 Methods

To answer the Research Question, this thesis examines if socioeconomic status influences the probability of dying and the probability to self-rate one's health status as fair/poor. In order to observe the outcome, both models use a binary outcome variable as their variable of interest. A binary outcome variable is an example of a limited dependent variable which means that the range of values is restricted (Wooldridge, 2009, p.529). In this thesis, the outcome variable of interest is two-year mortality and self-rated health. The dependent variable can take on two variables. This definition makes the outcome variable binary in its response. For two-year mortality the variable of interest can either take the value 0 for being alive and 1 for being dead. For self-rated health the variable of interest can either take the value 0 for good/excellent health or 1 for fair/poor health.

$$y = \begin{cases} 0 \; if \; alive \; or \; good \; health \\ 1 \; if \; dead \; or \; poor \; health \end{cases}$$

The next section is structured as follows. First, the theoretical groundwork of the method used will be presented, after this, the model specification will be carried out.

4.1 Binary Outcome Models

The interest in a binary outcome models lies in the estimation of the probability of *y* to take on the value of 1 and not as with a continues outcome variable where y itself is estimated.

$$P(y = 1|x) = P(y = 1|x_1, x_2, \dots, x_k) \qquad \text{(I)}$$

4.1.1 Linear Probability Model (LPM)

$$p = pr[y = 1|x] = \boldsymbol{x}'\beta \qquad \text{(II)}$$

This can be done in several ways where linear probability model is the least favored to use. The reason lies in the construction of the function. In a linear probability model there is no restriction on the function and the estimates can take on values that are less than zero or bigger than 1 which does not make sense when estimating probabilities (Wooldridge, 2009, p.530). However, in the linear regression model the coefficient β_i is at the same time the marginal effect and the magnitude can be interpreted directly which is not possible in a probit model as we will later see.

The linear probability model will later be used as a robustness check and will be discussed in section 5.3.

4.1.2 Probit Model

To account for the problem of the LPM that the estimates can be bigger than 1 and smaller than 0 a probit model will be used in this thesis. The advantage of a probit model is that the values for all parameters and the x_i are limited between 0 and 1 because of the probability distribution $y_i$where a distributional assumption is made. This is achieved by using a function of $F(\boldsymbol{x}'\beta)$ with the cumulative distribution function $\phi(\boldsymbol{x}'\beta)$ of the standard normal distribution (Wooldridge, 2009, p.530ff);

$$F(\boldsymbol{x}'\beta) = \phi(\boldsymbol{x}'\beta) = \int_{-\infty}^{\boldsymbol{X}'\beta} \phi(z)dz \qquad \text{(III)}$$

In this thesis, a probit model is used but a sensitivity test will be made with a logit model that uses the standard logistic distribution as its cumulative distribution function.

The estimated coefficients of a probit model are difficult to interpret since the probability that $y = 1$ is affected through the cumulative distribution function. What can be said though is that an increase in a coefficient β_i increases the likelihood that $y = 1$. Therefore, one can interpret the sign but not the magnitude of the coefficient when using a probit model (Wooldridge, 2009, p.532). To account for this section 4.1.3 introduces the 'marginal effects' with which it will be possible to analyse also the magnitude of a coefficient.

4.1.3 Marginal Effects

As we learned in 4.1.2 the magnitude of a probit estimator is not interpretable. Even though the coefficients magnitude is not interpretable, the magnitude for the marginal effects is interpretable. For continuous variables the interpretation of its marginal effects is different compared to categorical variables.

A marginal effect of a continuous variable is simply the partial derivate of a given *xi* where the others are held constant. They reflect the change in the probability of $y = 1$ when the independent variable *x* changes by 1 unit while all other coefficients are held at their mean.

$$\text{Marginal effects of a probit model} = \frac{\partial p}{\partial x_i} = \phi(\boldsymbol{x}'\beta)\beta_i$$

Based on the equation we see that the coefficients and the marginal effects always have the same symbol because $\phi(\boldsymbol{x}'\beta)$>0, therefore it is only determined by the coefficients β_i and this will lead to the same symbol of the marginal effect $\frac{\partial p}{\partial x_i}$ (Wooldridge, 2009, p.532).

For a categorical variable, it does not make sense to compute how the probability of y = 1 changes given the mean of the categorical variable. The marginal effect for categorical variables therefore shows how the probability that a certain event occurs changes when the categorical variable changes from its defined reference point, while at the same time holding all other variables at their means. For example, when we want to obtain the marginal effect for education we first need to define a reference for example *Low Secondary or Lower* education. The marginal effect tells us then how the probability that a certain event occurs when, for example, *Lower Secondary or Lower* education changes to another value, like *Tertiary* education, while holding all other variables at their means (Wooldridge, 2009, p.533).

$$\Pr(Y = 1|X, X_{EDU} = Low\ Secondary\ or\ Lower) - \Pr(X = 1|X, X_{EDU} = Tertiary)$$

4.2 Model Specification

In this thesis two models are used to answer the Research question. Model 1 estimates the probability of dying when controlling for the SES variables of interest and covariates and Model 2 estimates the probability of reporting fair/poor health when controlling for the SES variables of interest and covariates. Additionally, both models will be estimated with only one SES at a time in order to measure the impact of only including one SES compared to the full model.

To answer *H4*, the sample will be divided based on retirement age into two samples where sample one covers people between 50 and 63 and sample two covers people above 63.

