

Ilona Pärssinen

**DETERMINANTS OF
OVER-INDEBTEDNESS AMONG
FINNISH HOUSEHOLDS**
Evidence from EU-SILC 2015 data

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Supervisors: Jukka Pirttilä
and Jani-Petri Laamanen
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ABSTRACT

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Over-indebtedness is a current phenomenon, which has been at public interest particularly since the last financial crisis. Over-indebtedness causes negative social and economic implications for households, which at worst can lead to social exclusion and poverty. Over-indebtedness increases also lenders' risks of credit defaults and poses a risk for the social and economic stability of the society, due to which it is important to research the phenomenon to prevent and restrict the growth of it. Over-indebtedness has been increasing steadily in Finland during last decades and has continued its growth even after the last financial crisis. In 2016, also the European Systemic Risk Board (ESRB) warned about the risks of the growing household indebtedness in Finland.

This study goes through over-indebtedness in theoretical framework and empirical findings of the determinants of over-indebtedness with a literary survey and statistical research. Traditional economic theory associates household over-indebtedness with uncertainty related to forecasting future income and according to the theory households borrow to smooth income fluctuations during their lifecycle. Over-indebtedness is a consequence of macroeconomic shocks that inevitably concern some proportion of households. Behavioral economics has recently contributed significantly on the research of over-indebtedness. Behavioral theories present over-indebtedness as a consequence of consumers' bounded rationality, which is caused by behavioral biases, inconsistent time-preferences and self-control problems. Due to bounded rationality and self-control problems, consumers end up consuming more than the optimal level on current period and accumulate too much debt compared to their income and wealth. Over-consumption and over-indebtedness increase household's financial burden, which leads to arrears and repayment defaults, when the disposable income is not sufficient to cover all expenses. Arrears and defaults are also impacted by household's equity and particularly decreases in its value, which hinders realizing assets in order to repay debt.

The study utilizes the wide EU-SILC micro-data in statistical estimation, and finds evidence supporting the importance of the risk factors identified in previous literature in causing over-indebtedness. Household's low level of income and education are major risk factors, since they lower the lifecycle resources. Level of education and the financial literacy accompanied by it have also an impact on the sustainability of household's financial decisions. Households' high expenses compared to their income increase their financial burden and increase the risk of arrears. Factors identified to increase the financial burden include living in rented accommodation and careless borrowing, in addition to low level of income. Increasing financial literacy is found to impact positively the sustainability of household's consumption and saving decisions and that it is also associated with smaller impact of behavioral biases and self-control issues.

The study supports focusing policy measures to improving financial literacy, because the common level of it is low particularly among households with the lowest income levels. The risk of over-indebtedness should also be restricted by regulating the supply of instant loans and other easily available high-cost credits more strictly. Founding a positive credit register is seen to have strong basis that would promote responsible borrowing and improve households' understanding of their financial situation.

Keywords: Household over-indebtedness, arrears, EU-SILC, probit estimation

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Ylivelkaantuminen on ajankohtainen ilmiö, jonka tutkiminen on noussut mielenkiinnon kohteeksi erityisesti viimeisimmän finanssikriisin jälkeen. Ylivelkaantuminen aiheuttaa kotitalouksille negatiivisia sosiaalisia ja taloudellisia vaikutuksia, jotka pahimmillaan johtavat syrjäytymiseen yhteiskunnasta ja köyhyyteen. Ylivelkaantuminen kasvattaa myös lainanantajien riskejä luottotappioista ja aiheuttaa riskin yhteiskunnan sosiaaliselle ja taloudelliselle vakaudelle, minkä vuoksi ilmiön tutkiminen sen kasvuun ennakoimiseksi ja rajoittamiseksi on tärkeää. Ylivelkaantuminen on kasvanut Suomessa tasaisesti viimeisten vuosikymmenten aikana ja jatkanut kasvuaan myös viimeisimmän finanssikriisin jälkeen. Vuonna 2016 myös European Systemic Risk Board (ESRB) varoitti Suomea korkeaan ja kasvavaan kotitalouksien velkaantumiseen liittyvistä riskeistä.

Tutkimus läpikäy ylivelkaantumista teoreettisessa viitekehyksessä sekä empiirisiä tuloksia ylivelkaantumisen syntymisestä kirjallisuuskatsauksen ja tilastollisen tutkimuksen avulla. Perinteinen talusteoreettinen näkemys kotitalouksien ylivelkaantumisesta liittyy tulevaisuuden tulojen ennustamisen epävarmuuteen ja teorian mukaan kotitaloudet velkaantuvat tasoittaakseen tulovaihteluita elinkaaren aikana. Ylivelkaantuminen on seurausta erityisesti makrotaloudellisista sokeista, jotka koskettavat välttämättä osaa kotitalouksista. Behavioraalinen taloustiede on kontribuoinut viimeaikoina merkittävästi ylivelkaantumisen tutkimukseen. Behavioraaliset teoriat esittävät, että ylivelkaantuminen on seurausta kuluttajien rajoitetusta rationaalisuudesta, joka johtuu taloudelliseen päätöksentekoon vaikuttavista behavioraalisista harhoista, epäjohdonmukaisista aikapreferensseistä ja itsekuri ongelmista. Rajoitetun rationaalisuuden ja itsekuri ongelmien vuoksi kuluttajat päätyvät kuluttamaan kuluvalle periodilla enemmän kuin olisi optimaalista ja kerryttävät tuloihinsa ja varoihinsa nähden liikaa velkaa. Ylikulutus ja -velkaantuminen lisäävät kotitalouden taloudellista ahdinkoa, joka johtaa maksurästeihin ja takaisinmaksun laiminlyönteihin, kun käytettävissä olevat tulot eivät riitä kattamaan menoja. Maksurästeihin ja laiminlyönteihin vaikuttaa myös kotitalouden nettovarallisuus ja erityisesti sen arvon lasku, mikä vaikeuttaa varallisuuden realisoimista velkojen takaisinmaksamiseksi.

Tutkimus hyödyntää tilastollisessa estimoinnissa laajaa EU-SILC mikroaineistoa, jonka avulla löydetään todisteita aikaisemman kirjallisuuden tunnistamien riksitekijöiden merkityksestä ylivelkaantumisen synnyssä. Kotitalouksien matala tulo- ja koulutustaso ovat merkittäviä riskitekijöitä, sillä ne madaltavat kotitalouden elämänkaaren resursseja. Koulutustasolla ja sen myötä kertyvillä taloustaidoilla on myös merkitys kotitalouksien taloudellisten päätösten kannattavuuteen. Kotitalouksien suuret tuloihin suhteutetut menot kasvattavat taloudellista ahdinkoa ja kasvattavat kotitalouksien riskiä maksuhäiriöistä. Taloudellista ahdinkoa kasvattaviksi tekijöiksi identifioidaan matalan tulotason lisäksi mm. vuokralla asuminen sekä huoleton lainaaminen. Taloudellisen lukutaidon kasvattamisella nähdään olevan positiivinen vaikutus kotitalouksien kulutus- ja velkaantumispäätösten kannattavuuteen, sekä yhteys behavioraalisten harhojen ja itsekuri ongelmien merkityksen vähentymiseen.

Tutkimus kannattaa politiikkatoimien keskittämistä talouslukutaidon kehittämiseen, sillä sen taso yleisesti erityisesti matalan koulutustason kotitalouksissa on matala. Lisäksi ylivelkaantumisen riskiä tulisi rajoittaa säätelemällä tiukemmin pikalainojen ja muiden helposti saatavilla olevien korkean koron lainojen tarjontaa. Positiivisen luottorekisterin perustamiselle nähdään vahvoja perusteita, jotka edesauttaisivat vastuullista luotonantoa sekä kotitalouksien ymmärrystä taloudellisesta tilanteestaan.

Avainsanat: Kotitalouksien ylivelkaantuminen, maksurästöt, EU-SILC, probit-mallinnus

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1 INTRODUCTION

Household indebtedness has been increasing for decades in the developed countries and is currently record-high also in Finland. Even though indebtedness is a natural part of lifecycle, monitoring and restricting the growth of it is necessary to avoid the consequences over-indebtedness has not only on the debtors and lenders, but also on the society as whole. Over-indebtedness poses a social and economic threat to the welfare of over-indebted individuals, and widespread household over-indebtedness can even threaten the economic stability of the whole society. Over-indebted households are vulnerable to economic shocks and cannot endure adverse income fluctuation, which is then reflected to the whole society as credit losses, diminished aggregated demand and results in cutbacks in production. There is currently a growing concern of widespread household over-indebtedness since it not only prolongs the recovery from any economic downturn, but also has played a major role in triggering financial crisis in the past. Period of rapid growth of indebtedness preceded both the early 1990's depression and the 2008 financial crisis. While the growth rate of indebtedness in Finland slowed down after the last financial crisis, the level of indebtedness has still been increasing ever since. The last financial crisis in particular outlined the importance of examining the development of household indebtedness and understanding the determinants associated with excessive indebtedness. Understanding the causes and consequences of over-indebtedness is at public interest. Over-indebtedness has been identified as major threat to sustainable growth also at the EU level and The European Commission has raised concern about the development of it and defined over-indebtedness as one of the key challenges in reaching the targets of reducing poverty and social exclusion.

Recent trends in the credit markets have accelerated the hazardous development of over-indebtedness. Households' conception of their indebtedness becomes easily obscure with low interest levels, new forms of instant consumer credit and increasing housing company loans. Households are encouraged to finance consumption with credit and constantly offered easy and instant credit that can be taken with little to no consideration. Consumers assessed not creditworthy enough to borrow from banks, can rely on alternative high-cost credit offered by other institutions. These households tend to also lack knowledge to make informed financial

decisions and may not comprehend the extent of their commitments. Policy responses to the adverse development of credit markets have not yet been proven successful and new manners to tackle the issue need to be developed. Adjusting policy measures accordingly is important in order to alleviate the risks that over-indebtedness poses for the stability of the economy.

Causes for over-indebtedness are traditionally searched from households' socio-economic characteristics and the circumstances they are in (see, for example Betti et al. (2007) and Disney et al. (2008)). Recent theoretical and empirical research on behavioral economics has gained more ground in explaining household over-indebtedness as a consequence of household's bounded rationality. Behavioral economics studies the impact of behavioral, i.e. psychological, cognitive, social and emotional factors on economic decision-making. Recent theoretical findings (see, for example Shefrin and Thaler (1988) and Thaler and Benartzi (2004)) model the influential biases and heuristics within households' decision-making process and form the basis for empirical experiments that examine the impact of behavioral phenomena on households' decision-making and over-indebtedness (see, for example Brown et al. (2005), Gathergood (2012) and Kilborn (2005)). Research finds strong evidence supporting the importance of behavioral factors on over-borrowing and financial difficulties.

This study aims to reveal determinants that increase household's risk of over-indebtedness and discuss the manners in which over-indebtedness is developed among Finnish households. The goal of the study is to form a comprehensive description of over-indebtedness and reveal the risk groups it. The study examines over-indebtedness from different viewpoints and presents both theoretical and empirical findings on the field. The phenomenon is first examined with comprehensive literature survey that presents theoretical and empirical findings of the nature of over-indebtedness, after which the findings are tested with an empirical research. The empirical research examines the current status of household over-indebtedness in Finland and analyses the determinants of the risk of over-indebtedness and arrears. The empirical research will mainly focus on risk groups of over-indebtedness among Finnish households but also make comparisons to other European countries. Policy measures targeted to prevent or alleviate over-indebtedness are also evaluated in the light of the results found. This study will utilize the extensive EU-SILC micro-data that contains specific household and individual level characteristics and combines them with relevant subjective measures of financial difficulties. The approach is based on survey data that is suitable for

revealing risk of over-indebtedness before household's financial difficulties have resulted in defaults.

This study is structured as following. The second chapter discusses the concept of over-indebtedness by first presenting three models of measuring over-indebtedness and different definitions of over-indebtedness derived from these measures. The second section of the second chapter then discusses the consequences of over-indebtedness for individuals, lenders and the society. The third section of the second chapter presents the current status of over-indebtedness in Finland and previous studies on the field. The third chapter describes over-indebtedness from a theoretical point of view. The first section of the third chapter presents the traditional theory of lifecycle hypothesis (LCH) and explains indebtedness as a natural part of household's lifecycle, while discussing the implications of excessive indebtedness. The second section of the third chapter then presents theoretical findings of behavioral economics that explain household over-indebtedness. The third section of chapter 3 then presents the ability-to-pay and negative equity theories that explain the decision-making leading to arrears and payment defaults and discusses the seriousness of different circumstances. The chapter 4 presents a comprehensive literary survey of empirical evidence of over-indebtedness. The chapter is divided into four sections, the first of which presents research related to household socio-economic characteristics and circumstances that are associated with increased risk of over-indebtedness. The second section of the fourth chapter presents empirical findings of the importance of financial literacy on financial decision-making and alleviating the risk of over-indebtedness. The third section focuses on findings of behavioral economics and discusses the impact of behavioral biases on household over-indebtedness. The fourth section of the chapter 4 then presents evidence on the importance of over-commitment on the risk of over-indebtedness and findings of the impact of credit market policies. The chapter 5 then presents empirical research conducted of household over-indebtedness in Finland. This study utilizes European Union Statistics on Income and Living Conditions (EU-SILC) data and examines the determinants of over-indebtedness drawn from the theoretical findings and literature survey. Comparative study of the determinants of over-indebtedness will also be presented. The research methods will be described in further detail in the chapter 5. The sixth chapter then goes through the results and draws conclusions of the risk groups of over-indebtedness. The policy measures targeted to fight over-indebtedness are also presented and evaluated on the light of the findings of the research. The study is then concluded in the chapter 7.

2 OVER-INDEBTEDNESS

The following sections present over-indebtedness as a phenomenon. This chapter first presents three models of measuring over-indebtedness. In the previous literature, there is no consensus on the definition of over-indebtedness or where can one draw the line between indebtedness and *excessive* indebtedness (Betti et al. 2007, 138). Suggestion for common European definition for over-indebtedness, which is prepared by task force of the European Commission for enabling pan-European comparability, is also presented. The second section will then discuss the consequences that over-indebtedness has for households, lenders and the society and in the third section the current status of household over-indebtedness in Finland is presented.

2.1 Measuring over-indebtedness

As there is no consensus on how over-indebtedness should be defined, there is no universal method to measure it either. Three approaches to modeling over-indebtedness are presented in the literature: objective, subjective and administrative models (Betti et al. 2007, 138). The three models of measuring over-indebtedness are presented in the following section 2.1.1 after which a proposal for a common definition of over-indebtedness of European Commission's task force is presented in the section 2.1.2.

2.1.1 Objective, subjective and administrative models

Objective model of measuring over-indebtedness is based on quantitative measures of excessive borrowing and spending that cause households' inability to repay or service debt. *Subjective model* is based on households' subjective judgment of their ability to service and repay debt and regards households over-indebted if they have to sacrifice their standard of living in order to pay back or service their liabilities. *Administrative model* measures over-indebtedness based on arrears and defaults that have been officially registered or declared in court. Administrative approach does not take the risk caused by household's unsustainable debt or consumption levels into consideration. (Betti et al. 2007, 138, 142.)

Objective indicators of over-indebtedness measure households' excessive borrowing and spending that increase households' risk of over-indebtedness and defaulting. Objective indicators of over-indebtedness describe household's unsustainable financial situation that has necessarily not yet resulted in defaults or bankruptcy. The most common objective indicators of over-indebtedness measure households' unsustainable levels of consumption to income, debt to assets or credit-service to income ratio. High consumption to income ratio may reveal unsustainable spending habits that may lead to excessive levels of debt if consumption is at least partly financed with borrowing. High consumption to income ratio may also indicate that household does not save enough of its disposable income in order to prepare for adverse income shocks. Households with irresponsible spending habits may have little to no liquid resources to cover unexpected expenses or repay their commitments when facing an adverse income shock, which makes them very vulnerable for adverse economic fluctuations. High debt to assets ratio measures household's negative equity position, where household is not able to cover its debt with own assets. Very high negative equity position indicates that household has an increased risk of defaulting on commitments if it faces adverse economic shocks. Debt servicing to income ratio is another commonly used measure for excessive debt levels. High debt servicing expenditure to income ratio indicates that household is struggling with debt repayment and has an increased risk of falling into arrears or defaulting on commitments. (Betti et al. 2007, 142–143, 150–151)

The difficulty in using objective measures is that the critical levels of over-indebtedness are hard to define. Betti et al. (2007, 142–143) argue that even though objective measures can reveal over-consumption and over-borrowing well, over-indebted households cannot be unambiguously identified with the most commonly used objective measures. Economic theory predicts that consumption to income ratios vary through the lifecycle. The lifecycle hypothesis (LCH) that is discussed in more detail in the following chapter, assumes that consumption to income over the lifecycle has a U-shape where the ratio first decreases with age as consumer's income increases and then again increases as income declines towards retirement and old age. In other words, consumer's consumption to income ratio is assumed to depend on age and a single critical value might not describe over-indebtedness correctly. Betti et al. (2007, 142–143) also show that over-indebted households tend to actually have lower than average consumption to income level, indicating that over-indebted households have already been forced to cut down consumption to pay their outstanding liabilities.

Betti et al. (2007, 142–143) argue that major problem of using debt to assets and debt-servicing expenditure to income ratios as measures of over-indebtedness are that they disregard some actually over-indebted households and consider some households over-indebted that actually have a stable financial situation. They argue that high debt to assets ratio alone does not take into consideration household's capability to repay debt with current available resources. On the other hand, some households with net wealth might not be able to realize their assets and struggle with debt repayment due to insufficient current resources. Davydoff et al. (2008, 45) also argue that debt to income ratio itself does not indicate over-indebtedness and borrowers are concerned only about debt servicing to income ratios. Debt servicing to income ratio on the other hand regards also extreme risk-averse behavior as sign of over-indebtedness. Extreme risk-averse consumers may have high debt servicing to income ratios even if they have sufficient current resources because they are willing to restrict their current consumption in order to repay debt as fast as possible. (Betti et al. 2007, 142–143, 150–151.) Davydoff et al. (2008, 45) also point out that the debt servicing to income ratio does not take into consideration other than credit commitment related payments and basing the analysis on the measure alone would give an incomplete picture of household's financial situation.

Subjective approach of over-indebtedness assumes that households are the most competent to judge their own financial situation and that their own perception is the most accurate way to model over-indebtedness (Betti et al. 2007, 144). Subjective measures of over-indebtedness can be collected with a household survey study alike the one used in this research (EU-SILC). According to subjective measures, household is identified as over-indebted if it judges its financial commitments as a burden or that it is struggling to repay debt. Different surveys use different questions to reveal over-indebtedness. The indicators of over-indebtedness may include questions of subjective financial burden, household's liquidity situation or arrears. By using a subjective measure of financial burden to identify unsustainable debt to asset positions one can avoid the difficulties identified with objective measures. Over-indebtedness is strongly associated with illiquidity and surveys attempt to reveal the household-specific thresholds, when households are no longer able to make ends meet without sacrificing its standard of living. Arrears are rather an objective measure than a subjective one, however when they are collected with a survey also minor arrears that have been repaid and not resulted in registered defaults are taken into consideration. Self-reported arrears may reveal also less severe illiquidity issues.

Due to subjective measures depend on household's own judgment of their financial situation they can over- or underestimate households' actual financial situation and the sustainability of their debt position. Disney et al. (2008) argue that instead of reflecting household's own financial situation, self-reported measures of over-indebtedness may reflect the overall economic situation and household's judgment of the severity of the current economic circumstances (Disney et al. 2008, 4, 51). Keese (2012, 127) argues that subjective over-indebtedness is dependent on household's current and expected financial situation, their attitude towards debt and general characteristics such as gender or culture.

Administrative model of over-indebtedness reveals households' current unsustainable financial situation but cannot actually predict household's vulnerability to adverse shocks (Disney et al. 2008, 4). Administrative measures are usually based on statics on debt settlement including debt settlement processes, insolvencies, bankruptcies, sequestrations or summonses. Administrative measures reveal severe over-indebtedness that has led to arrears and defaults and the severity of the situation with the amount of outstanding debt or the length of the default situation. Over-indebted individuals may however have prolonged financial difficulties long before their first payment defaults due to consumers tend to avoid bad credit records even by borrowing more in an already difficult financial situation. Using registered debt settlement as a measurement of over-indebtedness captures only individuals whose financial problems have already become severe. This group of individuals covers only a small proportion of over-indebted individuals. (Davydoff et al. 2008, 42–43.) Davydoff et al. (2008, 32) show in their report that administrative measures are commonly used at national level statistics. They find that the most common measures used by governments in EU member states are administrative and legal measures based on registered debt settlement processes or arrears. The processes and juridical systems however differ between nations causing a lack of comparability across countries (Davydoff et al. 2008, 36; Betti et al. 2007, 142).

