

# HOUSEHOLD FINANCIAL VULNERABILITY: AN EMPIRICAL ANALYSIS

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## **Abstract**

Using survey data, we investigate household financial distress. Specifically, we propose an indicator of financial vulnerability to analyse jointly different features of household financial distress. We also analyse the socio-demographic and economic determinants of financial vulnerability. A total number of 3,102 Italian households make up the sample.

The empirical analysis highlights that for the median level of the financial vulnerability index households already exhibit some important symptoms of financial vulnerability, such as problems getting to the end of the month or inability to meet unexpected expense. Concerning the determinants of the financial vulnerability index, there are three evidences that need to be pointed out. First, the level of debt servicing is positively related to financial vulnerability and the effect is stronger for households holding unsecured debt, i.e. consumer credit. Second, financial vulnerability also increases for impulsive individuals, who may adopt impatient, short-sighted behaviour patterns which make it difficult for them to be fully aware of the consequences of their financial and spending decisions. Third, increased education helps to reduce financial fragility.

**Keywords:** Financial Vulnerability Index, Household debt, Consumer Credit, Survey Data, Principal Component Analysis.

Jel Code: C21; D14; D91; G21

## 1. Introduction

The recent financial and economic crisis highlights a worsening in the economic and financial situation of households; a growing number of families are facing difficulties in repaying secured or unsecured debt, have arrears in paying utility bills or rent, and are unable to make ends meet or to cope with unexpected expenses.

The empirical literature has mostly focused on the determinants of household debt burden and financial distress (May et al. 2005, Del Rio and Young 2008, Christelis et al. 2010). Highly indebted households are “financially fragile”, that is are more likely to default on their loans commitment, especially when hit by adverse income shocks (Jappelli et al. 2008).

In this paper we still focus on household debt burden, but we analyse a more comprehensive definition of financial fragility in order to take into account not only over-commitment due to excessive indebtedness, but also other conditions of financial instability, such as the inability to face the monthly outlay and to balance the budget, arrears in paying utility bills, difficulties in shopping for food or paying the rent. We define those households as “financially vulnerable”. In a context of increasing impoverishment and social exclusion, a careful analysis of this phenomenon is needed in order to formulate policy measures aimed at providing competences and tools that can help individuals to manage their resources appropriately and to take sustainable borrowing decisions.

The aim of the paper is twofold:

- to propose an indicator of financial vulnerability aimed at synthesizing different profiles of household financial stress;
- to analyse how household characteristics infer with the level of financial vulnerability.

Concerning the latter aim, we are specifically interested in investigating the role of debt in determining household financial vulnerability. According to theory (Modigliani and Brumberg 1954, Ando and Modigliani 1963), households decide to take loans as a way of anticipating spending, based on expectations of increased future income receipts; within this framework, indebtedness, as well as saving, enhances economic welfare by smoothing consumption over time. However, in recent years household debt, in

particular unsecured debt (i.e. consumer credit), has recorded high levels of growth and this has raised concerns about the fact that household debt may be inconsistent with the optimising behaviour of intertemporal consumption and may instead be associated with the prevalence of a difficult financial and economic position of indebted households, at least for some categories of borrowers and/or in some local context. In such cases, households may risk a level of indebtedness that is unsustainable in relation to their earnings, and this may lead to financial vulnerability.

The empirical analysis focuses on the Italian case. The Italian Statistic Institute (ISTAT) in its Survey on Living Conditions and Income Distribution provides insight of a worsening trend; in 2008, 17% of households declaring problems in making ends meet and a third of respondents say they are not able to face significant, unexpected expenses. Moreover, in 2008, there was a rise in the number of households facing financial difficulties: in particular, 11.9% of households declared getting into arrears on the payment of utilities and other bills, whilst 10.9% of households said they were not able to heat their homes adequately. Moreover, as outlined by the Bank of Italy Survey on Household Income and Wealth, the median households' net wealth diminished by about 1% in 2006-08 and, in the same period, the average household income contracted by about 4% in real terms. Furthermore, the proportion of households with debts has increased by almost two percentage points, to 27.8%, thus extending the rising trend under way since 2000, while the number of loans undergoing repayment problems is growing.

Empirical estimates are based on a national survey carried out by ANIA - the Italian Association of Insurance Companies - in September 2009; a total number of 3102 households make up the sample. We are the authors of the questionnaire, designed to provide a comprehensive, up-to-date picture of Italian households financial situation; the strength of the dataset is that it contains a detailed variety of socio-demographic, economic, financial and behavioural characteristics of Italian household, and a number of items specifically aimed at identifying financial vulnerability.

The novelty in this work is threefold:

- to our knowledge no previous studies have proposed an indicator of financial vulnerability for jointly analyse different features of household financial distress. The topic is itself relevant and has remarkable policy implications.

