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Household Heterogeneity and Policy Relevance

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by Sarah Kuypers and Gerlinde Verbist

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Over-indebtedness and poverty:

patterns across household types and policy effects[1]

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Abstract

Household debt has increased significantly since the second half of the 20th century, making it one of the cornerstones of household financial behaviour. It is, however, necessary to monitor that indebtedness does not spiral out of control, as it can have negative consequences both at the micro and macro level. In this paper, we measure over-indebtedness in the poverty framework, while also taking into account the (potential) leverage by assets. We focus on a case study of Belgium, using data from four waves of the Eurosystem Household Finance and Consumption Survey (HFCS). Our results are relevant both in terms of the levels of over-indebtedness measured as well as from the point of household heterogeneity and policy relevance. While the classical indicators mainly identify those who initially borrow large amounts as over-indebted, our analyses point towards the importance of low disposable income and the ownership of non-mortgage debt in explaining over-indebtedness, poverty and financial vulnerability. We also simulate two potential policy reforms which address these two main risk factors.

JEL Classification: G51, I32

Key words: debt, over-indebtedness, poverty, social policy, Belgium

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1. Introduction

Over the last decades, household debt has reached unprecedented levels in most developed countries (OECD, 2017). Although taking on debt is a natural financial instrument available to households – for instance to smooth consumption over the life cycle or to finance new investments (Sierminska, 2014) – recently concerns have been raised for its durability. A high level of household debt potentially threatens the stability of the financial system and even the overall economy (Mian, Sufi & Verner, 2017), as exemplified by the Great Financial Crisis.

Also at the micro level, high levels of debt are potentially problematic, commonly labelled as 'over-indebtedness'. High debt burdens do not only put a strain on finances, but also have a profound impact in terms of social and psychological well-being (e.g. Fitch et al., 2011). The literature has proposed various indicators to measure the extent of over-indebtedness of which the most common are the debt-to-income ratio, the debt-to-asset ratio and the debt service-to-income ratio. Yet, although these indicators are measured at the individual level often they are used to say something about the condition of household finance in general. Over-indebtedness is still understudied from a social risk perspective (Angel & Heitzman, 2015; D'Alessio & Iezzi, 2016). In terms of policies to combat over-indebtedness, attention mainly goes towards increasing financial literacy or the design of judicial procedures for debt management and alleviation.

At the same time the literature concerning the financial vulnerability of individual households typically focuses on income poverty, where household disposable income (adjusted for household size and composition) is compared to a poverty line. Since debt repayments are generally not considered, this approach, however, tends to overestimate the living standard households with debts can actually achieve with their disposable income. This type of vulnerability may be particularly relevant for specific types of households, so taking account of household heterogeneity is very important.

Currently there are only a couple of studies that have empirically analysed the relationship between over-indebtedness and poverty, namely Carpentier and Van den Bosch (2008) for Belgium, D'Alessio and Iezzi (2016, 2013) for Italy, Ntsalaze and Ikhide (2016) for South-Africa and Wałęga and Wałęga (2021) for Poland. Angel & Heitzman (2015) and Fisher (2005) are the only two studies who have considered the role of general welfare state policies to explain and combat over-indebtedness.

The current paper contributes to this small literature by studying the relationship between over-indebtedness and poverty for Belgium, using data from the Eurosystem Household Finance and Consumption Survey (HFCS). In particular, we add to the literature on three dimensions. First, we build further on the empirical studies listed above by studying the impact of taking into account debt repayments not only in terms of the poverty headcount, but also in terms of the poverty gap and poverty intensity (i.e. based on the class of Foster-Greer-Thorbecke (FGT) indicators (1984)). Second, in these indicators we consider potential leveraging through the ownership of assets, thereby accounting for heterogeneity across households. Finally, we simulate and evaluate two potential policy reforms which include debt repayments in the design of social policies.

The remainder of this paper is structured as follows. Section 2 provides an overview of the literatures on (over-)indebtedness and poverty on the one hand and the link between the two and with social policies on the other hand. The data and methods are described in Section 3. Section 4 presents how FGT poverty indicators are affected by the inclusion of debt repayments and asset leveraging. Section

5 then provides empirical evidence on over-indebtedness as measured in the poverty framework, while Section 6 studies the impact of two potential policy reforms. The last sections concludes.

2. Literature overview

2.1. Household debt and over-indebtedness

Since the development of the life-cycle hypothesis (LCH) by Ando & Modigliani (1963) and the permanent income hypothesis (PIH) by Friedman (1957) household debt has been considered a natural source of finance for private households. It allows to keep consumption constant over the life-cycle by accumulating debt when income is low and paying it back when income is higher. Debt is a general term that includes all types of amounts which are still owed to other households, banks, financial and non-financial institutions and the state, and hence covers mortgages, consumer credit, credit card debt, personal loans, arrears on bills, rents, taxes, etc.

In most developed countries levels of household debt have increased substantially since the second half of the 20th century, reaching a peak around the financial crisis of 2007/08 and remaining high afterwards (OECD, 2017). The last few years a further increase in particularly mortgage debt was fuelled by a context of low interest rates (Dumitrescu et al., 2022; Stockhammer & Wildauer, 2018). Moreover, during the last decades income growth has slowed down which has made it more difficult for households to repay their debt (OECD, 2017). In 2020, household debt reached 53.4% of GDP on average across the EU and 65.6% for Belgium (EUROSTAT, 2022), which is still an underestimation as this is a national accounts indicator not capturing loans between households, credit from unregulated lenders and arrears. Evidence at the microlevel also points towards a widespread distribution of household debt, including in Belgium (Balestra & Tonkin, 2018; de Sola Perea, 2020).

Sometimes debt reaches excessive levels which is generally labelled as *over-indebtedness.* Given the assumptions of rationality, perfect information, far-sighted planning and unrestricted credit access, the LCH and PIH models can only account for over-indebtedness when it results from unexpected adverse shocks to consumption needs or financial resources (Betti et al., 2007). These may be caused for instance by unemployment, sickness, divorce or a rise in debt interest rates. However, in the real world these assumptions do not always hold, and both consumer irrational behaviour and market imperfections can also result in households being over-indebted. Financial literacy, time preferences (myopia), information asymmetry and access to credit are crucial factors in this regard. For instance, limited transparency in lenders' terms and conditions and borrowers' financial illiteracy can cause imprudent financial behaviour and hence over-indebtedness (D'Alessio & Iezzi, 2016).

Over-indebtedness is considered to have negative consequences both at the macro and micro level. At the micro level households who are over-indebted often experience financial difficulties, either lowering their standard of living to be able to make repayments or defaulting on the repayments which further increases their indebtedness (and potentially leading to seizures and evictions). Moreover, besides the financial consequences over-indebtedness also has a social, psychological and health impact. Research has found a relationship between over-indebtedness and levels of stress, depression and anxiety (Fitch et al., 2011; Gatherhood; 2012), family problems, stigma and social exclusion (Vallins, 2004) and even physical health (e.g. postponement of medical care) (Kalousova & Burgard, 2013; Keese & Schmitz, 2014). At the macro level, over-indebtedness may cause instability of the

financial system. For instance, over-indebtedness may lead to an increase in the number of unserviced loans, which weakens banks' balance sheets (Civic consulting, 2013). This in turn generally leads to tightening the margin and conditions on new loans (Bruggeman & Van Nieuwenhuyze, 2013), reducing – often much needed – access to credit. The consequences of over-indebtedness are not limited to households and the financial system; it also affects the overall economy as it may lead to a recession affecting aggregate demand, employment and growth (Mian, Sufi & Verner, 2017).

Although the concept of over-indebtedness is often used, there is to date no consensus on its definition. It is not just the inability to meet financial obligations (although sometimes used as definition, for instance by Angel & Heitzmann, 2015), but rather refers to a "complex, multi-faceted, social phenomenon, caused and compounded by a combination of economic, social, institutional, individual and cultural factors" (Civic Consulting, 2013, p.15). A study conducted for the European Commission in 2008 identified a list of elements that were common across Member States (European Commission, 2008). It includes a comparably high level of repayment commitments (economic dimension), a longer-term structural problem (temporal dimension), resulting in financial and/or social exclusion (social dimension) and accompanied by severe stress (psychological dimension).

As a consequence of the lack of a generally accepted definition, a variety of indicators have been used to measure over-indebtedness. In general, they can be divided into three groups (Ferreira, 2000 as cited by Betti et al., 2007):

1) *administrative* indicators which are extracted from judicial procedures such as the number of people on debt settlement (see e.g. Jappelli et al., 2013)
2) *objective* indicators which evaluate the extent to which debt is sustainable in terms of the capacity to repay such as the debt-to-income ratio, the debt-to-asset ratio, the debt service-to-income ratio or the number of loans people have (see e.g. Balestra & Tonkin, 2018; D'Alessio & Iezzi, 2016; 2013; Sierminska, 2014)
3) *subjective* indicators that capture to which extent households themselves assess whether they are over-indebted, for instance by asking whether they experience their debt repayments as a heavy burden, are having difficulties in making ends meet or are unable to face unexpected expenses (e.g. Betti et al., 2007; D'Alessio & Iezzi, 2016; 2013; Kempson, 2002)

The indicators proposed in this paper belong to the second set of objective indicators by defining the capacity to repay as reaching a minimally acceptable living standard (i.e. poverty line) after debt repayments are fulfilled.