4.2.1 Model 1

The first model specified observes the effect of the four different SES variables used in the model and their probability of dying (two-year mortality). Furthermore, various covariates are included to address the compositional differences.

$$P(Y = 1|X) = \phi(\beta_0 + \beta_1 x_{iEDU} + \beta_2 x_{iOCC} + \beta_3 x_{iINC} + \beta_4 x_{iETH} + \boldsymbol{X_i'}\beta + u_i)$$

Y represents the two- year mortality. Where $P(Y = 1|X)$ is the probability that an individual is dead and therefore takes on the value one. ϕ is the cumulative normal distribution function of the probit- model. β_0 is the constant. x_{iEDU} represents education for individual *i*. x_{iOCC} is represents occupation for individual *i*. $\beta_3 x_{iINC}$ is the represents the household income for individual *i*. x_{iETH} represents ethnicity of individual *i*. u_i refers to the error term.

The variables included in model 1 are described in more detail below:

- Education: This is the first variable of interest, and it contains three categories; *Low Secondary or Lower* education, *Upper & Post-Secondary* education and *Tertiary* education
- Occupation: This is the second variable of interest, and it contains four categories; *Very Advantaged, Advantaged, Disadvantaged* and *Very Disadvantaged*
- Income: This is the third variable of interest and is a continuous variable.
- Ethnicity*:* This is the fourth variable of interest and it contains 3 categories; *Estonians*, *Russian* and *Other*.

The vector $\boldsymbol{X_i'}\beta$ contains the following variables:

- Gender: In order to address gender different mortality outcomes gender as a bivariate control variable is included. Gender is a widely used control variable in research that is concerned about the impact of socioeconomic variables.
- Age*:* Even though we split the dataset into two samples based on their age the variable age is included in order to control for age within the samples. Age is a widely used control variable in research that deals with mortality. The observations have values between 50- 102.

- Civil status: Previous research has shown that civil status has an impact on one's health, especially widowhood increases the likeliness for a decrease in health (Zisook & Shuchter, 1991). Civil status contains four categories; *Married/ Married like Relationship*, *Divorced or Married but living separated*, *Widowed* and *Never Married.*

4.2.2 Model 2

The second model specified observes the effect of the four different SES variables used in the model and their probability of reporting fair/poor health. Furthermore, the same covariates are included to address the compositional differences as in Model 1.

$$P(Y = 1|X) = \Phi(\beta_0 + \beta_1 x_{iEDU} + \beta_2 x_{iOCC} + \beta_3 x_{iINC} + \beta_4 x_{iETH} + \boldsymbol{X_i'}\beta + u_i)$$

The model specification is the same as in section 4.2.1 but this time instead of two-year mortality the variable of interest is whether being in excellent/good or fair/poor health determined by self-rated health.

5 Results

In this section results obtained are presented for Model 1 and Model 2. As described in 4.1.2 the coefficients from a probit regression are only interpretable in direction but not in magnitude. To account for this, scholars usually discuss results in marginal effects. Therefore, in order to also interpret the magnitude of the coefficients the results are interpreted with the average marginal effects at the means (in Appendix D the probit regressions used to obtain these marginal effects can be found). For both, Model 1 and Model 2, in column (2) – (5) the results for different SES variables are presented, and their effect is measured individually while covariates remain the same. For both, Model 1 and Model 2, the final model where the multidimensionality of the SES variables is addressed is presented in column (1).

In general, all the SES variables on two-year mortality have a considerable weaker impact and are not as significant as the probability of reporting fair/poor health. The reason for this will be addressed in section 7.

5.1 Model 1: Marginal Effects of SES Variables on Mortality

In Table 7 the results for the average marginal effects at the means are presented.

Household Income: The marginal effect of household income on the probability of dying is only significant for the older population presented in section B. The effect is significant at the 5% level for both the final model (1) and the household income specific model (2). For (1) a 1 unit increase will decrease the probability of dying by -0.6 percentage points (pp) compared to -0.7 pp in (2). The interpretation is as follows with EUR; when we increase the income of an individual by a 1000 EUR per month while holding everything else at their means, the probability of dying will decrease by 0.6 pp.

Education: In Section A model (3), a change from *Low Secondary or Lower* education to *Upper & Post-Secondary* education leads to a 1.7 pp decrease in the probability of dying and it is significant on the 10 % level. In the same model a change from *Low Secondary or Lower* education to *Tertiary* education leads to a 2.8 pp decrease in the probability of dying and it is significant on the 1 % level.

When including all the other SES variables in Model (1) only *Tertiary* education remains significant and is associated with a 2.5 pp decrease in the probability of dying compared to the reference group.

In Section B only *Tertiary* education is significant and the effect almost halves from (3) to (1). Compared to the reference group *Tertiary* education is associated with a decrease in the probability of dying of 1.9 pp in (1) and 3.6 pp in (3).

Occupation: Similar trends are observed for occupation where the model with the SES variable on its own is more significant in (4) as when other SES variables are included in (1). Furthermore, the effect becomes smaller in all categories from model (4) to (1). Interestingly, for the younger sample a change from *Very Disadvantaged* to *Disadvantaged* is significant in both (1) and (4) but not in the older sample. For them, on the other hand, a change from *Very Disadvantaged* to *Advantaged* is significant in both (1) and (4).

Ethnicity: For Model 1 there is only one significant result for the older population presented in section B. The probability of dying decreases by 2.1 pp for the category *Other* compared to *Estonians* in (1). This odd finding will later be discussed in Section 7

Table 7: Model 1 marginal effects at the means

	Depended Variable: Two-Year Mortality				
	(1)	(2)	(3)	(4)	(5)
	A: Ages 50-63				
HHincome in TSD EUR	0.0005	0.000			
	(0.001)	(0.001)			
Education (Ref. Low Secondary or Lower)					
Upper & Post-Secondary	-0.015		-0.017*		
	(0.010)		(0.009)		
Tertiary	-0.025**		-0.028***		
	(0.011)		(0.010)		
Occupation (Ref. Very Disadvantaged)					
Disadvantaged	-0.011*			-0.016**	
	(0.006)			(0.006)	
Advantaged	0.002			-0.007	
	(0.009)			(0.009)	
Very Advantaged	-0.007			-0.017**	
	(0.010)			(0.007)	
Ethnicity (Ref. Estonian)					
Russian	0.001				-0.0002
	(0.007)				(0.008)
Other	-				-
Observations	2,148	2,148	2,148	2,148	2,148
	B: Ages 64+				
HHincome in TSD EUR	-0.006**	-0.007**			
	(0.003)	(0.003)			
Education (Ref. Low Secondary or Lower)					
Upper & Post-Secondary	0.0002		-0.008		
	(0.009)		(0.009)		
Tertiary	-0.019*		-0.036***		
	(0.011)		(0.009)		