2.1.2 Towards a common European definition of over-indebtedness

Due to there is no consensus on measuring over-indebtedness and to enable statistical comparison across countries and analyzing the effects of policy measures, a group of experts has prepared a report for the use of the European Commission to define common definition and measures of over-indebtedness. The report '*Towards a common operational European*

definition of over-indebtedness' reviews literature on the causes and nature of over-indebtedness and aims at providing foundation for common European definition of over-indebtedness, give an overview of political, administrative and legal approaches to over-indebtedness as well as providing a handbook for policy makers in EU member states for measuring and tackling over-indebtedness. (Davydoff et al. 2008, 5–6.)

Davydoff et al. (2008, 34–37) find in their report that the definitions of over-indebtedness vary between European countries and that none of the countries surveyed have an official definition or measurement of over-indebtedness. They summarize the most common elements in the definitions of over-indebtedness and argue that the common definition should be measured at household level, since the income of household members can be assumed to be pooled. In addition, only contracted commitments should be considered when considering the causes of over-indebtedness and informal commitments excluded. According to their proposal, household should be defined as over-indebted if it is unable to meet recurring expenses and is unable to meet contracted commitments without reducing its standard of living. Being defined as over-indebted should indicate that household has structural and persistent financial difficulties instead of temporary ones and suffers from illiquidity, meaning that household is unable to alleviate the situation by realizing assets or borrowing. (Davydoff et al. 2008, 37.)

Since over-indebtedness is multi-dimensional, Davydoff et al. (2008) suggest that over-indebtedness should be measured with multiple indicators instead of using only a single indicator. Their report reviews commonly used indicators in European studies: statistics on arrears and debt settlement, surveys of households' financial burden and other indicators including objective measures (e.g. debt to income and debt service to income ratio) and register based measures (e.g. users of debt service agencies). The report analyses the indicators based on their information content, comparability, reliability, frequency, coverage and usage. The suggestion for common European definition of an over-indebted household is that household (1) has comparably high expenses to income that force it below the poverty threshold, (2) has structural arrears, (3) is burdened by monthly payments of financial commitments, (4) considers its payment capacity at least difficult and (5) suffers from illiquidity and thus is unable to meet unexpected expenses and is not able to repair its finances by resorting to financial or non-financial assets or further borrowing. Households at risk of over-indebtedness fulfill the five measures mentioned apart from that they are only

approaching the poverty threshold or the minimum cost of living but have not yet been forced below it. With structural arrears, the definition refers to a situation where household has frequent payment delinquencies that necessarily have not yet resulted in payment defaults. (Davydoff et al. 2008, 55.) The suggestion of Davydoff et al. (2008) will be utilized also in the empirical study conducted in the chapter 5.

2.2 Consequences of over-indebtedness

Over-indebtedness is an economic and social problem that has severe impacts on the stability of the society. Over-indebtedness has an adverse impact on the welfare of individuals and forces them to lower their standard of living. Over-indebtedness also poses individuals to risk of poverty and social exclusion. Borrowers' over-indebtedness increases the risk of credit defaults and jeopardizes the financial stability of lenders and at extreme situations, the stability of the whole financial sector. Understanding the severity of over-indebtedness and its determinants is vital in order to adjust policy measures accordingly.

2.2.1 Consequences for individuals

Over-indebtedness leads to payment defaults that restrict consumers' access to credit markets and decreases the ability to smooth consumption with income volatility. Over-indebted consumers are forced to lower their standard of living and often the financial situation does not recover even after income increases because they need to first pay back the outstanding debt. (Gutiérrez-Nieto et al. 2017, 194–196; Gerlach-Kristen & Lyons 2017, 2.) Financial service providers base their decisions to grant credit on information given by the borrower and credit history records. Credit records showing arrears are an indication of a lowered creditworthiness to lenders due to which over-indebted individuals face exclusion from credit. Commercial banks have little to no incentives to serve individuals with recorded arrears and they need to rely on credit from alternative financial providers. Alternative credit usually comes with high interest rates and charges, limited amounts of credit as well as short repayment periods. These disadvantageous conditions often increase the number of credit contracts needed and lead to a vicious cycle of repaying outstanding debt with new debt. Over-indebtedness is particularly concerning as the impact of it is disproportionate among the weakest individuals in economic and social terms and may result in complete financial

exclusion. Over-indebted individuals may even exclude themselves from financial services due to negative past experiences and fear of losing control. (Anderloni & Vandone 2011, 3–4.) Over-indebtedness also impacts making other types of contracts such as hire purchase contracts, tenancy agreements or even employment contracts at some cases. Over-indebted individuals are forced to prepay commitments in order to make contracts of basic needs such as mobile subscription or insurance with the little current resources they have. Recorded arrears make it difficult to move into even a cheaper rental apartment and might make individuals dependent on social support. All these effects all deepen the risk of social exclusion and poverty.

Over-indebtedness has an adverse impact on individual's psychic well-being. Over-indebtedness has adverse psychological impacts and lowers the self-esteem of individual (Gutiérrez-Nieto et al. 2017, 194–196). Studies show that over-indebtedness can lead to severe distress that may have also physical implications when over-indebtedness is a long-term situation. Brown et al. (2005, 656–659) show that household heads of over-indebted households report significantly increased levels of distress and lower levels of psychological well-being than those without debt. The impact is mainly caused by having unsecured credit since household heads with only mortgage report average levels of distress. Other studies also confirm that the impact of debt on health is due to subjective judgment of debt burden and not by the objective level of debt per se. The objective level of debt correlates with factors that indicate better socioeconomic status, such as higher wealth levels. Households also have different optimal levels of debt during the lifecycle, which may explain the results. (Selenco & Batinic 2011, 1728–1729; Sweet et al. 2013, 98.)

Long-term indebtedness impacts also physical health. Blomgren et al. (2014) study Finnish individuals that had been under foreclosure for at least 15 years until 2010 and find that risk of severe health problems including diabetes, coronary diseases and pulmonary diseases is increased among long-term over-indebted individuals in comparison to their control groups. They also find that the impact of over-indebtedness on health is stronger among women than men. They suggest that the impact is due to individual's distress of debt burned, their reduced disposable income due to foreclosure, which causes health-damaging behavior.

2.2.2 Consequences for the financial sector and the society

Over-indebtedness may lead to repayment delinquencies especially in economic downturn when over-indebted individuals are no longer able to meet their liabilities. Due to adverse economic shocks the number of arrears may increase sharply and increasing number of defaults on loans may even endanger the solvency of lenders and cause loss of reputation and diminish the trust in the financial sector. (Gutiérrez-Nieto et al. 2017, 194–196; Serrano-Cinca et al. 2014, 3801–3802, 3809.) Studies show that failed banks are associated with fast credit growth before a financial shock and a sharp decline straight after it as the economic downturn increases the delinquencies in repayments (Serrano-Cinca et al. 2014, 3801). Risk of default can become contagious and affect also other banks and the stability of financial system (Gutiérrez-Nieto et al. 2017, 191).

The level of outstanding debt to disposable income expanded effectively in all EU countries during few years before the last financial crisis. Household credit growth coincided with decreasing of financial difficulties and arrears due to economic expansion and easier access to credit. The proportion of households having difficulties making ends meet declined especially in those countries with the fastest growth of indebtedness. Statistics show that fast credit growth before the crisis contributed to the extent a country was impacted by the crisis: the countries that were impacted first and hardest by the crisis were also the ones the level of household indebtedness was highest before the crisis. In Finland however, credit growth was at mediocre level (19 %-points from 2004 to 2007) yet arrears declined only marginally and no impact on making ends meet could be perceived. The relation of indebtedness and financial difficulties is thus not straightforward, since even if consumption smoothing eases with credit availability, serving outstanding credit increases significantly household's expenses it must cover with income. As the financial crisis hit, households had accumulated significant levels of debt and due to the slowdown in the growth of real income, the increased costs of servicing the accumulated debt and the cutting of credit, financial difficulties increased significantly. (Fondeville et al. 2010, 18–23.)

Extensive household over-indebtedness may trigger economic crises and pose a risk for the whole society, since over-indebted households are particularly vulnerable to adverse economic shocks. Major proportion of their disposable income is bound by debt servicing and repayment costs, hindering their capability to prepare for income fluctuations. The number

and value of payment defaults begins to increase with economic downturn, leading to growing credit losses and increasing default risk for lenders. Over-indebtedness worsens the impact of negative income shock on aggregated demand, as households are not able to finance consumption with lending due to their payment defaults. The demand shock leads to profit losses and increasing rate of bankruptcies and business loan defaults that are vital for the economic stability. Even though the financial sector could bare the credit losses on household sector loans, the impact of the demand shock extends the impact on broader to the economy. (Nykänen 2018.) Even after income has increased to its original, it takes time before the consumption to recovers from the crisis since households have to first repay their arrears (Gerlach-Kristen & Lyons 2017, 2).

According to Bank of Finland, excessive indebtedness can pose even a systemic risk to the financial sector. Over-indebted households typically have consumer credit in addition to mortgage and while major part of consumer credit is collateralized and granted by banks, non-banks that are not under the supervision of authorities grant a significant and increasing proportion of consumer credit. These lenders include small-loan companies and peer-to-peer lending and their business models are potentially not adequately risk tested against adverse financial shocks. The credit granted by these companies is associated with high APRs (annualized percentage rate) and higher than average default rates as it is typically granted to individuals assessed uncreditworthy by banks. These types of consumer loans pose a social risk to the society due to they are associated with triggering debt cycling and arrears and leading to severe financial difficulties. Even if consumer credit granted by these companies does not yet pose a systemic risk, the evolvement of the sector needs to be closely followed. (Koskinen & Tuomikoski 2017.)

Over-indebtedness increases poverty in society, especially since households with the lowest levels of income are the most vulnerable to its consequences. Over-indebted households are able to consume a significantly smaller proportion of their income than non-indebted households, due to high debt servicing costs. Over-indebtedness is an important factor causing and sustaining poverty in society, especially among low-income households, elderly households and households that have only one adult provider. (Betti et al. 2007, 154; Gutiérrez-Nieto et al. 2017, 197.)

2.3 Over-indebtedness in Finland

Household indebtedness has been increasing in Finland since late 1990's and is currently above the EU average. The European Systemic Risk Board (ESRB) also raised a concern regarding the risks of the growing indebtedness among Finnish households. During the past two decades the debt to disposable income ratio of Finnish households has increased from 60 % to almost 130 %. Meanwhile growth rate of indebtedness persisted through the recession followed by the last financial crisis, household disposable income and savings rate have been declining. In 2016 the savings rate turned negative and was even further diminished in 2017 and the growing spread between debt to disposable income and savings to income of Finnish households raises concern about the financial stability of Finnish society. Debt is particularly unevenly distributed in Finland as 10 % of all households borne 50 % of all debt granted by financial institutions. They account for one fifth of all indebted households and have debt over three times their annual disposable income and are especially vulnerable to any adverse shocks. Household indebtedness has historically been a major trigger of economic crises due to it increases households' vulnerability to adverse economic shocks. Household over-indebtedness increases the vulnerability of the whole society and the extent the economy is impacted by adverse shocks. Mortgage forms major part of household debt, which makes households' financial stability also dependent on residential real-estate market developments. Mortgage is typically granted with variable interest, which exposes households to interest rate risk. Particularly as interest levels begin to increase after a long period of low interests, households without saving may find themselves in financial difficulties. (Bank of Finland 2017; OSF 2018c; ESRB 2016.) The ESRB also warned that the Finnish banking sector is very concentrated and large compared to the size of the economy, has large mortgage portfolios the risk weights of which are lower than on average in Europe and heavily reliable on market funding. Due to the interlinked structure of the Nordic-Baltic financial sector, the ESRB raised also a concern of the contagious effect across the region if the risks of household indebtedness were to be realized. (ESRB 2017, 44; ESRB 2016.)

The stock of consumer credit grew 5.7 % in 2017, and the growth rate of unsecured credit was particularly high at 10.9 %. Credit institutions operating in Finland grant 80 % of all consumer credit. The remaining 20 % of the stock is for most part granted by other financial institutions and foreign credit institutions. Small-loan companies and peer-to-peer lending

account for a small proportion of the whole stock. (Bank of Finland 2018.) Even though mortgage and secured consumer credit form the largest part of total household debt stock, unsecured credit is the riskiest debt type that triggers household over-indebtedness. Instant loans are major triggers for over-indebtedness as they often are taken with little consideration and in situations that are already financially difficult. After regulatory attempts to restrict the interest rate of small loans (under 2,000 euros) and marketing of instant loans, new forms of loans have been introduced to the markets. These loans include limit loans and loans to aggregate the existing small loans into one larger loan, to which the interest restrictions do not apply. Aggregated loans have typically tempting conditions as the monthly installments, interest and costs are typically smaller than of all the commitments that debtor has combined. The repayment periods however are long, and the debt burdens increase to substantial levels and only prolong debt problems. Marketing of limit and aggregated loans is targeted to debtors that already have multiple commitments that they are unable to handle.

Payment defaults in Finland are piled up to same individuals that on average have 15 registered payment defaults. Suomen Asiakastieto Oy registered almost 1.3 million new payment default entries by the third quarter of 2018. Payment defaults were registered for 7,500 new persons compared to Q3/2017 and the total number of people with payment defaults was record-high, over 380 thousand, in Q3/2018. (Asiakastieto 2018.) Yearly half a million persons (including juridical persons) have payments under debt enforcement. Debt enforcement was terminated during the year 2017 considering 55 % of these people. They were either able to repay their debt, the debt was expired, or they were declared to have no garnishable income or distrainable assets. Payments under debt enforcement include also fees under public law that do not result in registered payment default if they are repaid within 1.5 years debt enforcement has begun. The total number of individuals under debt enforcement and the amount of outstanding debt has been increasing for years and is currently record high. (OSF 2018b.)

Over-indebtedness is a topical subject also in Finland and noteworthy studies have already been conducted of Finnish households' over-indebtedness. Rantala and Tarkkala (2009) have conducted an extensive research of debt problems at the turning point of the economic upturn and financial crisis. More recent research is presented by Raijas, Lehtinen and Leskinen (2010) and Oksanen, Aaltonen and Rantala (2015). Raijas et al. (2010) study the determinants of over-indebtedness utilizing Finnish studies and statistics on the field. Oksanen et al. (2014)

contribute to the Finnish research by conducting an extensive study of over-indebtedness based on administrative information of debt enforcement. Hyytinen and Putkuri (2018) contribute to the behavioral research of over-indebtedness by studying the impact of optimism on over-borrowing with Finnish household data. They perform unique analysis of household's borrowing behavior and the forecasting errors they make and find novel results on the linkage of optimistic forecasting errors and accumulating excessive levels of debt.

Finland, as a Nordic welfare state, is considered to take care of the basic necessities of its citizens, such as healthcare and basic livelihood (Oksanen et al. 2015, 232). Oksanen, Aaltonen & Rantala (2015, 232) hypothesize in their study of debt problems in Finland that the security provided by the welfare state diminishes the impact of socio-economic factors on the risk of debt problems, while individual characteristics and lifestyle as well as behavior regarding economic decisions has more role in explaining debt issues. Agreeing with Oksanen et al. (2015), this provides an interesting aspect for studying the determinants of over-indebtedness among Finnish households.

3 OVER-INDEBTEDNESS IN THEORETICAL FRAMEWORK

The following chapter focuses on the theoretical framework of over-indebtedness. The chapter is divided into four parts. The section 3.1 presents the traditional economic approach to indebtedness: the lifecycle hypothesis of consumption and saving. The section describes households' consumption-saving decisions and discusses the nature of indebtedness explained by the model. Reasons for over-indebtedness that are in line with the traditional theory are also discussed. The section 3.2 presents theoretical behavioral research that attempt to explain households' perceived consumption-saving decisions that contradict with the traditional rational expectations model. The section presents the relevant behavioral drivers of over-indebtedness that are due to biases within individual's decision-making process. The third section 3.3 then presents the *ability to pay* and *negative equity theories* that explain households' decisions to default on their commitments.

3.1 Traditional economic theory

Indebtedness in traditional economic theory is explained with household consumption smoothing over the lifecycle. The *lifecycle permanent income hypothesis*¹ (LC-PI) states that households' current consumption is not dependent on their current income, instead they consume based on their lifecycle resources that are distributed evenly throughout the lifecycle. Rational consumers are assumed to be able to solve the optimal level of consumption that is a constant fraction the consumption opportunities that can be financed with the lifecycle resources. Households redistribute their resources over the lifecycle and smooth the impact of income fluctuations on consumption by borrowing and saving. Indebtedness is thus an optimal and rational decision for young households in particular, since their level of income is lower than the lifecycle permanent level. While current income exceeds the lifecycle permanent level, households save the excess income for retirement when again the level of income decreases. The level of consumption is thus assumed not to vary with the level of current income, instead to remain constant during different parts of the lifecycle. (Disney et al. 2008, 6; Gutiérrez-Nieto et al. 2017, 189; Hall 1988, 971.)

¹ The lifecycle permanent income hypothesis is based on the theoretical findings of Friedman (1957) and Modigliani (1966)

The theory assumes that rational consumers are able to “solve” the optimal level of consumption that can be financed with the lifecycle resources. Households’ utility maximization over the lifecycle is based on intertemporal allocation of resources between current and future periods. Based on Deaton (1992), Betti et al. (2007, 138) present the optimal level of consumption in period t as a constant fraction c :

$$(1) \quad c_t = c = \frac{r}{(1+r)} \left(\sum_{i=0}^T \frac{y_{t+i}}{(1+r)^{t+i}} + A_t \right).$$

The right side of the equation presents the lifecycle resources: y_t is the period t income, r the real interest rate and A_t is household’s assets on period t that can be positive or negative. The equation (1) states that the constant optimal level of consumption is financed with current income and either with wealth or by borrowing when current resources fall short of lifecycle permanent level. (Betti et al. 2007, 138.)

In the generalization of the LCH, consumers are able to optimize their level of lifecycle consumption based on their rational expectations of future resources and thus their future assets and liabilities remain balanced during the lifecycle and over-indebtedness should not occur. The generalization however does not acknowledge the impact of uncertainty related to predicting future income or wealth development. Households may face unpredictable adverse events that are not in their control, such as external macroeconomic shocks that trigger unemployment or unexpected changes in one’s health that may cause incapacity for work. The uncertainty related to predicting future income is in fact the only factor explaining over-indebtedness that is in accordance with the LCH, since the theory assumes that excluding unexpected events, rational consumers are able to estimate their lifecycle resources and adjust current consumption to it. Betti et al. (2007) present the impact of uncertainty following Hall (1978) that presents a commonly referred approach to incorporating uncertainty into the LCH. In the model future income is assumed to be stochastic, i.e. the changes of it to be completely random. Betti et al. (2007, 139) state that as consumers choose the optimal level of consumption with all available information, the change of optimal consumption under uncertainty can be presented:

$$(2) \quad E_t(c_{t+1}) = c_t \rightarrow c_{t+1} = c_t + u_{t+1},$$

where u_{t+1} utility in period $t + 1$. The presentation is known as the *Martingale Hypothesis* and states that the expected change in consumption from period t to period $t + 1$ is zero (i.e. the expected consumption of period $t + 1$ is the consumption level of period t). When incorporating uncertainty in the model, consumers are no longer able to “solve” the optimal consumption level and the optimal level of consumption can thus change with new information, differentiating from the assumption of constant consumption of the general LCH. According to the Martingale Hypothesis, consumers use all available information in estimating lifecycle income and all expected information including (expected) changes in future income, should already be incorporated into the optimal level of consumption. The general stochastic presentation states that the optimal level of consumption changes only due to unexpected information and that the changes of it are random. The unpredictability of random changes causes over-indebtedness when the optimal level of consumption decreases drastically due to unexpected shocks, meanwhile the consumer has borrowed based on former estimation of the optimal consumption. Such unpredictable changes that are out of control of the individual are mainly adverse macroeconomic shocks that impact households’ income (or expenses). Macroeconomic shocks affect inevitably a proportion of households, implying that over-indebtedness is a phenomenon that is out of consumers control when estimating the optimal consumption. As long as consumers are assumed to have rational expectations, households that are not impacted by adverse macroeconomic shocks should never become over-indebted. Rational households base their consumption and borrowing decisions on all available information about their future resources and their assets and liabilities should remain balanced if no adverse and unexpected external shocks occur. (Betti et al. 2007, 139–141.)