Moreover, the index can be particularly suitable both for monitoring the evolution of the phenomenon during time and for cross-country comparisons;

- the empirical analysis focuses on Italian households, while previous studies have mostly been undertaken in the US and, to a lesser extent, the UK;
- the dataset is detailed and specifically designed to investigate households financial distress.

The paper is organised as follows. Section 2 provides the theoretical framework. Section 3 explains data used in the analysis. Section 4 focuses on the financial vulnerability index and the empirical methodology. Section 5 discusses the results. Section 5 draws some concluding remarks.

## **2. Theoretical framework**

There is a substantial literature that uses data from surveys on households to focus on the determinants of household debt burden and financial distress. Contributions mainly focus on loans commitment (secured and/or unsecured, i.e. mortgages and/or consumer credit) and explores issues concerning household “financial fragility”, defined in Jappelli et al. (2008) as inability to repay financial debt.

Del and Young (2008) use a self-reported indicator of financial distress and analyse the probability of households which hold unsecured debt reporting problems with repayment. Results show a clear link between their subjective measure of financial distress and other indicators of the affordability of debt. In particular, unsecured debt to income ratio proves to be the main determinant of financial distress. Furthermore, while the proportion of households reporting debt problems did not change much between 1995 and 2000, there were significant changes in their socio-economic characteristics. This drives the authors to the conclusion that there was an increase in unsecured debt taken on by young households with a high debt-income ratio which in turn makes them more vulnerable to potential shocks in their income, to increases in interest rates and to adverse financial shocks.

May et al. (2005) investigate the affordability of debt for homeowners and renters, both in terms of the amount of household income that is devoted to servicing debts and

households' perceptions of whether their debts are a problem. The evidence suggests that, while the vast majority of debt is borne by homeowners with mortgages, debt problems are concentrated among renters, who are consistently more likely to report problems servicing their unsecured debt than homeowners. Moreover, households with both high levels of income gearing and high debt in relation to housing assets are more likely to face debt problems.

Duygan and Grant (2006) analyse how propensity to fall into arrears on mortgages and unsecured loans is affected by adverse shock to a household's income and how the response to these adverse events vary across countries and depend on local financial and judicial institutions. Results show that adverse shocks, such as an unexpected change in income, increase the incidence of arrears, but the extent of this depends crucially on the cost of default.

Christelis et al. (2010) analyse the financial fragility of Europeans aged 65 and over and describe how this vary across countries, age groups, health status and other socio-economic variables. They report that the stock of accumulated debt, the time to maturity, the availability of collateral and the weight of instalment payments in disposable income indicate an element of household financial fragility.

Other authors, Brown and Taylor (2008) and Fay et al. (2002), analyse the empirical determinants of debt burden, default and bankruptcy - using household level data as well - and propose different socio-demographic and economic explanatory variables. While all the above studies analyse financial problems related to loan commitments, Worthington (2006) and Bridges and Disney (2004) focus on a slightly different objective.

In particular, rather than focussing on more acute events such as debt insolvency, Worthington (2006) examines a milder form of financial distress: the inability to engage in basic social activities such as meals with family and friends, nights out and holidays. The author finds that financial distress is very much a function of the demographic and socio-economic characteristics of households and, to a lesser extent, debt portfolio; however, all the variables that identify financial distress are empirically analysed by the authors in different regressions and this inhibits to obtain information on the overall degree of household financial distress, since it is different the case of households that give up one social activity or all of them.

Bridges and Disney (2004) focus on the characteristics of low-income families that have problems of arrears and default on loan commitments as well as in other different areas, such as payment for housing and utilities. In their analysis, the authors combine the arrears data in order to examine how the aggregate level of arrears is associated with different household characteristics and show that credit use and accumulation of arrears differ between single parents and couples with children, and also between homeowners and renters. They also show that loans from finance companies pose repayment difficulties for almost one in five of families, primarily tenants.

Following Worthington (2006) and Bridges and Disney (2004), we aim to examine a more comprehensive definition of household financial fragility in order to take into account not only over-commitment due to excess indebtedness, but also other conditions of financial instability, such as the inability to meet the monthly outlay and to balance the budget, arrears in paying utility bills, difficulties in shopping for food or paying the rent.

We define those households as “financially vulnerable”, since they are particularly exposed to adverse shock - such as job loss, reduction in working hours, death, illness - that can eliminate or reduce an income source and/or determine unexpected liabilities and negatively impact their financial situation.

As a starting point, financial vulnerability can be caused by unsound or unsustainable borrowing choices which lead individuals to contract debt levels that are too high in relation to current and future earnings capacity. Financial vulnerability may also be driven by factors other than debt, such as low income and wealth levels; life-style behaviours which, either due to irresponsibility or short-sightedness, lead an individual to unsustainable expenditure or non optimal money management; adverse events that may negatively impact their financial situation and/or absence of financial instruments (e.g. life or damage insurance policies) that enable individuals to manage risk more effectively.