Occupation (Ref. very disadvantaged)					
Disadvantage	-0.009			-0.011	
	(0.011)			(0.011)	
Advantaged	-0.019*			-0.025***	
	(0.010)			(0.009)	
Very Advantaged	-0.028**			-0.039***	
	(0.011)			(0.009)	
Ethnicity (Ref. Estonian)					
Russian	-0.002				0.001
	(0.008)				(0.008)
Other	-0.021*				-0.021
	(0.013)				(0.014)
Observations	3,588	3,588	3,588	3,588	3,588

Notes: The estimates represent marginal effects from probit estimations, evaluated at the means of the independent variables. Brackets contain robust standard errors. *p<0.1, **p<0.05, ***p<0.01 For all models age, gender and marital status has been used as controls

5.2 Model 2: Marginal Effects of SES Variables on Self-Rated Health

In Table 8 the results for the average marginal effects at the means of Model 2 are presented. Compared to Model 1 all SES variables are significant for both age groups with the exception of *Other* in the section A.

Household Income: The marginal effect of household income on the probability of reporting fair/poor health is significant and negative for both samples under scrutiny. In general, there is a decrease in the magnitude and significance when controlling for other SES variables in (1) compared to (2). The Interpretation is shown with results obtained in section A (1). When we increase the income of an individual by a 1000 EUR per month while holding everything else at their means the probability of reporting Fair/Poor health decreases by 1.2 pp.

Education: The marginal effect of a change from *Low Secondary or Lower* education is highly significant at the 1 % level and negative for all categories and the effect becomes bigger for a higher level of education. Not surprisingly model (3) reports stronger effects than (1) when other SES variables are included. As a reference example in section A (1), a change from *Low Secondary or Lower* education to *Tertiary* education decreases the probability of reporting Fair/Poor health by 22.7 pp.

Occupation: The marginal effect of a change from *Very Disadvantaged* is highly significant for all categories and the effect becomes bigger for a more advantaged level of occupation with the exception for section B (1) where a change from *Very Disadvantaged* to *Disadvantaged* decreases the probability of reporting fair/poor health by 3.8 pp and a change to *Advantaged* only decreases it by 3.5 pp. However, in (4) this anomaly is reversed where a change from *Very Disadvantaged* to *Disadvantaged* decreases the probability of reporting fair/poor health by 7.7 pp and a change to *Advantaged* decreases it by 8.7 pp.

Ethnicity: Compared to model 1, the results for Ethnicity are highly significant for *Russian* in both samples where *Russian* is associated with an increase in the probability of reporting fair/poor health. Furthermore, in section B (1) the category *Other* is associated with a higher risk of reporting fair/poor health compared to the reference category *Estonians.*

Table 8: Model 2 marginal effects at the means

	Depended Variable: Self-Rated Health,				
	(1)	(2)	(3)	(4)	(5)
	A: Ages 50-63				
HHincome in TSD EUR	-0.012**	-0.019***			
	(0.005)	(0.005)			
Education (Ref. Low Secondary or Lower)					
Upper & Post-Secondary	-0.068**		-0.094***		
	(0.028)		(0.025)		
Tertiary	-0.227***		-0.340***		
	(0.039)		(0.031)		
Occupation (Ref. Very Disadvantaged)					
Disadvantaged	-0.101***			-0.135***	
	(0.030)			(0.029)	
Advantaged	-0.155***			-0.222***	
	(0.032)			(0.030)	
Very Advantaged	-0.196***			-0.337***	
	(0.041)			(0.033)	
Ethnicity (Ref. Estonian)					
Russian	0.102***				0.104***
	(0.028)				(0.027)
Other	0.028				0.026
	(0.045)				(0.044)
Observations	2,277	2,277	2,277	2,277	2,277
	B: Ages 64+				
HHincome in TSD EUR	-0.008**	-0.012***			
	(0.003)	(0.003)			
Education (Ref. Low Secondary or Lower)					
Upper & Post-Secondary	-0.056***		-0.069***		
	(0.015)		(0.014)		

Tertiary	-0.134***		-0.185***		
	(0.025)		(0.020)		
Occupation (Ref. very disadvantaged)					
Disadvantage	-0.038*			-0.077***	
	(0.020)			(0.020)	
Advantaged	-0.035*			-0.087***	
	(0.020)			(0.018)	
Very Advantaged	-0.078***			-0.176***	
	(0.023)			(0.024)	
Ethnicity (Ref. Estonian)					
Russian	0.079***				0.086***
	(0.014)				(0.014)
Other	0.111***				0.110***
	(0.023)				(0.024)
Observations	3,588	3,588	3,588	3,588	3,588

Notes: The estimates represent marginal effects from probit estimations, evaluated at the means of the independent variables. Brackets contain robust standard errors. *p<0.1, **p<0.05, ***p<0.01 For all models age, gender and marital status has been used as controls

5.3 Sensitivity Analysis

The chi-square tests that all included variables equal zero are significant on the 1% level for all models run.