2.2. Poverty

Contemporary research in developed countries usually expresses inequality and poverty in terms of equivalent household disposable income (see e.g. OECD 2008; 2011). Yet, despite their widespread use income-based poverty measures have some well-known limitations.

For instance, apart from the income they may generate, assets and savings are not taken into account. Owning savings and assets has been shown to have many positive effects on living standards, not only in economic terms but also socially and psychologically (e.g. Killewald et al., 2017; Lerman & McKernan, 2008). Since income and assets are imperfectly correlated it is increasingly argued that inequality and poverty indicators that take into account both income and assets are more appropriate for determining

who is worse off and for guiding policy responses (Kuypers & Marx, 2019). Therefore, the literature studying so-called joint income-wealth poverty and inequality indicators is rapidly expanding (see e.g. Balestra & Tonkin, 2018; Brandolini et al., 2010; Kuypers & Marx, 2021, 2018 for poverty indicators and Galluser & Krapf, 2022; Kuypers et al., 2021a, 2021b for inequality indicators).

The main findings highlighted in these poverty studies usually focus on the extent to which households are lifted out of poverty because of their savings and asset holdings, while often refraining from a discussion of the group of households which remain poor even when wealth is accounted for or are even worse off because they have higher debts than assets. The inequality studies, on the other hand, focus mainly on the increase in inequality levels due to high wealth holdings at the top of the distribution. In line with that policy analysis and recommendations in this literature primarily address how to tackle extreme richness through equitable and efficient taxation. Yet, designing policies aimed at encouraging wealth accumulation at the bottom is equally important, not in the least to redistribute the returns from wealth taxation in a sensible way.

2.3. The link between household (over-)indebtedness and poverty

Although there exists an intuitive link between poverty and household (over-)indebtedness, research on the topic has so far been rather limited. On the one hand, official poverty indicators as for instance produced by EUROSTAT, the OECD or national statistical offices are expressed in terms of household disposable income and in that way do not account for the fact that in practice debt repayments lower the actual 'disposability' of many households' income (Kuypers & Marx, 2019). On the other hand, studies on household debt often find that income is one of the strongest predictors of over-indebtedness, even after controlling for other factors (Brown & Taylor, 2008; Bridges & Disney, 2004; Kempson et al., 2004; Sierminska, 2014). This clearly suggests a link with poverty, but often this link is not made explicitly. This may be partly due to the fact that the relationship is difficult to disentangle, as causality is likely to run in both directions. Indeed, household debt can be both a cause and consequence of poverty (Carpentier & Van den Bosch, 2008).

On the one hand, high levels of debt (repayments) may not leave sufficient resources for households to live from, resulting in poverty. Also, increasingly more households with middle incomes are found to be over-indebted (Civic consulting, 2013), which suggests there are households which are generally not considered in poverty statistics (i.e. they have an income above the poverty line), but may fall below the poverty line once their debt repayments are subtracted from their income.

On the other hand, households living in poverty may need to resort to debt in order to make ends meet. Households on low incomes are more sensitive to negative shocks such as unemployment or divorce, which as mentioned above are considered major drivers of over-indebtedness. Sometimes taking on loans or buying on credit may be the only 'coping strategy' available to poor households. Yet, even when there are other options (which may even be more optimal), poor households may resort to debt. As mentioned above, over-indebtedness can result from "irrational" (in the economic sense) consumer behaviour or market imperfections. The poor are more often excluded from access to regular credit such that they may need to resort to non-regulated lenders which often charge high fees and interest rates. Also, households in poverty tend to exhibit more often non-optimal financial behaviour than those who are not poor. This has often been explained by the circumstances or personal characteristics of the poor, but an interesting third explanation which has received much

attention the last decade is the fact that having few resources (i.e. scarcity) changes the way people look at problems and make decisions, which is outside the control of those exhibiting the behaviour (e.g. Shafir & Mullainathan, 2013; Shah et al., 2012).

Since it may be more difficult for households in poverty to repay their debt, a vicious cycle of a poverty and debt trap can arise.

Currently there are only a couple of studies that have empirically analysed the impact of taking into account debt repayments on poverty indicators, namely Carpentier and Van den Bosch (2008) for Belgium, D'Alessio and Iezzi (2016, 2013) for Italy, Ntsalaze and Ikhide (2016) for South-Africa and Wałęga and Wałęga (2021) for Poland. We extend their approach on the one hand by studying not only the poverty headcount, but also the poverty gap and squared poverty gap and on the other hand by considering leveraging through asset ownership. Although it does not allow to formally disentangle the causal direction of the relationship, it does provide enhanced insight into the impact of debt (repayments) on the intensive and extensive margin of poverty.

2.4. Proposed indicators

In a first indicator we take disposable income and subtract debt repayments and compare the result against the poverty threshold, which is in line with the previously mentioned studies. Inspired by the approach of D'Alessio & Iezzi (2016, 2013) who consider asset leveraging within the framework of the debt service-to-income ratio we propose several indicators that account for the ownership of certain assets that can serve as (potential) leverage against debt. In the first version, the assumption is that households only sell financial assets to meet debt repayments. In a second version, households are assumed to sell both financial assets and real assets other than the main residence. Finally, the last version takes into account all assets including the main residence. However, for the latter only its annuity value is considered, under the hypothesis that households continue to live in their homes (D'Alessio & Iezzi, 2016, 2013)[2].

We believe the indicators we propose overcome several of the limitations from which other over-indebtedness indicators suffer. First, the category of administrative indicators "considers the outcome rather than the situation of indebtedness" (Betti et al. 2007, p.142). The poverty-based indicators have the benefit of acknowledging the fact that being over-indebted is much broader than being unable to meet financial obligations. Indeed, households may rely on coping strategies such as lowering their living standard in order to make payments. In that case they do not show up in administrative indicators, while this is the case in our indicators when their living standard is lowered below the poverty line. Moreover, since administrative indicators largely rely on the judicial system, they may complicate comparisons across time and especially across countries. On the contrary, established poverty indicators such as the ones used in this paper have been extensively used for cross-country comparisons and evolutions over time.

Second, the category of subjective indicators evidently suffer from the fact that they rely on individuals' interpretations of concepts such as 'a heavy burden'. Although these indicators may

[2] Our approach is slightly different from that of D'Alessio & Iezzi (2016; 2013). While they compare assets with the total amount of outstanding debt and decrease the debt repayments proportionally (hence comparing two stocks and adjusting the flow of debt repayments accordingly), we make the assumption that over-indebted households in poverty sell assets to make the debt repayments of that year and not necessarily to pay off the entire debt they own (hence comparing the stock of assets with the flow of debt repayments).

provide valuable information on the actual experience of (over-)indebtedness and results appear to be broadly consistent with economic theory (Betti et al., 2007) and other over-indebtedness indicators (D'Alessio & Iezzi, 2013), inter-personal and inter-cultural differences in interpretations hamper comparisons across time and place and even within country/time (D'Alessio & Iezzi, 2013).

Furthermore, the category of objective indicators largely hinges on the threshold above which indebtedness is considered to be (potentially) problematic. For the number of loans the cut-off point usually lies at four (Kempson, 2002; D'Alessio & Iezzi, 2016, 2013), but has the main drawback that it does not account for the amounts that are borrowed. For the most often used indicators in this group (debt-to-asset ratio, debt-to-income ratio, debt service-to-income ratio) there appears to be no consensus on the appropriate threshold. In the case of the debt service-to-income ratio (which comes closest to our indicators), for instance, thresholds of 30% or 40% have been regularly used, while 50% is sometimes used for countries with well-developed credit markets (such as USA, UK) (Wałęga and Wałęga, 2021). Another issue is that such thresholds are applied to everyone, thus not accounting for potential household heterogeneity. In practice, having debt repayments equal to 30% of household income may be experienced very differently by households on low incomes than for those having high incomes (Sierminska, 2014). Also, the LCH and PIH models suggest that the critical threshold should vary over the life cycle (Betti et al., 2007). Hence, these indicators capture debt problems in different household types and at different points of the life cycle (Disney et al., 2008). Although where to draw the poverty line is not completely free of criticism (see e.g. Goedemé et al, 2022 and Jenkins, 2020 for a recent overview of the issues), the 60% of median household equivalised disposable income can be considered a commonly accepted benchmark in the European Union (Wałęga and Wałęga, 2021).

