OVER-INDEBTEDNESS IN ITALY:
HOW WIDESPREAD AND PERSISTENT IS IT?

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Abstract

The purpose of this paper is to examine the measures of over-indebtedness proposed in the literature and to apply them to the Italian case from 2008 to 2014 by using the wide array of information available from the Bank of Italy's survey on households. The numerous measures of over-indebtedness are critically analysed from both a cross-sectional and a historical perspective. The panel also enables us to analyse the transition into and out of over-indebtedness. Moreover, by using the Eurosystem's Household Finance and Consumption Survey (HFCS), we can compare the over-indebtedness of Italian households with that of other euro-area countries. The paper also addresses the issue of the measurement errors that could bias both the level of over-indebtedness and estimates of the transition into and out of it.

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1. Introduction

The recession following the financial crisis that began in 2008 and the job losses it triggered, along with a continuing squeeze on credit, have raised the concern that a substantial and growing number of households are likely to have difficulty in managing the debts they accumulated in the years leading up to the crisis.

There is some evidence of this having occurred in the countries hardest hit by the recession, which are also, to a large extent, those that recorded the largest increase of household debt before the crisis.

In the case of Italy, for many years the significant increase in household debt did not give rise to concerns for several reasons: the initial level of household indebtedness was particularly low by international standards and the increase recorded in recent years only filled part of that gap; the growth in indebtedness was seen as reflecting the reduction in both nominal and real interest rates caused by the increased competitiveness of financial markets, which cut the cost of debt and the number of credit constraints. The troubled economic conditions associated with the crisis also led to the recent passing of a law on consumer bankruptcy in Italy.[1]

Analysing over-indebtedness is of interest for many reasons. It is of course a problem for people who live in a condition of economic distress they are unable to escape. Over-indebtedness must, therefore, be considered a social issue and its measurement should focus on the number of people involved and the extent of their financial difficulties. But over-indebtedness can also be seen as an issue for financial intermediaries and for the stability of the financial system as a whole. Consequently, the amount of debt and the amount of collateral provided to guarantee the loans play a key role.

This paper attempts to expand the existing knowledge on over-indebtedness in Italy. In doing so, and following the line of a previous work on the same topic (D'Alessio, Iezzi, 2013), the paper discusses the methods used to measure over-indebtedness and analyses the relevance of its persistence.

The empirical research is conducted mainly using data from the Bank of Italy's Survey on Household Income and Wealth (SHIW), which collects data on debt, income and assets along with subjective indicators of well-being. A comparative analysis of over-indebtedness across several countries is carried out using data from the first wave of the Eurosystem's Household Finance and Consumption Surveys (HFCS).

The paper is organized as follows. Section 2 outlines the main measures of over-indebtedness used in the literature. Section 3 examines and discusses these measures critically with reference to the Italian case using micro-data from the SHIW. Section 4 examines the performance of the indicators used to identify over-indebted households. Section 5 examines the trend of the indicators over the period 2008-2014. Section 6 analyses how the measures of over-indebtedness characterize the various segments of Italy's population. Section 7 examines the persistence of over-indebtedness. Section 8 compares the degree of over-indebtedness across euro area. Section 9 concludes.

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[1] See Viimsalu (2010) for an analysis of the relevant European legislation.

2. Definitions of over-indebtedness

According to the life-cycle theory, households turn to credit markets because they seek steady living conditions over their lifetime. Since income generally increases at the beginning of a person's life and decreases in the period following retirement, debt is the means that allows households to smooth their expenses over their life cycle; young families expect their future income to grow and spend more than they earn, thus accumulating debt that they will repay later in their lives.

Given this picture, there are many reasons why households may accumulate more debt than they can repay.[2]

A first driver of over-indebtedness is financial imprudence (Disney, Bridges and Gathergood, 2008; Anderloni and Vandone, 2010), i.e. poor financial decisions caused by an inadequate understanding of the real cost of repaying loans. Financial imprudence may be linked both to the issue of the transparency of lenders' terms and conditions (Department of Trade and Industry, 2001) and to borrowers' financial literacy and ability to manage their finances correctly (i.e. to plan future expenses and income; Lusardi and Tufano, 2009).[3] The imprudence may also derive from psychological biases and mental shortcuts affecting consumers' decisions and predictions about borrowing, such as the over-confidence bias, i.e. the tendency to underestimate the probability of suffering an adverse event (Kilborn, 2005). Bucks and Pence (2008) show that borrowers with floating-rate mortgages are likely to underestimate or not know how much their interest rates could change.

Over-indebtedness may also arise when unexpected events change the initial conditions in which the contract between creditor and debtor was concluded (Keese, 2009).[4] An unexpected reduction of household income (e.g. a job loss), unforeseen expenses (e.g. expensive medical care), an increase in the cost of debt (e.g. a rise in interest rates) are all events that can lead to over-indebtedness. Unexpected changes in the family structure may also affect the ability to repay the debt (e.g. a divorce or the birth or death of a family component).

In some cases the cause of over-indebtedness is poverty, which leads individuals incapable of coping with their expenses to ask for a loan that has little chance of being repaid; this mainly happens when creditors are unable to select the right debtors. It is also important to note the situation when the need for a loan is determined by the condition of over-indebtedness itself, triggering a vicious cycle that is potentially disruptive for families and dangerous for financial intermediaries.[5]

But what do we really mean by over-indebtedness and how can we measure it? There is not a consensus in the literature on the definition of over-indebtedness (Kempson, 1992; Bridges and Disney, 2004; Kempson, McKay and Willitts, 2004) and, consequently, on how to measure it. In a recent study the European Commission (European Commission, 2008a) examined and compared definitions and measures of

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[2]   An analysis of the nature of over-indebtedness in the framework of economic theory and on how to measure it can be found in Betti et al. (2007).

[3]   A recent critique of financial education public programs can be found in Willis (2008).

[4]   Of course, the effects of adverse events can be limited by insurance. When the events are reasonably foreseeable, the lack of insurance can be seen as a form of imprudence.

[5]   As noted by Valins (2004), factors such as gambling and addiction to drugs and alcohol can also be considered causes of over-indebtedness, although they are barely considered in the mainstream debt literature.

over-indebtedness in EU countries, underlining the different points of view emerging from the different socio-economic and legislative environments.

For example, in Germany, over-indebtedness has been defined as a situation where household income "in spite of a reduction of the living standard, is insufficient to discharge all payment obligations over a long period of time" (Haas, 2006). In France, where there is a special Committee on the topic, individuals are considered over-indebted when, with well-meaning intentions, they are unable to meet the obligations arising from debts obtained for non-professional reasons. In the UK the focus is on being in arrears on the payment of regular bills, over-indebtedness being defined as a situation "where households or individuals are in arrears on a structural basis, or at a significant risk of getting into arrears on a structural basis" (Oxera, 2004).

In Italy, Law 3/2012 defines over-indebtedness as a situation in which there is a persistent imbalance between obligations and assets that can be easily liquidated, as well as an inability to fulfill the obligations regularly. The law states that over-indebted persons can apply for a repayment plan to a specific agency and to a court of law, and, if accepted, the plan is also binding for the creditors. The court can also order a suspension of any executive action by the creditors against the debtors to allow the latter a fresh start.

In the wide variety of official national definitions of over-indebtedness, the European Commission study identifies some features common to all countries: the economic dimension (amount of debt to repay), the temporal dimension (the relevant horizon is the medium-long term), the social dimension (the basic expenses that have to be met ahead of the repayment of the debts) and the psychological dimension (the stress caused by being over-indebted).

A recent study by the European Commission aimed at developing a common definition across the EU identified a set of criteria to be applied in measuring over-indebtedness (European Commission, 2010):
- the unit of measurement should be the household, because the incomes of individuals are usually pooled within the same household;
- indicators need to cover all aspects of households' financial commitments: borrowing for housing purposes, consumer credit, paying utility bills, making rent and mortgage payments and so on;
- over-indebtedness implies an inability to meet recurrent expenses and therefore should be seen as a structural rather than a temporary condition;
- it is not possible to solve the problem simply by borrowing more;
- for a household to meet its commitments, it must reduce its expenses substantially or find ways to increase its income.

Following these criteria, a household is over-indebted when its existing and expected resources are insufficient to meet its financial commitments without lowering its standard of living, which might mean reducing it below what is regarded as the minimum acceptable in the country concerned, and might have both social and policy implications.

This definition of over-indebtedness might be widely accepted in principle but in practice it is very difficult to identify households that meet all these criteria. Consequently empirical studies have tended to use more practical definitions.

3. Indicators of over-indebtedness

Recent studies of over-indebtedness have tended to converge on a common set of indicators, recognizing that there is no universal agreement on which indicator best captures true over-indebtedness (Department for Business, Innovation and Skills, 2010; Keese, 2009). In some cases the indicators may signal a vulnerability (i.e. a risk of over-indebtedness) rather than an actual situation of over-indebtedness.

In what follows we provide an assessment of the most common indicators of over-indebtedness that can be used for the case of Italy. Most of them are built using micro-data obtained from the last four waves of the SHIW; two subjective indicators are also computed using EU-SILC data.

The SHIW has been conducted almost every other year by the Bank of Italy since 1965 to collect information on the economic behavior of Italian households, using a sample of about 8,000 households (Banca d'Italia, 2015). The survey collects detailed data on income and wealth, but also information on demographics, consumption, savings, and several other topics. In 2014 the Bank of Italy released an abridged version of the SHIW (the 'r-SHIW' from now on) for the year 2013, collecting qualitative information on the economic behavior of Italian households using a sample of only 2,000 households. The analysis that follows is based on micro-data from these surveys.