In a probit model we obtain a pseudo-R-squared. The pseudo-R-squared compares the likelihood of an unrestricted log likelihood that $y = 1$ with a restricted model. The restricted model estimates the likelihood where only the intercept is present meaning that all coefficients are restricted to be zero. When now the coefficients do not have any explanatory power the unrestricted log-likelihood will be the same as the restricted and the R-squared will be zero meaning no explanatory power of the coefficients. In Model 1 and Model 2 the highest R-squared was obtained for both samples in (1) ranging from 7.9 for Model 2 and the younger sample to 12.1 for the older sample in Mode 1.

Both the chi-square test and pseudo-R-squared are not real sensitivity tests but rather shows that all models tested have at least some predictive power.

There were some sensitivity checks conducted though. Instead of running a probit model, a logit model is run. In a logit model the cumulative distribution function is the logistic function. The logit model does not differ remarkably from the results obtained with the probit model.

In addition, a simple linear probability model is run. The simple linear probability model does not differ remarkably from the results obtained with the probit model. This is not surprising since in praxis linear probability models and nonlinear models such as probit in the end produce very similar results in estimating the probability that binary dependent outcome variable $y = 1$ (Angrist & Pischke, 2008). Furthermore, in the linear regression model the coefficient β_i is at the same time the marginal effect and can be interpreted directly. Comparing the coefficients β_i with the marginal effects obtained in Table 7 for Model 1 and in Table 8 the differences are do not deviate in any notable way.

6 Conclusion

After having measured the multidimensionality of different SES variables on two different health outcomes this section will address the results and answer the Research Question and the Hypotheses. First, the primary Research Question will be discussed and from there the Hypothesises are evaluated.

The research aim of this thesis was to analyse the multidimensional nature of different SES variables and their effect on health outcomes in the specific case of Estonia. Furthermore, to give new insight in the ongoing discussion on life course theories this thesis creates two samples, one younger and one older, to see whether socioeconomic status has a diminishing effect when measured for older people as predicted by the age-as-leveler hypotheses. After having conducted the analysis it can be said that the research aim was successfully met and will be discussed in further detail in the following sections.

6.1 Research Question

Before addressing the hypotheses, the primary research question is evaluated. In my thesis I find a strong and clear relationship between socioeconomic status and its influence on health outcomes. Health

outcomes are measured by the probability of reporting fair/poor health and dying in 50+ aged people living in Estonia. Furthermore, an independent effect has been found also for household income to some degree for all four SES dimensions presented in this paper. Last, my results are consistent with the age-as-leveler hypothesis where SES variables have a weaker association with health outcomes in old age.

6.2 Hypothesis

The Hypotheses described in section 2.7 are now presented and answered with the results of my thesis.

H1 – Threshold Relationship:

Already in the 80s, the poverty threshold model was challenged by scholars that SES variables do not have a threshold relationship toward health outcomes but rather follow a gradient relationship (see for example Adler et al., 1994; Link & Phelan, 1995; Marmot, Shipley & Rose, 1984). My findings follow previous findings that there is a gradient relationship with the exception for section B (1) in Model 2, where a change from *Very Disadvantaged* to *Disadvantaged* decreases the probability of reporting fair/poor health by 3.8 pp. A change to *Advantaged* only decreases it by 3.5 pp. For income, when analysing the marginal effect for different ranges of household income the effect of an increase in household income on health outcomes is bigger for a lower household income and the effect decreases when measuring the marginal effect for a higher household income range. But the effect does not vanish as it would be expected by the threshold model presented in section 2.1

H2 – Multidimensionality of SES Factors for Education, Occupation and Ethnicity

The multidimensionality of different SES variables is the most recent theory in research on socioeconomic status on health. The main idea is that different SES variables influence health in different ways. As illustrated education might influence health in the way that better-educated people have better cognitive ability that enables them to process information in a better way. Therefore, better-educated people can evaluate a situation better and choose the most beneficial option for them (Cutler & Lleras-Muney, 2010). As for social class in society, measured by occupation in this study, the idea states that a higher status position reduces stress and therefore reduces health problems (Marmot, 2004). For ethnic disparities in health in Estonia there are previous findings that link different behaviours like alcohol consumption for different ethnicities to worse health outcomes (Rahu et al., 2009). Furthermore, the finding from (Groenewold & van Ginneken, 2011) show that ethnic Russians in Estonia have been more dissatisfied with the access to health care.

In my thesis I am able to show that health outcomes are influenced by various SES variables through different channels. This is achieved by including all variables in the same model. For the findings in Model 1 and Model 2 presented in column (1) in Table 7 and Table 8 most of the significant effects remain in the full model compared to the models run with only one SES variable. As discussed in section 2.5 some SES variables will take up the effect from the others especially education and occupation.

This is confirmed as well because the marginal effects in percentage are smaller in (1) compared when each SES variable is run alone. Furthermore, most effects found in the models (2) – (5), where SES variables are run without the others, remain significant in (1) leading me to conclude that for education, occupation and ethnicity, health outcomes are influenced by different SES variables through different channels.

H3 – Financial Resources

Having found evidence that education, occupation and ethnicity affect health outcomes through different channels, previous research for financial resources is mixed, when controlling for other SES variables (Deaton & Lubotsky, 2003; Elo & Preston, 1996; Kull, 2006; Smith, 2007).

In my thesis, financial resources were significant for almost all sections with the expectation of the younger sample in Model 1. For the other sections, these effects remain significant in column (1) when controlling for other SES variables and in column (2) when only including household income. The finding is in line with pre-financial crisis literature on financial resources in Estonia. Therefore, H3 is rejected as the only hypothesis that is rejected in this thesis. In the discussion possible explanations will be evaluated.

H4 – Age-as-Leveler Effect of Socioeconomic Status in Old Age

Even though previous literature is mixed, the association of SES on health outcomes is decreasing in the older sample. The results obtained in section 5 strongly support the age-as-leveler hypothesis with some exceptions.