Finally, compared to previous studies who have measured over-indebtedness in the poverty framework, our indicators include information not only on incomes and debt repayments, but also on assets. This is in line with developments in the poverty measurement literature which as mentioned above evolves in the direction of joint income-wealth poverty indicators as well as in line with in the financial margin literature (Ampudia et al., 2016)[3]. Considering the role of asset ownership in these poverty-based indicators of over-indebtedness is relevant for several reasons. First, it combines the rationale behind the debt-to-asset and debt service-to-income ratios into a single indicator. Second, not considering asset ownership ignores an important aspect of household heterogeneity and the most important function of assets, namely that they can be used as a buffer in times of need. Indeed, when debt spirals out of control it may be considered less problematic if it can be resolved by selling an asset. Therefore, we account for differences in asset ownership among households with otherwise similar amounts of debt repayments and/or income. Furthermore, one of the dimensions of over-indebtedness put forward by the European Commission (2008) is that it should reflect a longer-term structural problem (temporal dimension). Considering assets besides income is much more in line with this temporal dimension as assets are more informative about the longer term financial position of households (e.g. Brandolini et al., 2010), while income can be volatile from one year to the next.

[3] Financial margin refers to the difference between income on the one hand and debt repayments and basic living expenses on the other hand. The latter is often proxied by the level of the poverty line. Ampudia et al. (2016) propose an additional condition for over-indebtedness by arguing that households are not in distress if they have sufficient liquid assets to cover a given number of months of the negative financial margin.

2.5. Policy

Another benefit that measuring over-indebtedness within the poverty framework has compared to other over-indebtedness indicators is that it makes the link with social policy more explicit. Most of the literature on over-indebtedness focusses on household level characteristics and circumstances as explanatory or correlated factors (Angel & Heitzman, 2015). However, country level factors also play an important role. A couple of studies have stressed the need to tackle over-indebtedness with a combination of preventive, curative and rehabilitative policy measures (European Commission, 2008; Civic Consulting, 2013). Most attention, however, goes towards policies to increase financial literacy, policies that regulate the terms and conditions of loans and consumer credit and the design of judicial procedures for debt management and alleviation (see e.g. Brown & Zehnder, 2007; Lusardi & Tufano, 2009; Stamp, 2012).

The link with social policies is rarely made, exceptions being Angel & Heitzman (2015) for the European Union and Fisher (2005) for the United States. Angel & Heitzman (2015) find that besides policies targeted specifically at combating over-indebtedness, also other welfare state policies are important in explaining differences in households' risk of being over-indebted. Fisher (2005) shows that higher unemployment benefits decrease the probability of personal bankruptcy. Their results thus underline "the relevance of the wider social policy framework in addressing over-indebtedness" (Angel & Heitzman, p.347). They, however, focus on the impact of the current design of social policies, which is not specifically aimed at combating or even considering over-indebtedness.

We contribute to this literature by investigating how we can strengthen the consideration of debt repayments in social policy design by simulating two reforms. The first reform shows the impact of taking into account debt repayments in the means-test of the social assistance benefit, while in the second reform over-indebted households receive a certain (capped) amount per month to pay off non-mortgage debt or arrears. Details of these reforms are explained in Section 6.

3. Data and methods

The relatively small number of studies on the link between over-indebtedness and poverty can for a large part be attributed to the long-time lack of household data covering both income, assets and debts. Poverty in the European Union (EU) is generally studied based on the Survey on Income and Living Conditions (EU-SILC) and its predecessor European Community Household Panel (ECHP). A couple of studies have also used these datasets to study (over-)indebtedness (e.g. Angel & Heitzman, 2015; Betti et al., 2007; Carpentier & Van den Bosch, 2008; Fondeville et al., 2010). However, what can be learned from these data is limited because in the regular survey only arrears are covered, while the special module on over-indebtedness in the SILC 2008 focusses only on consumer credit.

In this paper we use data from the Eurosystem Household Finance and Consumption Survey (HFCS). We use all four waves currently available, with the first wave providing information on incomes in 2009 and debt and assets at the moment of interview in 2010, the second wave refers to 2013-14, the third to 2016-17 and the fourth to 2019-20. In this survey the following types of debt are included: mortgage debt covering both those for the main residence as for other real estate property and non-mortgage debt covering credit card debt, credit line/overdraft and other non-mortgage loans. Monthly

repayment information is not available for credit card debt or overdrafts[4]. Unfortunately, the HFCS is suffering from the opposite of EU-SILC in that arrears are not included in the data.

We focus on an in-depth study of Belgium. Descriptive statistics on household debt are presented in Table A.1. in the Appendix (see also de Sola Perea & Van Belle, 2022; de Sola Perea, 2020, Du Caju et al., 2014). These indicate that around 60% of individuals belong to a household that owns any form of debt, representing a small increase from 55% in the first wave in 2009-10. This mainly represents an increase in mortgage debt, which can be attributed to the context of low interest rates which has made it both cheaper to take on debt and has made investment in real assets often more profitable than other types of investments. Of those owning debt, about half only has mortgage debt, a quarter only non-mortgage debt and a quarter both types of debt. Besides debt participation, also the outstanding amounts have increased, again particularly for mortgage debt. At the median, debts represent one fifth to one fourth of assets and about a year of gross income. The median debt service-to-disposable income ratio amounts to around 21%. While the first two indicators have slightly increased over the period considered, the latter has remained fairly stable. This already indicates that these over-indebtedness indicators measure different risks.

The HFCS data have been used before to study (over-)indebtedness (e.g. Bankowska et al., 2015; Bartiloro et al., 2015; Sierminska, 2014), focussing on the traditional objective indicators. This is likely related to the fact that the HFCS only includes incomes gross of taxes and social insurance contributions, which are not suitable for poverty analysis. Therefore, for the analyses in this paper disposable incomes are estimated using the tax-benefit microsimulation model EUROMOD. This model takes the observed gross incomes and applies the official tax-benefit rules in place to derive disposable incomes. The procedure and results for the first HFCS wave are documented in Kuypers et al. (2016; 2017) and for the second wave in Kuypers et al. (2020) and Boone et al. (2019). In the framework of the current paper this has been extended to include the third and fourth wave as well. Table A.1. and Table A.2. in the Appendix show that it makes an important difference in the obtained results when using disposable versus gross incomes.

Based on these simulated disposable incomes, we estimate the Foster-Greer-Thorbecke (FGT) (1984) indicators with parameters 0, 1 and 2, reflecting the poverty rate, poverty gap and poverty intensity:

$$FGT_0 = \frac{H}{N} \qquad \text{poverty rate}$$

$$FGT_1 = \frac{1}{N} \sum_{i=1}^{H} \left(\frac{z - y_i}{z}\right) \qquad \text{poverty gap}$$

$$FGT_2 = \frac{1}{N} \sum_{i=1}^{H} \left(\frac{z - y_i}{z}\right)^2 \qquad \text{poverty intensity}$$

where H=number of poor (y_i below z), N=number of individuals, z =poverty line, y_i=income of household in which individual i lives. The poverty line is set at 60% of the median equivalised household income.

We also decompose these indicators by population subgroups according to the type of debt repayments they make: households who (1) have no debt repayments, (2) have repayments only for

[4] This implies that the number of observations and hence results may slightly differ between indicators which account for total outstanding debt and indicators which account for debt repayments.

mortgage debt, (3) have repayments only for non-mortgage debt and (4) have repayments for both types of debt. This distinction is relevant because the characteristics of these types of debt are quite different. Mortgage debt generally consists of large amounts, a long duration (typically between 20 to 30 years), a modest interest rate (in Belgium often fixed throughout the duration) and perhaps most importantly is secured by the value of an asset. Non-mortgage debt, on the contrary, usually involves smaller amounts, but is often considered riskier as interest rates are higher, repayment periods shorter, not always secured by assets and sometimes provided by unregulated lenders. Access to non-mortgage debt is generally wider than to mortgage debt, which can be both a good thing as it may provide much needed financial leeway, but also attracts less solvent borrowers, increasing the risk of default. The decomposition results in two components: the subgroup population share on the one hand and the level of the poverty indicator for each subgroup on the other:

$$FGT = \frac{K}{N} * FGT(k)$$

As described above we analyse the impact of using different specifications of y_i in these indicators:

a) Baseline: y_i
b) Subtracting debt repayments: $y_i - dr_i$
c) Financial assets as leverage: $(y_i - yfa_i) - dr_i + \min(dr_i, fa_i)$
d) Non-housing assets as leverage: $(y_i - yfa_i - yra_i) - dr_i + \min(dr_i, (fa_i + ra_i))$
e) All assets as leverage: $(y_i - yfa_i - yra_i) - dr_i + \min(dr_i, (fa_i + ra_i + ha_i * ann))$
f) All assets to escape poverty: $(y_i - yfa_i - yra_i) - dr_i + (fa_i + ra_i + ha_i * ann)$
g) Income + annuitized net wealth (assets minus debt): $(y_i - yfa_i - yra_i) + NW_i * ann$

where y_i=equivalised household disposable income, dr_i=debt repayments, fa_i=financial assets, yfa_i=income from financial assets, ra_i=real assets other than the main house, yra_i=rental income, ha_i=housing assets, ann=annuity, NW_i=net wealth. The annuity is calculated as follows with ρ=interest rate and n=life expectancy: $ann = \left[\frac{\rho}{1-(1+\rho)^{-n}}\right]$. Income from financial assets and rental income is subtracted from disposable income as households stop receiving this income when they sell the assets it is derived from (D'Alessio & Iezzi, 2016, 2013; Kuypers & Marx, 2018). The poverty line remains constant in all specifications.