3.2 Behavioral theory

Traditional economic theory faces criticism since it assumes consumers are able to solve complex optimization problems under uncertainty, or at least act as if they were able to optimize a constant consumption level for the lifecycle, but also due to empirical evidence shows a strong correlation between current period income and consumption. Behavioral economics has gained more ground on the field by providing plausible explanations for over-indebtedness, beyond the uncertainty of estimating future income. Behavioral economic theories are based on an assumption that individuals have *bounded rationality*, i.e. they do not

behave as expected by the traditional theory of rational expectations due to their decision-making is restricted by behavioral biases. According to behavioral theories households fail to adjust their current consumption to their lifecycle resources because of behavioral biases and instead end up consuming more than the optimal level. Behavioral theories also suggest that in addition to their incapability to solve the optimal level of consumption, consumers fail to follow their consumption or saving plans due to lack of self-control. Over-consumption leads to excessive indebtedness when the current level of income cannot cover the consumption and spending needs to be financed with debt. And while current income could cover the desired level of consumption, over-consumption leads to unsustainably low savings rates. (Betti et al. 2007, 141; Ottaviani & Vandone 2011, 755; Thaler & Benartzi 2004, 165.) The following section will present factors presented by behavioral theories that impact individual's decision-making processes and lead to holding unsustainable levels of debt compared to resources.

Behavioral economics assume that consumers have inconsistent time preferences and are *present biased*, which can explain the perceived correlation of current income and consumption. Inconsistent time preferences and myopia (i.e. strongly preferring current period utility at the cost of future benefits) impact the allocation of resources for current and future periods and may lead to over-consumption and over-indebtedness. The traditional theory of rational expectations assumes that consumers choose the optimal consumption level by optimizing the lifecycle level with an exponential discounting model, where future costs and benefits are discounted with the real interest rate. Behavioral economics model the impact of present bias with *hyperbolic discounting* that applies an additional factor for discounting future costs and benefits. O'Donoghue and Rabin (2001) present the impact of present bias, utilizing the model developed by Phelps and Pollak (1968) and used by also Laibson (1997). O'Donoghue and Rabin (2001, 126) present consumer's intertemporal preferences at period t with utility function:

$$(3) \quad U^t(u_t, u_{t+1}, \dots, u_T) \equiv \delta^t u_t + \beta \sum_{\tau=t+1}^T \delta^\tau u_\tau,$$

where u_t presents the utility received at period t , δ is the discount factor $\delta = \frac{1}{(1+r)^t}$, where r is the discount rate and β presents consumer's time-inconsistent preference for immediate satisfaction. Current utility is weighted with δ^t , while the weight for future utility is $\beta \delta^t$. If $\beta = 1$ the equation (3) corresponds to the exponential discounting model, according to which

time-consistent consumers value their utility based on theories of rational expectations. Time-consistency in preferences indicates that consumer prefers to have the same level of utility in all periods and does not prefer the utility or well-being in one period over the others. When $\beta < 1$, consumers are present biased and prefer current period utility at the cost of future utility, which is more heavily discounted than it would be with the exponential discounting model. Time-inconsistency leads to consuming too much in all periods, since also as the next period $t + 1$ comes, the current utility u_{t+1} , is strongly preferred at the cost of future utility. (O'Donoghue and Rabin 2001, 125–126.)

Behavioral theories acknowledge that consumers can be aware of their myopic preferences and attempt to restrict their consumption with financial planning. Behavioral findings argue that even if consumers are capable of performing financial planning, they fail to follow any pre-defined plan due to lack of self-control. Shefrin and Thaler (1988) illustrate the issues with self-control on their *Behavioral Life-Cycle Hypothesis* with a dual preference set consisting of planner and doer preferences. There is an internal conflict between the two sets of preferences: the planner attempts to maximize the lifecycle utility that consists of doer sub-utilities, while the doer would maximize its (short-run) utility by consuming all resources on current period. The planner will need to exert willpower to restrict the myopic behavior of the doer, which causes psychic costs caused by resisting the temptation of having immediate benefits and gratification. By having to exert willpower, the short run utility diminishes more than is caused by the reduction in consumption, and the more the consumption needs to be restricted, the higher are the costs of the willpower effort. (Shefrin & Thaler 1988, 611–612, 615.)

As presented by Shefrin and Thaler (1988), consumers are assumed to be able to restrict their myopic behavior by exerting willpower, the impact of which is however dependent on how aware consumers are of their self-control problems. Present biased consumers are typically in behavioral theories divided into *naïve* and *sophisticated* individuals, the former of which are unable to realize their inconsistent time-preferences or foresee their self-control problems, while the latter are aware of them and attempt to restrict their behavior by exerting willpower. (Thaler & Benartzi 2004, 167–168.) O'Donoghue and Rabin (2001) present a model of partial naïveté to illustrate the behavior of individuals with different levels of self-control problems. They define $\hat{\beta}$ as consumer's own belief of their present bias. Consumers behave as modeled

by equation (3) and are divided into four groups depending on the relation of their beliefs and their actual present bias β :

$$\left\{ \begin{array}{ll} \hat{\beta} = \beta = 1 & \text{Time-consistent} \\ \hat{\beta} = \beta < 1 & \text{Sophisticated} \\ \hat{\beta} = 1 > \beta & \text{Naïve} \\ 1 > \hat{\beta} > \beta & \text{Partially naïve} \end{array} \right.$$

Time-consistent consumers behave as assumed by the traditional theories of rational expectations. By setting $\beta = 1$ in the equation (3), it corresponds to the exponential discounting model. Sophisticated present biased consumers use hyperbolic discounting ($\beta < 1$) instead, but are completely aware of their self-control problems ($\hat{\beta} = \beta$). Naïve consumers on the contrary are unaware of their self-control problems and believe they are acting as time-consistent consumers ($\hat{\beta} = 1$), but are actually present-biased ($\beta < 1$). Partially naïve consumers on the other hand acknowledge their self-control problems ($\hat{\beta} < 1$) but underestimate the magnitude ($\hat{\beta} > \beta$) and instead believe that they are acting as sophisticated individuals. Previous literature on self-control problems typically has divided present biased into only two groups, sophisticated and naïve. O'Donoghue and Rabin (2001) argue that replacing the setting with partial naiveté, models the self-control problems more accurately, since any degree of naiveté results in different choices than complete sophistication. (O'Donoghue and Rabin 2001, 127, 130.)

Naïveté increases the risk of over-indebting, since being unaware of their self-control problems naïve, or *partially naïve*, individuals rush into having immediate gratification. The lack of self-control leads to over-consumption that can be financed with debt, since the future costs of over-consumption and irresponsible borrowing are heavily discounted and neglected when making current period consumption decisions. Naïve individuals tend to be optimistic and prone to procrastinating with activities that have immediate costs, such as paying more than the minimum amount due on the credit card. Procrastinating with debt repayment accelerates the accumulation of debt and increases their risk of over-indebtedness. Completely sophisticated individuals on the contrary would be aware of that they would face self-control problems in the future if they further procrastinate any immediate costs. Sophistication (or small degree of naiveté) alleviates the problem and reduces the risk of accumulating excessive debt due to procrastinating the repayment of it. However, even sophistication does not guard

present biased consumers from over-consumption altogether. Sophisticated individuals are able to foresee facing self-control problems in the future and choose the immediate benefits instead of having to exert willpower on the inevitable. Even completely sophisticated individuals may thus end up over-consuming and financing it with borrowing, despite of being more conscientious with the repayment of debt. (O'Donoghue & Rabin 1999, 119–120.) Myopic consumers can assess that their level of debt is excessive, but still end up over-consuming or taking irrational risks due to their lack of self-control. Behavioral findings suggest that present biased consumers discount future costs heavier than future earnings, which further hinders their ability to estimate their future utility correctly. (Ottaviani & Vandone 2011, 755; Kilborn 2005, 21.) Controlling myopic preferences with only willpower seems not effective enough in the light of these theoretical results. Alternative solutions for controlling myopic behavior include external pre-commitment tools, in which a contribution is deducted straight from income or consumer sets an automatic transfer to a savings plan straight away after receiving earnings. With a restrictive enough external pre-committed saving tool, consumer can choose the maximum feasible consumption without having to exert any willpower. In practice pre-defined plans may not be exhaustive enough as consumers have to have a buffer available against unexpected and urgent expenses, instead of leaving only the minimum amount required for regular expenses. Psychologists have found effect in self-enforced mental rules in restricting consumption to sustainable levels without having to rely on self-control. These mental rules need however to be simple and stable enough and they neither are effective when it comes to naïve individuals that are unaware of their time-inconsistent preferences. (Shefrin & Thaler 1988, 613–615.)

Behavioral economics has identified several other biases that restrict responsible financial decision-making. People have a tendency to develop heuristics, i.e. mental shortcuts to alleviate the challenge of probability estimation. People tend to consistently miscalculate probabilities, especially related to adverse events. Mental shortcut used in probability estimation is called the *availability heuristics* that implies that probabilities are estimated based on how easily a similar event can be recalled. Risk estimations tend to be based on the availability, or in other words, the frequency, recentness and importance, of a similar event. The more available a similar event is, or the easier it is to recall, the more the probability of the event is overestimated, and vice versa the harder it is to recall an (adverse) event, the more the probability is underestimated. Failing to estimate probabilities correctly has an impact on borrowing decisions and increases the probability of household ending up with an

unsustainable level of debt. Over-indebtedness lacks availability if household has not experienced liquidity crisis or other financial difficulties frequently or recently. (Kilborn 2005, 13, 19–20.)

Awareness of default rates or bankruptcy statistic hardly impacts consumers' estimation of their own probability of over-indebtedness. Psychological studies show that even if individuals knew the statistical probability of an adverse event, they tend to underestimate their own predisposition to the risk. Behavioral studies claim that the *overconfidence bias* as it is referred as, is actually present in most of people. Overconfidence bias impacts over-indebtedness due to people tend to underestimate their own risk of adverse events that could lead to financial difficulties, and instead end up borrowing excessively. The impact of overconfidence bias is further worsened by individuals' *illusion of control* that makes them believe they are able to diminish their risk by controlling their behavior. Overconfidence bias impacts the risk of over-indebtedness especially when the economic situation is expected to improve. Expectations of a better economic situation encourage households to borrow to reach a higher level of consumption that they are expecting to reach eventually as the economic situation improves. Households tend to overestimate the probability of higher future earnings and underestimate the probability of facing any adverse shocks and may end up borrowing excessively. (Kilborn 2005, 18–19.)

Due to their bounded rationality, individuals fail to choose the optimal savings rate to maximize lifetime utility and instead prefer current benefits, even with unreasonably high future costs. Individuals also tend to underestimate their probability of adverse shocks, leading them to irrational risk-taking. According to behavioral theories, unsustainable levels of debt can be explained with irrationalities within individual's decision-making process and irrational risk-taking. Over-indebtedness is triggered by the combination of excessive debt and adverse economic shocks. (Anderloni & Vandone 2011, 2; Kilborn 2005, 17–18.)

3.3 The ability-to-pay and negative equity theories

The following section will focus on the theoretical presentation of debt repayment problems. There are two theories, namely *the negative equity theory* and *the ability-to-pay theory*, which explain the decision-making leading to arrears and payment defaults. The negative equity

theory presents arrears as a strategic decision that is made rationally comparing the costs and benefits of repaying debt. The decision to firstly fall into arrears, and eventually default on loans, is triggered by household's negative equity that is caused by for example housing price decline and a high loan-to-value ratio. Strategic arrears or payment defaults are possible only with non-recourse loans that can be collected or distraint only to the value of collateral. The negative equity theories are assumed to be relevant in countries such as the USA, where non-recourse loans exist in the legislation and particularly in explaining mortgage defaults. The ability-to-pay theory explains arrears as a consequence of affordability problems that are due to mainly adverse shocks to income or expenses. The decision to fall into arrears is not a strategic choice and households attempt to avoid arrears and having to default on commitments to the last. Arrears are triggered only when household's resources become inadequate to cover their regular commitments and household is facing liquidity constrains, i.e. is not able to borrow more or realize accumulated wealth to cover the income decline. The ability-to-pay theory is assumed to be more accurate in explaining debt repayment issues in full-recourse countries such as the European countries analyzed in this study. The borrowers are less sensitive to negative equity since the whole amount of full-recourse loans, including interest and costs, can be garnished from debtor's current and future income and distrainted to the value of all debtor's assets. Since in full-recourse environment, defaulting is rather a consequence of an adverse income shock than an intended strategic choice, household's probability of falling into arrears is determined by its financial vulnerability to adverse shocks. The larger the share of debt servicing to income, the more vulnerable the household is to negative shocks to income. (Kukk 2016, 5–7; Gerlach-Kristen & Lyons 2017, 3–4; Aristei & Gallo 2016, 454.)

Arrears are a signal to creditors of debtor's lowered creditworthiness and increased risk of defaulting. Arrears are a predictive sign of more severe financial difficulties and often used in the literature as an indicator of the risk of over-indebtedness. Falling into arrears can be presented with a decision-tree following Gerlach-Kristen and Lyons (2017). The left of the decision-tree presents the negative equity theory and the right side the ability-to-pay theory and it indicates three possible paths to arrears.

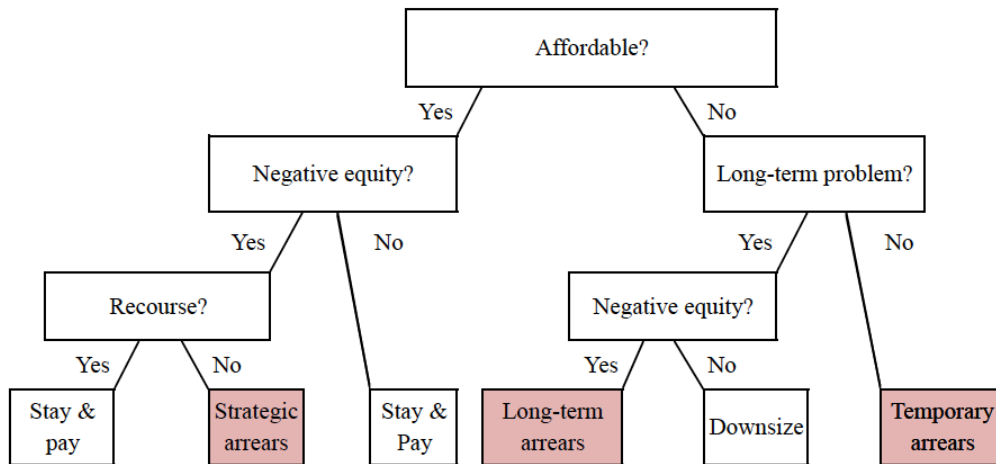


Figure 1: Decision tree of arrears

According to the negative equity theory, households can fall into arrears even if they are not facing any severe affordability issues. Negative equity, caused by for example housing price decline, in non-recourse environment is an incentive to fall into strategic arrears and eventually default on loans, typically mortgage. If the outstanding value of debt significantly exceeds the value of the collateral, household may be better off defaulting instead of repaying the debt. In full-recourse environment household does not benefit from strategic arrears, as the loan needs to be fully repaid despite the value of the collateral has decreased. If the household is not facing affordability issues, it is not optimal to fall into arrears and the household needs to repay the loan at full value. According to the ability-to-pay theory, falling into arrears has different paths depending on the expected duration of financial difficulties. If household expects its financial situation to improve after short-term affordability issues, falling into temporary arrears can be optimal in comparison to downsizing and lowering the standard of living. In such situation household expects that it is able to repay the arrears when the financial situation improves and does not necessarily have to default completely. When facing long-term affordability issues, the decision depends on household's equity. If household has positive equity, it is forced to downsize to repay commitments but as downsizing might not be an option for households constrained by negative equity, they are forced to default and fall into long-term arrears. This situation is referred as *dual-trigger* arrears, because it is caused by the combination of affordability issues and negative equity. The economic and social implications of long-term arrears caused by the dual-trigger are substantial in comparison to the implications of short-term arrears. Policy measures to prevent the dual-trigger situation have been in the center of attention since the last financial crisis that caused a significant increase in mortgage default and foreclosure rates. (Gerlach-Kristen & Lyons 2017, 11–12, 19.)

4 LITERARY SURVEY ON THE CAUSES OF OVER-INDEBTEDNESS

The following chapter provides a literary survey on the empirical evidence of causes and determinants of household over-indebtedness. Literature identifies several household characteristics and circumstances that are associated with increased risk of over-indebtedness. Previous studies (see, for example, Berthoud & Kempson 1992, Herbert & Kempson 1995, Webley & Nyhus 2001, Betti et al. 2007) have identified several risk factors that increase the risk of over-indebtedness. Risk factors include (1) young age, (2) low income, (3) unemployment, (4) having dependent children and (5) having only one adult provider, (6) being divorced or separated, (7) living in rented accommodation, (8) having multiple credit commitments, (9) facing unexpected income shocks and (10) having a neglectful attitude towards paying commitments. The impact of these risk factors on household's economic stability is rather cumulative than immediate and the risk tends to increase with the number of risk factors household fulfills. Households that fulfill multiple risk factors are not capable of preparing for adverse economic shocks and are vulnerable to income fluctuations. (Disney et al. 2008, 4; Kempson et al. 2004, 29–32.) Kempson et al. (2004, 29) find that the exposure to the risk of over-indebtedness of households fulfilling four or more of the risk factors is significantly increased. Survey conducted by Gutiérrez-Nieto et al. (2017) suggests that explanations for over-indebtedness given by over-indebted individuals and creditors tend to be different. Lenders and financial experts consider that over-indebtedness is to be blamed on irresponsible borrowing and debtors' lack of financial literacy. Debtors themselves tend to blame external factors such as adverse economic shocks or the actions of lenders and ignore the impact of their own actions or illiteracy on their exposure to the risk. (Gutiérrez-Nieto et al. 2017, 188–190.)

The following literature survey present these factors that predispose households to the risk of over-indebtedness and discusses the relation of these factors and the probability of facing external adverse events. The following literary survey is divided into three sections. The first section 4.1 presents identified socio-economic characteristics that impact household's lifetime resources and increase their risk of long-term financial difficulties. The second section 4.2 presents previous findings how households' lack of financial literacy impact their risk of

over-indebtedness. The third section 4.3 then presents the impact of limited rationality in financial decision-making caused by behavioral biases. The section 4.4 presents findings on the impact of over commitment and adverse credit market policies.

4.1 Household's socio-economic characteristics

Economic literature acknowledges that socio-economic circumstances and life events have a significant impact in predisposing households to debt repayment difficulties and arrears. The risk of persistent financial difficulties arises mainly from a lack of lifetime resources that are due to for example low level of education, unstable wage or uncertain employment prospects. Households at the highest risk of over-indebtedness suffer material deprivation and do not have savings to cover unexpected expenses or income fluctuation. (Gerlach-Kristen & Lyons 2017, 3; Disney et al. 2008, 4–5; Kempson et al. 2004, 29.) Facing unexpected adverse shocks to income, expenses, health, family status or employment makes households unable to balance their resources and expenditure requirements and increases significantly their risk of over-indebtedness (Kukk 2016; Betti et al. 2007, 140). This section is divided into two sub-sections, the first of which presents evidence related to the impact of low income and adverse income shocks and the second the other household and individual level characteristic associated with increased risk of over-indebtedness.

4.1.1 Low income and adverse shocks

Previous studies show that there is a clear relationship between over-indebtedness and low income. Studies show that the relation of low income and over-indebtedness remains significant even after controlling for other relevant household characteristics. (Davydoff et al. 2008, 16.) The proportion of households that are over-indebted among those households that are indebted tends to decrease with the level of income, even though the debt levels tends to increase with the income level (Betti et al. 2008, 147–148.) Fondeville et al. (2010, 33) find that the proportion of over-indebted households is significantly increased among European low-income households that have disposable income below 60 % of the national median. They measure over-indebtedness with an objective measure that considers household over-indebted based on the proportion of outstanding debt to disposable income. Outstanding debt refers to all debt that has become due for payment, including also debt that is due to be paid

but not yet considered as arrears. (Fondeville et al. 2010, 27.) Fondeville et al. (2010, 27) consider it evident that households that have outstanding debt due to be paid exceeding their monthly disposable income, are facing severe difficulties in managing their finances. They find, based on the EU-SILC 2008 module of over-indebtedness, that approximately 7 % of low-income households have outstanding debt exceeding their monthly disposable income, while the proportion is 4.5 % among households with income level above the threshold. They find significant differences between countries: the widest spread was in Greece where 12.8 % of low-income households were considered over-indebted and only 3.4 % of higher income households. In Germany for example the relationship was the other way around and a larger proportion of higher income households had outstanding credit exceeding their disposable income than of low-income households. (Fondeville et al. 2010, 33.) Kempson and Atkinson (2006, 29) make a distinction between two groups in financial difficulties: over-indebted households and low-income households. According to their research of UK households, the over-indebted households had average income levels, while their level of mortgage and unsecured debt was excessive in comparison to their earnings. The other group in financial difficulties consisted mainly of households that belonged to the two lowest income quintiles and typically did not have mortgage and had only low levels of unsecured credit. However, the debt servicing to income ratio of the households that had debt, was significantly high. (Kempson and Atkinson 2006, 18, 24–25)

Betti et al. (2007) argue that the variation of indebtedness levels between income groups in different countries can be explained with the level of liberalization of consumer credit markets. They divide countries based on if the credit market policies are restricted or liberalized and argue that households in countries with liberalized consumer credit markets have a higher propensity to borrow and the differences in indebtedness levels between income groups are larger than in countries with restrictive credit market policies. Betti et al. (2007) claim that credit market liberalization has a significant impact on households' consumption to income ratios and the U-shape of consumption to income predicted by the LCH can only be perceived in the European countries that have liberalized credit markets. They suggest that in countries that are considered to have restricted credit markets, households are not able to optimally smooth their lifetime consumption and it tends to decline with age. (Betti et al. 2007, 147–151.)