The wealth of data made available by the biennial Italian survey allows us to construct all the common indicators of over-indebtedness at the household level with a good degree of accuracy. For example, with regard to debt burden indicators, the SHIW collects data on income and debt servicing costs for all types of loan for the last three waves (2010, 2012, and 2014), while for 2008 the survey does not collect information on debt servicing costs associated with businesses.

The indicators broadly reflect four aspects of over-indebtedness: making high repayments relative to income, being in arrears, making heavy use of credit, and finding that debt is too big of a burden. Table 1 lists and provides a brief description of some indicators that it is possible to estimate using data from the last four waves of the SHIW and data from the r-SHIW on 2013.

The first indicator captures the burden imposed by debt repayments and sets an arbitrary threshold on repayments relative to gross income, beyond which they are deemed a significant burden for households. Oxera (2004) identifies 50 per cent as the threshold for the cost of debt to income ratio beyond which repayments become a major burden for households (DeVaney and Lytton, 1995). Other studies put the limit at 30 or 40 per cent.[6]

Repayment-to-income ratios offer an apparently simple way of measuring the risk of over-indebtedness, although households with high levels of income can potentially bear

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[6]   D'Alessio and Iezzi (2013) and Coin et al. (2013) tackled the issue of a statistical assessment of the threshold using two different methods, both leading to the conclusion that a 30 per cent threshold for the debt burden indicator is the preferred choice. Other authors (ECB, 2013b; Bartiloro et al., 2015) choose a higher threshold (i.e. 40 per cent) when dealing with gross income rather than net income.

a debt burden higher than 30 per cent of their income. For this reason, some authors restrict the focus to low income households. [7]

Table 1 – Indicators of over-indebtedness estimated using SHIW data

Category	Indicator	Description	Available years				
			2008	2010	2012	2013	2014
Cost of servicing debt	$A1_{30}$	Households spending more than 30% of their gross monthly income on total borrowing repayments (secured and unsecured)	X*	X	X		X
	$A2_{30}$	Households spending more than 30% of their gross monthly income on total borrowing repayments (after deducting their financial assets)	X*	X	X		X
	$A3_{30}$	Households spending more than 30% of their gross monthly income on total borrowing repayments (after deducting their financial assets and properties other than their main home)	X*	X	X		X
	$A4_{30}$	Households spending more than 30% of their gross monthly income on total borrowing repayments (after deducting financial and real assets except for the residual life estate of the household's home)	X*	X	X		X
	B_{25}	Households spending more than 25% of their gross monthly income on unsecured repayments	X**	X	X		X
	C	Households whose spending on total borrowing repayments takes them below the poverty line	X*	X	X		X
Arrears	D1	Households more than 3 months in arrears on a credit commitment	X	X	X	X	X
	D1B	Households more than 3 months in arrears on a credit commitment or household bill			X	X	X
	D2	Households more than 3 months in arrears on a credit commitment and whose liabilities are above the assets	X	X	X		X
	D2B	Households more than 3 months in arrears on a credit commitment or household bill and whose liabilities are above the assets			X		X
Number of loans	E_4	Households with 4 or more credit commitments		X	X		X
Subjective perception of burden	F	Households declaring that their borrowing repayments are a "heavy burden"				X	

* The cost of the loan repayment is not available for loans for business purposes.
** Owing to missing information, all loans and mortgages for the purchase or for the renovation of properties are assumed to be secured, while all loans for other household needs are assumed to be unsecured.

Moreover, debt-to-income ratio measures typically do not consider household assets. Households might accept a debt burden of more than 30 per cent if they can rely on financial assets worth more than their outstanding debts: it appears questionable to classify such households as over-indebted. In fact, households might be able to meet their debt servicing obligations by selling some of the assets, though this might be problematic if their only asset is the home in which they are living. Furthermore, the

[7] For example, Banca d'Italia (2015) considers vulnerable only households whose income is below the median. The choice of the type of income to be used in the indicator, i.e. whether it should be the monetary income or the disposable income, is still debated. A study by Banca d'Italia (2015) uses monetary income (i.e. not including imputed rents) while D'Alessio and Iezzi (2013) consider disposable income, arguing that the exclusion of imputed rents leads to an uneven treatment of home owners and tenants.

availability of assets may allow households with a heavy debt burden to access new credit. In any case, an expansion of credit should make it easier for households to manage their debt and cope with temporary reduction in income.

Considering the debt-to-income ratio indicator with a 30 per cent cut point ($A1_{30}$, where $A1=R/Y$), the SHIW collects detailed information on household assets, allowing us to exceed the limits of the traditional indicator. First of all, we can consider that households who hold financial assets may sell them to repay their debts if there is an unexpected event, such as a job loss, that jeopardizes their ability to make payments. It is also possible to define a different version of the traditional debt burden indicator, by reducing the total borrowing repayments by an amount proportional to the ratio between the outstanding debt and the value of the financial assets, under the hypothesis that households use their financial assets to repay some or all of their debts, thus reducing their debt servicing costs proportionally.

In mathematical terms, if FA is the stock of financial assets and D is the outstanding debt, the debt servicing costs are reduced by an amount equal to FA/D. If the value of the financial assets exceeds the debt, the outstanding debt becomes null. Note also that when households sell their financial assets, they stop receiving the related income flows, thus their disposable income, Y, decreases by an amount equal to the income from financial assets, YFC, and the modified debt-burden indicator becomes:

$$A2 = \frac{\max(0, D-FA)}{D} \cdot \frac{R}{(Y-YFC)}.$$

The use of financial assets to repay some or all of the outstanding debt implies in general that A2<A1, except where the return on the financial assets is particularly high and the financial liabilities are long-term debts.

Households might also own real assets such as their homes and other properties. Since a household's home is generally very illiquid, it is important to distinguish two different upgrades of the debt burden indicator. In the first case we assume that households can use both financial assets and real assets in the form of properties other than their homes.

If RA is the stock of real assets in the form of properties other than the household's home, assuming that the household sells all these assets together with the financial assets to repay its debts, the debt servicing costs are reduced by an amount equal to $(FA+RA2)/D$. As for the preceding case, the use of properties to repay some or all of the outstanding debt implies that the household stops receiving some or all of the income flows coming from those assets, so their disposable income decreases by $YRC2$, which represents the income from real estate associated with the assets sold, and the debt burden indicator becomes:

$$A3 = \frac{\max(0, D-FA-RA2)}{D} \cdot \frac{R}{(Y-YFC-YRC2)}$$

Another version of the indicator includes the household's home. We assume that households cannot obtain the entire value of the property, but only the part representing the value of the residual life estate, under the hypothesis that households continue to live in their homes. The value of the residual life estate can be obtained by multiplying the market value of the property by a coefficient depending on the age of the holder of

the life estate.[8] If *RA1* is the market value of the household's home and *f* is the conversion coefficient applied to the value of the residual life estate, the debt servicing costs are reduced by *(FA-RA2-RA1·f)/D* and the debt burden indicator becomes:

$$A4 = \frac{\max(0, D - FA - RA2 - RA1 \cdot f)}{D} \cdot \frac{R}{(Y - YFC - YRC2)}$$

Finally it is possible to identify three new indicators of over-indebtedness, $A2_{30}$, $A3_{30}$ and $A4_{30}$, by using the three variables A2, A3 and A4, defined above, and the 30 per cent cut point, as used for the traditional indicator A.

A different indicator refers to unsecured loans only, and puts the limit at 25 per cent. The limit is lower than the previous one as the risks connected with collateralized debts are basically covered by real assets, thus the analysis must be restricted to unsecured loans. SHIW data also allow us to define the B_{25} indicator, which teases out households that spend more than 25 per cent of their gross monthly income on unsecured repayments. [9]

Another indicator refers to the economic margin which measures how much income each household has left after it has serviced its debits and paid the necessary living expenses (Johansson and Persson, 2006; IMF, 2005; BIS, 2007; Stone, 2006; Kutty, 2005). A negative margin means that the household would find it hard to make ends meet and might therefore default on its debts. Thus, according to this indicator, a household is over-indebted if the economic margin is null or negative.

In order to identify the economic margin of each household it is possible to follow an objective approach that measures the minimum level of living costs through the relative poverty line. For this purpose we use the modified OECD scale of equivalence (which assigns a coefficient of 1 to the head of household, 0.5 to other household members aged 14 or more, and 0.3 to those younger than 14) and a poverty line equal to 60 per cent of the median income (European Commission, 2008b). The C indicator identifies households as over-indebted when their spending on total borrowing repayments takes them below the poverty line.

The arrears indicator captures all forms of debts and household bills for which a household is at least three months in arrears. The cut-off period was chosen in a way that households simply forgetting to pay a bill or debt for one or two months would not be considered over-indebted (Oxera, 2004).

Using SHIW data we can define both the general indicator D1B, which refers to arrears including those on domestic bills (paying the rent and utility bills) and a narrower indicator D1 that refers only to structural arrears connected with repayments of mortgage and consumer loans. These indicators, however, are not affected by the amount of the debt. Moreover, it is plausible to assume that responses to the direct question on arrears are affected by patterns of shame and embarrassment that are likely to prevent individuals from answering truthfully.

Magri and Pico (2012) suggest developing this indicator so that it also includes households' assets and liabilities. The two authors define an indicator D2 which singles

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[8] The Italian Revenue Agency provides coefficients for the computation of the value of the residual life estate as a function of the current market value and the owner's age.

[9] For 2008, owing to missing information, all loans and mortgages for the purchase or renovation of properties are assumed to be secured, while all loans for other household needs are assumed to be unsecured.

out over-indebted households, e.g. those stating they are in arrears by over 90 days in the repayment of a loan while simultaneously having more liabilities than assets, with the latter's value reduced to take account of the low liquidity of some of them. Real assets are deflated by 50 per cent, while financial assets are restricted to deposits.