The last two specifications do not necessarily reflect a situation of over-indebtedness, but are added as reference to the developments in the poverty measurement literature. The final specification g) is the approach that is often taken in the joint income-wealth poverty literature (Kuypers & Marx, 2021). The main difference with the other specifications is that debt is taken into account in terms of the annuity value of its total outstanding amount rather than its repayments and that all assets are considered at their annuity value rather than only the housing assets. Specification f) is added as step in between e) and g) in which alle assets are considered similarly as in specification e) but while they are capped at the level of debt repayments in e) they are not capped in f), in other words, assets can also be used to supplement insufficient income, so as to escape poverty altogether.

The FGT poverty indicators, however, always also include households who are poor and do not have debt (repayments). Therefore, we derive over-indebtedness indicators by each time comparing the baseline FGT poverty measure in specification a) with the other specifications. In other words, we

define as over-indebted those households who are not poor when using specification a) but are poor when using respectively specification b), c), d) or e) and also those households who are already poor when using specification a), but whose poverty gap becomes larger in the other specification.

In the logistic regression we include the following socio-demographic factors: age, gender, highest education achieved, activity status, household type, tenure status and migrant background (defined as being born in a country other than Belgium). Previous research has shown that these are correlated with over-indebtedness (see e.g. Civic consulting, 2013; Fondeville et al., 2010; Anderloni & Vandone, 2008 overviews).

All analyses are based on household level amounts of incomes, debts (repayments) and assets, but all individuals are included in the calculations (except in the logistic regression where only adults are included). Results are derived using household weights and multiple imputation commands following Rubin's rule (1987) with bootstrap standard errors and using 100 replicate weights.

4. Household debt, income poverty and leverage through assets

In this section we first provide a general overview of the impact of taking into account debt repayments and potential leveraging through asset ownership on FGT poverty indicators. Afterwards, we distil over-indebtedness indicators and study the role of household heterogeneity therein.

Figure 1 first shows for each HFCS wave the FGT poverty indicators for the different specifications defined in the previous section. Moving from the standard baseline income concept[5] to one that takes account of debt repayments entails a sharp increase in the poverty rate, in all four waves with around 8 to 9 percentage points. Considering potential leveraging through financial assets decreases the poverty rate compared to specification b) with around 5 to 6 percentage points, hence eliminating about two thirds of the initial increase between the baseline and specification b). Including other types of assets leads to further smaller reductions in poverty rates at about 1.5 to 2.5 percentage points. Even in specification e) where all assets are considered as leverage poverty rates still remain higher compared to the baseline specification. This implies that there are households whose debt repayments push them below the poverty line even if they would sell all their assets. Including all wealth in the poverty indicators (as is done in scenarios f) and g)) leads to much lower poverty rates than in the baseline, highlighting the buffering capacity of wealth. Results for the other two indicators on the poverty gap and intensity show very similar patterns across the different specifications, although the impact of including debt repayments (from specification a) to b)) is considerably stronger than for the poverty rate (doubling for FGT1 and tripling for FGT2), financial assets cancel out about half of the increase compared to two thirds for the poverty rate, while the impact of including other assets is somewhat larger, especially for the FGT2.

[5] Our baseline FGT indicators are different from those calculated by EUROSTAT. This is due to the fact that the underlying survey is different (HFCS versus EU-SILC) and that we use disposable incomes as simulated by EUROMOD compared to directly observed in the survey (see e.g. Assal et al., 2020 for the difference between observed and simulated poverty based on EU-SILC). Since the paper focuses on the comparison between the different specifications, this issue does not affect our analyses.

Although the levels of the FGT indicators differ across waves, the comparisons between specifications within each wave are largely similar. Therefore, in what follows we perform analyses on data pooled across the 4 waves[6].

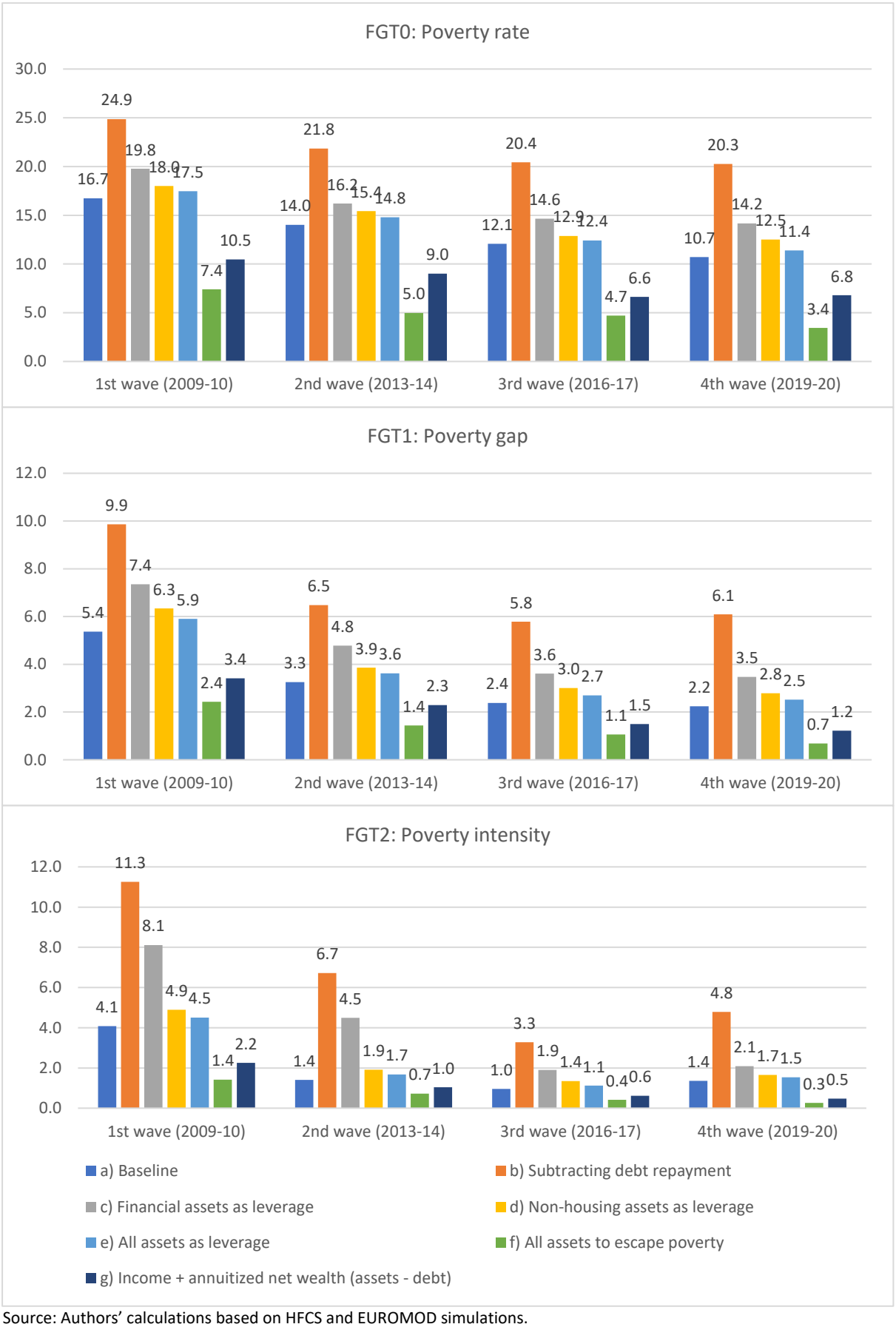
Table 1 presents the results from the decomposition of the three FGT poverty indicators using the different specifications by subgroups of no debt repayments, only for mortgage debt, only for non-mortgage debt and for both (non-)mortgage debt. As discussed in Section 3 the decomposition of the overall FGT indicators falls into two components: the population share of each group and the FGT indicator for each group separately. Regarding the first component we find that 46.7% have no debt repayments, while the majority of those with debt repayments only have mortgage debt (34.5%) and the other two groups are more or less equally split around 9-10% each.[7] Regarding the second component, for almost all specifications and in each of the three FGT indicators the highest percentages are found for the group of households who only have repayments for non-mortgage debt. They already have the highest poverty rate even in the baseline specification, hence before considering debt repayments. This is a clear sign of their financial vulnerability. The percentages for the group of households with only mortgage debt repayments and for both types of debt also strongly increase when moving from the baseline to specification b). To a large extent, however, these households are protected by their assets, as is illustrated by the lower figures in the other specifications. For households with only non-mortgage debt repayments poverty figures also decrease in the specifications with asset leveraging included, but to a more limited extent.