First, household income seems to have a significant effect on the probability of dying only for the older sample but not for the younger sample which the age-as leveller hypothesis does not expect. For self-rated health, the effect on the other hand is in line with the age-as-leveler hypothesis where household income is a weaker predictor for the older sample in column (1). This difference between two-year mortality and self-rated health will be addressed in the discussion.

For Model 1 where significant results are obtained in (1), education seems to be a fair predictor even in old age. For Model 2 education in the final model (1) remains a strong predictor in old age in predicting to report fair/poor health but is nevertheless weaker then for the younger sample.

Occupation in Model 1 is not comparable since the categories have no significant result in the same category. Model 2 on the other hand, suggests that Occupation is a strong indicator that someone reports fair/poor health when they are still in the workforce but as soon as they retire this effect is strongly reduced leading to the conclusion that former occupation as measured for the retired people in the old individual sample is not as a strong predictor as when the people are still working. This finding is worth mentioning because it can be linked to the Whitehall studies. In the Whitehall studies their findings for worse health outcomes for lower employment grade can be explained among other reasons by work-

related stress and monotonous work with little control. Once becoming retired this direct effect will disappear and lead to less work-related health effects.

For Ethnicity, a diminishing effect is found where in Model 2 being Russian in the old sample does have a lower marginal effect on the probability to report fair/poor health compared to the younger sample.

7 Discussion

In this section the findings from my research are linked to previous research and some explanation for different phenomena found in the results will be presented. After this the limitations of this study are addressed. then some practical implications are given and finally an outlook for future research is presented.

My findings are congruent with the findings from previous research on SES variables in several ways. First of all, the findings obtained have been also found in previous literature when the multidimensional nature of SES was observed. As found in my thesis, Cutler, Lleras-Muney, and Vogl (2008) also have found similar results where the effect of SES had a stronger probability that y = 1 for self-rated health and weaker but still significant probability that y = 1 for mortality. One reason might be that morbidity (measured as self-rated health) is more sensitive to the SES variables whereas in mortality other factors such as biological factors play a more pronounced role. In the next sections, the discussion continues for each SES variable on its own

Education: Unsurprisingly for both, self-rated health and two-year mortality, education is associated with higher education leads to better health outcomes (Leinsalu, 2002, 2004; Mackenbach et al., 2015; Reile & Leinsalu, 2013). Since these studies range from 1996 to 2006 and my data is from 2011, my thesis concludes that in Estonia health inequalities in education persisted even the economic landscape was interrupted by an economic crisis.

Financial Resources: Furthermore, my thesis is consistent with the previous literature on financial resources where income has a significant effect on its own. I now give a possible explanation why my findings and previous findings in Estonia found a connection between financial resource and health outcomes. First and foremost, out of pocket cost are present in Estonia meaning that the insurance fund does not cover all expenses meaning some cost will roll-over to the individual in case of illness. Therefore, poor people might not go to the doctor to get every treatment for every disease leading to a worse health outcome. Second, dental care is not covered by the insurance fund. Since research find a clear link between oral health and its effect on general health (see for example Kandelman, Petersen & Ueda, 2008) and since poor people in Estonia spend less money on dental health (Võrk et al., 2014), the poor dental health might affect the general health leading to a poorer overall health for poorer people.

After having addressed the reason for a significant effect of household income this section discussed the contradicting finding that for two-year mortality only a significant effect of income was found for the older sample and not for the younger. The reason might be that income does not affect the mortality

of younger people and will only lead to worse self-rated health due to not getting treatment because of the out of pocket cost. On the other hand, for the old sample, a harmless disease that is not taken care of due to monetary constraints can lead to severe diseases ultimately leading to one's death. Therefore, income does not predict death in the younger sample but in the older. This effect at play might eventually lead to this contradicting finding for old and the young sample compared to self-rated health.

Social Class in Society: Previous scholars argue ones social class in society influences health outcomes through stress where a lower social class leads to worse health outcomes (Marmot, 2004). Compared to previous findings for Estonia (see Reile & Leinsalu, 2017), my thesis finds significant associations for both, two-year mortality and self-rated health in relation to occupation.

As found in section 5 the effect of socioeconomic status on health outcomes is declining with old age. This effect is especially striking for occupation where the marginal effect for the probability to report fair/poor health is only around a third compared to the younger population. I argue that there are two effects at play that explain this drastic reduction. First of all, as already discussed and validated, age itself seems to reduce the effect of SES on health outcomes. Second, occupation in the older sample is measured by former occupation rather than actual occupation since most people are retired. This finding can be linked to the Whitehall studies. In the Whitehall studies, their findings for worse health outcomes for lower employment grade can be explained among other reasons by work-related stress and monotonous work with little control. Once becoming retired this direct effect will disappear and lead to less work-related health effects.

Ethnicity: As already discussed in section 6.2 the effect of all SES variables become smaller in model (1). The idea behind this is that other variables take up some of the effect since they impact health through the same channel to some degree while at the same time having their independent effect. However, a very interesting fact has yet not been discussed. In Model 2 all SES variables have a remarkable reduction in their magnitude when including other SES-variables except ethnicity where the marginal effect is reduced only by 0.2 pp for the younger sample (0.7 pp for the older sample, respectively). Compared to other SES variables, where some SES variables of interest change by as much as 14 pp in the model with all SES variables included, the reduction for Ethnicity is notably small. I conclude that this is due to the fact that Ethnicity is associated with self-reported health entirely through a different channel than the other SES variables in Estonia. This finding is remarkable since previous research find that that the effect of ethnicity is reduced when controlling for other SES variables meaning that ethnicity affects health outcomes through similar channels, to some degree, as other SES variables (Cutler, Lleras-Muney & Vogl, 2008).