We also add another indicator, D2B, which includes households having long-term arrears on the rent or on utilities. These data, however, are only available in the SHIW for 2012 and 2014.

A different approach to measuring over-indebtedness is to exploit the presence of multiple debts. The Task Force on Tackling Over-indebtedness set up by the British Department of Trade and Industry (DTI) (Kempson, 2002) identified a strong relationship between reporting debt repayment difficulties and being in arrears and having four or more credit commitments. This measure must be seen as an indicator of risk, as the involvement of multiple creditors might limit the creditors' ability to measure the risk of insolvency correctly. Having multiple debts might be a strategic decision for households wishing to obtain an amount of credit higher than what the banking system would normally allow. However, given the expansion of credit products in recent years, it has been suggested that the threshold of four credit commitments might no longer be meaningful and might not reliably detect situations of over-indebtedness since having a large number of outstanding small debts does not necessarily imply a condition of difficulty. Using SHIW data it is possible to measure the number of loans, considering households to be over-indebted when they have four or more debts (the E_4 indicator).[10]

A simple and powerful method of measuring over-indebtedness is to ask people directly whether or not they are facing debt repayment difficulties. This is preferred approach used by Betti et al. (2007) in their cross-comparison of over-indebtedness in European Union countries. Using the EU's harmonized Household Budget Survey and the European Community Household Panel dataset, Betti et al. argue that although their measure is subjective, and thus prone to error owing to different people's interpretations of whether or not they are facing repayment difficulties, there does not appear to be a substantial group of people who hide their difficulties from official surveys. The SHIW does not provide information that allows the construction of this specific indicator; in the r-SHIW, however, households are asked whether or not they are facing debt repayment difficulties. The indicator (F) can, therefore, only be estimated for 2013.

All these indicators address different aspects of over-indebtedness and provide potentially valuable information. Some of them take into account income and repayments only (i.e. $A1_{30}$, B_{25}, C) while some others also consider assets ($A2_{30}$, $A3_{30}$, $A4_{30}$, D2, D2B), and some others merely identify signals of potential over-indebtedness which do not take into account the outstanding debt (E_4, D1, D1B, F). Thus, none of these indicators is ideal in the sense that it is better than the others. Disney et al. (2008) argue that the various indicators are likely to capture debt problems in different household types and at different points of the life cycle. The challenge here is to find an appropriate set of indicators that can determine the likely proportion of the population

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[10]   For 2008, owing to missing information, the number of loans for household needs and for business purposes is approximated by the number of loan types (loans for the purchase of motor vehicles, loans for furniture, loans for non-durable goods, loans for the purchase of other goods or for daily expenses, loans for education, medium- and long-term and short-term debts for business purpose). The level of disaggregation is reasonably high to allow a good approximation of the total number of loans.

facing debt repayment difficulties. Moreover, such a set of indicators must adapt to the available data.

4.How many households are over-indebted?

Figure 1 reports estimates for all the indicators for the year 2014. According to the SHIW, the share of Italian households spending more than 30 per cent of their income to repay their debts is 2.3 per cent, i.e. one tenth of all indebted households.[11]

If we include assets held by households, thereby shifting the focus from the condition of financial disequilibrium to that of insolvency, the percentage drops to 1.6, 1.6 and 0.9 per cent respectively for the following indicators: A2, which considers financial asset; A3, which considers financial assets and properties other than the household's home; A4, which considers all assets except the value of the residual life estate of the household's home.

The share of over-indebted households is only 0.7 per cent when using the 25 per cent cut point for non-collateralized debts, given the low levels of usage of consumer credit among Italian households and the relatively low average amount of credit per household (Magri et al., 2011).

About 3.9 per cent of households are estimated to be poor and indebted or to have debt servicing costs that take them below the poverty line.

The percentage of households in arrears on credit commitments is only 0.5 per cent, but when we include arrears on household bills the percentage rises to 8.4 per cent. If we take account of both the condition of being in arrears and that of having more liabilities than assets, the two figures drop to 0.3 per cent and 1.6 per cent respectively. The percentage of households with four or more credit commitments is also very low at 0.2 per cent.

Using r-SHIW data, the share of households with the perception of having debt problems is 8.5 per cent in 2013[12]. As mentioned above, however, Disney at al. (2008) suggest that these perceptions may be fuelled by media and be related to the households' own levels of self-esteem and economic stability.

Given the various alternative indicators of over-indebtedness, it is important to assess the degree to which they overlap and thus capture a single dimension of over-indebtedness, and the degree to which they diverge and thus capture different dimensions.

The percentages reported in Table 2 show how the debt burden indicators are connected with each other. Households who are identified as over-indebted according to the $A4_{30}$ indicator are, with very few exceptions, a subset of the households who are considered over-indebted according to the $A3_{30}$ indicator, and the same holds true down to the $A1_{30}$ indicator. The A indicators seem to overlap largely with the C indicator and, to a much lesser degree, with the indicators D1 and D2. The indicator of the number of credit commitments, $E_{4,}$ seems to overlap poorly with the others.

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[11] Following the approach used in Banca d'Italia (2015), which uses monetary income and considers only households below the income median, the percentage of vulnerable households (2 per cent in 2014) is very similar to that computed here with the more traditional debt burden indicator.

[12] Betti et al. (2007), who used subjective indicators derived from the EU-SILC found that in 2007 about 10 per cent of Italian households were over-indebted and that Italy has the lowest level of over-indebtedness among European countries (the EU average is 16 per cent).

Figure 1 – Over-indebtedness in Italy, 2014

(percentage of over-indebted households according to different indicators)
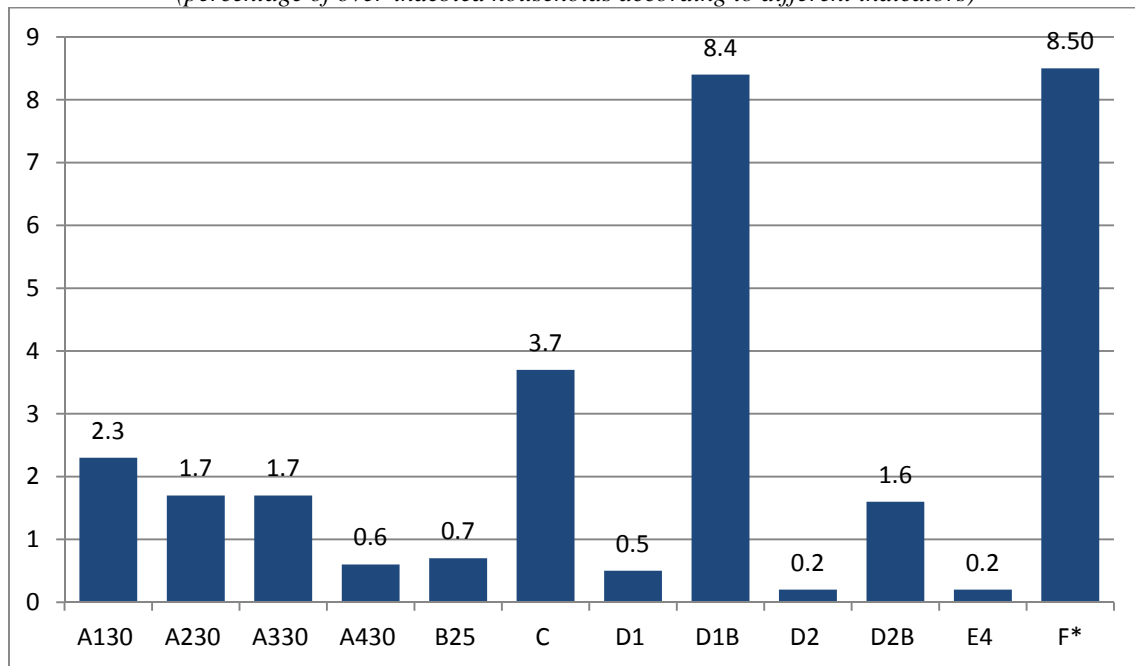
(*) Estimation based on r-SHIW data for 2013.

Table 2 – Indicators of over-indebtedness, 2014

(percentages of over-indebted households according both to the row and the column criteria)[*]

	$A1_{30}$	$A2_{30}$	$A3_{30}$	$A4_{30}$	B_{25}	C	D1	D1B	D2	D2B	E_4
$A1_{30}$...........	2.3	1.7	1.7	0.6	0.6	1.1	0.2	0.4	0.1	0.3	0.1
$A2_{30}$...........	1.7	1.7	1.7	0.6	0.4	1.1	0.2	0.4	0.1	0.3	0.1
$A3_{30}$...........	1.7	1.7	1.7	0.6	0.5	1.0	0.2	0.3	0.1	0.3	0.1
$A4_{30}$...........	0.6	0.6	0.6	0.6	0.3	0.5	0.1	0.3	0.1	0.2	0.0
B_{25}.............	0.6	0.4	0.5	0.3	0.7	0.5	0.0	0.2	0.0	0.1	0.0
C................	1.1	1.1	1.0	0.5	0.5	3.7	0.3	0.9	0.2	0.5	0.1
D1	0.2	0.2	0.2	0.1	0.0	0.3	0.5	0.5	0.2	0.2	0.0
D1B...........	0.4	0.4	0.3	0.3	0.2	0.9	0.5	8.4	0.2	1.6	0.1
D2	0.1	0.1	0.1	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.0
D2B...........	0.3	0.3	0.3	0.2	0.1	0.5	0.2	1.6	0.2	1.6	0.1
E_4...............	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.2

(*) The marginal frequencies are along the diagonal.