The results of EU-SILC 2008 module of over-indebtedness show that income shocks have a significant impact on the risk of over-indebtedness, independent of household's level of income as such. The results indicate that even households that have high original income levels are exposed to the risk of over-indebtedness when facing an adverse income shock. The results of the EU-SILC 2008 module show that in comparison to other households, over-indebted households are significantly more likely to have faced a major income shock. Third of over-indebted households reported having faced a major income loss during last 12 months, while the proportion was only 19 % among other households. The results indicate that households that have faced a significant adverse income shock are twice as likely to be over-indebted compared to households that have not faced any major income losses. Low-income households are particularly vulnerable to adverse shocks. 41.3 % of over-indebted low-income households reported having faced an adverse income shock, while the proportion was 30.8 % among over-indebted households with income above the poverty threshold. In Finland the difference was less significant as 33.0 % of over-indebted low-income and 31.5 % of higher income households reported facing an adverse income shock. In some countries, for example Portugal, a significantly larger proportion of over-indebted households with income above the poverty threshold (68 %) had faced an income shock than of low-income households (16 %). Household with higher income level typically may have accumulated high level of debt that is no longer manageable after the income decline. The EU-SILC 2008 special module data however reveals that adverse income shocks are not the only significant factor causing over-indebtedness, since majority of over-indebted households had not faced any income losses. (Fondeville et al. 2010, 42–46.)

Disney et al. (2008, 30–31) also identify income shocks as an important factor causing financial difficulties. They identify unemployment, divorce or family dissolution and changes in health as possible causes of income shocks, all of which might have different impacts on the risk of over-indebtedness. Regarding unemployment, they hypothesize that unemployment may lead to over-indebtedness firstly because household is not no longer able to service debt that was taken while employed. Secondly, households that experience unemployment typically do not have adequate savings to cover the income losses caused by unemployment and may resort to consumer credit to make ends meet. If they are unable to find employment to restore their level of income, they might find themselves unable to repay the debt. (Disney et al. 2008, 30–31.) Disney et al. (2008, 55) find that arrears during unemployment are not

only driven by the income shock but instead the combination of income loss and having high credit commitments.

Fondeville et al. (2010, 40–42) study the impact of unemployment to over-indebtedness with the EU-SILC 2008 module data by measuring employment status of a household with work intensity that varies from zero when all of the working-aged household members are unemployed to one when all of them are employed full-time. The EU wide results show rather small impact of employment intensity on over-indebtedness when income level is controlled. In some countries, Finland included, the relation of employment intensity and over-indebtedness however is evident. Employment intensity decreases household's risk of over-indebtedness as 2.7 % of households in the lowest employment intensity group (0–0.19) were over-indebted, and only 0.8 % of the highest group (0.75–1). In some countries the relationship seemed to be the other way around or there was no clear relationship between over-indebtedness and employment intensity. Focusing only on the low-income group of households, Fondeville et al. (2010) show that the risk of over-indebtedness tends to in fact grow with the intensity of work. The tendency is probably due to the increased access to credit of those households that are in employment compared to unemployed ones. (Fondeville et al. 2010, 40–42.)

4.1.2 Other household characteristics

Young age is generally considered as a predictor of over-indebtedness. Davydoff et al. (2008) conduct a literary survey of the nature of over-indebtedness with European studies and argue that younger households are at above the average risk of financial difficulties irrespective of their other characteristics or circumstances. (Davydoff et al. 2008, 11.) Kempson et al. (2004) find similar results in their study of British households by showing that the rate of arrears is significantly higher among young households and that it decreases significantly among households aged 30 or older. Oksanen et al. (2014) also find in their study of Finnish households that younger households had more debt and the prevalence of debt problems was the most common among the youngest age group.

The LCH model suggests that the level of indebtedness is expected to relate negatively on age, since younger households borrow more than older ones to smooth their lifetime

consumption. The expected income growth of younger households is higher, which rationalizes their negative asset positions. (Disney et al. 2008, 15.) Betti et al. (2007, 150) argue that since households are expected to borrow based on their expected lifetime resources, over-indebtedness among indebted households should not depend on age. In line with Betti et al. (2007), Fondeville et al. (2010, 34–35) find that the proportion of over-indebted households among indebted households is rather constant between different age groups. They study over-indebtedness with the EU-SILC 2008 special module data of over-indebtedness and measure over-indebtedness with an objective measure of excessive debt burden. They define that household has excessive debt burden if overall outstanding debt (debt that is due for payment) exceeds household's monthly disposable income. They find that the variation of excessive debt burden is rather small between different age groups, with the exception of households over 65 that have considerably lower debt burdens. Age thus affects household's probability of being indebted, but not directly the probability that an indebted household becomes over-indebted. Disney et al. (2008, 15) even argue that due to expected income growth opportunities, the same level of excessive debt burden is more severe among older households than younger ones.

Previous studies (see, for example Disney et al. 2008; Betti et al. 2007; Kempson et al. 2004; Fondeville et al. 2010, Davydoff et al. 2008) show that having children increases household's risk of over-indebtedness. Having children increases household expenses and makes a large proportion of them fixed. Having children also tends to impact household's disposable income, as especially mothers may choose to stay home with children or to work only part-time. With a large proportion of expenses being fixed, households have little room to adjust expenses to income fluctuations making them vulnerable for adverse economic shocks. (Fondeville et al. 2010, 35–36.)

Single parents with dependent children have a significantly higher probability of financial difficulties than two-parent families. Betti et al. (2007, 153) show that lone parents with at least one dependent child under the age of 16 are especially exposed to the risk of over-indebtedness. The EU-SILC 2008 module reveals that almost 10 % of single parent households were over-indebted, which is twice the proportion than among other types of households (Fondeville et al. 2010, 37). Davydoff et al. (2008, 13–14) argue that the risk is the higher the younger is the youngest child in the household. They however note that the impact of lone parent should be interpreted carefully since the increased risk of a lone parent

is mainly due the fixed expenses caused by having dependent children and the number of adults has less of an effect. The study of Kempson et al. (2004) of British households complements the argument and shows that lone parents are typically young, have low income and have faced a significant income drop due to relationship breakdown, which all impact their higher risk of financial difficulties.

Even though studies show similar results of the impact of dependent children on over-indebtedness practically across all European countries, there are differences whether the number of children impacts the risk. Kempson et al. (2004) show that in Britain, the number of dependent children increases household's risk of arrears. The EU-SILC 2008 module results show that in some countries the risk of over-indebtedness decreases if the number of children increases to three or more. Households with many children tend to have lower levels of disposable income than households with fewer children, but studies show that the impact of dependent children is actually independent of households' income levels. Large low-income households are necessarily not more vulnerable to over-indebtedness than large higher income households. The EU-SILC 2008 module reveals that for example in Spain and Slovenia, large low-income households have actually a lower risk of over-indebtedness than small low-income households. The size of the family seems to increase the risk only for higher income families. (Fondeville et al. 2010, 34, 36–37.)

Studies show that going through family breakdown, such as divorce, increases the risk of over-indebtedness (Fondeville et al. 2010, 37; Disney et al. 2008, 4). EU-SILC 2008 module shows that twice the proportion of divorced or separated individuals was over-indebted compared to married individuals and 50 % more compared to unmarried individuals. The impact is independent of income effects and occurs among low and high-income groups, reflecting probably the costs and emotional effects of separation. (Fondeville et al. 2010, 37.) Lyon and Fisher (2006, 326–327) go through previous literature and summarize the findings of Del Boca (1994), Duncan and Hoffman (1985, 1988), Smock (1993) and Zagorsky (2005) and present that men are less likely to face financial difficulties than women because of divorce, because men are more likely to keep their level of income and at the same time they benefit from lower expenses. Lyon and Fisher (2006, 326–327) present based on the findings of Del Boca (1994) and Duncan and Hoffman (1985) that women are more likely to face financial difficulties after divorce, because they are often granted the custody of children and

also because they are less likely to have credit history on their own names. (Lyons & Fisher 2006, 326–327.)

Literature shows that individuals living in rented accommodation have a higher risk of becoming over-indebted, because they face relatively higher housing costs and tenants also tend to have lower than average income levels. The EU-SILC 2008 module shows that in EU as whole, owner-occupied housing is associated with a lower than average risk of financial difficulties. Low level of income and having mortgage however increase the risk of over-indebtedness. When focusing only on the low-income households the relation is actually reversed: owner-occupied housing was actually associated with a higher risk than rented housing. (Fondeville et al. 2010, 38–39.)

Another significant predictor of financial difficulties identified in literature (see, for example Disney et al. (2008), Disney & Gathergood (2013), Oksanen et al. (2014)) is low level of education. Oksanen et al. (2014) identify that low level of education is associated with both the prevalence of debt problems among Finnish households as well as the amount of debt outstanding. The impact on the risk of over-indebtedness is twofold as lower level of education is associated firstly with lower level of income, and secondly with low level of financial knowledge. Financial literacy and adequate financial skills are vital for households in order to make responsible financial decisions. The research on the importance of financial literacy will be further discussed in the following section.

4.2 Financial literacy

Traditional theories of consumption and saving behavior assume that consumers make rational choices such as saving when income is high and borrowing to sustain the acquired level of consumption when income is lower. Empirical studies have showed that participation and performance in the financial market, including the ability to make saving and borrowing decisions, is restricted by financial knowledge. (Gathergood 2012, 590; Gutiérrez-Nieto et al. 2017, 190.) Lusardi and Mitchell (2014) study the results of several international studies using similar survey questions related to basic financial concepts such as risk diversification, interest rate and inflation calculations. They find that, independent of the stage of economic

development, low levels of financial literacy are prevalent in most of the countries studied. (Lusardi & Mitchell 2014, 13.)

Financial literacy has an important role in financial decision-making, particularly in today's financial environment where new and more complex financial services are constantly developed. Previous studies show that financial literacy impacts positively responsible saving, investment and borrowing decisions, wealth accumulation and participation in the stock market. (Lusardi & Mitchell 2014, 5–6, 34.) Lusardi and Tufano (2015, 4–8) show that households with the lowest levels of financial literacy have a significantly higher probability of assessing their debt burden as excessive. They study the relation of over-indebtedness and financial literacy with survey questions that measure both respondents' capabilities to perform financial calculations and the subjective judgment of their own financial understanding. Gathergood (2012) bases his study also on the questions of Lusardi and Tufano (2015) and finds that individuals with outstanding consumer credit debt tend to give incorrect answers to questions related to the costs of consumer credit. He also finds that of over-indebted households are 33 % more likely to lack financial literacy than households on average. (Gathergood 2012, 595–596.)

Lusardi and Mitchell (2014) study the economic implications of financial literacy with a literary survey. They argue that financially illiterate individuals are more prone to using rules of thumb in saving decisions² and making financial errors³, while individuals with better financial knowledge are more prone to participating in the financial markets, invest in stocks⁴ and undertaking retirement planning and thus accumulate more wealth⁵. They argue also that financial literacy correlates with the ability to manage regular payments⁶ and precautionary saving⁷ and that the least illiterate individuals tend to borrow more and with higher costs and accumulate less wealth⁸. (Lusardi & Mitchell 2014, 21–22.)

Households that lack financial literacy tend to pay significantly higher costs on their credit than households with better financial literacy. The costs are paid in the form of financial

² see, Bernheim 1995, 1998

³ see, Calvet, Campbell and Sodini 2007, 2009

⁴ see, for example Kimball and Shumway 2006; Christelis, Jappelli and Padula 2010; van Rooij, Lusardi and Alessie 2011; Yoong 2011; Almenberg and Dreber 2011; Arrondel, Debbich and Savignac 2012

⁵ Lusardi and Mitchell 2007

⁶ see, Hilgert, Hogartg and Beverly 2003

⁷ see, de Bassa Scheresberg 2013

⁸ see, for example Stango and Zinman 2009; Lusardi and de Bassa Scheresberg 2013

charges that are caused by their inferior repayment habits compared to those with better financial understanding, and high average APRs of their portfolios. (Disney & Gathergood 2013, 2246–2247; Lusardi & Tufano 2015, 23–25.) Lusardi and Tufano (2015, 23) find that on a sample of American population, households with the lowest levels of financial literacy pay up to 50 % higher costs on credit than on average. They find that the most illiterate households in the USA bear a disproportionate proportion of the total financial charges as they pay up to 42 % of the total costs, while the group accounts for only 29 % of the whole population. They argue that the most illiterate individuals tend to pay only the minimum due amount on credit, have repayment delinquencies and frequently exceed account limits. (Lusardi & Tufano 2015, 23–25.) Disney and Gathergood (2013, 2246–2247) find that households with the lowest levels of financial literacy have up to eight times the proportion of high-cost credit in their portfolios than households with better financial knowledge and the APRs of their portfolios are up to 9 %-points higher than average. Individuals lacking financial literacy frequently fail to take advantage of available borrowing opportunities with lower costs but instead take high-cost credit such as payday or instant loans (Lusardi & Mitchell 2014, 25). Argwal et al. (2009, 3–4) for example find that two thirds of people taking payday loans had at the time at least 1000 dollars limit available on their credit card.

Hyytinen and Putkuri (2018) show that the optimism of household's financial expectations is a predictor of over-indebtedness. They show that over-borrowing correlates with household's capability of financial forecasting and particularly with optimism in financial decision-making. They study Finnish households with nationally representative Income Distribution Statistics (IDS) panel data from 1994 to 2013, which includes register based statistics of households' demographics, income and borrowing, and the survey based data collected for the purposes of EU-SILC. Forecasting errors are calculated from the data and linked to households' borrowing behavior. They identify two categories of financial forecasting errors: optimistic (the expectation is better than the realized outcome) and pessimistic (the realized outcome exceeds the forecasted one). They argue that on average forecasting errors balance each other out, while the households making the optimistic errors are at greater risk of financial difficulties. Their results show that the households making *non-prudent forecasting errors* (household makes a forecasting error and the financial situation worsens) are associated with the highest debt-to-income ratios and are the most likely to report being over-indebted. Optimism in financial expectations correlates strongly with irresponsible borrowing and difficulties in money management, even if the average forecasting error is not large in

monetary terms. These households also experience the largest income shocks, the average being 4,500 euros. (Hyytinen & Putkuri 2018, 56–57, 62, 67–68.) Hyytinen & Putkuri (2018, 73) suggest that it is possible that the expectations of households making forecasting errors are biased and note that the likelihood of making forecasting errors is linked to the same characteristics that are associated with lack of financial literacy.

4.3 Behavioral factors

Several empirical analyses have challenged the rationality of households' decision-making and showed that over-indebtedness can be a result of irrationalities within household's borrowing decisions. According to behavioral studies households' consumption and saving decisions are influenced by psychological factors such as impulsive consumption, overconfidence, social comparison and incapability of understanding the future outcomes of current period decisions (myopia). (Gutiérrez-Nieto et al. 2017, 190; Ladas et al. 2014, 150; Anderloni and Vandone 2011, 2.) Ladas et al. (2014, 150) argue that the performance of models explaining household indebtedness can be significantly improved by including psychological determinants in the model. Even though variety of significant predictors of financial difficulties, including psychological phenomena, have been identified and studied, literature does not provide any single explanatory model for modeling consumer indebtedness (Ladas et al. 2014, 150). The following section will focus on presenting evidence of behavioral phenomena that have been identified to impact the risk of over-indebtedness.

Sub-optimal behavior in the credit markets can lead to financial difficulties, and in order to avoid them, consumers need to have financial knowledge (Gathergood 2012, 591). Behavioral studies have revealed inconsistencies in consumers' time preferences and habit of using hyperbolic discounting in valuing cash flows. Ability to make farsighted saving plans is restricted by consumer's strong preferences for immediate satisfaction from current consumption and without controlling unsustainable consumption-saving decisions lead to financial difficulties and over-indebtedness. Inconsistent time-preferences and hyperbolic discounting cause over-indebtedness via impulsivity and self-control problems. Consumers that lack self-control tend to have impulsive consumption behavior, overestimate durations of time intervals, and discount heavily future cash flows⁹. (Ottaviani & Vandone 2011, 755.)

⁹ See, for example Wittman and Paulus (2008)

Gathergood (2012, 591–596) shows that discounting future cash flows heavily alone has statistically insignificant effect on over-indebting, while the impact on over-indebtedness is mediated by individuals' self-control problems. Gathergood (2012) finds that over-indebted households have a 50 % higher probability of being heavy discounters than average, while the probability of being impulsive and having self-control problems is twice the average.

Studies (see, for example Gathergood 2012, Kamleitner et al. 2012 and Webley & Nyhus 2001) show that lack of self-control increases households' probability of becoming indebted (Achtziger et al. 2015). Achtziger et al. (2015) study the relation of consumers' self-control and the debt levels and find that the lower the level of individual's self-control the higher is individual's level of debt, and vice versa. Gathergood (2012) finds similar results and shows that over-indebtedness measured with repayment delinquencies and subjective financial distress is disproportionately higher among individuals that have self-control problems. Both studies find that financing impulsive consumption with debt plays a major role in causing over-indebtedness. Ottaviani and Vandone (2011) also find that impulsivity in financial decision-making leads to holding significantly higher levels of debt than on average. They explain the probability of holding debt with traditional socio-economic variables and variables that are intended to catch the effects of impulsivity and other psychological factors. Impulsivity is measured with Barratt Impulsiveness Scale (BIS)¹⁰ and it scores individual's impulsiveness with various factors. Ottaviani and Vandone (2011) find that after controlling for socio-economic variables, BIS predicts statistically significantly consumer credit levels, while having no significant effect on levels of mortgage. (Ottaviani & Vandone 2011, 757–758.)

Individuals that lack self-control use disproportionately more quickly accessible credit such as in-store credit or payday loans that facilitate impulsive consumption. Instant credit has high costs and by using it to finance impulsive consumption households become more vulnerable to debt problems. (Gathergood 2012, 591, 597–599.) Research shows (see, for example Berthoud and Kempson 1992) that unplanned spending increases the risk of arrears (Kempson 2002, 48). Achtziger et al. (2015, 145–147) argue that in fact the impact of self-control to unsustainable debt levels is completely mediated by compulsive buying facilitated by quick-access borrowing. Gathergood (2012, 591) even argues that self-control has an effect on over-

¹⁰ BIS-11; Patton, Stanford, & Barratt, 1995

indebting beyond the inability to resist compulsive consumption. He finds that individuals lacking self-control and financial literacy have a higher probability of facing adverse financial shocks and argues that it is due to they are impulsive in making other decisions as well, regarding employment for example. He shows that after controlling for unexpected financial shocks, the relevance of self-control and financial literacy decreases. Part of the relationship of self-control and over-indebtedness can thus be explained by the higher than average probability of impulsive individuals to face financial shocks. (Gathergood 2012, 591, 599–600.) Bertrand, Mullainathan and Shafir (2004) argue that the poor are particularly bound by the lack of self-control. Scarcity of economic resources highlights the impact of biases when the financial margins for errors are narrow. Shah, Mullainathan and Shafir (2012) study the impact of scarcity on financial decision-making. They argue that due to scarcity, frequent expenses that normally when resources are adequate do not require much attention (such as buying groceries) require substantial focus, when resources are scarce. Due to focus on making ends meet is substantial other problems become neglected. Scarcity may lead to high-cost borrowing with short maturities, since these loans are easily available and alleviate making ends meet, while households neglect the implications the costs of repayment will have. Making ends meet requires a large part of attention and causes a cognitive burden that hinders the performance of households in other decision-making. Cognitive load may prevent households from being able to correctly estimate optimal borrowing rates or lead to excessive financial risk-taking. (Shah et al. 2012.)