Last, there is one finding that really seems out of place. The category *Other* for ethnicity in Model 1 section B is significant meaning that all the countries who are combined under the category *Other* have a lower risk of dying. When comparing to previous research, this might be explained by the healthy migrant theory but when we compare the result with self-rated health the effect shows a clear negative

association between self-rated health and the summary category *Other*. One explanation for this anomaly lays in the data since in this time-period only 8 people from that category died. This low number of deaths will inevitably lead to a bias in the results which probably is reflected by the results obtained.

7.1 Limitations and Validity

In order to obtain validity for this thesis, it is inevitable to talk about its limitations. Since the thesis is cross-sectional organized, I am unable to add a cohort effect where we look at the same people over time. This will create various problems. First, in my thesis I might measure different groups of people because I cannot measure a cohort effect when having cross-sectional data. Second, this effect might be even more pronounced in Estonia since the older sample has lived a longer part of their life under the Soviet Union and the younger sample has spent a considerable large time in relation to their age in the period after the collapse of the Soviet Union. Therefore, for example I can only say my data is consistent with the age-as-leveler hypotheses rather than actually test for the hypotheses.

Second, deleting 864 observations where no information on household income was retrieved can lead to bias when the missing observations are not missing completely at random. Section 3.1 tries to account and conclude the model does not suffer from major bias yet still some bias may still arise from the delete.

Third, the end-of-life interview might not reflect the true mortality rate where mortality is underestimated. However, if the underestimation of mortality is caused by randomness, no bias should arise, but rather explanatory power is reduced. Since most of the signs are the same as for self-rated health it can be concluded that no major bias from the underestimation of the two-year morality arises for the coefficients. Unfortunately, for self-reported health it has been shown that the subjective nature itself is prone to several biasing factors (Knäuper & Turner, 2003). Fortunately, as is shown by numerous scholars (see for example the work from Burstrom (2001)), self-rated health is a strong predictor of mortality. Finally, it can be said taht even though two-year mortality might be underestimated in the population under study, it still does not suffer from bias because the results show the same signs for self-rated health and vice-versa (for a further discussion on self-rated health and its strong predictive power for mortality I redirect to the influential work from Idler & Benyamini (1997)).

7.2 Practical Implications

One of the major implications is that ethnicity plays a significant role in predicting someone's health outcomes when controlling for other SES variables. As found by Groenewold & van Ginneken (2011) in the early 2000 the Russian minority was more dissatisfied with the access to health care. Taking this into account and since Estonia is a young independent state, their healthcare system might not yet be as inclusive as in other developed countries towards minorities. Of course, to undermine this statement more research in this area needs to be conducted but if this should be true, the health care systems might need a general investigation to determine if there are systematic mechanisms at play that predict varying service outcomes related to ethnicity.

Furthermore, this thesis gives further weight that a government should not neglect education in their resource distribution process. Not only will more human capital lead to more financial output but also the costs for the health sector can be reduced. In addition, from the four SES variables, education can be directly influenced by the state and therefore a policy or school reform to improve the educational level of the citizen will most likely have a positive influence on the general health of its citizen. Finally, education seems to have the strongest effect on health outcomes of all SES variable studied in this thesis making it not only the easiest but also the most efficient SES variable that can be addressed by a policy.

7.3 Future Research

After having looked at all-cause mortality and self-reported health, I encourage future research to look at different causes of mortality in Estonia. This means that not all-cause mortality will be observed but rather different causes of death are analyzed separately. With this breakdown, the mechanism through which SES variables influence health can be better understood and also the major problem hubs can be identified from where the inequality arises in health related to socioeconomic status. For example, if low education leads to risky behaviours such as smoking which eventually leads to a higher risk of getting lung cancer, then the problem will be understood in more detail. Finally, the inequality can be addressed more efficiently.

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Appendix

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Appendix B Missing Income Variable at Random

Table 9: Missing Household Income

Depended Variable: HHincome (1 = missing)	
	(1)
Self-rated Health	-0.0515
	(0.0454)
Education (Ref. Low Secondary or Lower	
Upper & Post-Secondary	0.0341
	(0.0539)
Teriary	0.106
	(0.0716)
Occupation (Ref. Very Disadvantaged)	
Disadvantaged	0.162***
	(0.0594)
Advantaged	0.250***
	(0.0583)
Very Advantaged	0.320***
	(0.0723)
Ethincity (Ref. Estonian)	
Russian	-0.0825
	(0.0525)
Other	-0.0722
	(0.0924)
Gender (Ref. Female)	
Female	-0.0857**
	(0.0433)
Age	-0.0209***
	(0.00234)
Marital Status (Ref. Married/Married like	
Doverced or Married but living separated	0.00252
	(0.0599)
Separated	0.135**
	(0.0620)
Never Married	0.0207
	(0.0769)
Constant	0.155
	(0.162)
Observations	6,728

Appendix C Running M1 & M2 Without Household Income

Model 1 and Model 2 are run once with a restricted version where I run the model without the excluded variables and once with an unrestricted version where we include the excluded household income variables.