If we consider only one version of each class of indicators ($A1_{30}$, B_{25}, C, D1, E_4), the degree of overlap appears limited. The percentage of households who are over-indebted according to two indicators simultaneously is not higher than 1.2 per cent (households spending more than 30 per cent of their income on borrowing repayments and whose spending on borrowing repayments takes them below the poverty line, i.e. the indicators $A1_{30}$ and C). In general, 5 per cent of Italian households are over-indebted according to at least one of the five indicators, 1.7 per cent according to at least two indicators simultaneously and 0.6 per cent according to three indicators, while only 0.1 per cent of households are over-indebted according to four or five indicators at the same time. No household in the sample is found to be over-indebted according to all five indicators simultaneously.

The percentages become higher if the indicator D1B is considered instead of D1; the share of over-indebted households according to at least one indicator becomes 12.2 per cent, and the share according to two or more indicators becomes 2.1 per cent.

Differences in the estimates of over-indebted families arising from the use of different indicators are a well-known fact for this kind of analysis (Department for Business, Innovation and Skills, 2010). The discrepancies are due to each indicator teasing out a different aspect of over-indebtedness, which is a complex phenomenon (Coin et al., 2013; D'Alessio and Iezzi, 2013; Disney et al., 2008). They also highlight the need to analyse the indicators separately and examine in closer detail how they are connected with a range of socio-economic factors.

To this end, it is useful to look at how the indicators are able to tease out the financial distress that is likely to be associated with over-indebtedness.[13]

The indicators most correlated[14] with financial distress (Figure 2) are those connected to arrears (D1 and D1B) and, to an even greater extent, those that include assets (D2 and D2B). Economic distress appears to be well associated with the $A4_{30}$ indicator, which accounts for households' real and financial assets. The association appears weak for the remaining indicators.

Figure 2 - Association index $\Phi^2/\max(\Phi^2)$ between over-indebtedness indicators and self-reported financial distress, 2014
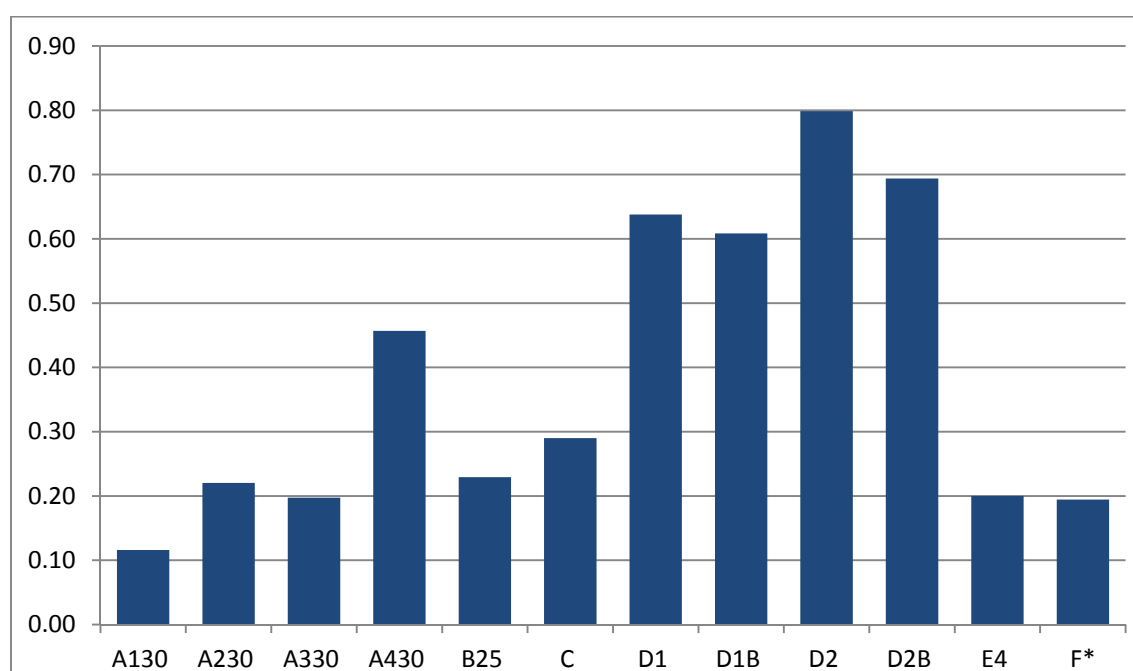
(*) Estimation on 2013 r-SHIW data.

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[13] In the SHIW questionnaire households are asked whether their income is sufficient to see them through the end of the month. In this paper, we define households in economic distress as those who report that they get to the end of the month "with great difficulty".

[14] Phi coefficients between the economic distress and the over-indebted indicators were computed. However, as these measures depend on the marginal distributions, we have divided the coefficients by their maximum. The resulting coefficients are very similar to asymmetric Somer's D coefficients, which measure how the over-indebtedness indicators reflect in the economic distress, accounting for the fact that over-indebtedness is only one of the causes of economic distress.

The estimates of the share of over-indebted households given above do not take into account the bias stemming from measurement errors. For example, the burden indicators could suffer from measurement errors affecting income, assets and liabilities in sample surveys. In SHIW data, under-reporting of debt values is considered to be significant, and probably higher than that of income (D'Aurizio et al., 2006; D'Alessio and Faiella, 2002).

In order to assess the possible impact of such problems on over-indebtedness estimates for Italy we use an adjusted dataset based on SHIW data prepared by D'Alessio and Neri (2015). These authors, after examining various methods for correcting non-sampling errors (selectivity bias and under-reporting) in the SHIW data based on specific knowledge of the phenomena, adopt calibration techniques to fill the gaps between the sample estimates and the information drawn from the National Accounts on household income, assets and liabilities. Different constraints are considered in the paper; in this context we adopt those, including the calibration of variables, that are expected to affect over-indebtedness indicators the most (i.e. financial liabilities and income). Of course these estimates must be used with caution and are meant to provide a general idea of the possible magnitude of the measurement errors. Moreover, the increase in the variability of estimates implied by these adjustments must be taken into account. The data are available up to 2012 only.

On this dataset, whose mean estimates of household assets, debts and income are by definition coherent with those derived from the National Accounts, the indicators $A1_{30}$, $A4_{30}$, B_{25}, C, D1 and D1B are computed (table 3). The comparison with the unadjusted estimates shows a moderate increase in the level of over-indebtedness for $A1_{30}$ (in 2012 from 2.5 per cent to 3.6 per cent for adjustment C7 and 3.2 per cent for C8) and $A4_{30}$ (from 0.9 per cent to 1.6 per cent and 1.6 per cent respectively). A moderate decrease is instead observed for C (in 2012 from 4.8 to 4.0 and 3.2) and B_{25}, (from 1.3 to 1.2 and 1.0). For the indicators D1 and D1B, instead, the adjusted estimates are of the same magnitude of the unadjusted estimates.

Table 3 – Comparison of some over-indebtedness indicators on adjusted and unadjusted SHIW data

(per cent)

	$A1_{30}$			$A4_{30}$			B_{25}			C			D1			D1B		
	Unadjusted	Adj (C7) *	Adj (C8) **	Unadjusted	Adj (C7) *	Adj (C8) **	Unadjusted	Adj (C7) *	Adj (C8) **	Unadjusted	Adj (C7) *	Adj (C8) **	Unadjusted	Adj (C7) *	Adj (C8) **	Unadjusted	Adj (C7) *	Adj (C8) **
2008	2.5	4.5	5.5	0.7	1.7	2.7	0.6	0.6	0.4	5.5	5.9	6.0	0.9	1.1	0.7	-	-	-
2010	3.1	4.9	4.6	0.8	1.8	1.7	1.5	1.9	1.5	6.8	5.8	5.6	1.1	1.5	1.2	-	-	-
2012	2.5	3.6	3.2	0.9	1.6	1.6	1.3	1.2	1.0	4.8	4.0	3.2	1.7	1.8	1.4	11.4	9.7	11.2

* Adj (C7) = includes the calibration of real and financial assets, financial liabilities and the total income.
** Adj (C8) = includes the calibration of real and financial assets, financial liabilities and income by type.

The conclusion is that most of the indicators point to moderate levels of over-indebtedness, below 4 per cent. The figures increase slightly when accounting for measurement errors, but remain below 6 per cent. Two indicators display levels around 10 per cent: the first, F, is based on a self-assessment of the respondents' economic conditions, which is not necessarily objective, while the second, D1B, concerns arrears including those on utility bills, thereby considering a much larger segment of the population than that limited to respondents who owe money to banks and financial

companies, but on the other hand it does not take into consideration the amount of debt (which could be small) or the assets held. The indicators that include assets (A2, A3, A4 and D2, D2B), which in our view can better account for potential insolvency conditions, show a degree of over-indebtedness below 2 per cent (or 3 per cent, if adjusted data are used).

5. Over-indebtedness over time

A comparison of the over-indebtedness indicators across the years (Table 4, left panel) shows that for most of the indicators, the percentage of over-indebted households strongly increased between 2008 and 2010, and decreased afterwards. For example, the debt poverty indicator C increased by 1.3 percentage points from 2008 to 2010 but dropped by almost 2 percentage points from 2010 to 2012, and by 1 percentage point between 2012 and 2014. A similar pattern can be observed for all the indicators of the cost of servicing ($A1_{30}$, $A2_{30}$, $A3_{30}$ and $A4_{30}$) and for the unsecured repayments indicator B_{25}. According to the arrears indicators, D1 and D2, the percentage of over-indebted households increased steadily between 2008 and 2012 and fell considerably only between 2012 and 2014. Looking at the general picture, 11 out of 12 indicators of over-indebtedness dropped between 2012 and 2014.