Social comparison is another emotional driver of excessive indebtedness. Evidence for “keeping up with the Joneses” or other hypotheses about social comparison driven indebtedness are found in the literature. Lea et al. (1995, 691) study psychological factors of indebtedness and money-management and find that indebted consumers are more likely to judge having below average economic resources and also find the inequality bothering. Cameron and Colby (1990) find two main determinants for positive relation of income and debt: social comparison and unreasonable risk-taking that is associated with lack of self-control. Following the relative income hypothesis of Duesenberry (1949), they show that social comparison leads to excessive borrowing when the income level rises as they are pressured to keep with the consumption of their peers for comparison become wealthier. Livingstone and Lunt (1992) find that the higher the debt level of household, the less likely they are to admit feeling pressure of social comparisons, while the other attributes they reported for their debt problems did not differ from households with less debt, indicating the

hazardous impact of denial and ignorance. Coibion et al. (2014) for example find contradicting results and show that in fact over-indebtedness among low-income households is less common in areas with high inequality than in areas with low inequality. They study the impact of social comparison on the high levels of debt in mid 2000's among low-income households in the U.S. They argue that credit supply restricts irresponsible borrowing when inequality is high as better income levels are the stronger indicator of creditworthiness, the higher inequality is. They argue that low-income households accumulated high levels of debt due to large credit expansion that targeted low-income households and that the causal link of inequality and debt goes through credit supply. Their results show that social comparison did not contribute to the debt crisis in the U.S.

4.4 Over-commitment and credit market policies

Over-commitment is identified in literature as one of the most important determinants of over-indebtedness, alongside with adverse income shocks. Households' capability to service and repay debt decreases with the number of credit commitments household has, increasing the probability of over-indebtedness. Over-commitment increases household's probability of falling behind on payments as controlling one's finances gets more difficult as the number of commitments increases. Previous studies show (see, for example Berthoud and Kempson 1992; Kempson et al. 2004) that the severity of household's arrears increases with the number of credit commitments and the proportion of monthly income household needs to spend on credit repayment. Davydoff et al. (2008, 21) argue that in fact the number of unsecured credit commitments impacts household's risk of over-indebtedness more than the amount of credit. Research shows that the impact of the amount of credit is less pronounced, i.e. having one large commitment is associated with a lower risk of over-indebtedness than having the same amount spread into multiple commitments. Davydoff et al. (2008, 21) argue that the difference is likely to be due to repayment period of one large commitment is longer than of the multiple smaller commitments. Having to make additional credit contracts to make ends meet is a clear sign of financial difficulties and a major trigger of over-indebtedness. (Davydoff et al. 2008, 21; Disney et al. 2008, 52–54; Kempson 2002, 45–46.) Kempson (2002) identifies also other indicators of irresponsible borrowing than repaying existing debt: borrowing despite being aware of repayment problems and financing unplanned spending with credit. Kempson (2002) finds that in fact a major part of households in financial

difficulties had anticipated their repayment struggles since two thirds of households studied that were uncertain about their repayment capabilities, faced financial difficulties at the time of the survey. (Kempson 2002, 44–47.) Unplanned spending is closely related to impulsive consumption that will be discussed in further detail in the following section.

Ottaviani and Vandone (2011) show that the determinants of decision-making process depend on the type of credit, due to the different lengths of time-horizons related to secured or unsecured borrowing. Decisions regarding secured credit such as mortgage need to be made considering a significantly long time-horizon and decisions are thus made more in accordance with the rationale of LCH than decisions related to unsecured borrowing that is based on fulfilling short run needs. Decisions related to unsecured credit are determined by one's willingness to finance consumption with credit and are more prone to non-rational behavior. (Ottaviani & Vandone 2011, 755–760.) Betti et al. (2007, 146–147) show that over-indebtedness is in fact a significant problem especially among households that have consumer credit commitments, as approximately half of them were over-indebted. Kukk (2016, 18) finds that the balance of consumer credit is in fact the main driver of arrears in the highest income quintiles that have better access to credit markets. Highest income quintiles borrow consumer credit proportionally more than households in lower income levels among which arrears are mainly driven by income shocks and high debt service to income ratios.

Credit market conditions seem to also impact over-indebtedness. Betti et al. (2007) find that in countries with more liberalized consumer credit markets, the proportion of over-indebted households tends to be significantly lower than in countries with restricted credit market policies. Households that face liquidity constraints are not able to optimally smooth their lifetime consumption and face the risk of financial difficulties especially when facing unexpected adverse shocks. Even though consumer credit has shown to influence the risk of over-indebtedness, it is an important source of liquidity that households can utilize to smooth short-term shocks. The inability to borrow can lead to severe financial problems, when households are not able to make ends meet. Betti et al. (2007) find that in countries with restrictive credit market policies, households are actually the most likely to take consumer credit when they are already at the risk of over-indebtedness. (Betti et al. 2007, 146–147.)

In perfect credit markets households would be able to borrow against their expected income with an interest based on risk pricing. In reality this however is not an attractive option for

lenders, since full-risk pricing would probably attract high-risk borrowers that have a significantly higher probability of defaulting and may risk lender's profitability. Credit market restrictions originate from asymmetric information between borrowers and lenders and due to adverse selection lenders use credit rationing or demand collateral against credit to exclude high risk lending. (Disney et al. 2008, 16; Rinaldi & Sanchis-Arellano 2006, 12.) Current income and household's ability to provide collateral thus constrain their borrowing possibilities (Rinaldi & Sanchis-Arellano 2006, 12–13; Disney et al. 2008, 16). Betti et al. (2007, 152) identify a group of *under-indebted* households that are at the greatest risk of poverty, at even higher risk than the over-indebted households and considerably higher compared to the population as a whole. These households have a very low level of income and high consumption to income ratios, consuming everything they earn. They are restricted from the credit markets due to their low capability to repay debt. Under-indebted households have difficulties in making ends meet due to liquidity constraints and in they would benefit from credit market liberalization and full-risk pricing. (Betti et al. 2007, 152.)

5 EMPIRICAL STUDY OF THE DETERMINANTS OF OVER-INDEBTEDNESS

The following chapter presents empirical research conducted of the level and determinants of over-indebtedness. The research identifies household characteristics that expose them to over-indebtedness and estimates the impact of these factors on the risk of over-indebtedness. The study focuses first on the determinants of over-indebtedness among Finnish households and then makes comparisons with two other European countries. This study utilizes the European Union Statistics on Income and Living Conditions (EU-SILC) that is a pan-European multidimensional micro-data survey. The comparability of the EU-SILC survey data is regarded to be very good since it is collected with the same frequency and the questions are harmonized across countries (Davydoff et al. 2008, 46).

The following section 5.1 first describes the used EU-SILC survey data and estimation methodology. Section 5.2 focuses in detail on the Finnish EU-SILC survey and examines the characteristics of over-indebted households. Two probit estimation models are also presented that examine the probability of household being in arrears and at risk of over-indebtedness. Section 5.3 focuses on making comparisons between Finnish, Swedish and British households by comparing the descriptive statistics and probit estimation results of households being in arrears and at risk of over-indebtedness. Credit market policies in the UK are very liberal compared to the two reference countries, due to which it is interesting to compare the determinants of over-indebtedness and characteristics of over-indebted households. Sweden on the other hand has a similar Nordic social security system than in Finland, while the levels of mortgage of Swedish households are significantly higher. An interesting aspect is to study the impact of high mortgage levels on the determinants of over-indebtedness.

5.1 Data and methodology

The following section 5.1.1 will present the EU-SILC data that is used to study the determinants and characteristics of household over-indebtedness. The second section 5.1.2 will then present the estimation methodology and variables used in the estimations.

5.1.1 EU-SILC data

EU-SILC collects data on indicators that are important in monitoring the fulfillment of EU's poverty and social exclusion reduction targets and in following the national level development. Reducing poverty and social exclusion are one of the main targets of Europe 2020 strategy, which aims at sustainable growth in EU that improves its competitiveness, productivity and sustainable market economy. Besides poverty reduction, Europe 2020 targets focus on employment, research and development, climate change, energy and education. The target of poverty and social exclusion reduction is to reduce the number of people at risk of poverty or social exclusion in the EU by 20 million. The national level target in Finland is to reduce the number of people at risk by 150 000. (Eurostat 2018a; Davydoff et al. 2008, 41.)

EU-SILC survey includes cross-sectional and longitudinal data on households' living conditions, income, poverty and social exclusion. EU-SILC measures both subjective and objective aspects of income, social inclusion and living conditions. Data is collected yearly and concerns the 12 months period before the interview. Longitudinal data is collected at a four-year rotating panel and it can be used to study individual level changes over time. EU-SILC survey interviews approximately 130 000 households every year for cross-sectional and 100 000 for longitudinal data operation. (Eurostat 2018a.) The EU-SILC data was selected due to it collects data widely on financial difficulties. The survey includes data on households' arrears, their liquidity situation and financial burden. Data is collected with an interview and it represents households' subjective judgment of their financial situation. The survey collects data on arrears by asking whether household has been in arrears, i.e. unable to pay on time their commitments due to financial difficulties, during the 12 months period before the interview. It also uncovers household's illiquidity problems by asking them to evaluate their capacities to face unexpected financial expenses with their own resources without having to ask for financial help or borrow more. Households are also requested to

evaluate their capabilities to make ends meet, which measures whether household has sufficient current resources to cover monthly expenses. The survey also takes into account households' financial exposure by asking them to judge the financial burden they are facing related to housing costs or loan repayment. (Davydoff et al. 2008, 53.)

5.1.2 Estimation methodology

Two indicators of over-indebtedness are constructed from the EU-SILC data for the purposes of this study. The first dependent variable is based on information of household's arrears that are commonly used in the literature to indicate illiquidity and increased risk of insolvency. Davydoff et al (2008, 41) argue that arrears are in general considered as a good measure of financial problems and indicator of an increased risk of over-indebtedness due to they clearly reflect households' repayment problems. As discussed in the chapter 2, arrears are triggered by affordability problems when household is no longer able to meet its expenses due to over-commitment or adverse shocks to income or expenses.

Arrears in EU-SILC data are collected at household level and separately for three types of commitments. Households are asked if they have been in arrears on (1) mortgage or rental payments, (2) utility bills or (3) hire purchase installments or other loans in the past 12 months. Households that report arrears are also asked to specify whether they have been in arrears only once or twice or more. The first dependent variable HIA (household in arrears) is constructed based on these survey questions. HIA is a dummy variable that gets value 1 if household has been in arrears at least once during the past 12 months and value 0 if household has not been in arrears or the question is not applicable due to household does not have the commitment in question. The first indicator HIA takes into consideration all households with arrears. Arrears are based only on interview answers and thus do not necessarily represent official records of payment defaults. Arrears considered in the survey represent also payment delinquencies that are not recorded in official credit information registers. On the other hand, all registered payment defaults are not represented in the survey as it focuses only on new arrears occurred in the past 12 months. Payment defaults that have occurred before that and have a repayment schedule that household follows are not considered as arrears in the survey.

Davydoff et al. (2008, 42–43) point out in their report that there are major differences in how, and by whom, statistics on arrears are registered and in the terminology used. They argue that variations with data collection methods and frequency diminish the reliability of arrears as a measure of over-indebtedness. The collection of EU-SILC data however is harmonized, and the information of arrears is collected with a survey. Variations between data collection methods can thus be assumed to be minimal and the reliability of the measure better than when comparing national measurements. There can still be differences on the scale how arrears present over-indebtedness, since the severity of arrears is dependent on the culture and regulation towards payment delinquencies. In addition, arrears are more severe the longer they last, which increases difficulties in comparing the level of over-indebtedness based on only arrears. (Fondeville et al. 2010, 4.) One shortcoming of the selected approach is that it does not take into consideration the severity of the arrears, i.e. the duration and amount of them. As discussed in chapter 2.3, it may be optimal for households to fall into temporary arrears if they are expecting their financial situation to improve and that they are able to pay back their arrears in the near future. More severe financial difficulties are triggered by the dual-trigger situation when household has both negative equity and affordability problems. Such severe illiquidity issues will result in longer-term arrears. (Gerlack-Kristen & Lyons 2017, 3.)

The second indicator of over-indebtedness is constructed to identify households at risk of more severe and longer-term financial difficulties. The study follows the definition suggested by Davydoff et al. (2008, 55–56) in the report prepared for the European Commission for measuring households *at risk of over-indebtedness* that are a sub-group of households in arrears. In addition to arrears, the indicator takes into account household's subjective financial burden and illiquidity problems. The second dependent variable HAROI (household at risk of over-indebtedness) is based on the definition of Davydoff et al. (2008) and constructed following Angel and Heitzmann (2015, 335). Household is considered to be at risk of over-indebtedness if it (1) has been in arrears during the past 12 months before the survey either with mortgage or rent payments, utility bills or other loan repayment (HIA = 1), (2) considers the financial burden of housing costs (mortgage or rent payments) or repaying other loans at least heavy, (3) considers making ends meet difficult or very difficult and (4) reports not having capacity to face unexpected financial expenses. This approach differs with one point from the construction of Angel and Heitzmann (2015, 335), which also excludes households that expect their financial situation to improve within the next 12 months. Excluding these

households could ensure that only households that are facing structural arrears would be considered as over-indebted, which is in line with the definition of Davydoff et al. (2008, 55–56). The regular EU-SILC survey does not however include the same question, as the 2008 special module of over-indebtedness used by Angel and Heitzmann (2015), and the expected duration of the arrears cannot be measured with the data in use.

Davydoff et al. (2008, 56) point out that important shortcomings of the presented approach are that the regular EU-SILC survey does not take households' debt to asset position or debt-servicing expenditure into consideration. They also argue that the picture of household's overall financial situation is incomplete due to the survey does not collect data on household's overall debt and asset positions. Davydoff et al. (2008, 53) also point out that the regular EU-SILC survey does not collect information of the total amount of debt or other commitments household has in arrears, alike the 2008 special module. Betti et al. (2007, 144) however argue that households are best to judge whether their level of debt is excessive. As discussed in chapter 2.1 the subjective approach supposes that households that report having difficulties with debt repayment have weighted their level of debt to their current and expected earnings and liquid assets and judged the debt level to exceed their repayment capacities without compromising their minimum standard of living. An unambiguous measure of excessive debt level for the whole sample of households would also be hard to define, which supports using subjective measures. (Betti et al. 2007, 144.) Subjective measures however do inevitably depend on household's interpretation of what are meant with terms like "*heavy financial burden*" or "*having difficulties in making ends meet*". Using arrears as an indicator of financial problems can alleviate the impact of subjective interpretations since arrears are rather an objective measure than a subjective one. (Fondeville et al. 2010, 4.)

The probit models run in the following sections explain the probability of arrears and over-indebtedness with independent variables drawn from the literature survey presented in chapter 4. The EU-SILC survey collects data widely on households' socio-economic characteristics on personal and on household level. The relevant individual level characteristics included in the analysis are sex, age, employment status, marital status and the level of education. Household level determinants included are household's income level, family type and tenure status. The cross-sectional EU-SILC survey does not include data on household's income shocks but as discussed in the literature survey, the most important reasons for adverse shocks to household's finances are loss of employment and divorce or separation. The impact of

these variables will be taken separately into consideration in the analysis. The study also estimates the impact of higher credit exposure with a dummy variable that captures whether household has hire purchase installments or other non-housing related loans. These loans include all secured and unsecured commercial credits, credit cards and store credit, student loans and mail orders. The regular EU-SILC survey does not collect data of the level of financial literacy or of any psychological determinants, which were identified in chapters 3 and 4 as possible causes of irresponsible borrowing and over-indebtedness. The impact of any psychological determinants or financial illiteracy cannot be estimated, however their impact on the results will be discussed. Majority of the determinants in the estimation are individual level variables, while the dependent variables are collected at household level. The household level characteristics are combined to the individual level data. As the head of household is not identifiable from the EU-SILC data, the individual level variables represent the impact of the characteristic on the probability of individual living in a household with arrears. Variables are weighted with their cross-sectional weights in order to represent the whole population.

Due to the dependent estimation variables HIA and HAROI are binary, this study utilizes probit model to estimate the impact of independent variables on over-indebtedness. Linear estimation models would face problems in restricting the possible values between 0 and 1 and result in heteroskedasticity in the error term. The general presentation of binary choice model is:

$$(4) \quad P\{y_i = 1|x_i\} = G(x_i, \beta),$$

which states that the probability of having $y = 1$, (i.e. household being in arrears or at risk of over-indebtedness) depends on the vector x_i of independent variables that is constructed from household socio-economic characteristics. The function G is traditionally restricted to functions of form $G(x_i, \beta) = F(x_i' \beta)$. Since the values of both G and F need to be restricted between $[0, 1]$, the function F is traditionally described with a distribution function. In the case of probit model, the standard distribution function is chosen:

$$(5) \quad F(w) = \Phi(w) = \int_{-\infty}^w \frac{1}{\sqrt{2\pi}} \exp\left\{-\frac{1}{2}t^2\right\} dt.$$

The impact of a change in x_i depends on the value of x_i , due to which the magnitude of probit estimation coefficient is not directly interpretable. The sign of the impact can be interpreted directly, while the magnitude needs to be calculated using partial derivatives. The impact of a change in a dummy variable is estimated by calculating the implied probabilities of the two possible outcomes, while other explanatory variables are fixed. (Verbeek 2004, 190–193.)

The general hypothesis for the HIA and HAROI probit model estimations are:

H₀: Socio-economic characteristic does not affect the probability of arrears / risk of over-indebtedness

H₁: Socio-economic characteristic affects the probability of arrears / risk of over-indebtedness

Many of the independent variables are divided into categories and the estimation results reveal whether there is a statistically significant difference between the impact of different categories on the probability of arrears or the risk of over-indebtedness.

5.2 Over-indebtedness in Finland

The study utilizes cross-sectional EU-SILC data collected in 2015. Finnish cross-sectional EU-SILC survey includes 10 267 household level and 26 422 level individual surveys. Data is collected by telephone interviews and from the registers of Statistics of Finland. Statistics Finland conducts the survey annually and selects randomly one at least 16 years old household member to answer the survey questions in a telephone interview, while also other household members are given the opportunity to participate. Each interviewed household is selected for the survey by weighting specific factors and they each are representative of approximately 200 other Finnish households in similar situation. The data used will be weighted with cross-sectional weights in order to represent the population as whole. (Statistics Finland 2018.)

5.2.1 Descriptive statistics

EU-SILC 2015 statistics reveal that 8.8 % of all Finnish households had been in arrears at least once in the past 12 months. The most common were arrears on utility bills as 6.2 % of

all households had been in arrears with utility bills at least once. 3.8 % of all households reported arrears with rent or mortgage payments and 3.2 % with other loan repayment including consumer credit commitments and student loans. The descriptive statistics of households in arrears are presented in the Table 1. Majority of households in arrears reported the incident occurring at least twice in the past 12 months: four out of five households in arrears with utility bills, almost two thirds with mortgage or rental payments and 70 % with other loan repayment were in arrears at least twice during the preceding year.

Table 1: Proportion of households in arrears

Households considered	Households in arrears (%)			
	On mortgage or rent	On utility bills	On other loans	Total
Whole population	3.8	6.2	3.2	8.8
Households having the commitment in question	6.1	6.2	6.5	8.8

The second row of Table 1 presents the statistics of arrears when considering only the proportion of households having the commitment in question. Almost half of all households had either consumer credit commitments or student loans and among these households, arrears were a slightly more common than arrears on utility bills that are relevant to practically all households. Also, when considering only the 62 % of Finnish households that had mortgage or rental payments arrears become almost as common.

EU-SILC data reveals that a significant proportion of Finnish household faces financial difficulties as summarized in Table 2. Almost 17 % of surveyed households judged mortgage or rental payments as a heavy burden and 5 % of households felt burdened by repayment of other loans. Illiquidity issues were also common among Finnish households: 24 % of Finnish households expected not to have capacity to face unexpected expenses, which indicates that almost one fourth of the population has not prepared for any adverse economic shocks. 6 % of households were already currently having difficulties to make ends meet and 2.0 % of households fulfilled all four criteria of being at risk of over-indebtedness (HAROI) i.e. being in arrears, feeling burdened by housing costs or debt repayment, being unable to cover unexpected expenses and having difficulties to make ends meet.

Table 2: Proportion of households facing financial difficulties

Burden of housing costs (%)	Burden of debt repayment (%)	Unable to face unexpected expenses (%)	Difficult to make ends meet (%)	HAROI (%)
16.7	4.9	23.5	5.9	2.0

Table 3 presents the statistics of arrears sorted by whether household reports financial difficulties or not. Presumably, the statistics show that arrears are associated with illiquidity issues and being burdened by financial commitments. Financial burden is strongly associated with arrears, while households not burdened by rent or loan repayment were significantly less likely to report arrears. Almost one fourth of households burdened with rent or mortgage were already in arrears, while the relation of consumer credit burden and more severe financial difficulties seems even more evident as almost half burdened with other loan repayment were already in arrears. The statistics further show that illiquidity issues impact the likelihood of arrears as almost one fourth of households reporting being unable to face unexpected expenses and 45 % currently having difficulties to make ends meet were in arrears, while yet again the proportion was significantly lower among households not reporting illiquidity issues.