Table 10: Model 1 und Model 2 without Household income

Depended Variable:	Two-Year Mortality				Self-Rated Health			
	M1: 50-63		M1: +64		M2: 50-63		M2: +64	
	(1) Restricted	(2) Unrestricted	(3) Restricted	(4) Unrestricted	(5) Restricted	(6) Unrestricted	(7) Restricted	(8) Unrestricted
Education (Ref. Low or Lower)								
Upper & Post-Sec.	-0.271*	-0.236*	-0.00110	0.0350	-0.199**	-0.216***	-0.231***	-0.222***
	(0.147)	(0.140)	(0.0805)	(0.0772)	(0.0797)	(0.0738)	(0.0633)	(0.0608)
Tertiary	-0.615**	-0.527**	-0.206	-0.161	-0.612***	-0.587***	-0.500***	-0.508***
	(0.280)	(0.245)	(0.135)	(0.128)	(0.105)	(0.0943)	(0.0857)	(0.0816)
Occupation (ref. Very Disadvantaged)								
Disadvantaged	-0.335	-0.180	-0.0785	-0.0659	-0.269***	-0.306***	-0.146*	-0.166**
	(0.231)	(0.192)	(0.110)	(0.104)	(0.0780)	(0.0706)	(0.0759)	(0.0726)
Advantaged	0.0348	0.0451	-0.198*	-0.243**	-0.415***	-0.413***	-0.144**	-0.174**
	(0.199)	(0.176)	(0.108)	(0.104)	(0.0829)	(0.0729)	(0.0734)	(0.0699)
Very Advantaged	-0.157	-0.282	-0.307**	-0.300**	-0.523***	-0.572***	-0.280***	-0.317***
	(0.318)	(0.299)	(0.153)	(0.143)	(0.106)	(0.0913)	(0.0917)	(0.0867)
Ethnicity (Ref. Estonian)								
Russian	0.0264	0.0105	-0.00172	0.00290	0.289***	0.286***	0.327***	0.317***
	(0.178)	(0.165)	(0.0784)	(0.0753)	(0.0795)	(0.0713)	(0.0623)	(0.0600)
Other	-	-	-0.244	-0.282	0.0887	0.154	0.496***	0.488***
			(0.182)	(0.179)	(0.120)	(0.110)	(0.133)	(0.126)
Gender (Ref. Male)								
Female	-0.203	-0.185	-0.418***	-0.432***	0.0905	0.0998*	0.0503	0.0788
	(0.136)	(0.126)	(0.0774)	(0.0746)	(0.0591)	(0.0531)	(0.0558)	(0.0533)
Age	0.0281	0.0292*	0.0632***	0.0625***	0.0433***	0.0442***	0.0447***	0.0449***
	(0.0175)	(0.0163)	(0.00532)	(0.00511)	(0.00734)	(0.00664)	(0.00427)	(0.00408)
Marital Status (Ref. Married/Married like Relationship								
Divorces/Separated	0.0605	0.0434	-0.103	-0.0734	-0.0283	0.0221	-0.180**	-0.196**
	(0.181)	(0.167)	(0.132)	(0.124)	(0.0731)	(0.0667)	(0.0835)	(0.0789)
Widowed	0.454**	0.396*	-0.195**	-0.187**	0.145	0.170	-0.167**	-0.176***
	(0.225)	(0.215)	(0.0925)	(0.0890)	(0.127)	(0.116)	(0.0663)	(0.0635)

Never Married	0.435**	0.387**	0.0580	0.103	-0.00219	0.0439	0.102	0.0866
	(0.173)	(0.165)	(0.145)	(0.136)	(0.0962)	(0.0880)	(0.113)	(0.107)
Constant	-3.355***	-3.475***	-5.864***	-5.832***	-1.844***	-1.913***	-2.195***	-2.204***
	(1.042)	(0.964)	(0.411)	(0.394)	(0.434)	(0.392)	(0.316)	(0.301)
Observations	2,148	2,638	3,588	3,937	2,277	2,791	3,588	3,937

Appendix D Probit Regression for Model 1 & Model 2

Model 1

Table 11: Probit regression Model 1

	Dependend Variable: Two- Year Mortality				
	(1)	(2)	(3)	(4)	(5)
	A: Ages 50 - 63				
HH income in TSD EUR	0.0128	0.000193			
	(0.0272)	(0.0301)			
Education (Ref. Low Secondary or Lower)					
Upper & Post- Secondary	-0.273*		-0.286**		
	(0.147)		(0.139)		
Tertiary	-0.622**		-0.663***		
	(0.256)		(0.232)		
Occupation (Ref. Very Disadvantaged)					
Disadvantaged	-0.333			-0.411*	
	(0.224)			(0.221)	
Advantaged	0.0317			-0.135	
	(0.189)			(0.185)	
Very Advantaged	-0.168			-0.474*	
	(0.292)			(0.266)	
Ethnicity (Ref. Estonian					
Russian	0.0307				-0.00659
	(0.178)				(0.174)
Other	-				
Gender (Ref. Male)					
Female	-0.203	-0.313**	-0.252*	-0.228*	-0.313**
	(0.131)	(0.130)	(0.130)	(0.130)	(0.130)
Age	0.0283*	0.0359**	0.0299*	0.0321*	0.0359**
	(0.0167)	(0.0167)	(0.0169)	(0.0166)	(0.0166)
Mariage (Ref. Married/ Married like Relationship					
Divorced/ Separated	0.0638	0.0747	0.0506	0.0581	0.0742
	(0.180)	(0.177)	(0.177)	(0.179)	(0.178)