Estimates of arrears based on the EU-SILC are generally higher than those based on the SHIW, probably owing to differences in how the question was phrased (the SHIW specifically refers to arrears of more than 90 days while the EU-SILC does not). The indicator follows the general trend described above, i.e. it grows between 2008 and 2010 and abates afterwards.

The EU-SILC estimate of the share of households reporting arrears in repaying their debt or paying utility bills is, as in the SHIW estimates, greater than the estimate obtained considering debts alone and above 10 per cent. The indicator's trend decreases at first and picks up afterwards, the opposite of the trend described before, and is influenced by the trend in arrears on utility bills, whose movements are the opposite of those on bank and financial debt.

As a robustness check, we restrict the analysis to households that took part in every wave of the SHIW from 2008 to 2014 (about 2,200 households). The comparison of the over-indebtedness indicators across the years computed on this panel sample (Table 4, right panel) does not change the overall picture. The decrease of over-indebtedness is slightly stronger between 2010 and 2012 compared with that observed on the full sample, but eases between 2012 and 2014.

As a further check we combine the over-indebtedness indicators into a single variable. We do this by considering the first principal component of the variables which define the different aspects of over-indebtedness. To allow a comparison over time only some of the available indicators were considered: $A1_{30}$, $A4_{30}$, B_{25}, C and D1. The trend of this combined indicator confirms the rise in the over-indebtedness observed from 2008 to 2010, and its decline in the following period.

Table 4 – Indicators of over-indebtedness, 2008-2014
(SHIW and EU-SILC estimates, per cent)

Indicator	Full sample					Panel sample				
	2008*	2010	2012	2013	2014	2008*	2010	2012	2013	2014
SHIW										
$A1_{30}$	2.5	3.1	2.5		2.3	2.0	2.3	1.7		1.6
$A2_{30}$	2.0	2.3	1.9		1.7	1.2	1.4	1.2		1.2
$A3_{30}$	1.9	2.1	1.9		1.7	1.2	1.3	1.2		1.1
$A4_{30}$	0.7	0.8	0.9		0.6	0.5	0.6	0.4		0.4
B_{25}	0.6	1.5	1.3		0.7	1.0	1.5	1.1		0.8
C.........................	5.5	6.8	4.8		3.7	6.3	6.4	5.0		4.3
D1 **..................	0.9	1.2	1.7	1.1	0.5	1.0	1.0	1.0	0.5	0.5
D1B **...............			11.4	11.5	8.4			10.3	6.9	6.9
D2......................	0.3	0.7	0.9		0.2	0.2	0.4	0.1		0.1
D2B....................			2.6		1.6			0.8		1.2
E_4........................		0.4	0.2		0.2		0.5	0.2		0.4
F				8.5					8.5	
First principal components***.	0.07	0.18	0.13	-	0.00	0.08	0.17	0.03		0.00
EU-SILC										
D1 **..................	2.8	3.0	2.8	2.6						
D1B **...............	13.9	10.9	11.5	12.2						

* For 2008 the cost of the loan repayment is not available for loans for business purposes. Moreover, in that year, owing to missing information, all loans and mortgages for the purchase or for the renovation of properties are assumed to be secured, while all loans for other household needs are assumed to be unsecured.

** SHIW data refers to considerable arrears only (90 days or more).

*** Principal component analysis conducted on the comparable variables for the period 2008-2014 ($A1_{30}$, $A4_{30}$, C, B_{25} and D1). Surveys of households from 2008 and 2012 are treated as supplementary units, and thus do not contribute to determine the principal components.

6. Who is over-indebted?

In this section, we investigate the individual and household characteristics of the over-indebted. Table 5 shows the percentage of over-indebted households according to the different indicators, by a range of household-level characteristics in addition to key characteristics of the head of household.

According to most of the considered indicators, over-indebtedness tends to be more frequent in the lowest class of income, although the share of indebted household in that class is lower than the average (20 per cent versus 23 per cent). The prevalence among the poorest class is particularly high according to the indicator reporting the arrears on both debts and bills; conversely, the indicator of the number of credit commitments shows its maximum value in the 3rd quintile. The subjective burden indicator F attains its maximum value in the 2nd quintile and declines slowly for the richest classes.

Over-indebtedness is generally more frequent among households whose head is less than 50 years old; the age profile of indebted households declines for households whose head is older than 50, and drops even more markedly when the head is over age 65. Approximately 3 per cent of households in which the head is younger than 40 spend more than 30 per cent of their income on borrowing repayments; this percentage rises to 4.5 per cent in the age class 41-50, and falls to 1.9 and 0.4 per cent in classes 51-65 and 65 or more. Similar patterns can be observed for most of the other indicators. For the

arrears indicators and the subjective burden indicator, however, the highest percentage of over-indebted households is found for households whose head is in the age group 31-40. According to the indicator of the number of loans, households whose head is less than 30 years old display the highest level of over-indebtedness.

Households in which the head has a lower secondary school certificate or an upper secondary school diploma are more likely to be over-indebted than the others. Households in which the head has no education at all are less frequently over-indebted, as they are often formed by elderly members who tend to have no debts. A different pattern can be observed for indicator D2B (being in arrears on credit commitments or utility bills and having more liabilities than assets), according to which over-indebted households are generally less educated. On the other hand, households with more educated heads are indebted more often than others, but are less frequently over-indebted, owing both to their relatively higher incomes and to a greater ability to evaluate and foresee the economic resources needed to repay the debts.

Unemployment is associated with high levels of over-indebtedness. For example, 3.3 per cent of households in which the head is unemployed spend more than 30 per cent of their income on borrowing repayments and 33.7 per cent state they are on arrears on credit commitments or bills. The same percentages drop respectively to 0.6 and 4.5 per cent for households in which the head is retired. A similar pattern emerges for the other indicators. Households in which the head is self-employed are generally more likely to be over-indebted compared with households in which the head is employed, also owing to the larger share of indebted households among the self-employed. The subjective burden indicator, however, shows an opposite pattern, being higher among employees than among the self-employed.

Households with a mortgage show the highest levels of over-indebtedness according to all indicators, with the exception of the indicator of the cost of servicing unsecured repayments and the arrears indicators on debts and bills, for which the highest level of over-indebtedness is detected for social tenants. As for the relationship between over-indebtedness and town size and geographical area of residence, no clear pattern is observed.

The profile of the average scores of the first principal component (Table 6) is quite close to that of the original indicators ($A1_{30}$, $A2_{30}$, $A3_{30}$, $A4_{30}$, C, B_{25} and D1). The agreement is lower with D2 and E_4, and even more so with D2B and D1B; this seems to imply some different aspect of the phenomenon.

Based on this synthetic indicator, we observe that the relative position of households whose head is young improved over the years compared with the others; on the contrary, the over-indebtedness of households whose head is self-employed worsened, probably due to the prolongation of the economic crisis that hit their business. The reduction of over-indebtedness observed in the most recent years appears more significant amongst the households belonging to the first income quintile.

Table 5 – Over-indebted households according to socio-economic characteristics, 2014

(per cent)