In short, although the group of households with only non-mortgage debt repayments make up a relatively small part of the population, and hence only marginally pop up in the overall poverty statistics, their risk of being poor is considerably higher compared to the other household groups. In other words, while poverty is for most households not related to non-mortgage debt repayments, the ownership of such debt does significantly increase the risk of being poor.

[6] Results by wave are available from the authors upon request.

[7] These shares differ slightly from the summary statistics in Table A.1. in the Appendix because here they are defined in terms of the flow concept of debt repayments, while in the Appendix the stock value of debt is used. As mentioned before, the HFCS does not include repayments information for all types of debt, resulting in slightly different number of observations.

Figure 1. Comparing different specifications of FGT poverty indicators per wave



Source: Authors' calculations based on HFCS and EUROMOD simulations.

Table 1. Subgroup decomposition of FGT poverty indicators (waves pooled)

Specification	No debt	Only mortgage debt	Only non-mortgage debt	Both (non-) mortgage debt
		Population share		
All	46.7%	34.5%	8.7%	10.1%
		FGT0		
a	18.7%	7.1%	19.7%	5.0%
b	18.7%	22.1%	29.0%	29.5%
c	18.7%	11.0%	24.0%	15.4%
d	18.7%	9.2%	21.3%	9.2%
e	18.7%	8.1%	21.1%	6.5%
f	7.8%	1.3%	10.5%	1.4%
g	12.7%	2.4%	14.7%	2.0%
		FGT1		
a	5.2%	1.4%	4.0%	0.9%
b	5.2%	7.9%	9.4%	11.0%
c	5.2%	3.8%	7.1%	4.9%
d	5.2%	2.5%	5.6%	2.7%
e	5.2%	1.9%	5.4%	1.6%
f	2.1%	0.3%	3.1%	0.4%
g	3.6%	0.6%	2.9%	0.3%
		FGT2		
a	3.4%	0.6%	1.6%	0.3%
b	3.4%	7.4%	13.2%	12.6%
c	3.4%	3.7%	11.2%	3.5%
d	3.4%	1.3%	3.0%	1.6%
e	3.4%	0.9%	2.8%	0.8%
f	1.1%	0.2%	1.6%	0.2%
g	2.0%	0.2%	1.0%	0.1%

Source: Authors' calculations based on HFCS and EUROMOD simulations.

5. Over-indebtedness in the poverty framework

In the previous section, we have focussed on overall FGT poverty indicators and the impact on their overall level of taking into account debt repayments and asset leveraging therein. As mentioned above, these indicators also include households who are poor but do not have debt (repayments). The remainder of the analyses therefore focus on the over-indebtedness indicators which can be derived from the comparison of the baseline specification a) and every other specification.

Table 2 shows on the diagonal axis the figures for those over-indebtedness indicators as well as the more 'traditional' over-indebtedness indicators (having 4 or more loans, a debt-to-asset ratio larger than 75%, a debt-to-income ratio larger than 300% and a debt-service-to-income ratio larger than 30%). Figures for all these indicators by wave are presented in Table A.2. in the Appendix. The remainder of the cells in Table 2 present the overlap between the different indicators.

The results indicate that subtracting debt repayments from disposable income (specification b)) pushes 13.2% below the poverty line or increases their poverty gap. When financial assets are included as leverage this share falls to 7% and for the other asset concepts to 4.9% and 3.6% respectively. The indicators based on the debt-to-income ratio or debt service-to-income ratio lead to an incidence of over-indebtedness that is relatively close to that identified by specification b). Nevertheless, only about half of the households identified as over-indebted in the poverty-based indicators are also identified as such in the debt-to-income and debt service-to-income indicators. The debt-to-asset criteria provides an over-indebtedness level that lies between that of specification c) and d), while the overlap with the poverty-based indicators is again rather limited. Having four or more loans 'only' identifies about 2% as being over-indebted and the overlap with the poverty-based indicators is very small.

Table 2. Indicators of over-indebtedness and their overlap (waves pooled)

	Poor(er) spec. b)	Poor(er) spec. c)	Poor(er) spec. d)	Poor(er) spec. e)	Loans >=4	Debt-to-asset >=75	Debt-to-income >=300	Debt service-to-income>=30
Poor(er) spec. b)	13.2							
Poor(er) spec. c)	7.0	7.0						
Poor(er) spec. d)	4.9	4.9	4.9					
Poor(er) spec. e)	3.6	3.6	3.6	3.6				
Loans >=4	0.6	0.4	0.3	0.2	2.0			
Debt-to-asset >=75	2.1	1.6	1.3	0.8	0.3	6.2		
Debt-to-inc. >=300	6.7	3.1	2.0	1.1	1.1	2.8	16.3	
Debt service-to-inc.>=30	8.0	4.0	2.7	1.8	1.2	2.1	10.2	14.8

Source: Authors' calculations based on HFCS and EUROMOD simulations.

The results of the logit regression of socio-demographic characteristics of households and its members are presented in Table 3. Looking at the results for specification b) it is clear that the risk of over-indebtedness is higher among younger households, the low or medium educated, single parents, home-owners with a mortgage as well as tenants and migrants from outside the EU. Interestingly, controlling for other characteristics employees run a lower risk of being over-indebted compared to retirees. Gender does not appear to play a role in explaining over-indebtedness. Once potential leveraging through assets is accounted for the impact of age and single parents is no longer significant.

Hence, taking into account assets controls for life-cycle variation. The high risks with regard to education, tenure status and migrant background, in contrast, remain high and significant. The odds ratio for tenants even increases once asset leveraging is taken into account.

Table 3. Logit regression socio-demographic characteristics of over-indebted (waves pooled)

	Poor(er) spec. b)		Poor(er) spec. c)		Poor(er) spec. d)		Poor(er) spec. e)	
	Odds ratio	**Sig.**	**Odds ratio**	**Sig.**	**Odds ratio**	**Sig.**	**Odds ratio**	**Sig.**
Age (ref: 65+)								
18-34	3.41	***	2.00	n.s.	1.23	n.s.	1.54	n.s.
35-54	2.71	***	2.03	*	1.22	n.s.	1.65	n.s.
55-64	2.38	***	2.10	*	1.33	n.s.	1.98	n.s.
Gender (ref: male)	1.14	n.s.	1.16	n.s.	1.12	n.s.	0.99	n.s.
Education (ref: tertiary)								
No or primary	2.27	***	3.16	***	3.19	***	2.10	*
Secondary	2.37	***	2.62	***	2.63	***	2.09	***
Labour status (ref: retired)								
Employee	0.43	***	0.47	**	0.47	*	0.53	n.s.
Self-employed	1.19	n.s.	1.03	n.s.	1.24	n.s.	1.19	n.s.
Unemployed	1.27	n.s.	1.79	n.s.	2.67	**	2.11	n.s.
Other	0.89	n.s.	1.07	n.s.	1.56	n.s.	1.59	n.s.
Household type (ref: couple)								
Single	1.24	n.s.	0.94	n.s.	0.90	n.s.	0.87	n.s.
Single parent	2.89	***	1.98	n.s.	0.90	n.s.	0.50	n.s.
Couple with children	1.17	n.s.	1.29	n.s.	1.05	n.s.	0.83	n.s.
Other	1.64	***	1.55	**	1.47	n.s.	1.68	*
Tenure status (ref: outright owner)								
Owner with a mortgage	12.23	***	8.59	***	11.28	***	6.68	***
Tenant/free user	1.66	**	2.27	***	2.38	***	3.26	***
Migrant background (ref: native)								
Migrant from within EU	1.37	n.s.	1.63	n.s.	2.01	*	1.75	n.s.
Migrant from outside EU	1.86	***	2.14	***	2.42	***	1.58	*
Waves (ref: wave 1)								
Wave 2	0.73	*	0.73	n.s.	0.94	n.s.	1.00	n.s.
Wave 3	0.84	n.s.	0.90	n.s.	1.06	n.s.	1.25	n.s.
Wave 4	0.96	n.s.	1.03	n.s.	1.26	n.s.	1.33	n.s.
Constant	0.01	***	0.01	***	0.00	***	0.00	***
Pseudo R^2	*0.1730*		*0.1336*		*0.1418*		*0.1014*	

Notes: Only adults (>=18) are included because of multicollinearity between several variables for children.
*** significant at 1%, ** significant at 5%, * significant at 10%, n.s. not significant
Source: Authors' calculations based on HFCS and EUROMOD simulations.