Table 3: Proportion of households in arrears per financial difficulty

Facing financial difficulties	Households in arrears (%)			
	Burden of housing costs	Burden of debt repayment	Unable to face unexpected expenses	Difficult to make ends meet
Yes	22.0	47.2	23.9	44.7
No	4.8	5.6	2.7	5.3

The figures presented in Table 3 support the assumption that arrears are mainly driven by illiquidity and current affordability problems instead of irresponsible behavior. However, the statistics indicate that there are households that are not burdened by financial commitments or facing illiquidity issues, yet still have been in arrears. These proportions perhaps represent the part of population impacted by limited rationality or financial literacy or have an indifferent attitude towards managing household finances.

EU-SILC data shows that the likelihood of arrears tends to decrease with age, as predicted by previous literature. The statistics presented in Table 4 show that arrears tend to fall especially among those aged 45 years or older and a significant drop in the level of arrears can be perceived among those aged over 60. The statistics on arrears are similar to the findings of

Fondeville et al. (2010, 34–35) regarding the rate of over-indebtedness between age groups in Europe. They find only marginal differences in the rate of over-indebtedness between the youngest age groups, while the oldest age group is associated with a significantly lower rate of over-indebtedness.

Table 4: Arrears per age group

Age group	HIA (%)
≤ 25	11.3
26–35	11.1
36–45	11.7
46–60	8.6
> 60	2.4

Table 4 shows that among the three youngest age groups (ages 0–25, 26–35 and 36–45), approximately 11 % was in arrears, while the proportion was 8.6 % among those aged 46–60 and only 2.4 % among those aged 60 or more. Literature suggests that the risk of over-indebtedness is increased among the youngest age group because they are the most eager to finance consumption with credit and tend to have low levels of income. Statistics show that the average debt to income ratio among young indebted adults in Finland is the highest of all age groups. However, the rate of indebtedness was only 65 % among the youngest group, while the rate among those aged 25–44 was over 180 %, explaining why the high debt-to-income ratios of young indebted households are not reflected in the statistics of Table 4. (OSF 2015.) Other factors may also explain why the statistics do not show increased arrears among the youngest age group. One important factor is that the proportion of households with children is lower among the youngest group. The EU-SILC data also confirms that having children increases the likelihood of becoming over-indebted. The statistics show that 6 % of households without children were in arrears, while the proportion was twice as high among households with dependent children. The statistics confirm that single parents are particularly at risk, since 18 % of them were in arrears.

Literature suggests that the likelihood of arrears and over-indebtedness is strongly linked to low income. Table 5 presents the statistics of arrears and risk of over-indebtedness by income quintile. The statistics show that the likelihood of arrears decreases the higher the income quintile and that the relation of being at risk of over-indebtedness follows a similar pattern.

Table 5: HIA and HAROI by income quintiles

Income quintile	HIA (%)	HAROI (%)
1st	12.9	3.9
2nd	10.9	4.0
3rd	7.3	2.1
4th	5.7	1.0
5th	2.6	0.3

Statistics in Table 5 show that the rate of arrears is the highest among the first income quintile of which almost 13 % was in arrears while the proportion was only 2.6 % among the fifth quintile. The rate of arrears between income quintiles declines approximately 2–3 percentage points per quintile. The proportion at risk of over-indebtedness declines also with the level of income, however it remains at approximately 4 % in the first and second income quintiles and declines only from the third quintile onwards. Based on the suggestion of Kempson and Atkinson (2006, 24–25) presented in the section 4.1, the persisting risk of over-indebtedness among the two lowest income quintiles could possibly be explained with their illiquidity issues. Kempson and Atkinson (2006, 24–25) argue that financial struggles in the two lowest quintiles are mainly driven by the low level of income, and not by *excessive* borrowing. Households in the two lowest income quintiles are typically struggling to make ends meet and if they have debt, the costs of it are high, making it almost inevitable that they are struggling with the repayment of it. The statistics presented by Peura-Kapanen et al. (2015, 16) also indicate that among households in the lowest income quintile (or two lowest income deciles) the average level of debt is lower than the median income, while the relation is the other way around in the higher quintiles (or deciles). This could imply that over-commitment plays a role in increasing the risk of over-indebtedness among households in the second income quintile and that the debt servicing costs could outweigh the impact of better liquidity.

Literature shows that high credit exposure and the number of credit commitments increases the risk of over-indebtedness. Since the EU-SILC does not collect data on the number or amount of household's loans, the impact of additional credit commitments or the level of debt could not be tested. Studies show that in general, having consumer credit increases household's risk of financial difficulties. The EU-SILC statistics presented in Table 6 support the assumption and show that the likelihood of being in arrears was 11 percentage points higher among households with other loan commitments (the EU-SILC data does not enable separating consumer credit commitments from all other non-housing related loans) compared to households without. The group of households marked as having *consumer credit* in Table 6

might thus include households that have only student loans. The statistics show that among households that do not hold consumer credit the rates of arrears and over-indebtedness are clearly lower than average. A significant difference is also perceived at levels of HAROI: only 0.6 % of households without consumer credit are at the risk of over-indebtedness while 4.0 % of households with consumer credit fulfill the criteria.

Table 6: HIA and HAROI by credit commitments

Credit commitment		HIA (%)	HAROI (%)
Consumer credit	No	2.5	0.6
	Yes	13.5	4.0
Mortgage	No	7.2	2.1
	Yes	9.1	2.5

Concerning mortgage, the variation of financial difficulties is smaller between the two groups. Statistics of HIA and HAROI presented in Table 6 show that 9 % of households with mortgage were in arrears, while the proportion was 7 % among the ones without. 2 % of households without mortgage were at risk of over-indebtedness, while only a slightly higher proportion of households with mortgage fulfilled the criteria. Literature suggests that the different impacts related to mortgage and consumer credit can be explained with different lengths of time-horizons due to which behavioral biases impact decisions related to consumer credit more than mortgage. Consumer credit commitments also include high-cost debt that may increase household's debt burden to excessive levels.

Even though mortgage forms the largest part of household debt, also a significant part of households without mortgage was in arrears. Significant part of these households live in rented accommodation and as previous studies show, tenants can be identified as one main risk group of over-indebtedness, due to their relatively high housing costs and low levels of income. The EU-SILC statistics show that households living in rented accommodation have an increased likelihood of being in arrears and at risk of over-indebtedness. 13 % of tenants reported arrears and 4 % of the group was at risk of over-indebtedness, both of which are above the average. Approximately 11 % of tenants reported arrears on rental payments and utility bills and 6 % on other loan repayment. Table 7 summarizes the statistics of HIA and HAROI by tenure status. In the light of Table 7, households living rent-free seem to be another risk group of over-indebtedness as almost 9 % of them were in arrears and 4 % fulfill the criteria of HAROI. These households however present only 0.8 % of all households.

Table 7: HIA and HAROI by tenure status

Tenure status	HIA (%)	HIA mortgage or rent (%)	HIA utility bills (%)	HIA other loans (%)	HAROI (%)
Outright owner	2.9	0.1	3.1	1.8	0.6
Owner paying mortgage	9.1	4.5	9.5	4.1	2.5
Tenant	12.5	11.3	11.1	6.4	4.0
Free	8.7	0.5	7.2	1.9	3.8

The likelihood of financial difficulties differs depending on household's tenure status, which is due to their different levels of disposable income and relative housing costs. The risk measured with both HIA and HAROI is the lowest among outright owners that tend to have relatively low housing costs and higher levels of income and assets than the other groups. Having mortgage on the other hand increases household's expenses and debt exposure and is associated with a higher likelihood of financial difficulties. 9 % of households with mortgage were in arrears, most commonly with utility bills and 2.5 % of households with mortgage were at risk of over-indebtedness. This probably reflects the severe repercussions of mortgage arrears, as due to arrears creditors have the right to declare the mortgage as defaulted and the whole outstanding amount of mortgage can become due for payment all at once. As it is unlikely that household with mortgage arrears could repay the mortgage all at once, the collateral, which in practice means the home of the household, needs to be realized. Unpaid utility bills on the other hand, while they accrue interest and costs on arrears and may eventually lead to payment defaults, the amounts due are significantly smaller and also the timeline to repay arrears before they are declared defaults is longer. When facing financial burden, households attempt to avoid mortgage arrears to the last by delaying other payments if necessary. Increasing rate of arrears on mortgage repayment is an indicator of increasing risk on the financial stability of the economy, and the development of it should be closely monitored.

The EU-SILC statistics presented in Table 8 show that the likelihood of arrears differs between different economic statuses. The statistics suggest that unemployment is a risk factor of over-indebtedness, since the level of arrears among unemployed was as high as 18 %, ten percentage points higher than among employed. The second most common arrears were among individuals with status 'Other', which includes all other economic statuses outside the labor market (permanently disabled, individuals fulfilling domestic tasks and other inactive persons). The level of arrears was also increased among students, of which 10 % was in arrears. The increased likelihood of arrears among unemployed, other inactive and students

might be mainly due to their relatively lower levels of income. Students usually also belong to the youngest age group and are thus more vulnerable to debt problems.

Table 8: Employment status and HIA

Employment status	HIA (%)
Employed	8.2
Unemployed	18.3
Student	10.4
Retired	1.8
Other	13.5

The statistics in Table 8 show that arrears were significantly less common among retired individuals that typically have repaid their loans and are considered to be more responsible in their spending. An interesting aspect for the probit estimation is to examine whether the economic statuses have an independent impact on the risk of over-indebtedness when the level of income and age is controlled.

Table 9 reports arrears by the level of education. Higher level of education is associated with lower risk of arrears, as predicted by previous studies. The EU-SILC data reveals that households with only basic education or upper secondary education are almost twice more likely to be in arrears than individuals with tertiary education, which is associated with higher level of earnings and also financial literacy that increases abilities with financial decision-making and reduces the risk of financial difficulties.

Table 9: Households in arrears by education levels

Education level	HIA (%)
Basic education	8.9
Upper secondary	9.5
Tertiary	4.8

The likelihood of arrears however does not decrease with the level of education per se. In fact, arrears were more common among households with upper secondary than households with only basic education. 9 % of individuals with only basic education were in arrears while the proportion was slightly higher (9.5 %) among individuals with upper secondary education. Higher likelihood of arrears among individuals with upper secondary education may be explained with their better access to credit markets, due to better employment and earning prospects. Better creditworthiness improves the liquidity situation while higher debt exposure increases their financial burden.

5.2.2 Probit estimations

The following section will utilize probit model to estimate the impacts of household's socio-economic variables on its risk of over-indebtedness. Probit models are estimated for two dependent variables HIA (household in arrears) and HAROI (household at risk of over-indebtedness) presented in chapter 5.1.2. The Wald test is passed for both HIA and HAROI probit estimation models and the coefficients of determination are statistically significant at 5 % risk level. The HIA probit model explains 19.9 % of the variation on the probability of having arrears and takes 16 132 observations into consideration. The HAROI probit model explains 21.2 % of the variation of the risk of over-indebtedness and takes 16 128 observations into consideration. The number of observations in the two probit estimations differ due to a few missing values in survey questions that are used in constructing the dependent variable HAROI. These observations, for which it was not possible to deduct the value of HAROI, have thus been omitted from the second estimation. The estimation results for both models are presented in Table 10.

Table 10: Probit estimation results

VARIABLES	(1) HIA	(2) HAROI
Sex		
Male	(Reference category)	
Female	0.0108 (0.0440)	0.105 (0.0692)
Income quintiles		
1 st income quintile	(Reference category)	
2 nd income quintile	-0.201*** (0.0643)	-0.0871 (0.0865)
3 rd income quintile	-0.546*** (0.0705)	-0.442*** (0.105)
4 th income quintile	-0.724*** (0.0792)	-0.760*** (0.135)
5 th income quintile	-0.865*** (0.0822)	-1.112*** (0.190)
Age groups		
≤ 25	(Reference category)	
26–35	0.173* (0.0933)	0.148 (0.123)
36–45	0.244** (0.0966)	0.319** (0.133)
46–60	0.193** (0.0963)	0.369*** (0.135)
>60	-0.0905 (0.156)	-0.234 (0.277)
Marital status		
Married	(Reference category)	

Never married	0.00866	-0.0605
	(0.0597)	(0.0941)
Divorced/separated	0.0251	0.113
	(0.0803)	(0.117)
Widowed	-0.106	0.105
	(0.149)	(0.226)
Household type		
Adult(s) without children	(Reference category)	
Single parent	0.141	0.0776
	(0.0960)	(0.138)
2 adults with children	-0.0430	0.100
	(0.0620)	(0.0932)
Tenure status		
Outright owner	(Reference category)	
Owner paying mortgage	0.221***	0.319***
	(0.0620)	(0.108)
Tenant	0.224***	0.488***
	(0.0702)	(0.111)
Free	0.276	0.568*
	(0.208)	(0.331)
Consumer credit	0.935***	0.928***
	(0.0562)	(0.0942)
Employment status		
Employed	(Reference category)	
Unemployed	0.299***	0.321***
	(0.0795)	(0.108)
Student	-0.131	0.0612
	(0.0861)	(0.114)
Retired	-0.488***	0.125
	(0.148)	(0.300)
Other inactive	0.0860	0.210*
	(0.0795)	(0.115)
Level of education		
Basic education	(Reference category)	
Upper secondary	-0.175***	-0.185**
	(0.0604)	(0.0826)
Tertiary	-0.414***	-0.582***
	(0.0696)	(0.113)
Constant		
Constant	-1.619***	-2.834***
	(0.149)	(0.225)
Observations	16,132	16,128
Pseudo R2	0.1990	0.2119

Robust standard errors in parentheses

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

The probit estimations show that the level of income has a statistically significant impact on the probability of arrears and risk of over-indebtedness. The results indicate that higher level of income is associated with lower probability of arrears and over-indebtedness. The first income quintile is the reference group, among which the probability of arrears is the highest. The probability of arrears decreases the higher the income quintile, while the risk of over-

indebtedness persists between the two lowest income quintiles. As discussed before, this phenomenon may possibly be due to the households in the two lowest income quintiles tend to be struggling to make ends meet and if they are indebted, the costs of their credit commitments tend to be high and the repayment of it may cause heavy burden to the household. One suggestion is that over-commitment is more frequent in the second income quintile and the costs of it outweigh the impact of better liquidity situation. The negative impact on the risk of over-indebtedness of the three highest income quintiles is statistically significant and increasing.

The probit models indicate that age impacts the probability of arrears and over-indebtedness. The LCH predicts that indebtedness is highest among the youngest age groups and begins to decline towards retirement. Literature associates young age also with more carefree attitude towards one's liabilities that causes over-consumption and financial difficulties. The probit results however do not support the assumption that young age per se increases the risk of over-indebtedness. The reference group in probit estimation is the youngest age group and the results indicate in fact that the probability of arrears and over-indebtedness is statistically significantly higher among the age groups of 36–60. The sign of the coefficient indicates that belonging to the oldest group could decrease the probability of arrears and over-indebtedness, however the impact is not statistically significant. These results imply that the impact of age on the risk of arrears and over-indebtedness does not differ between the two youngest and the oldest group. The results suggest that the increased rate of arrears and over-indebtedness among young households is due to their low income and relatively high commitments. Younger people have also lower levels of education and financial literacy, which increase the rate of arrears and risk of over-indebtedness among the group.

Marital status does not seem to have an independent impact on the probability of arrears or over-indebtedness among Finnish households. The results do not indicate any statistically significant differences in the probabilities between married as the reference group and divorced or separated, widowed or the ones never married. Divorce and separation were hypothesized to be a major cause of income shocks, while the interest was to test whether they have an independent impact on over-indebtedness. After controlling for income levels, any independent impact cannot be perceived. Literature also suggests that having dependent children increases households' expenses and makes a large proportion of them fixed, increasing their vulnerability to over-indebtedness. The probit estimation results however do

not show any statistically significant impact on over-indebtedness after controlling for other factors including the level of income. Finnish households benefit from the generous social welfare system that supports households with children and low-income in particular, which reduces their risk of over-indebtedness. An interesting aspect for the following section is to observe if there are differences between the two Nordic welfare states and the UK.

The results indicate that households' tenure status has a statistically significant impact on the probability of arrears and over-indebtedness, even after controlling for income levels. The impact of living in rented accommodation is statistically significant and the results indicate that of all tenure types, tenants are associated with the highest risk of over-indebtedness. The risk among households living rent-free does not differ statistically from the risk of outright owners as a reference group, among which the risk of over-indebtedness is the lowest. The results show that the risk of arrears and over-indebtedness is also increased among households that have mortgage, in comparison to the outright owners group. The estimation results show a smaller difference between the groups of households that have mortgage or live in rented accommodation than the descriptive statistics reported previously in the Table 7. The probit estimation results show more or less the individual impact of tenure status on the risk of arrears and over-indebtedness, while the statistics in Table 7 do not control for other factors. Households that have mortgage tend to have higher levels of income than households living in rented accommodation and the results indicate that major part of the risk of tenants is due to their low level of income. The dummy variable of other loan commitments also captures the impact of higher debt exposure. The variable shows a strong and statistically significant positive impact on the risk of arrears and over-indebtedness and the results indicate that having consumer credit increases households' risk of over-indebtedness considerably.

The estimation results show that unemployment is associated with a higher risk of over-indebtedness. The probability of arrears and over-indebtedness is significantly higher among unemployed than among employed as the reference group. Unemployed individuals have typically faced an adverse income shock and are struggling to maintain their standard of living with a lower level of income. Unemployment also makes smoothing income volatility more difficult due to lenders are reluctant to grant credit to unemployed individuals with reasonable costs. To avoid increasing arrears or payment defaults to the last, unemployed individuals might thus resort to high-cost credit such as instant loans, while hoping for that

they will find employment and their financial situation will improve shortly¹¹. The impact of unemployment is statistically significant even after controlling for the level of income, which indicates that unemployment has an independent impact on over-indebtedness. The difference on probabilities between employed and either the other inactive group or students is not statistically significant, even though the rate of arrears among these two groups was increased based on the statistic reported earlier in Table 8. The higher likelihood of arrears could be explained with the low levels of income among students and the other inactive group. Students also tend to live in rented accommodation, which based on the results presented earlier is also associated with higher risk of arrears and over-indebtedness. Being retired on the other hand has a statistically significant negative impact on the probability of arrears, however the impact on the risk of over-indebtedness is not statistically significant and can be judged being as common as among the employed.

The probit estimations support the findings that higher level of education decreases the risk of over-indebtedness. The estimation results show a negative and statistically significant impact of education on both the probability of arrears and over-indebtedness even after controlling for other factors including income. Individuals with only basic education have the highest risk of over-indebtedness and the risk decreases with the level of education. Some of the impact of education can possibly be explained with its relation to financial literacy and behavioral phenomena. Lusardi et al. (2017) show that financial literacy increases with the level of education due to individuals with higher levels of education have better incentives to invest in it. Individuals with tertiary education have the largest variation of lifetime income and benefit the most from consumption smoothing. Financial ignorance may be optimal for individuals with lowest levels of education, which results in weaker financial skills and higher risk of over-indebtedness. (Lusardi et al. 2017, 472–473.) Education increases financial understanding and the incentives to invest in it, which can also diminish the impact of behavioral biases on financial decision-making, as the individuals are more sophisticated and aware of their self-control problems. It could be assumed that increasing understanding of financial concepts should replace their likelihood of using rules of thumb in financial decision-making.

¹¹ This type of findings are also reported by for example Disney et al. (2008, 32) regarding UK households

The estimation results show evidence in favor of the ability to pay theory. The results indicate that a significant part of the risk of over-indebtedness is due to illiquidity issues caused by low level of income or relatively high level of expenses. Factors indicating relatively higher financial burden such as living in rented accommodation, having mortgage or other loan commitments have all a significant impact on the risk of over-indebtedness. In order to study the relevance of the negative equity theory, or more precisely the relevance of the dual trigger, the data should have included more information about households' debt to asset positions and changes in housing prices in particular. Including data on households' debt and asset positions would be an interesting aspect for further research, since it would provide a more complete picture of households' over-indebtedness. Gerlach-Kristen & Lyons (2017) for example find results that support the relevance of the dual trigger among European households and particularly in explaining long-term arrears. They find that arrears correlate with the interaction of house price decline, the years of ownership and an income decline, while negative equity (measured with the interaction of house price decline and the outstanding amount of mortgage) does not have an impact on arrears. (Gerlach-Kristen & Lyons 2017, 13–16.) Estimating the impact of the dual trigger could also provide indications of the severity of financial difficulties. As it was presented in the section 3.3, the dual-trigger of affordability issues and negative equity could drive households to long-term arrears and increase the rate of mortgage defaults in the economy.

The probit model does not show significant differences on HIA or HAROI between men and women. The results are interpreted that women and men have statistically equal probability of living in a household that is in arrears or at risk of over-indebtedness. The estimation method is not able to capture any impact on sex on the risk of over-indebtedness due household level arrears cannot be indicated to a specific household member. The different risks of men and women could be estimated from official registered payment defaults, the majority of which are registered to one household member that has made the commitment in question. Possible standpoint could have also been to estimate individually the probability of households with only one member, which could have indicated whether the risk of over-indebtedness is higher among single women than men. Useful information could have also been accomplished by first identifying the “head of household” and then analyzing if it has an impact on the risk of over-indebtedness whether this member of the household is male or female.