Household or household reference person	$A1_{30}$	$A2_{30}$	$A3_{30}$	$A4_{30}$	B_{25}	C	D1	D1B	D2	D2B	E_4	F*	Indebted households	% households
Age of the head														
Up to 30	2.8	2.0	2.0	0.4	0.6	5.0	0.1	12.6	0.0	3.1	0.7	6.5	33.1	8.6
31 to 40	3.3	2.7	2.8	1.1	0.6	5.4	1.0	13.3	0.4	2.0	0.2	21.9	35.7	16.9
41 to 50	4.5	3.0	3.1	1.2	1.4	6.4	0.6	10.6	0.2	2.6	0.4	7.3	33.8	21.9
51 to 65	1.9	1.7	1.6	0.6	0.9	3.6	0.8	8.2	0.3	1.7	0.3	6.6	24.4	17.6
Over 65	0.4	0.3	0.2	0.0	0.1	0.7	0.2	3.6	0.0	0.3	0.0	3.2	6.9	35.0
Educational qualification of the head														
Up to Primary school certificate	0.5	0.4	0.2	0.2	0.3	1.5	0.3	8.1	0.1	1.2	0.0	2.8	7.3	23.6
Lower secondary school cert.	2.8	2.4	2.2	1.0	1.0	5.3	0.7	13.0	0.3	2.9	0.2	11.8	24.5	36.6
Upper secondary school diploma	2.7	2.0	2.1	0.5	0.8	4.3	0.6	5.0	0.2	0.7	0.6	8.6	30.1	26.3
University degree	2.9	1.7	1.9	0.5	0.0	1.6	0.2	2.8	0.0	0.1	0.0	10.7	32.4	13.5
Activity status of the head														
Employee	2.5	2.0	2.1	0.7	0.6	4.5	0.7	7.9	0.3	1.8	0.3	11.8	33.9	36.8
Self-employed	8.5	6.3	5.6	2.4	3.4	7.2	0.8	7.0	0.0	2.5	1.2	7.7	43.4	9.6
Unemployed	3.3	2.9	2.9	1.1	0.5	7.0	1.6	33.7	0.8	6.3	0.0	24.7	24.8	5.7
Retired	0.6	0.3	0.2	0.0	0.2	1.0	0.2	4.5	0.0	0.4	0.0	3.5	8.0	37.8
Other not employed	1.3	1.0	1.0	0.3	0.2	5.2	0.0	11.7	0.0	1.3	0.0	4.9	18.9	10.1
Number of earners														
1	2.7	2.2	2.1	0.7	0.7	4.4	0.4	10.2	0.2	1.9	0.1	6.5	19.1	53.2
2	1.9	1.1	1.2	0.5	0.6	3.0	0.6	6.4	0.2	1.2	0.3	12.4	26.9	38.0
3 or more	1.1	1.0	1.0	0.2	0.3	2.0	0.7	6.0	0.3	0.9	0.3	5.2	29.2	8.8
Quintiles of equivalent household income														
1st quintile	3.1	2.8	2.6	1.3	1.1	9.5	1.2	28.2	0.5	5.4	0.0	9.2	19.4	20.2
2nd quintile	2.1	1.6	1.5	0.7	0.6	7.8	0.7	7.8	0.2	1.1	0.0	15.1	20.2	19.8
3rd quintile	2.3	1.6	1.7	0.7	1.2	0.8	0.4	3.4	0.1	1.0	0.6	6.3	22.8	20.0
4th quintile	1.9	1.2	1.2	0.2	0.2	0.0	0.1	1.5	0.0	0.2	0.3	8.9	23.2	20.0
5th quintile	1.9	1.3	1.3	0.1	0.2	0.1	0.1	0.8	0.0	0.1	0.2	2.7	29.3	20.0
Housing tenure														
Owned outright	0.6	0.4	0.4	0.1	0.3	0.9	0.1	3.6	0.0	0.1	0.1	2.6	12.4	58.2
Buying with mortgage	15.5	12.1	11.8	3.0	1.6	16.6	2.7	5.3	0.8	1.6	1.0	43.9	100.0	10.1
Social tenant	1.0	1.0	1.0	1.0	1.0	6.8	0.7	32.6	0.7	6.9	0.0	5.2	14.9	5.4
Private tenant	1.9	1.3	1.1	1.0	1.5	4.7	0.6	18.8	0.4	4.5	0.0	8.6	17.7	15.3
Rent free	0.4	0.3	0.3	0.3	0.3	3.1	0.3	10.3	0.1	2.7	0.6	6.1	19.7	11.1
Town size (inhabitants)														
Up to 20,000	1.9	1.5	1.4	0.3	0.3	3.4	0.1	6.6	0.1	1.1	0.2	8.6	22.1	46.2
From 20,000 to 40,000	3.2	2.6	2.6	0.7	0.9	4.9	1.2	10.4	0.5	2.5	0.5	6.8	24.8	14.2
From 40,000 to 500,000	2.1	1.5	1.5	0.8	1.0	3.9	0.7	9.2	0.2	2.0	0.2	10.1	24.5	27.0
More than 500,000	2.8	2.0	2.0	1.0	0.7	2.5	0.6	10.9	0.2	1.3	0.3	7.3	21.1	12.5
Geographical area														
North	2.1	1.4	1.5	0.4	0.4	2.7	0.5	6.5	0.3	1.9	0.3	8.1	23.5	47.4
Centre	2.8	2.0	2.0	0.9	0.6	2.3	0.3	7.5	0.0	1.1	0.1	11.0	26.0	20.2
South and Islands	2.2	2.0	1.7	0.6	1.1	5.9	0.6	11.7	0.1	1.3	0.2	7.7	20.4	32.4
Total	**2.3**	**1.7**	**1.7**	**0.6**	**0.7**	**3.6**	**0.5**	**8.4**	**0.2**	**1.6**	**0.2**	**8.5**	**23.0**	**100.0**

(*) Estimation based on 2013 r-SHIW data.

Table 6 – Synthetic indicator of over-indebtedness, 2014
(First principal component of over-indebtedness indicators; average scores)(*)

	First principal component (average scores)			
	2008	**2010**	**2012**	**2014**
Age of the head				
Up to 30	0.41	0.32	0.35	0.02
31 to 40	0.39	0.55	0.34	0.12
41 to 50	0.13	0.44	0.36	0.23
51 to 65	-0.03	0.04	0.06	0.01
Over 65	-0.21	-0.17	-0.15	-0.22
Educational qualification of the head				
Up to Primary school certificate	-0.08	0.01	-0.15	-0.17
Lower secondary school cert.	0.22	0.40	0.27	0.11
Upper secondary school diploma	0.06	0.14	0.24	0.04
University degree	-0.02	-0.01	0.05	-0.08
Activity status of the head				
Employee	0.17	0.24	0.20	0.04
Self-employed	0.34	0.70	0.89	0.59
Unemployed	0.90	0.98	0.44	0.18
Retired	-0.19	-0.14	-0.17	-0.20
Other not employed	0.28	0.41	0.13	-0.06
Number of earners				
1	0.17	0.27	0.22	0.04
2	-0.01	0.11	0.03	-0.03
3 or more	-0.11	0.11	0.06	-0.12
Quintiles of equivalent household income				
1st quintile	0.61	0.92	0.58	0.26
2nd quintile	0.13	0.14	0.20	0.10
3rd quintile	-0.08	0.05	0.09	-0.03
4th quintile	-0.13	-0.10	-0.09	-0.16
5th quintile	-0.18	-0.09	-0.12	-0.17
Housing tenure				
Owned outright	-0.16	-0.11	-0.16	-0.19
Buying with mortgage	1.16	1.42	1.14	1.05
Social tenant	0.25	0.35	0.41	0.09
Private tenant	0.18	0.37	0.30	0.09
Rent free	0.02	0.24	0.22	-0.12
Town size (inhabitants)				
Up to 20,000	0.11	0.22	0.13	-0.06
From 20,000 to 40,000	0.07	0.08	0.17	0.11
From 40,000 to 500,000	0.04	0.16	0.10	0.04
More than 500,000	0.00	0.20	0.15	0.02
Geographical area				
North	0.07	0.09	0.09	-0.05
Centre	-0.15	0.18	0.14	-0.01
South and Islands	0.22	0.32	0.20	0.08
Total	**0.07**	**0.18**	**0.13**	**0.00**

(*) Principal component analysis conducted on the comparable variables over the period 2008-2014 ($A1_{30}$, $A4_{30}$, B_{25}, C and D1). Household surveys from 2008 and 2012 are treated as supplementary units, and thus do not contribute to determine the principal components.

7.How long does the over-indebtedness condition last?

Measuring the share of the population who is over-indebted in a given moment is not sufficient, alone, to gauge the extent of the financial difficulties faced by the population; it is necessary to supplement the information set with evidence on the persistence of the phenomenon. In fact, the type of economic consequences associated to over-indebtedness can be very different depending on its duration along people's lives.

SHIW data allow us to perform a longitudinal analysis of households in financial difficulty. In this perspective, the pattern of changes over time, from one wave to the next, becomes relevant. We start by analysing descriptive statistics, which provide a useful insight on the degree of mobility among the two conditions over time (i.e. being over-indebted vs. not being over-indebted).

The share of households experiencing at least one instance of over-indebtedness from 2008 to 2014 is lower than 6 per cent according to most of the indicators (Table 7). The share is greater when the indicator C is used: 13.1 per cent. The share of households remaining over-indebted over the whole seven-year period is even smaller: 0.6 per cent for indicator C, 0.1 per cent for D1 and nil for the rest.

According to these data, the degree of persistence of over-indebtedness is low: only the indicator C points to a larger share of households experiencing more than one instance of over-indebtedness in the four waves considered: 5.9 per cent. The other indicators all point to a share lower than 1 per cent, apart from $A1_{30}$ for which it is 1.6 per cent. The average duration of the condition of over-indebtedness is around a year and a half according to most of the indicators, and more than two years for the indicator C.

Table 7 – Over-indebtedness over time, Unadjusted transitions 2008-2014
(share of households)

Indicator	Number of waves in which the households are over-indebted						Over-indebted at least once	Average number of years in over-indebtedness (*)	Share of over-indebted households who were over-indebted in one wave only
	0	1	2	3	4	Total			
$A1_{30}$	94.4	4.0	1.3	0.3	0.0	100.0	5.6	1.8	71.4
$A2_{30}$	95.7	3.8	0.4	0.2	0.0	100.0	4.3	1.5	88.4
$A3_{30}$	95.7	3.9	0.3	0.1	0.0	100.0	4.3	1.5	90.7
$A4_{30}$	98.2	1.6	0.1	0.1	0.0	100.0	1.8	1.3	88.9
B_{25}	96.7	2.4	0.7	0.2	0.0	100.0	3.3	1.2	72.7
C	86.9	7.2	3.6	1.8	0.6	100.0	13.1	2.2	55.0
D1	97.2	2.3	0.4	0.1	0.1	100.0	2.8	1.5	82.1
D2	99.3	0.5	0.2	0.0	0.0	100.0	0.7	1.5	71.4

(*) Computed considering the persistence rate between consecutive waves.

In Table 8 we examine the extent to which households who were over-indebted in one year remained over-indebted when they were interviewed again two years later or, conversely, were able to escape over-indebtedness. It seems to confirm that persistence in over-indebtedness from one wave to the following is generally low. Nevertheless, transitions into and out of over-indebtedness vary depending on the indicator used. For example, about 67 per cent of households that spent more than 30 per cent of their income on debt repayment in 2012 were no longer over-indebted in 2014, while 33 per cent still were. This confirms the low persistence of over-indebtedness over time according to the traditional indicator of the cost of servicing. About 98 per cent of households not in a condition of over-indebtedness in 2012 remained so in 2014.

The persistence of over-indebtedness detected by the traditional indicator of the cost of servicing is even less pronounced if the indicator takes account of the financial and real assets of households: the probability of getting out of over-indebtedness rises to

about 75 per cent. This might be due to the volatility of assets prices as well as the greater measurement errors that affect wealth compared to income.