Table A.3. in the Appendix shows the results of this regression for the classical over-indebtedness indicators. Having 4 or more loans mainly identifies higher risks among the young and home-owners with a mortgage. A high debt-to-asset ratio is mainly common among the lower educated, home-owners with a mortgage as well as tenants and migrants from outside the EU, while the indicators in terms of the debt-to-income and debt service-to-income ratio highlight high risks among the young,

singles (with and without children) and home-owners with a mortgage. Interestingly, the risk for tenants is either smaller than for outright home-owners (debt-to-income) or not significantly different (debt service-to-income).

Hence, our over-indebtedness indicators calculated within the poverty framework combine the risk groups identified by the more traditional indicators.

Table 4 investigates to what extent over-indebted households differ from not over-indebted households on some characteristics of the main building blocks of our over-indebtedness indicators, namely disposable income, debt and assets. In particular, it presents the mean of equivalised disposable income, the share of repayments for non-mortgage debt in total debt repayments, the mean interest rate, duration and initial amount borrowed for both mortgage and non-mortgage debt and the mean of the three asset concepts we use in the specifications d) to e). These means are for each indicator compared for those considered over-indebted with those not considered over-indebted (those with no debt are not included in the calculations). A similar table for the other over-indebtedness indicators is provided in Table A.4. in the Appendix.

First, it is clear that in all four specifications equivalised disposable income is significantly lower among the over-indebted than those who have debt but are not over-indebted, with the difference becoming even a bit more pronounced once assets are accounted for. This difference in income between the over-indebted and not over-indebted is much smaller in the 'classical' indicators, and even reverse when having 4 or more loans is used as criterium.

Second, the share of non-mortgage debt repayments is larger for the over-indebted, with again a more pronounced difference once assets are taken into account. This difference is also found for the debt-to-asset ratio, while there is no difference for the number of loans indicator and an opposite relationship for the debt (service)-to-income ratios. Furthermore, the interest rate that is paid on non-mortgage debt also tends to be higher for the over-indebted (around 5 compared to 3.7-3.9). Again, this is similar to the results for the debt-to-asset ratio indicator, but different from the other 'classical' indicators. In none of the classical indicators or the ones proposed here is there a difference in the interest rate paid on mortgage debt (at least on average). The mean duration of mortgage debt is slightly longer for the over-indebted (21 years against 19-20), but this disappears in specification e) when all assets are taken into account. The duration of non-mortgage debt is typically 5 to 6 years. The 'classical' indicators reveal the same results in terms of duration of both types of debt. Regarding the initial amounts borrowed of mortgage debt, these are somewhat higher for the over-indebted when using specification b), but this difference disappears in the other specifications. The debt-to-asset ratio and the debt (service)-to-income ratios reveal a much larger difference in initial amounts borrowed. In the case of non-mortgage debt the amounts borrowed are smaller for the over-indebted in our proposed indicators, while the opposite is found for the debt (service)-to-income ratios.

Finally, regarding the assets included as potential leveraging, it is clear that financial assets are again substantially lower among the over-indebted. The more broader asset concepts are at the mean more or less the same between the over-indebted and others (in specification d) and e) the means are higher for the over-indebted, but with very large standard errors so likely not statistically different from that of the not over-indebted).

In short, the indicators we propose in this paper highlight quite different risk factors for being over-indebted than the more classical over-indebtedness indicators. While the latter mainly identify those who initially borrow large amounts as over-indebted, the indicators calculated in the poverty framework rather point towards low disposable income, a larger share of non-mortgage debt and the higher interest rate paid for that type of debt as the most important risk factors.

Table 4. Comparison of income, debt and asset characteristics (waves pooled)

	Poor(er) spec. b)		**Poor(er) spec. c)**		**Poor(er) spec. d)**		**Poor(er) spec. e)**	
	No	Yes	No	Yes	No	Yes	No	Yes
Mean equivalised disposable income	27,349	14,010	25,843	12,186	25,343	11,295	25,022	10,814
	(395)	(246)	(337)	(291)	(332)	(282)	(322)	(292)
Mean share of non-mortgage in total debt	20.9	26.9	20.6	34.5	21.4	31.9	21.2	38.1
	(1.1)	(2.2)	(1.0)	(3.2)	(0.9)	(3.5)	(0.9)	(4.4)
Mean interest rate mortgage debt	3.0	3.0	3.0	3.1	3.0	3.1	3.0	3.1
	(0.0)	(0.1)	(0.0)	(0.1)	(0.0)	(0.1)	(0.0)	(0.2)
Mean interest rate non-mortgage debt	3.7	5.0	3.8	4.9	3.9	5.3	3.9	5.2
	(0.2)	(0.4)	(0.2)	(0.5)	(0.2)	(0.6)	(0.2)	(0.6)
Mean duration mortgage debt	19	21	19	21	20	21	20	20
	(0)	(0)	(0)	(1)	(0)	(1)	(0)	(1)
Mean duration non-mortgage debt	6	5	6	6	6	5	6	5
	(0)	(0)	(0)	(1)	(0)	(0)	(0)	(0)
Mean amount mortgage debt	127,345	151,094	132,833	134,327	133,545	126,731	133,560	123,065
	(2,401)	(6,604)	(2,575)	(6,927)	(2,501)	(7,340)	(2,448)	(7,788)
Mean amount non-mortgage debt	21,452	16,540	21,282	14,652	21,112	11,971	20,821	12,700
	(2,515)	(1,728)	(2,317)	(1,697)	(2,136)	(1,646)	(2,100)	(1,979)
Mean financial assets	49,482	22,451	47,141	14,019	45,174	19,375	44,056	25,789
	(2,629)	(2,853)	(2,376)	(3,750)	(2,301)	(5,187)	(2,267)	(6,897)
Mean non-housing assets	109,202	109,387	109,776	105,695	107,395	127,678	104,727	171,687
	(5,761)	(21,860)	(5,737)	(39,714)	(5,553)	(56,069)	(5,456)	(73,164)
Mean non-housing assets + annuity housing assets	114,822	114,447	115,392	110,284	112,930	132,631	110,236	176,794
	(5,782)	(21,921)	(5,774)	(39,732)	(5,584)	(56,098)	(5,485)	(73,193)

Notes: Bootstrap standard errors are in parentheses. HMR=household main residence.
Source: Authors' calculations based on HFCS and EUROMOD simulations.

6. Policy simulations

In this section, we show the (potential) results of two simulated policy reforms. These reforms focus on the main risk factors that were highlighted in the discussion of Table 4, namely a low disposable income and the presence of non-mortgage debt.

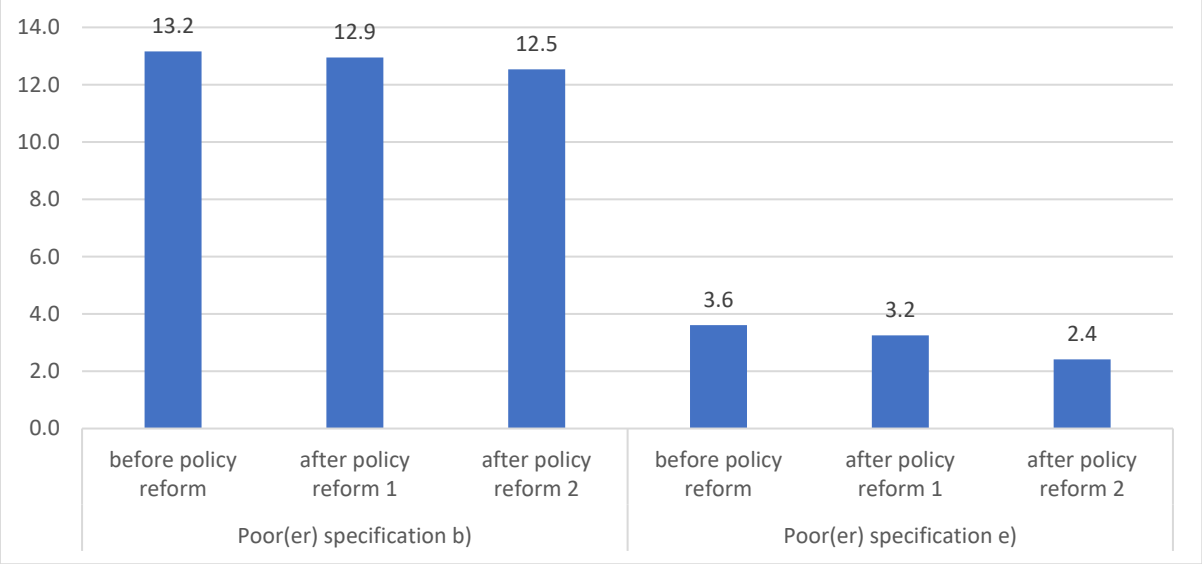
The first reform focuses on increasing the disposable income of a particularly vulnerable group of households: those that live on a social assistance benefit and have debt repayments. In its current form the means-test used to determine eligibility for the Belgian social assistance benefit ("*leefloon*") takes into account a fictional rate of return on assets that are owned above a certain amount (Marchal et al., 2021) and decreases the amount of the benefit accordingly. We argue here that it only seems fair

that it then also considers the debt repayments. In practice, this reform is simulated in EUROMOD by comparing the baseline scenario with a scenario in which debt repayments are subtracted from the income concept used for the means-test to simulate eligibility for the social assistance benefit.