Widowed	0.462**	0.520**	0.467**	0.485**	0.520**
	(0.217)	(0.217)	(0.217)	(0.218)	(0.216)
Never Married	0.442***	0.531***	0.440***	0.481***	0.530***
	(0.168)	(0.162)	(0.166)	(0.161)	(0.164)
Constant	-3.380***	-4.065***	-3.464***	-3.765***	-4.065***
	(1.008)	(0.998)	(1.017)	(0.987)	(0.992)
Observations	2,148	2,148	2,148	2,148	2,148
		B: Ages 64+			
HH income in TSD EUR	-0.0637**	-0.0645**			
	(0.0297)	(0.0293)			
Education (Ref. Low Secondary or Lower)					
Upper & Post- Secondary	0.00205		-0.0679		
	(0.0819)		(0.0750)		
Tertiary	-0.204		-0.397***		
	(0.128)		(0.105)		
Occupation (Ref. Very Disadvantaged)					
Disadvantaged	-0.0805			-0.0961	
	(0.105)			(0.102)	
Advantaged	-0.193*			-0.244**	
	(0.107)			(0.0977)	
Very Advantaged	-0.308**			-0.442***	
	(0.146)			(0.121)	
Ethnicity (Ref. Estonian)					
Russian	-0.0150				0.0122
	(0.0783)				(0.0782)
Other	-0.252				-0.230
	(0.184)				(0.180)
Gender (Ref. Male)					
Female	-0.422***	-0.430***	-0.425***	-0.415***	-0.427***
	(0.0749)	(0.0750)	(0.0750)	(0.0747)	(0.0745)
Age	0.0634***	0.0630***	0.0622***	0.0634***	0.0629***
	(0.00550)	(0.00541)	(0.00550)	(0.00541)	(0.00541)
Marital Status (Ref. Married/Married like Relationship)					
Divorces / Separated	-0.116	-0.0923	-0.0880	-0.102	-0.0833
	(0.131)	(0.132)	(0.132)	(0.131)	(0.132)
Widowed	-0.214**	-0.157*	-0.181*	-0.184**	-0.140
	(0.0923)	(0.0908)	(0.0926)	(0.0920)	(0.0913)

Never Married	0.0304	0.0645	0.0789	0.0561	0.0871
	(0.143)	(0.141)	(0.144)	(0.143)	(0.141)
Constant	-5.817***	-5.912***	-5.817***	-5.900***	-5.962***
	(0.427)	(0.415)	(0.427)	(0.416)	(0.412)
Observations	3,588	3,588	3,588	3,588	3,588

Model 2

Table 12: Probit regression Model 2

	Dependent Variable: Self- Rated Health				
	(1)	(2)	(3)	(4)	(5)
	A: Ages 50 - 63				
HH income in TSD EUR	-0.0308**	-0.0509***			
	(0.0140)	(0.0138)			
Education (Ref. Low Secondary or Lower)					
Upper & Post- Secondary	-0.189**		-0.274***		
	(0.0804)		(0.0773)		
Tertiary	-0.597***		-0.902***		
	(0.106)		(0.0894)		
Occupation (Ref. Very Disadvantaged)					
Disadvantaged	-0.271***			-0.367***	
	(0.0780)			(0.0761)	
Advantaged	-0.408***			-0.588***	
	(0.0830)			(0.0770)	
Very Advantaged	-0.511***			-0.879***	
	(0.106)			(0.0876)	
Ethnicity (Ref. Estonian)					
Russian	0.279***				0.284***
	(0.0801)				(0.0775)
Other	0.0747				0.0677
	(0.121)				(0.117)
Gender (Ref. Male)					
Female	0.0885	-0.0280	0.0345	0.0823	-0.0299
	(0.0592)	(0.0554)	(0.0566)	(0.0586)	(0.0553)
Age	0.0430***	0.0481***	0.0450***	0.0453***	0.0484***
	(0.00734)	(0.00714)	(0.00729)	(0.00727)	(0.00713)

Marital Status (Ref. Married/Married like Relationship)					
Divorced/Separated	-0.0349	-0.0113	-0.0137	-0.0453	0.0165
	(0.0727)	(0.0712)	(0.0720)	(0.0721)	(0.0708)
Widowed	0.129	0.204*	0.138	0.191	0.244**
	(0.125)	(0.122)	(0.124)	(0.124)	(0.122)
Never Married	-0.0176	0.0684	0.00610	-0.0101	0.133
	(0.0955)	(0.0928)	(0.0946)	(0.0928)	(0.0929)
Constant	-1.789***	-2.397***	-1.932***	-2.069***	-2.535***
	(0.435)	(0.413)	(0.431)	(0.421)	(0.412)
Observations	2,277	2,277	2,277	2,277	2,277
		B: Ages 64+			
HH income in TSD EUR	-0.0308**	-0.0436***			
	(0.0134)	(0.0128)			
Education (Ref. Low Secondary or Lower)					
Upper & Post- Secondary	-0.230***		-0.286***		
	(0.0635)		(0.0577)		
Tertiary	-0.488***		-0.654***		
	(0.0871)		(0.0670)		
Occupation (Ref. Very Disadvantaged)					
Disadvantaged	-0.148*			-0.297***	
	(0.0759)			(0.0718)	
Advantaged	-0.136*			-0.333***	
	(0.0750)			(0.0658)	
Very Advantaged	-0.284***			-0.600***	
	(0.0922)			(0.0731)	
Ethnicity (Ref. Estonian)					
Russian	0.319***				0.342***
	(0.0630)				(0.0614)
Other	0.495***				0.462***
	(0.130)				(0.129)
Gender (Ref. Male)					
Female	0.0457	0.00211	0.0384	0.0515	0.00387
	(0.0561)	(0.0536)	(0.0542)	(0.0555)	(0.0539)
Age	0.0445***	0.0478***	0.0445***	0.0483***	0.0472***
	(0.00442)	(0.00428)	(0.00440)	(0.00435)	(0.00428)
Marital Status (Ref. Married/Married like Relationship)					
Divorced/Separated	-0.187**	-0.184**	-0.183**	-0.203**	-0.160*

	(0.0835)	(0.0821)	(0.0830)	(0.0825)	(0.0825)
Widowed	-0.176***	-0.0811	-0.152**	-0.147**	-0.0620
	(0.0661)	(0.0646)	(0.0653)	(0.0651)	(0.0646)
Never Married	0.0913	0.0959	0.0648	0.0489	0.169
	(0.114)	(0.110)	(0.112)	(0.112)	(0.112)
Constant	-2.147***	-2.571***	-2.112***	-2.466***	-2.682***
	(0.328)	(0.312)	(0.326)	(0.317)	(0.312)
Observations	3,588	3,588	3,588	3,588	3,588