According to the indicators of arrears, of the cost of servicing unsecured loans and of the number of credit commitments, the degree of persistence of over-indebtedness is even lower and the probability to escape the condition of over-indebtedness stands between 86 and 95 per cent.

Conversely, according to the debt poverty indicator and the indicator of arrears on credit commitments and bills, the persistence of over-indebtedness is higher: the percentage of households that were over-indebted in 2012 but not in 2014 is about 50-60 per cent.

Table 8 – Transitions in over-indebtedness
(row percentages)

Indicator		2008-2010*		2010-2012		2012-2014	
		No	Yes	No	Yes	No	Yes
$A1_{30}$	No	98.6	1.4	98.6	1.4	98.4	1.6
	Yes	71.4	28.6	75.6	24.4	67.0	33.0
$A2_{30}$	No	98.9	1.1	99.0	1.0	98.6	1.4
	Yes	84.3	15.8	81.1	18.9	77.0	23.0
$A3_{30}$	No	98.9	1.1	99.0	1.0	98.6	1.4
	Yes	86.9	13.1	81.2	18.8	75.1	24.9
$A4_{30}$	No	99.5	0.5	99.7	0.3	99.3	0.7
	Yes	92.1	7.9	93.6	6.4	74.2	25.8
B_{25}	No	99.1	0.9	99.2	0.9	99.3	0.7
	Yes	76.4	23.6	97.0	3.0	94.2	5.8
C	No	96.0	4.0	97.4	2.6	97.5	2.5
	Yes	52.4	47.7	70.5	29.5	64.4	35.6
D1	No	99.2	0.8	98.5	1.5	99.7	0.3
	Yes	85.9	14.1	70.5	29.5	86.3	13.7
D1B	No					96.1	3.9
	Yes					56.4	43.6
D2	No	99.6	0.4	99.5	0.5	99.8	0.2
	Yes	70.6	29.4	76.7	23.4	92.9	7.1
D2B	No					98.8	1.3
	Yes					90.3	9.7
E_4	No			99.8	0.2	99.7	0.3
	Yes			96.8	3.2	95.0	5.0

* The cost of the loan repayment is not available for loans for business purposes in 2008. Owing to missing information, all loans and mortgages for the purchase or for the renovation of properties are assumed to be secured, while all loans for other household needs are assumed to be unsecured.

Measurement errors also tend to affect the estimates of transitions.[15] In the literature concerning poverty dynamics, many authors (Bane and Ellwood, 1986; Duncan et al, 1984; Jenkins, 2000; Devicienti and Gualtieri, 2004) argue that transitions into and out of poverty should take into account measurement errors and transitory income shocks that do not significantly affect the individuals' living standard. In order to reduce the potential biases, some authors propose to restrict the definition of an exit from poverty to cases where the post-transition income is well over the poverty line, and that of an entry into poverty to cases where the income is well below the poverty line. In general, the range is symmetric around the poverty line (i.e. +/- 10 percentage points).

This approach can be applied to the case of over-indebtedness for all the indicators based on a threshold; in what follows, for the sake of simplicity, we will limit our

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[15] The adjustments described above cannot be used to analyse transitions as the corrections do not take into account the panel component.

analysis to $A1_{30}$, $A4_{30}$, B_{25} and C. We perform a sensitivity analysis by identifying an interval of uncertain classification between the two states of over-indebtedness and non-over-indebtedness. For the variables $A1_{30}$ and $A4_{30}$, when households fall in the range from 25 to 35 per cent of income (as defined in each case), stability over time is assumed;[16] the same applies for B_{25} in the range of income from 20 to 30 per cent. For the indicator C, a range of 10 per cent around the poverty line is considered.

By definition, this approach amplifies the persistence of the phenomena over time, reducing the transitions accordingly (Table 9). For example, the conditional probability of an over-indebted household in 2008 remaining over-indebted in 2010 rose from 28.6 to 47.7 per cent. For the B_{25} indicator, the same conditional probability increased from 23.6 to 55.8 per cent. In general, the persistence rose significantly for $A1_{30}$ and B_{25} while the increase was less pronounced for $A4_{30}$ and C.

Table 9 – Transitions into over-indebtedness - Adjusted transitions
(row percentages)

Indicator		2008-2010*		2010-2012		2012-2014	
		No	Yes	No	Yes	No	Yes
$A1_{30}$	No	99.1	0.9	99.3	0.7	99.1	0.9
	Yes	52.3	47.7	59.4	40.6	43.9	56.1
$A4_{30}$	No	99.6	0.4	99.7	0.3	99.5	0.5
	Yes	89.0	11.0	92.6	7.4	64.7	35.3
B_{25}	No	99.4	0.6	99.4	0.6	99.5	0.5
	Yes	44.2	55.8	86.8	13.2	86.2	13.8
C	No	96.7	3.3	97.5	2.5	97.5	2.5
	Yes	50.8	49.2	63.7	36.3	64.4	35.6

* The cost of the loan repayment is not available for loans for business purposes in 2008. For lack of information, all loans and mortgages for the purchase or renovation of properties are assumed to be secured, while all loans for other household needs are assumed to be unsecured.

A different approach to dealing with measurement errors in the analysis of transitions is the latent class analysis (LCA), which provides a useful framework to separate true changes from spurious changes and therefore to assess the impact of measurement issues in the analysis of transitions. Such models are based on the assumption that the true variable of interest (the condition of over-indebtedness in our case) cannot be measured directly. It is only possible to measure some imperfect indicators (manifest variables) of such a latent variable. The covariation actually observed among manifest variables is due to each manifest variable's relationship with the latent variable (for a comprehensive description of LCA for transitions see Neri, 2009).[17]

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[16]   We define O, NO and U as the conditions of being Over-indebted, Non Over-indebted and Uncertain respectively; in any combination observed in two waves implying an Uncertain condition (i.e. O,U; U,O; NO,U; U,NO) we recode the Uncertain state with that corresponding to the other observed state (O for the first two combinations, NO in the remaining two). In the few cases of both uncertain states (U,U), one of the two other conditions (O or NO) has been randomly drawn in both waves. Although the correction is applied symmetrically around the threshold, (U,NO) and (NO,U) combinations are more frequent than (U,O) and (O,U) combinations, due to the higher marginal frequency of NO compared to O. The estimates of over-indebtedness indicators tend to be slightly lower than the unadjusted estimates.

[17]   The latent Markov model (LMM) provides a useful extension of the LCA model for investigating true change, controlling for the influence of noisy data. It was introduced in 1955 by Wiggins and also referred to as the latent transition or hidden Markov model (see Wiggins, 1973; Langeheine and Van de Pol, 1994; and Vermunt, 1997).

In the model used in our analysis the transition probabilities are allowed to vary over time, while the measurement properties are constrained to be time-invariant and are modelled using a quasi-independence model. The measurement part of the model assumes that observations tend to concentrate on the main diagonal (absence of error), while for the other cells the probability of error does not depend on the condition of over-indebtedness (quasi-independence assumption). The only hypothesis in the structure of true latent transitions is that they depend on the condition of over-indebtedness at the beginning of the period.

The model is estimated using the EM algorithm (Dempster et al., 1997). The fit is evaluated using the Pearson statistic and the likelihood ratio. When the model is locally identifiable both statistics follow an asymptotic Chi-squared distribution. In order to compare non-nested models, the AIC and BIC criteria were used.

The sample used in such estimates is greatly reduced compared to the full sample (about 2,800 versus 8,000 units per wave); moreover the share of over-indebted households according to different indicators is quite small, so the latent model estimates might suffer from some instability. Nonetheless, the probability of persistence in over-indebtedness is steadily higher than that observed on the raw data (Table 10)[18]. This confirms that measurement errors tend to artificially amplify the mobility of households among the states. According to these new estimates an over-indebted household would remain in that condition for approximately 5 years on average, much longer than the figure obtained using the raw data.

In conclusion, according to estimates on raw data, the persistence in over-indebtedness is generally quite low; households frequently remain in that condition for a short time (1-2 years on average). However, persistence in over-indebtedness significantly increases when taking into account of measurement errors: over-indebted household would then remain in that condition for approximately 5 years on average.

Table 10 – Transitions in over-indebtedness – Adjusted transitions with LCA
(row percentages)

Indicator		2008-2010*		2010-2012		2012-2014	
		No	Yes	No	Yes	No	Yes
$A1_{30}$	No	98.3	1.7	98.7	1.3	98.9	1.1
	Yes	13.5	86.5	43.6	56.4	20.9	79.1
$A4_{30}$	No	96.6	3.4	100.0	0.0	99.3	0.7
	Yes	60.0	40.1	25.5	74.5	17.9	82.1
B_{25}	No	98.7	1.3	98.4	1.6	100.0	0.0
	Yes	15.8	84.2	44.5	55.5	40.8	59.2
C	No	98.8	1.2	98.7	1.3	99.3	0.7
	Yes	11.9	88.1	45.3	54.8	27.7	72.3

* The cost of the loan repayment is not available for loans for business purposes in 2008. Owing to missing information, all loans and mortgages for the purchase or for the renovation of properties are assumed to be secured, while all loans for other household needs are assumed to be unsecured.

8. Over-indebted households across European countries

In this section we develop a cross-country comparison of household over-indebtedness by using the Eurosystem's Household Finance and Consumption Survey

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[18] For all the indicators analysed, the levels of over-indebtedness implicit in the transition matrices are higher compared with the estimates on the raw data. This is consistent with what we found using data adjusted for under-reporting.

(HFCS). The survey is a joint project undertaken by all the central banks that are part of the Eurosystem and three National Statistical Institutes, and provides detailed household-level data on various aspects of household balance sheets and related economic and demographic variables, including income, private pensions, employment and measures of consumption (ECB, 2013a, 2013b). A key distinguishing feature of the HFCS is that it provides individual household data, which have been collected in a harmonized way in 15 euro-area countries for a sample of more than 62,000 households. The reference year for most country surveys, including Italy, is 2010.