The second policy reform focuses on the ownership of non-mortgage debt and provides help to over-indebted households owning that type of debt. The simulated reform is inspired by work done by credit banks in the Netherlands and a pilot project that is currently carried out in Antwerp, one of the largest cities in Belgium. In the latter, overindebted households receive maximum 150 euros per month to pay off non-mortgage debt or arrears (see https://www.samvzw.be/nieuws/schuldsanering-nederland-en-belgie-2-stad-antwerpen). Here, we simulate this policy in Stata by taking the minimum of non-mortgage debt and 1,800 euros per year. The amount is awarded to those who are considered poor after leveraging by all assets (specification e)) and who have a positive amount of non-mortgage debt.

Figure 2 shows the share of individuals living in over-indebted households according to the over-indebtedness indicator using specifications b) and e) before the policy reform and after each of the two policy reforms. It is clear that in both policy reforms over-indebtedness decreases, although to a relatively limited extent.

Figure 2. Over-indebtedness before and after policy reforms (waves pooled)



Source: Authors' calculations based on HFCS and EUROMOD simulations.

Table 5 presents the socio-demographic composition of those being lifted out of over-indebtedness through the policy reforms and compares it to the composition of those being over-indebted before the reform as well as the total population. It focuses on bivariate relations as there are not sufficient observations to perform a logistic regression mutually controlling for all characteristics. Most noteworthy is the fact that policy reform 1 proportionally helps more often migrants from outside the EU and household types that do not fall under the classical four types (e.g. three generation households) in both specifications and in specification b) this is also the case for tenants. Among the households helped by policy reform 2 there are proportionally more unemployed, couples without children and tenants in both specifications and also 55-64 years old, secondary educated and migrants from outside the EU in specification b).

Table 5. Socio-demographic characteristics of those helped by policy reforms (waves pooled)

	Helped reform 1 spec. b)	Helped reform 1 spec. e)	Helped reform 2 spec. b)	Helped reform 2 spec. e)	Poor(er) spec. b) before reform	Poor(er) spec. e) before reform	Total population
Age							
<18	29.7	18.6	16.4	20.1	31.3	24.9	20.1
18-34	33.6	33.8	34.3	33.0	27.0	27.6	21.4
35-54	21.5	29.5	21.9	22.1	29.8	28.8	27.6
55-64	15.2	18.1	18.7	15.9	8.3	12.7	12.7
65+	0.0	0.0	8.8	8.9	3.5	6.0	18.2
Gender							
Male	49.9	51.7	49.3	51.7	48.7	49.2	49.1
Female	50.1	48.3	50.7	48.3	51.3	50.8	50.9
Education							
No or primary	36.6	23.8	22.1	26.2	30.8	28.1	23.2
Secondary	40.3	51.4	65.8	55.9	48.1	54.5	44.1
Tertiary	23.1	24.8	12.1	17.9	21.1	17.3	32.7
Labour status							
Employee	16.6	23.9	13.2	23.4	30.3	22.4	36.5
Self-employed	5.6	10.2	0.5	2.5	7.0	5.8	3.7
Unemployed	16.3	11.3	25.2	18.1	7.2	10.8	5.0
Retired	2.7	3.8	8.2	10.9	5.5	8.5	20.7
Other	58.8	50.8	53.0	45.2	50.1	52.4	34.0
Household type							
Single	11.4	13.7	21.5	13.4	8.1	10.0	14.9
Single parent	4.7	3.3	6.0	1.5	5.9	1.6	2.8
Couple	9.4	4.8	26.1	23.8	12.9	15.7	26.0
Couple with children	17.8	17.9	13.2	15.9	29.0	19.7	22.4
Other	56.8	60.3	33.3	45.4	44.1	52.9	33.9
Tenure status							
Outright owner	54.6	78.7	1.1	26.0	77.4	62.0	42.0
Owner with a mortgage	0.0	6.0	13.4	20.8	8.3	10.8	33.3
Tenant/free user	45.4	15.3	85.5	53.2	14.3	27.3	24.7
Migrant background							
Native	56.8	49.0	64.2	72.1	74.9	65.9	83.7
Migrant from within EU	4.6	5.0	5.2	10.3	6.4	9.2	5.8
Migrant from outside EU	38.7	45.9	30.6	17.6	18.8	24.8	10.5

Source: Authors' calculations based on HFCS and EUROMOD simulations.

7. Conclusion

Household debt has increased significantly since the second half of the 20th century, making it one of the cornerstones of household financial behaviour. It is, however, necessary to monitor that indebtedness does not spiral out of control, as it can have negative consequences both at the micro and macro level. In this paper, we measure over-indebtedness in the poverty framework, while also taking into account the (potential) leverage by assets. We argued that this approach has the benefit of combining the logic behind two popular over-indebtedness indicators, namely the debt-to-asset and the debt service-to-income ratio, setting the critical cut-off point for over-indebtedness at a widely accepted threshold of the poverty line and in that way making the link with social policy explicit.

Our results are relevant both in terms of the levels of over-indebtedness measured as well as from the point of household heterogeneity and policy relevance. We find that about 13.2% of individuals live in a household that becomes poor(er) because of its debt repayments. When financial assets are included as leverage this share is equal to 7%, to 4.9% if all non-housing assets are considered and 3.6% when also the annuity value of the house is taken into account. The overlap with the more classical over-indebtedness indicators is relatively limited. Therefore, it is often argued that a combination of indicators is needed to study over-indebtedness (Wałęga and Wałęga, 2021; Bankowska et al., 2015). Our indicators, however, seem to capture a combination of the socio-demographic risk groups that are found for other over-indebtedness indicators. Also, while the classical indicators mainly identify those who initially borrow large amounts as over-indebted, the indicators calculated in the poverty framework rather point towards low disposable income, a larger share of non-mortgage debt and the higher interest rate paid for that type of debt as the most important risk factors. The decomposition of the FGT poverty indicators also highlighted the financial vulnerability of households with non-mortgage debt. We simulated two policy reforms which address these two main risk factors, where the first increases the disposable income of social assistance beneficiaries and the second provides a capped amount to pay off non-mortgage debt. Although the overall impact of these reforms is relatively limited, it is able to lift some vulnerable households out of over-indebtedness, particularly tenants and migrants from outside the EU.

In terms of policy recommendations, our results suggest that combating over-indebtedness should be targeted at increasing disposable income and help managing non-mortgage debt. Our reform scenarios showed there is also a potential role for social policy. Currently, social policy design hardly considers the role of debt in financial vulnerability, so there seems ample room for reforms in that regard. We encourage future research to look further into this aspect. Finally, our results are also relevant in times of shocks such as those recently caused by the COVID pandemic, the Ukrain war and its resulting energy crisis. In those periods, the Belgian government decided together with the banking sector to allow households to postpone repayments of mortgage debt. Our results suggest that a similar policy for non-mortgage debt would be needed to support the most vulnerable.

Overall, our analyses point towards the importance of low income and non-mortgage debt in explaining over-indebtedness, poverty and financial vulnerability. We feel that these aspects have so far been undervalued in research on over-indebtedness and in policies enacted to tackle it.