5.3 Comparative study

The following section compares the levels and determinants of over-indebtedness among Finnish, Swedish and British households. The research utilizes cross-sectional EU-SILC data from 2015, which includes 14 250 Swedish and 21 231 British households, will be used for the estimations. The findings are also compared to the ones of Fondeville et al. (2010) conducted with the EU-SILC 2008 special module data that includes also more specific data on household's debt commitments. Fondeville et al. (2010) study the accumulation of consumer credit and its impacts on financial difficulties and identify the types of households that are at risk of over-indebtedness.

5.3.1 Descriptive statistics

Table 11 presents statistics of the proportion of households in arrears and at risk of over-indebtedness in Sweden, the UK and Finland. The statistics show that arrears are least common among Swedish and most common among Finnish households. Arrears were almost as common among British households as Finnish, while of Swedish households less than 4 % reported arrears. The risk of over-indebtedness was also the lowest among Swedish households of which less than one percent fulfilled the four criteria of HAROI. The risk was highest among British households as almost 4 % of them fulfilled the criteria, which is almost twice the proportion than among Finnish. Even though the proportion of households in arrears is highest in Finland, financial difficulties tend to be more severe among British households. Almost half of British households in arrears fulfilled all criteria of HAROI, while the proportion was only one fifth among Finnish households in arrears.

Table 11: Financial difficulties in Sweden, UK and Finland

Indicator	SE (%)	UK (%)	FI (%)
Arrears on mortgage or rent	1.6	3.6	3.8
Arrears on utility bills	2.4	6.9	6.2
Arrears on other loans	1.9	2.9	3.2
HIA (total)	3.8	8.5	8.8
HAROI	0.9	3.9	2.0

Arrears on utility bills were the most common in all three countries. In Sweden the differences between the three types of were the smallest, indicating that different types of

arrears are more piled up to the same households. The statistics presented in Table 11 show similar results as the EU-SILC 2008 special module of over-indebtedness that studied over-indebtedness with more specific data that included data of also the amount and types of credit commitments. Since 2008, the rate of arrears has diminished in Finland and Sweden, while in the UK arrears had developed to the opposite direction. In 2008, at the beginning of the financial crisis, the rate of arrears was higher in Finland (by 0.6 %-points) and Sweden (by 1.6 %-points), while in the UK the arrears were lower than in 2015 (by 1.4 %-points). (Fondeville et al. 2010, 22.)

The Table 12 presents statistics of arrears among households by their employment status. Arrears among employed were the most common in Finland (8 %), while the proportion was 6 % in the UK and less than 4 % in Sweden. Unemployment has similar impact on the likelihood of arrears in all countries compared. The rate of arrears among unemployed was significantly increased in the UK, where 22 % of unemployed were in arrears. In Sweden where arrears are significantly less common, as high as 15 % of unemployed were in arrears. In Sweden and the UK, alike in Finland, another group with high rate of arrears seems to be the *other* group outside the labor market. In all three countries arrears were significantly less common among retired.

Table 12: Arrears per employment status

Employment status	HIA (%)		
	SE	UK	FI
Employed	3.6	6.0	8.2
Unemployed	14.7	21.8	18.3
Student	6.9	9.9	10.4
Retired	1.2	1.2	1.8
Other	12.9	18.8	13.5

Table 13 summarizes the proportions of households in arrears and at risk of over-indebtedness by income quintiles. The statistics indicate that higher level of income is associated with lower probability of arrears and over-indebtedness evidently in all three countries. However, financial difficulties seem to be distributed more evenly between income groups in Finland than in Sweden or the UK, where financial difficulties are more strongly associated with belonging to the two lowest income quintiles.

Table 13: HIA and HAROI by income quintiles

Income quintiles	HIA (%)			HAROI (%)		
	SE	UK	FI	SE	UK	FI
1st	9.4	14.6	12.9	3.0	8.1	3.9
2nd	5.3	10.3	10.9	1.8	5.0	4.0
3rd	2.4	5.7	7.3	0.4	2.7	2.1
4th	0.9	3.4	5.7	0.1	0.7	1.0
5th	1.3	1.2	2.6	0	0.3	0.3

In the UK and Sweden, the risk of over-indebtedness is significantly increased among households in the lowest income quintile. In the UK and Finland, the risk of over-indebtedness is twice the average among the lowest income quintile while in Sweden the risk is three times the average. In Finland, the risk of over-indebtedness persists between the first and the second income quintile, while in the UK and Sweden there is a clear difference.

Households living in rented accommodation have a significantly increased risk of over-indebtedness in all three countries studied. Table 14 presents the statistics of arrears and risk of over-indebtedness by household's tenure status. The statistics show that the likelihood of arrears and over-indebtedness is highest among tenants and especially increased in the UK, as almost 17 % of them were in arrears and 9 % at risk of over-indebtedness. Tenants seem to be a risk group also in Sweden since the rate of arrears among tenants was almost twice the average. The risk of over-indebtedness among tenants in the UK seems substantial compared to Finland or Sweden, which may be due to Nordic social security systems are more generous in granting housing benefits for households in the lowest income groups.

Table 14: HIA and HAROI by tenure status

Tenure status	HIA (%)			HAROI (%)		
	SE	UK	FI	SE	UK	FI
Outright owner	1.3	0.9	2.9	0	0.3	0.6
Owner with mortgage	2.4	3.5	9.1	0.4	1.3	2.5
Tenant	7.3	16.7	12.5	2.7	8.5	4.0
Free	-	4.0	8.7	-	1.4	3.8

Arrears and over-indebtedness are the least likely among outright owners. In Sweden, the statistics in fact imply that none of outright owners were at risk of over-indebtedness and the proportions in the UK and Finland are also only 0.3 % and 0.6 %. Among Swedish households, the outright owner group accounts for only a small fraction of households and as large proportion as 60 % of Swedish households have mortgage. In Finland and the UK, the proportion of households with mortgage was approximately one third of households. In

Sweden or the UK mortgage seems not to impact the likelihood of over-indebtedness as much as it does in Finland where the difference in arrears and the risk of over-indebtedness is significant. The results highlight the importance of increasing systemic risk in Finland among households with mortgage, of which the ESRB also raised a warning. Mortgage repayment culture between Finland and Sweden differs significantly as Finnish households are expected to repay their mortgage completely, while Swedish households make installments mainly only in the beginning of the contract. This explains the high proportion of Swedish households with mortgage and also indicates that the levels of outstanding mortgage they have might be smaller.

The following Table 15 presents the statistics by the two types of credit commitments identified from EU-SILC data, mortgage and other loan commitments. Alike in Finland, having consumer credit or other non-housing related loans has a similar impact on the likelihood of arrears and being at risk of over-indebtedness in Sweden and the UK. Almost half of surveyed households in all countries had other loan commitments. The statistics in Table 15 show significant differences on the rate of arrears among households with other loan commitments than households without. The difference is the largest among Finnish households as the rate of arrears was 11 percentage points higher among households with other loan commitments than households without, while the difference is more moderate in the countries compared. Approximately 4 % of Finnish and British households with other loan commitments and 2 % of Swedish fulfilled all criteria of HAROI, while the proportion was clearly lower among households without other loan commitments.

Table 15: HIA and HAROI by credit commitments

Credit commitment		HIA (%)			HAROI (%)		
		SE	UK	FI	SE	UK	FI
Other loans	No	1.4	5.3	2.5	0.3	2.7	0.6
	Yes	6.6	9.4	13.5	2.1	4.3	4.0
Mortgage	No	6.0	8.8	7.2	2.1	4.4	2.1
	Yes	2.1	3.5	9.1	0.3	1.3	2.5

As discussed earlier, having mortgage does not impact the risk of over-indebtedness as strongly as having consumer credit. The EU-SILC statistics show that in fact in the UK and Sweden, households with mortgage tend to be less over-indebted than households without. As showed before, in Finland the relation is the other way around, even if the differences were relatively small. The results are mainly explained by the different distribution of population

by tenure status. 82 % of households without mortgage in Sweden are tenants, while the proportion is only 28 % in the UK and 21 % in Finland. Of households owning their accommodation only 11 % are outright owners in Sweden, while the proportion is over 40 % the UK and Finland. As the statistics in Table 14 show, the likelihood of over-indebtedness is significantly increased among tenants and the lowest among outright owners. Even though only a slightly higher proportion of households not having mortgage are tenants in the UK than in Finland, the difference in the risk of over-indebtedness is significant. The statistics in Table 14 indicate that tenants are a significant risk group in the UK, which can be explained by their relatively high financial burden of housing costs. 70 % of tenants in the UK have housing burden exceeding 25 % of their disposable income, which is significantly higher compared to 57 % in Finland. Housing burden exceeds 60 % of disposable income among British households living in rented accommodation, while in Finland the proportion is only 5 %. (Eurostat 2018b.)

The EU-SILC statistics presented in Table 16 show that over-indebtedness is significantly increased among households with dependent children evidently in all three countries. Households without dependent children are below average in all three countries, while single parents seem to be particularly vulnerable to financial difficulties.

Table 16: HIA by household type

Household type	HIA (%)		
	SE	UK	FI
No children	3.3	3.7	5.9
Single parent	7.1	28.8	18.1
2 adults	4.9	9.9	10.8

Almost 30 % of single parent households were in arrears in the UK, while in Finland the proportion was also as high as 18 % and 7 % in Sweden. The likelihood seems to be significantly lower among two adult households with children, however still increased in comparison to households without children.

5.3.2 Probit estimations

The following section compares the determinants of over-indebtedness between Finland, Sweden and the UK. HIA and HAROI probit estimation models are executed with Swedish

and British EU-SILC data and the estimation results of the three countries are compared. The HIA model explains 22.3 % of the variation on the probability of arrears in the Swedish EU-SILC data and 25.6 % in the British data. The HAROI model explains 27.2 % of the variation on the risk of over-indebtedness in Swedish data and 24.1 % in British. The Wald tests of all four estimation models are passed and the model coefficients of determination are statistically significant at 5 % risk level. The estimation results are presented in the Table 17.

Table 17: Probit estimation results Sweden and UK

VARIABLES	(FI) HIA	(FI) HAROI	(SE) HIA	(SE) HAROI	(UK) HIA	(UK) HAROI
Sex						
Male	(Reference category)					
Female	0.0108 (0.0440)	0.105 (0.0692)	-0,0789 (0.0714)	-0,143 (0.125)	-0,027 (0.0508)	-0,0331 (0.0672)
Income quintiles						
1 st income quintile	(Reference category)					
2 nd income quintile	-0.201*** (0.0643)	-0.0871 (0.0865)	-0.404*** (0.101)	-0,18 (0.141)	-0.202*** (0.0630)	-0.193** (0.0793)
3 rd income quintile	-0.546*** (0.0705)	-0.442*** (0.105)	-0.757*** (0.115)	-0.676*** (0.167)	-0.329*** (0.0705)	-0.258*** (0.0904)
4 th income quintile	-0.724*** (0.0792)	-0.760*** (0.135)	-1.163*** (0.134)	- (0.167)	-0.572*** (0.0899)	-0.775*** (0.135)
5 th income quintile	-0.865*** (0.0822)	-1.112*** (0.190)	-0.822*** (0.135)	- (0.167)	-0.759*** (0.125)	-0.717*** (0.153)
Age groups						
≤ 25	(Reference category)					
26–35	0.173* (0.0933)	0.148 (0.123)	0,0513 (0.171)	-0,243 (0.297)	-0.168* (0.0958)	-0.248** (0.123)
36–45	0.244** (0.0966)	0.319** (0.133)	0,227 (0.175)	0,311 (0.264)	-0,0557 (0.102)	-0,104 (0.128)
46–60	0.193** (0.0963)	0.369*** (0.135)	0,251 (0.182)	0,287 (0.280)	-0,048 (0.106)	-0,0294 (0.136)
>60	-0.0905 (0.156)	-0.234 (0.277)	-0.510* (0.279)	-0,165 (0.405)	-0.370** (0.160)	-0.385* (0.199)
Marital status						
Married	(Reference category)					
Never married	0.00866 (0.0597)	-0.0605 (0.0941)	0,00653 (0.0924)	-0,0445 (0.183)	0,0917 (0.0746)	0,121 (0.101)
Divorced/separated	0.0251 (0.0803)	0.113 (0.117)	0,0627 (0.111)	0.370** (0.174)	0,0863 (0.0862)	0.275*** (0.106)
Widowed	-0.106 (0.149)	0.105 (0.226)	-0,268 (0.222)	0,384 (0.347)	0.257** (0.127)	0.371** (0.171)
Household type						
Adult(s) without children	(Reference category)					
Single parent	0.141 (0.0960)	0.0776 (0.138)	-0,142 (0.164)	-0,192 (0.231)	0.622*** (0.0831)	0.445*** (0.0975)
2 adults with children	-0.0430 (0.0620)	0.100 (0.0932)	0,0853 (0.102)	-0,162 (0.160)	0.227*** (0.0727)	0,113 (0.0898)
Tenure status						
Outright owner	(Reference category)	(Reference category)	(Reference category)		(Reference category)	(Reference category)

Owner paying mortgage	0.221*** (0.0620)	0.319*** (0.108)	-0,18 (0.183)	-0.331*** (0.119)	0.291*** (0.0926)	0,196 (0.121)
Tenant	0.224*** (0.0702)	0.488*** (0.111)	0,133 (0.179)	(Reference category)	0.962*** (0.0799)	0.914*** (0.102)
Free	0.276 (0.208)	0.568* (0.331)	-	-	0,214 (0.338)	0,043 (0.379)
Consumer credit	0.935*** (0.0562)	0.928*** (0.0942)	0.877*** (0.0930)	1.004*** (0.179)	0.516*** (0.0531)	0.436*** (0.0661)
Employment status						
Employed	(Reference category)					
Unemployed	0.299*** (0.0795)	0.321*** (0.108)	0.422*** (0.149)	0.735*** (0.207)	0.423*** (0.111)	0.422*** (0.131)
Student	-0.131 (0.0861)	0.0612 (0.114)	0,0383 (0.154)	0.407* (0.222)	-0.255** (0.105)	-0,176 (0.134)
Retired	-0.488*** (0.148)	0.125 (0.300)	0.408* (0.233)	-0,12 (0.370)	-0.306** (0.140)	-0,234 (0.168)
Other inactive	0.0860 (0.0795)	0.210* (0.115)	0.483** (0.194)	0.729*** (0.275)	0.252*** (0.0674)	0.246*** (0.0846)
Level of education						
Basic education	(Reference category)					
Upper secondary	-0.175*** (0.0604)	-0.185** (0.0826)	-0.275*** (0.0930)	-0.561*** (0.151)	-0.172** (0.0671)	-0,0836 (0.0887)
Tertiary	-0.414*** (0.0696)	-0.582*** (0.113)	-0.426*** (0.102)	-0.535*** (0.172)	-0.396*** (0.0627)	-0.251*** (0.0808)
Constant	-1.619*** (0.149)	-2.834*** (0.225)	-1.574*** (0.294)	-2.041*** (0.431)	-1.961*** (0.173)	-2.333*** (0.227)
Observations	16,132	16,128	7,417	3,973	11,521	11,523
Pseudo R2	0.1990	0.2119	0.2229	0.2724	0.2555	0.2407

Robust standard errors in parentheses

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

The results in Table 17 reveal a shortcoming of the probit estimation regarding the Swedish HAROI probit estimation. The estimation drops out significant number of the observations that belong to the three explanatory variables, the fourth and the fifth income quintiles and the outright owner group, that are left outside of the estimation. These variables predict the failure (HAROI = 0) perfectly and the variables are automatically left outside of the estimation, since the estimated coefficient would have been infinite. None of the observations among the fifth income quintile or the outright owners group in the estimation data fulfill the criteria of HAROI. Among the 4th income quintile, only 0.1 % of the observations fulfill the criteria of HAROI but these deviant observations are dropped out of the estimation due to missing values in some of the other independent variables. The estimation results raise a question of the reliability of the data set in use, or if the criteria for risk of over-indebtedness are too strict to describe debt issues among high-income Swedish households. These results suggest that in Sweden the risk of over-indebtedness would be non-existent among the two highest income

groups and the outright owners, however no such conclusions can be made based on these results. There probably would be a more appropriate approach to describe the debt issues among the highest income quintiles in Sweden. The estimation could be most likely more accurately performed, if the data included more information about household's debt exposure. Debt to assets or debt servicing to income ratios could give a better picture of the risks of over-indebting also among the highest income groups.

The probit estimation results are for the main parts similar with Swedish and British data as were presented in the previous chapter with Finnish data. The estimation results support the ability-to-pay theory and show that affordability issues are a major driver of arrears and over-indebtedness. The level of income has a statistically significant negative impact on the risk of over-indebtedness in all three countries studied. The results of HIA estimation are straightforward in all three countries and the probability of arrears declines the higher the income quintile. The UK HAROI results show that income level has a statistically significant negative impact on the risk of over-indebtedness, which declines steadily from the first till the fourth income quintile. However, the risk of over-indebtedness is less decreased among the fifth income quintile than the fourth, which might be due to the levels of debt can be substantial among the fifth income quintile. The SE HAROI estimation is performed considering only the three lowest income quintiles, since none of the observations in fourth and fifth income quintiles fulfill the criteria of HAROI. These results also imply a statistically significant decreasing impact of income level to the risk of over-indebtedness and support the relevance of affordability issues in explaining over-indebtedness in Sweden. Unlike among Finnish households, there is a clear difference on the risk of over-indebtedness between the two lowest income quintiles among Swedish and British households.

The probit estimation results show that age does not have a statistically significant impact on the risk of arrears or over-indebtedness among Swedish households after controlling for other factors. The results show a negative impact on the risk of over-indebtedness and arrears for the oldest age group, however the results are statistically insignificant. In the UK, the estimation results indicate a negative impact of age on the probability of arrears and the risk of over-indebtedness, however the estimation results are not statistically significant except for the oldest group in HIA model and the second youngest group in HAROI model. The results of UK estimations are more in line with the LCH, according to which the risk of over-indebtedness is increased among the youngest households due to their higher demand for debt

for consumption smoothing purposes. Belonging to the oldest age group has a statistically significant negative impact on the probability of arrears, but the impact on the risk of over-indebtedness is statistically insignificant. The UK HAROI results show that somewhat surprisingly that the risk of over-indebtedness is the lowest among the age group 26 to 35 years.

The reference group being the married group, the results show a statistically significant positive impact on the risk of over-indebtedness among divorced or separated in Sweden and the UK, while the impact on the probability arrears is not statistically significant. The results differ from the ones received for Finnish households, among which marital status was not a predictor of over-indebtedness. Divorce and separation are major causes of adverse income shocks and increase the risk of over-indebtedness particularly since divorced or separated attempt to keep their standard of living with lower disposable income. The risk among divorced or separated persists even after controlling for income levels, which indicates that divorcing or separation may also have psychic costs that affect the management of household finances and also impact borrowing opportunities. In the UK the risk is also increased also among widowed that in addition to an adverse income shock, causes sorrow and has psychological costs that may hinder the ability to manage household finances. The different impacts between the UK and the two Nordic welfare countries may be due to the different levels of social security widows are entitled to.

The probit estimation results support the earlier observation that having dependent children is a major driver of over-indebtedness in the UK. The UK results show that the probability of arrears is the highest among single parent households, while the risk among two parent households does not differ statistically from the risk of households without children. Neither FI nor SE probit estimation results show statistically significant impact of having children on the risk of over-indebtedness. The difference is most likely due to the Nordic social security system gives generous support particularly low-income families with children.

The estimation results show that tenure status impacts the risk of over-indebtedness in all three countries studied. In Finland and the UK, having mortgage or living in rented accommodation increases household's probability of arrears compared to outright owners as the reference group while tenure status is not a predictor of arrears among Swedish households. Living in rented accommodation is associated with a higher risk of over-

indebtedness evidently in all countries studied. The SE HAROI estimation is executed considering only two groups – tenants and owners with mortgage – due to the outright owners group is dropped out of the estimation because none of the observations fulfill the criteria of HAROI (and the free category has no observations). Tenants are considered as the reference group in the SE HAROI estimation and based on the results, their risk of over-indebtedness is increased compared to households with mortgage. Having mortgage does not seem to increase the risk of over-indebtedness in the UK HAROI estimation, unlike shown with the FI estimation. In comparison to Swedish households particularly, Finnish households are obliged to repay their mortgage completely, and the installments of it may also cause substantial burden to the household. The dummy variable of having other loan commitments has a statistically significant impact on the risk of arrears and over-indebtedness in all three countries studied. Even though mortgage forms the major part of household credit, decisions related to mortgage are typically more deliberate while accumulation of consumer credit may be result of careless or shortsighted behavior. Repayment of consumer credit increases household's financial burden, especially if the borrowing decision is done without much consideration since the interest and costs of instant credit particularly may be substantial.