This harmonized survey can be exploited to describe the distribution of financial pressure across the countries and to identify which groups of households are vulnerable to economic and financial risk in some countries while not in others. In fact most of the over-indebtedness indicators can be computed (Table 11).

Italy's over-indebtedness indicators are generally lower than those for other European countries; only Finland shows steadily lower indicators, while Austria, Germany and Slovakia are approximately at the same level as Italy. The highest levels are found for Spain, the Netherlands, Slovenia and Luxembourg. Even after adjusting for non-response and under-reporting, the level over-indebtedness of Italian households remains lower than that of most of the other countries.[19]

Table 11 – Cross-country comparison of over-indebtedness, HFCS data

(per cent)

	Austria	Belgium	Germany	Spain	Finland	France	Greece	Italy	Luxembourg	Netherlands	Portugal	Slovenia	Slovakia
$A1_{30}$	2.9	6.1	3.9	14.1	1.0	5.8	5.0	**3.2**	8.4	10.1	8.2	10.0	3.6
$A2_{30}$	1.8	3.9	2.3	11.4	0.7	3.8	4.3	**2.1**	6.0	7.5	6.2	8.6	2.9
$A3_{30}$	1.7	3.5	1.6	7.8	0.5	2.5	2.5	**1.6**	4.2	6.7	4.7	7.9	2.4
$A4_{30}$	1.4	1.4	0.7	3.2	0.2	0.6	1.2	**0.7**	1.9	4.0	2.3	0.5	1.0
B_{25}	1.1	1.5	0.6	4.0	0.0	2.0	1.6	**1.6**	1.9	3.5	2.6	8.1	1.0
C	6.1	10.5	8.5	13.4	1.3	7.9	6.9	**6.0**	15.0	16.3	8.3	8.7	4.7
E_4	0.5	0.8	3.0	1.7	0.0	2.8	0.6	**0.4**	2.2	4.2	0.3	2.2	0.2

In almost all the countries considered, over-indebted households are more frequent amongst those with low income; in Germany, on the contrary, we observe higher levels of over-indebtedness in the two richest income quintiles (Table 12).

The age profile of Italian over-indebted households, rising up to the 30-40 age group and declining afterwards, is quite common, characterizing also Finland, France, Belgium, Portugal, Luxembourg and the Netherlands. In Slovakia, Spain and Austria the highest level of over-indebtedness is found for households whose head is less than 30 years old, while in Slovenia and Greece the highest level is found for households whose head is in the 41-50 age class. Germany is the only country for which the level of over-indebtedness is highest in the 51-65 age class.

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[19]   Sample surveys on income and wealth are usually affected by selectivity bias and under-reporting. It is likely that the HFCS estimates of other countries are also biased in the same direction as the SHIW estimates (European Central Bank, 2013a) although information about that is not available.

In all the countries considered, with the exception of Slovenia, and Slovakia, households whose head is self-employed are more frequently over-indebted than the other households.

Table 12 – Over-indebted households across the countries
Debt burden indicator ($A1_{30}$), HFCS data
(per cent)

	Austria	Belgium	Germany	Spain	Finland	France	Greece	Italy	Luxembourg	Netherlands	Portugal	Slovenia	Slovakia
Age													
Up to 30	5.1	7.9	2.7	27.0	1.2	6.3	6.2	**3.6**	13.8	13.4	14.9	2.6	6.7
31 to 40	5.0	8.8	3.8	23.1	2.1	11.3	6.0	**6.6**	14.5	13.9	14.9	12.7	6.0
41 to 50	2.1	8.0	5.8	14.2	1.0	7.5	7.2	**4.6**	7.1	12.0	10.2	23.2	3.3
51 to 65	1.8	4.5	8.2	8.4	1.0	5.1	5.3	**2.4**	4.7	4.1	6.1	7.0	1.1
Over 65	1.1	1.8	1.0	3.1	0.2	1.0	1.4	**0.6**	0.8	4.3	1.5	2.4	0.0
Educational qualification													
Primary or below	22.5	5.9	1.3	9.7	.	3.0	3.0	**1.2**	5.3	4.4	7.3	0.0	0.0
Lower secondary school certificate	2.5	5.5	3.4	14.0	0.7	4.9	5.7	**4.6**	9.6	5.1	13.7	0.7	1.4
Upper secondary school diploma	3.2	5.4	3.5	21.0	1.2	7.0	6.8	**3.5**	10.4	7.5	8.4	14.2	3.7
University degree	1.3	6.5	4.9	15.1	1.2	8.0	4.6	**3.5**	7.7	13.7	5.6	10.6	4.4
Work status													
Employee	3.2	6.9	4.6	18.2	1.2	7.9	4.4	**3.8**	11.2	9.5	10.1	8.5	4.6
Self-employed	4.7	14.4	12.1	24.1	3.8	14.6	7.5	**8.0**	9.9	33.9	16.1	9.0	2.8
Not employed	2.4	4.3	2.0	9.1	0.6	2.1	4.7	**1.7**	4.1	5.3	4.8	11.1	2.4
Quintiles of household income													
1st quintile	3.4	12.9	2.8	14.1	2.0	6.3	7.9	**6.7**	14.3	15.4	13.7	19.4	6.5
2nd quintile	3.9	7.7	2.6	17.0	0.7	5.7	5.5	**1.8**	7.7	12.7	8.9	16.7	4.2
3rd quintile	2.5	5.6	3.2	17.5	0.8	6.1	6.4	**3.2**	10.0	6.9	8.6	2.0	2.7
4th quintile	3.0	1.3	6.0	13.5	0.7	6.1	3.1	**2.1**	6.6	5.3	6.5	9.8	3.1
5th quintile	1.8	2.0	4.8	8.2	0.9	4.9	2.2	**2.3**	3.1	5.1	3.0	2.2	1.8
Total	**2.9**	**5.9**	**3.9**	**14.1**	**1.0**	**5.8**	**5.0**	**3.2**	**8.4**	**8.8**	**8.2**	**10.0**	**3.6**

9. Conclusion

The purpose of this paper is to examine the measures of over-indebtedness proposed in the literature and apply them to the Italian case from 2008 to 2014 by exploiting the wealth of information coming from the Bank of Italy's survey on households.

We show how the indicators address different aspects of over-indebtedness and provide potentially valuable information. Some of them take into account income and repayments only while some others also consider assets, and others merely identify signals of potential over-indebtedness which do not take into account the outstanding debt. Thus, none of these indicators is ideal in the sense that it is better than the others.

Most of the indicators point to moderate levels of over-indebtedness, below 4 per cent. Two indicators display considerably higher levels, around 10 per cent: the first, F, is based on a self-assessment of the respondents' economic conditions, which is not necessarily objective, while the second, D1B, concerns arrears including those on utility bills, thereby considering a much larger segment of the population than that limited to respondents who owe money to banks and financial companies, but on the other hand it does not take into consideration the amount of debt (which could be small) or the assets held. All the indicators that include assets, which in our view can best identify true conditions of over-indebtedness, fall below 2 per cent.

Considering the adjusted SHIW dataset, whose mean estimates of household assets, debts and income are by definition coherent with those that can be inferred from the

National Accounts, we found a moderate increase in the level of over-indebtedness for most of indicators.

The indicators that best detect the condition of economic distress associated with over-indebtedness are those referring to the arrears on debts and bills and, when real and financial assets are included, also the indicator of the cost of servicing. The association with economic distress is lower for the other indicators.

The comparison of the over-indebtedness indicators across years shows that, for most of the indicators, the percentage of over-indebted households strongly increased between 2008 and 2010, and decreased afterwards.

Over-indebtedness tends to be more frequent in the lowest class of income, although the share of indebted households in that class is lower than the average. The prevalence among the poorest class is particularly high according to the indicator reporting the arrears both on debts and bills.

Over-indebtedness is generally more frequent among households whose head is less than 50 years old, according to the age profile of indebted households which declines after age 50 years and even more markedly after age 65. Moreover, unemployment is associated with high levels of over-indebtedness. Households in which the head is self-employed are generally more likely to be over-indebted compared with households in which the head is employed, also owing to the larger share of indebted households among the self-employed.

Households with a mortgage show the highest levels of over-indebtedness according to all indicators, with the exception of the indicator of the cost of servicing unsecured repayments and the indicators of arrears on debts and bills, for which the highest level of over-indebtedness detected varies depending on which is indicator is used for social tenants.

Based on estimates on raw data, persistence in over-indebtedness from one wave to the following is generally low, especially when the indicators take account of the financial and real assets of households. This might be due to the volatility of assets prices as well as to the greater measurement errors that affect wealth compared to income. Conversely, according to the debt poverty indicator and the indicator of arrears on credit commitments and bills, the persistence of over-indebtedness is higher. Households frequently remain in a condition of over-indebtedness for a short time (1-2 years on average).

Our paper, however, shows that the estimates of the transitions are significantly biased due to measurement errors, which tend to artificially amplify the mobility of households among the states, underestimating the persistent states. When measurement errors are considered, an over-indebted household remains in that condition for approximately 5 years on average, much longer than the figure obtained using the raw data.

Italy's over-indebtedness indicators are generally lower than those for other European countries; only Finland shows steadily lower indicators, while Austria, Germany and Slovakia are approximately at the same level as Italy. The highest levels are found for Spain, the Netherlands, Slovenia and Luxembourg. Even after adjusting for non-response and under-reporting, the level over-indebtedness of Italian households remains lower than for most of the other countries.

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