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Appendix

Table A.1. Summary statistics household debt and debt repayments by wave

	1st wave (2009-10)	2nd wave (2013-14)	3rd wave (2016-17)	4th wave (2019-20)
Debt participation (%)				
Any debt	55.1	60.6	61.1	59.0
	(1.4)	(1.3)	(1.5)	(1.2)
Mortgage debt	39.5	46.5	48.5	44.5
	(1.4)	(1.4)	(1.5)	(1.4)
Non-mortgage debt	29.8	30.6	31.1	28.4
	(1.4)	(1.5)	(1.6)	(1.5)
Only mortgage debt	25.2	30.0	29.9	30.6
	(1.4)	(1.6)	(1.5)	(1.3)
Only non-mortgage debt	15.5	14.0	12.6	14.6
	(1.0)	(1.2)	(1.1)	(1.1)
Both (non)-mortgage debt	14.3	16.6	18.5	13.8
	(1.3)	(1.4)	(1.4)	(1.1)
Conditional medians (€)				
Total debt	49,922	60,435	79,176	85,000
	(3,901)	(4,794)	(4,879)	(7,038)
Mortgage debt	72,147	84,454	102,896	107,267
	(4,593)	(6,653)	(5,625)	(6,741)
Non-mortgage debt	6,000	7,350	6,000	6,540
	(741)	(848)	(907)	(772)
Repayments total debt	8,400	8,851	10,030	10,349
	(327)	(304)	(394)	(265)
Repayments mortgage debt	8,400	8,402	10,157	10,807
	(251)	(376)	(386)	(259)
Repayments HMR mortgage debt	8,078	8,400	9,530	10,582
	(290)	(335)	(444)	(283)
Repayments other mortgage debt	8,748	6,480	8,280	9,768
	(775)	(665)	(930)	(1,074)
Repayments non-mortgage debt	3,367	3,449	3,936	4,008
	(287)	(324)	(433)	(249)
Median ratios (%)				
Debt-to-asset	19.6	20.1	26.3	24.7
	(1.6)	(2.0)	(2.1)	(1.8)
Debt-to-*gross* income	82.9	87.7	99.2	114.8
	(5.3)	(9.0)	(11.7)	(6.8)
Debt-to-*disposable* income	117.7	132.8	153.2	173.6
	(8.7)	(14.0)	(19.3)	(10.4)
Debt service-to-*gross* income	15.0	13.4	14.0	14.7
	(0.7)	(0.6)	(0.6)	(0.6)
Debt service-to-*disposable* income	21.8	20.6	21.0	22.7
	(0.8)	(0.6)	(0.6)	(0.8)

Notes: Bootstrap standard errors are in parentheses. HMR=household main residence.
Source: Authors' calculations based on HFCS and EUROMOD simulations.

Table A.2. Indicators of household over-indebtedness by wave

	1st wave (2009-10)	2nd wave (2013-14)	3rd wave (2016-17)	4th wave (2019-20)
Poor(er) compared to baseline a)				
Specification b)	14.2	11.8	13.4	13.3
	(1.2)	(1.4)	(1.4)	(1.1)
Specification c)	7.5	6.0	7.4	7.0
	(0.9)	(1.0)	(1.1)	(0.8)
Specification d)	4.6	4.5	5.3	5.1
	(0.7)	(0.9)	(1.0)	(0.7)
Specification e)	3.4	3.2	4.3	3.5
	(0.6)	(0.7)	(0.8)	(0.6)
Number of loans >=4	1.3	2.6	2.0	2.1
	(0.4)	(0.7)	(0.6)	(0.6)
Debt-to-asset >=75	6.5	4.7	8.6	5.0
	(0.9)	(0.7)	(1.1)	(0.7)
Debt-to-*gross* income >=300	8.6	9.0	9.8	10.2
	(0.9)	(1.1)	(1.3)	(1.0)
Debt-to-*disposable* income >=300	13.4	15.6	17.5	18.7
	(1.2)	(1.3)	(1.4)	(1.2)
Debt service-to-*gross* income >=30	8.2	5.8	5.7	6.2
	(0.9)	(0.9)	(1.0)	(0.9)
Debt service-to-*disposable* income >=30	15.3	13.8	13.8	16.1
	(1.3)	(1.2)	(1.4)	(1.1)
Debt service-to-*disposable* income >=30 (after policy reform 1)	15.3	13.6	13.7	16.1
	(1.3)	(1.2)	(1.4)	(1.1)
Debt service-to-*disposable* income >=30 (after policy reform 2)	12.4	12.5	13.1	15.3
	(1.2)	(1.3)	(1.4)	(1.1)

Notes: Bootstrap standard errors are in parentheses.
Source: Authors' calculations based on HFCS and EUROMOD simulations.

Table A.3. Logit regression socio-demographic characteristics other over-indebtedness indicators

	Loans >=4		Debt-to-asset ratio>=75		Debt-to-income ratio>=300		Debt service-to-income ratio>=30	
	Odds ratio	**Sig.**	**Odds ratio**	**Sig.**	**Odds ratio**	**Sig.**	**Odds ratio**	**Sig.**
Age (ref: 65+)								
18-34	20.43	***	4.56	**	23.46	***	6.43	***
35-54	21.15	***	2.66	n.s	6.07	***	2.78	***
55-64	12.33	**	1.76	n.s	1.29	n.s	1.95	*
Gender (ref: male)	0.50	*	0.86	n.s	0.94	n.s	0.87	n.s
Education (ref: tertiary)								
No or primary	2.89	n.s	3.17	***	1.20	n.s	1.12	n.s
Secondary	0.83	n.s	1.72	***	1.11	n.s	1.08	n.s
Labour status (ref: retired)								
Employee	0.65	n.s	0.52	n.s	0.91	n.s	0.81	n.s
Self-employed	1.74	n.s	0.36	n.s	1.36	n.s	1.98	*
Unemployed	0.45	n.s	0.74	n.s	0.71	n.s	0.76	n.s
Other	0.76	n.s	0.95	n.s	1.17	n.s	1.15	n.s
Household type (ref: couple)								
Single	0.29	n.s	0.97	n.s	1.51	**	1.86	***
Single parent	0.66	n.s	1.24	n.s	2.60	***	2.17	***
Couple with children	1.12	n.s	1.11	n.s	0.94	n.s	0.87	n.s
Other	2.01	n.s	0.98	n.s	0.42	***	0.71	*
Tenure status (ref: outright owner)								
Owner with a mortgage	13.22	***	49.80	***	20.55	***	24.02	***
Tenant/free user	1.83	n.s	82.78	***	0.38	***	1.13	n.s
Migrant background (ref: native)								
Migrant from within EU	0.41	n.s	1.63	*	1.74	**	1.13	n.s
Migrant from outside EU	0.23	**	1.91	***	1.37	n.s	1.39	*
Waves (ref: wave 1)								
Wave 2	1.52	n.s	0.94	n.s	1.03	n.s	0.78	n.s
Wave 3	1.55	n.s	1.48	*	1.31	n.s	0.71	**
Wave 4	1.55	n.s	1.16	n.s	1.53	**	0.93	n.s
Constant	0.00	***	0.00	***	0.00	***	0.01	***
Pseudo R^2	*0.2171*		*0.0376*		*0.1425*		*0.0995*	

Note: Only adults (>=18) are included because of multicollinearity between several variables for children.
*** significant at 1%, ** significant at 5%, * significant at 10%, n.s. not significant
Source: Authors' calculations based on HFCS and EUROMOD simulations.

Table A.4. Comparison of income, debt and asset characteristics other over-indebtedness indicators

	Loans >=4		Debt-to-asset ratio>=75		Debt-to-income ratio>=300		Debt service-to-income ratio>=30	
	No	Yes	No	Yes	No	Yes	No	Yes
Mean equivalised disposable income	23,982	26,174	24,393	20,331	25,100	21,659	25,481	20,316
	(311)	(2,409)	305	1,916	408	403	409	378
Mean share of non-mortgage in total debt	22.4	22.5	20.7	41.1	29.1	6.9	25.1	15.3
	(0.9)	(3.2)	0.9	3.9	1.2	0.5	1.1	1.2
Mean interest rate mortgage debt	3.0	2.9	3.0	2.9	3.1	2.8	3.0	3.0
	(0.0)	(0.2)	0.0	0.2	0.0	0.1	0.0	0.1
Mean interest rate non-mortgage debt	4.0	4.7	3.9	5.1	4.2	3.5	4.0	4.1
	(0.2)	(0.7)	0.2	0.5	0.2	0.3	0.2	0.3
Mean duration mortgage debt	20	20	19	24	18	22	19	21
	(0)	(1)	0	1	0	0	0	0
Mean duration non-mortgage debt	6	6	6	6	6	5	5	6
	(0)	(1)	0	1	0	0	0	0
Mean amount mortgage debt	134,055	109,542	128,373	203,731	101,472	190,010	113,683	175,576
	(2,450)	(8,709)	2,569	11,212	2,363	5,135	2,393	5,653
Mean amount non-mortgage debt	20,158	18,995	20,332	18,355	17,082	32,577	18,944	23,293
	(2,062)	(2,374)	2,132	2,844	798	8,871	2,368	2,101
Mean financial assets	43,356	29,067	46,183	4,854	48,911	28,706	46,785	32,347
	(2,280)	(7,487)	2,353	618	2,851	2,743	2,751	3,188
Mean non-housing assets	106,171	188,637	117,278	18,459	115,398	94,984	95,079	146,716
	(6,823)	(66,305)	7,546	3,674	9,910	7,984	5,454	21,225
Mean non-housing assets + annuity housing assets	111,665	193,814	123,028	20,911	120,664	100,965	100,197	153,161
	(6,845)	(66,442)	7,573	3,728	9,944	8,035	5,469	21,295

Notes: Bootstrap standard errors are in parentheses.
Source: Authors' calculations based on HFCS and EUROMOD simulations.

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