Unemployment has a statistically significant positive impact on the probability of arrears and over-indebtedness in all countries studied. In Sweden and the UK, a similar impact is shown for also other inactive groups that are outside of the labor market, which differs from the results found with Finnish data. The HIA results show that alike in Finland, the probability of arrears is decreased among pensioners in the UK, while the impact is not statistically significant considering HAROI. In Sweden, the risk of over-indebtedness among pensioners is statistically the same as among employed. The UK data also shows a statistically significant negative impact on the probability of arrears among students.

The probit estimation results support the earlier suggestion that the level of education impacts the risk of over-indebtedness in all three countries. The impact of higher education level is statistically significant even after controlling for the level of income and the impact is the stronger the higher the level of education. The impact of education on the risk of over-indebtedness on the other hand is not as straightforward among Swedish or British households as it was among Finnish households. The results show that among Swedish households the impact of education on the risk of over-indebtedness is approximately the same between the ones with upper secondary or tertiary education. In the UK on the other hand the risk of over-

indebtedness is only decreased among the ones with tertiary education, and the impact of upper secondary education is not statistically significant. These results confirm the importance of financial education on the risk of over-indebtedness.

6 RESULTS AND POLICY MEASURES

The following chapter draws conclusions of the analysis performed in the previous chapter. The first section presents the risk groups of over-indebtedness that are identifiable from the EU-SILC data and discusses the determinants that trigger over-indebtedness among risk groups. In the second section 6.2 the policy measures targeted to alleviate household over-indebtedness are presented and evaluated. Future development of policy measures is also discussed.

6.1 Risk groups of over-indebtedness

This study finds strong evidence to support the importance of the risk factors of over-indebtedness¹² identified in previous literature¹³, which were presented in chapter 4.1. The risk groups of over-indebtedness identified from Finnish EU-SILC can be characterized with these risk factors and the factors seem to have a cumulative impact on the risk of over-indebtedness.

The impact of the first risk factor, young age, is not as straightforward among Finnish households as described by previous literature. The statistics show that approximately 11.5 % of people aged under 46 live in households with arrears, while the proportion is a bit lower among the ones aged 46–60 and significantly lower among the ones aged 60 and over. The probit results confirm that after controlling for other factors, the risk of over-indebtedness is not increased due to young age per se, in fact the ones aged 0–35 have the second lowest risk of arrears and over-indebtedness after the oldest age group. Youngest individuals cannot thus be unambiguously identified as a risk group of over-indebtedness. Young households do, however, typically fulfill several other risk factors that have a statistically significant impact on over-indebtedness: they tend to have low levels of income and either live in rented accommodation or have substantial amount of mortgage compared to their current level of income.

¹² (1) Young age, (2) low income, (3) unemployment, having (4) dependent children or (5) only one adult provider, (6) being divorced or separated, (7) living in rented accommodation, (8) having multiple credit commitments, (9) facing unexpected income shocks and (10) having a neglectful attitude towards paying one's commitments.

¹³ See, for example Berthoud & Kempson 1992, Herbert & Kempson 1995, Webley & Nyhus 2001, Betti et al. 2007

The results show evidence that low income is a significant risk factor of over-indebtedness among Finnish households. Households belonging to the two lowest income quintiles are identified as a major risk group of over-indebtedness. The percentage of low-income households at risk of over-indebtedness is twice the average and their vulnerability to over-indebtedness is especially increased if they fulfill also other risk factors such as being unemployed. The impact of unemployment on the risk of over-indebtedness persists even after controlling for other factors including the level of income. In addition to having low levels of income, unemployed struggle to smooth their consumption due to difficulties in getting new credit. In order to smooth the income volatility, they may need to resort to high cost credit. Prolonged unemployment has also psychic costs that may hinder the capability to manage household finances. Unemployment and over-indebtedness cause an employment trap that may push household to long-standing poverty and social exclusion. It might not be profitable for them to improve their income level since debt enforcement begins as soon as they begin to receive income that can be garnished. Other groups based on economic statuses are students and other inactive people outside the labor market. Neither being student nor belonging to the other group has an independent impact on over-indebtedness, but they do have increased levels of arrears. The increased risk of financial difficulties among these groups is most likely mainly due to low level of income and that they typically live in rented accommodation.

The Finnish EU-SILC confirms that tenants are a risk group of over-indebtedness. Statistics in Table 7 show that tenants are particularly burdened by housing costs and like students they typically have low levels of income. Tenants typically also have less wealth, thus if they hold debt, their debt to asset ratios are high. Statistics also identify households that live rent-free or with reduced rent as a risk group of over-indebtedness, even if they are not burdened by housing costs. These households typically include families with dependent children, unemployed or other people outside of the labor market, which fulfill several other risk factors of over-indebtedness. Households with dependent children can also be identified as a risk group of over-indebtedness due to their likelihood of arrears is significantly increased compared to households without children. The probit results however do not show any independent impact of having children thus the increased risk of households with children is due to other factors including low level of income particularly in single parent households and higher levels of debt. The EU-SILC survey does not collect data on the number of credit commitments or amount borrowed, however the results show that the types of credit

identifiable from the survey – mortgage and other credit commitments – increase households' risk of over-indebtedness. Mortgage in particular increases household's financial burden, since it forms the major part of household credit. Other loan commitments on the other hand include also high cost consumer credit that is typically combined with other risk factors such as low income or unemployment.

The Finnish EU-SILC also identifies that people with only basic education are a risk group of over-indebtedness. The probability of arrears is also increased among the ones with upper secondary education. The impact however is probably due to their higher credit exposure, since upper secondary education itself has a decreasing impact on arrears and over-indebtedness. Individuals with low levels of education tend to lack financial knowledge and be more prone to behavioral biases, which hinder their possibilities to make sustainable financial decisions.

6.2 Policy measures

Policy measures intended to tackle over-indebtedness can be divided into *preventive* and *curative* measures. The former attempt to influence the supply and demand sides of credit markets, while the latter are intended to respond to default situations. Preventive measures on the demand side consist of financial education, financial and debt counseling and precautionary warning of the consequences of payment delinquencies or defaults. Precautionary warning can prevent consumers from adopting careless behavior but requires that the consequences are anticipatorily communicated and that the level of penalties issued is sustainable and does not impose debtors to critical financial difficulties. (Anderloni & Vandone 2010, 6, 9–11.) Precautionary warning may have negligible impact on the behavior of the risk groups, since they are the most likely to be impacted by behavioral biases and underestimate their risk of over-indebtedness.

Financial education attempts to promote responsible borrowing behavior and understanding of financial information but also to impact the psychological patterns in financial decision-making by endorsing preparing for adverse shocks with precautionary saving or insurance solutions. (Anderloni & Vandone 2011, 6, 9–11.) Increasing the level of financial knowledge with educational programs has been seen as an obvious cure for debt problems. Fernandes et

al. (2014) however show that even substantial educational programs have negligible effects on behavior after couple of years, due to financial knowledge has little impact on decisions controlled by emotions, such as compulsive buying. Financial education should instead promote propensity to plan and proactivity in managing household finances and teach pre-commitments tools that restrict spending opportunities and diminish the impact of lacking self-control. Teaching financial knowledge should be focused only on “just-in-time” financial advising that is connected to a particular financial decision. (Fernandez et al. 2014, 1873–1874.) Angulo-Ruiz and Pergelova (2015, 569–571) however acknowledge that the schooling system has an important role in developing responsible financial behavior, particularly for young consumers whose parents do not have adequate financial knowledge. They show that financial knowledge is heavily affected by the examples of money-management skills they get from their parents and poor examples can even outweigh some knowledge acquired via financial education, particularly in low-income households.

There are currently several initiatives attempting to impact the level of financial knowledge in Finland. Financial education is more integrated to the national curriculum and the development of it will be monitored with the PISA Tests of financial skills, in which Finland took part for the first time in 2018. The Deaconess Institute and few banks operating in Finland are also organizing another major financial skills initiative (Taloustaitohanke) that aims at improving the financial skills of young individuals that are struggling with money-management and are at high risk of social exclusion. In addition to teaching financial knowledge, the initiative aims at strengthening the feeling of control and improving young consumers’ motivation on financial management, which in the light of Angulo-Ruiz and Pergelova (2015) is the most effective way to impact financial behavior. Households struggling with money-management are also offered financial and debt counseling provided by Finnish municipalities, which however acts rather as a curative measure than preventive one, since people tend to seek help only when they are already over-indebted. (Peura-Kapanen et al. 2015, 69.) Improving financial skills throughout the lifecycle is important since the impact of financial education is not lasting and would be most effective occurring simultaneously with financial decision-making. Financial education should be taught all the way from primary school until the end of secondary school to ensure that financial knowledge and propensity to financial planning of young consumers are at adequate level. Universal financial education would even out the differences in financial literacy caused by different

backgrounds and alleviate the risk of over-indebtedness that is increased among certain groups.

On the supply side preventive measures consist of legal measures to limit irresponsible lending: mandatory transparency of loan terms and conditions that enables responsible borrowing, appropriate credit scoring procedures to ensure responsible lending and special measures such as rate ceilings for consumer credit. (Anderloni & Vandone 2010, 6, 10–11.) Legislative restrictions and the supervision of Financial Supervisory Authority (FIN-FSA) limit credit supply and protect the macro stability of the economy, since institutions under their supervision lend majority of household debt. Current macroprudential tools focus on controlling over-indebtedness particularly by restricting the loan-to-value ratios of mortgage. New controls however need to be introduced to safeguard the economy, since according to Bank of Finland, the risks of household indebtedness are increasingly due to commercial and housing company loans. (Nykänen 2018.)

Legislative reform was implemented in 2013 to restrict the supply of instant loans that are major triggers of debt problems. An interest rate cap of 50 % was mandated for credit contracts with nominal values below 2,000 euros and the marketing of instant credit was restricted. Majamaa et al. (2016) find that the legislative reform has succeeded in restricting the instant credit supply and diminished the number of people with problematic instant debt, especially among the youngest age group. One side effect however is that the supply of instant credit *outside of the scope of the legislative reform*, i.e. credit contracts above 2,000 including also credit limits, has increased. Majamaa et al. (2017) show that as a consequence the levels of problem debt over-indebted individuals hold has increased to significantly higher level. As a response, the Ministry of Justice has prepared a proposal for new legislative reform to the Finnish Parliament, which would bring also credit contracts above 2,000 euros to the scope of the rate cap and tighter the consequences of violating the rate cap requirement. (Ministry of Justice 2018.)

Responsible lending requires adequate information of borrower's repayment capabilities, past repayment history and overall debt exposure. By collecting payment defaults, current credit registers safeguard lenders from credit losses and prevent further over-indebtedness. Lenders however have to rely on the information provided by borrowers when it comes to the overall debt exposure. Authorities and financial actors are calling for establishing a positive credit

register that would collect information of debtors' all credit commitments and give more adequate understanding of their financial situation. Positive credit register would promote responsible lending, prevent over-commitment and cut short debt cycling that in most cases worsens household's financial situation. Lenders should comply with the ethics of lending and ignoring the information given of the debt exposure would transfer more responsibility to the lenders that currently are willing to lend high-cost credit to already over-indebted individuals. Positive credit register would also facilitate these households that already have multiple credit commitments in understanding the extent of their debt exposure. In today's society, where indebtedness is an increasing concern that has the potential of triggering financial crisis, preventing defaulting and over-indebtedness should be a vital part of corporate responsibility. Consumers need to be encouraged to contact their creditors at the earliest point they notice they are struggling with money-management and creditors should feel responsibility to guide them to seek financial advice.

Curative measures consist of legislative measures restricting debt collection, debt management and restructuring schemes such as restructuring loans, arranged payment schedules or settlement procedures. Curative measures attempt to prevent over-indebted households from further indebtedness and alleviate the impact of adverse negative shocks to protect over-indebted households from poverty and social exclusion. (Anderloni & Vandone 2010, 6.) Peura-Kapanen et al. (2015, 56) assess that policy measures in use in Finland are rather curative than preventive, while preventive measures would need to be strengthened in order to avoid increasing of debt problems.

Debt restructuring is last resort means for long-term over-indebtedness. It is initiated by district court if debtor has been verified insolvent, has attempted to reach agreement with lenders, the debt is not payable without restructuring and insolvency is primarily not caused by debtor's own irresponsible behavior. Debt restructuring cannot be granted if it is caused by careless borrowing or repayment behavior or if the debt has been formed as a consequence of a crime. The court can assess that debt restructuring can be granted despite these factors if it considers that there are *substantial reasons* in favor of granting debt restructuring. The court can assess that the significance of the default is smaller to the lenders than the significance of overcoming debt problems is to the debtor. The court can also consider that if debtor has attempted to repay debt or the debt is very old as factors in favor of granting debt restructuring. Debtors will be mandated to follow a repayment schedule that typically lasts

five years, after which the remaining debt is remitted. (KKV.) Debt restructuring can be a very effective curative measure, but it cannot eliminate the reasons behind over-indebtedness. Debtors applying for debt restructuring are typically unemployed and have very low levels of income and education and Fredriksson (2014) shows that as many as 40 % of them ended up under debt enforcement the same year as their restructuring scheme ended. To alleviate the impact of unemployment trap, Peura-Kapanen et al. (2015, 55) propose giving debtors a couple months free from debt enforcement when becoming employed in order to get household finances sorted out.

Rational and foresighted consumers cover unexpected expenses with precautionary saving or with credit the amount and interest of which is based on a careful assessment of their repayment capacity. Promoted by digitalization and new innovations – instant – is becoming the new normal also in borrowing. Consumers are offered credit as fast as within 24 hours, which promotes irresponsible borrowing as decisions can be made with little to no consideration. Preventing the hazardous development, Peura-Kapanen et al. (2015) support increasing the supply of social lending that currently works only as a curative measure, even if its potential is in preventing over-indebtedness. Social lending is granted to low-income households that do not have possibilities to borrow from the market with reasonable costs. Social lending is an optional service provided by Finnish communities and it is granted to for example getting household finances in order and breaking debt cycles or for furthering rehabilitation or employment. Social small loans could replace some of the need for instant credit and would result in lower costs of debt restructuring and other costly forms of curative measures. (Peura-Kapanen et al. 2015.) Restructuring loans are another important curative measure with which household's outstanding loans will be aggregated into one commitment that is guaranteed by the Finnish Guarantee Foundation. Debtors need to be assessed capable to repay the restructuring loan, and guarantee is thus not granted to all over-indebted households. Other actors have acknowledged the demand for aggregated loans to over-indebted households. These loans have high costs and long repayment periods, which might further worsen the financial situation of an already over-indebted household. Defaulting instead would cut short further indebteding and repayment of debt with more reasonable costs and interest via debt enforcement. (Guarantee Foundation 2018.)

7 CONCLUSIONS

This study forms a comprehensive description of the risk groups of over-indebtedness in Finland. The study supports the findings of previous studies and determines socio-economic characteristics that impose households to the risk of over-indebtedness. Understanding the multidimensional causes of over-indebtedness is vital in order to adjust the policy measures correctly. Diverse set of tools is required to alleviate the consequences that over-indebtedness has on the well-being of individuals and the social and economic stability of the society.

The research concludes that adverse income shocks or unexpected expenses are one of the most important individual triggers of payment defaults. Adverse shocks are due to for example unemployment and trigger over-indebtedness as household is no longer able to keep the acquired consumption level or is not able to smooth the income fluctuation due to liquidity constraints. As previous literature finds, households tend to have bounded rationality due to which they are inadequately prepared for adverse shocks. Liquidity constrained households may be forced to borrow with high costs in order to avoid defaulting on their existing commitments. Lack of financial literacy leads to suboptimal borrowing decisions and worsens the already financially difficult situation. As Hyytinen and Putkuri (2018) show, the same households that seem the most incapable of forming rational expectations of their financial situation also experience the largest income declines.

However, also households that have not faced any adverse economic shocks become over-indebted. Households belonging to the lowest socio-economic groups are at the risk of over-indebtedness due to they are struggling to make ends meet with current resources and are constantly living beyond their means. Their necessary living expenses are relatively high due to they typically live in rented accommodation, while other factors including dependent children increase their risk even further by making major part of household expenses fixed. Households belonging to the lowest socio-economic groups must resort to high-cost credit to smooth consumption due to their low creditworthiness. These households may pile up instant credit commitments that have high APRs and short maturity periods, which triggers arrears and may result in payment defaults. Over-commitment is a trigger of debt problems also among wealthier households. Compulsive buying and lack of self-control may lead to over-

commitment, which increases the risk of over-indebtedness especially if consumption is financed with multiple credit commitments. Optimist financial expectations and behavioral heuristics play their part in increasing the number of credit commitments household has and clouds their perception of debt exposure. Irresponsible lending further increases over-commitment with aggressive marketing and instant credit being constantly available. Financial difficulties become severe as soon as household needs to resort to new credit to pay-off old ones.

Preventing young households from becoming over-indebted is particularly important since due to their low levels of income and wealth, payment defaults may become a long-standing problem that may have severe consequences and lead to social exclusion and poverty. Payment defaults also often make it difficult to get rental apartments and restrict precautionary saving and the ability to accumulate wealth. To prevent over-indebtedness of young households, financial education plays a major role particularly for those from the lowest socio-economic groups. This study finds evidence supporting the importance of education in restricting the risk of over-indebtedness. Households with low levels of education tend to make sub-optimal financial decisions and be prone to behavioral biases such as myopia or using rules of thumb. Financial planning and precautionary saving should belong to the skills taught universally in comprehensive school. Impulsivity and inexperience in financial decision-making may tempt young households to make unconsidered decisions when exposed to aggressive marketing of instant credit. Further legislative restrictions are required to limit the supply of high-cost instant credit in order to protect young households and financially struggling households from worsening of financial distress. There is also an urgent need to develop credit products such as social small loans to substitute high-cost credit that triggers debt problems in order to alleviate the financial struggles of liquidity constrained households. Repaying high-cost credit will worsen the financial difficulties of households that need to resort to it when there are no other options available. Social lending has potential to significantly decrease the costs of debt enforcement and restructuring, which is why it should be easily available and marketed as a better option to alternative high-cost credit.

Loan-to-value ratios are an efficient tool in restricting household indebtedness related to mortgage. Mortgage forms the largest part of household credit, while the risk of over-indebtedness is particularly increased when households supplement mortgage with secured or unsecured consumer credit. Housing companies finance construction and renovation more and

more with credit that does its part in weakening households' and lenders' perception of their level of indebtedness. Positive credit register would be a beneficial tool in understanding household debt exposure and in restricting irresponsible lending and borrowing. Registering granted loans would need to be mandatory for all types of lenders, as it would be to verify borrower's financial stability from the information available. Positive credit register would prevent increasing of the number of credit commitments household has, which is a major trigger of debt problems. On the other hand, lenders would be more easily made responsible for irresponsible lending as it could be verified that it has ignored the information available regarding household's repayment capacities.

The study succeeds to provide a comprehensive description of household over-indebtedness in Finland and to make comparisons to households in Sweden and the UK. The current phenomenon of over-indebtedness is examined widely from different perspectives. The study identifies several plausible determinants for over-indebtedness from household's socio-economic characteristics and circumstances and discusses the importance of behavioral biases and lack of financial literacy based on previous literature. Determinants are examined by both the means of literature survey and empirical research using extensive micro-level data. The study succeeds to show plausible results of the impact of household socio-economic characteristics on their risk of over-indebtedness and is able to identify risk groups of over-indebtedness. Behavioral factors or financial literacy that were hypothesized to impact the risk of over-indebtedness could not be measured with the data in use, and the impact of them could not be accurately estimated. The impact of these factors on the results was however speculated based on the findings of previous literature presented. Main shortcomings of the research are the inability to measure the impact of income fluctuations or household's debt exposure on the risk of over-indebtedness. Income shocks could be incorporated performing panel data estimation by using the longitudinal EU-SILC data. Incorporating also variables measuring household's actual debt exposure and number of credit commitments would probably also have improved the accuracy of the results.

An interesting aspect would have also been to study the triggers of payment defaults and determinants of over-indebtedness within the risk groups. Further research could find details of the triggers of over-indebtedness, which would enable targeting policy measures to alleviate the characteristic causes of different risk groups. The impact of financial literacy and its power in restricting irrational decision-making among Finnish consumers should also be

further examined. Behavioral biases persist even if individual is aware of the risks of their actions and is capable of performing financial calculations. The forms of financial education thus need to be closely examined and the results of current initiatives closely monitored to detect if financial education and teaching pre-commitment tools is effective in restricting myopic behavior.

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