Given that situations of financial vulnerability are likely to be in most cases the result of a variety of interrelated causes, the phenomenon and its determinants need to be analysed analytically.

### **3. Data and variables**

### *3.1 The sample*

The paper benefits from a survey carried out by Ania, the Italian Association of Insurance Companies. The survey was conducted by GF Eurisko between 15<sup>th</sup> and 30<sup>th</sup> September 2009, interviewing 4000 individuals throughout Italy, all adults aged 18 years or over. A total number of 3102 households make up the sample [1].

In preparing the questionnaire we aimed at providing a comprehensive, up-to-date picture of household financial situation [2].

The strength of this dataset is that it includes socio-demographic, economic, financial and behavioural characteristics of Italian households, as well as a number of items to identify household financial vulnerability. Specifically, the respondents were asked questions in five topic areas:

- socio-demographic characteristics;
- economic-financial characteristics;
- changes in the economic and financial situation;
- level of financial literacy;
- behaviour and personal attitudes.

Questions in the first group sought to identify the socio-economic profiles of respondents i.e., geographic area, size of place of residence, age, gender, marital status, and household size. These questions are those commonly used in national and international surveys researching, at different levels and with different objectives, household characteristics and behaviour.

The second group included questions traditionally aimed at establishing the economic-financial profile of households in terms of income level, amount and type of financial and real wealth, indebtedness, and employment conditions. Other questions sought to identify potential elements of vulnerability and/or the existence of risk management instruments: e.g. whether the head of the household received or paid maintenance of a divorced spouse, the type of employment contract (fixed or open-ended), career prospects, the use of life and/or damage insurance policies.

The third group of questions addresses more directly individuals' vulnerability or well-being both by collecting data relating to any situations of difficulty and by investigating respondents' perceptions of their personal economic-financial situation. Other questions



focus on the occurrence of adverse events such as job loss, illness, death, invalidity, which may cause a reduction in income and/or an increase in unexpected expenses, problems or delays in payments relating to, for instance, utilities, debt repayment instalments or rent. Further areas of investigation in this group are the congruity of income in relation to monthly expenditure, the capacity to save, the level of difficulty in meeting food and clothing costs, the capacity to face unexpected expenses, changes in households' economic situations over the preceding twelve months and expectations for the future.

The fourth group focuses on the educational level of individuals and their financial literacy. In particular, as regards financial literacy the survey uses four questions contained in the Bank of Italy's Survey of Household Income and Wealth in its investigation of households' financial capability [3]. In recent years financial literacy has gained the attention of a wide range of major policy makers, who are concerned that individuals do not have the necessary knowledge of financial concepts to make decisions most advantageous to their economic well-being. Indeed, such deficiency of financial literacy can affect an individual's day-to-day money management, ability to put in place savings or insurance solutions designed to safeguard their financial future, and capacity to understand the risks and consequences of borrowing decisions (Braunstein and Welch 2002; FSA 2005, OECD 2005, Elliehausen et al. 2007).

The last group of questions measures behavioural aspects that influence individual decision-making. The reason why we introduced these questions in the questionnaire is that in recent years there have been a growing number of studies in the field of behavioural economics suggesting that individual financial choices are influenced not only by socio-demographic and economic variables, but also by psychological factors, which may induce individuals to behave in a way that conflicts with traditional notions of economic rationality (Meier and Sprenger 2007, Zermatten et al. 2005, Franken et al. 2008, Strack et al. 2006). Among others, one of the main aspects that influences household decision-making is that individuals tend to systematically overvalue immediate costs and benefits and undervalue those in the future; in other words, their preferences are not time-consistent, as vice-versa posited by traditional economic models, and they give greater importance to present events as compared to those in the future (Franken et al., 2008; Rachlin and Jones, 2008; Strack et al., 2006). In the field

of psychology this concept is linked to impulsivity (Wittmann and Paulus, 2008, Martin and Potts, 2009; Potts et al., 2006).

### *3.2 Descriptive statistics*

We start our analysis with some simple descriptive statistics of our sample (Appendix A).

Sampled households are for the most part made up of individuals who are married (68.9%) or living together (6.1%), whilst respondents who are separated account for 5.1% and divorced for 3.8%; unmarried or widow(er)s therefore make up 17.5% of the sample. Roughly 60% of households have children; young couples without children and older couples without children represent, respectively, 5.4% and 10.7% of the sample.

The distribution of households on the basis of the professional status of the head reveals that around 30% of individuals interviewed were not active in the labour market. Roughly 40% of household heads interviewed are employees, of which 7.6% are in non-permanent employment (e.g. temporary contracts, project, term or maternity leave replacement, or apprenticeship or training solutions) and 3.4% are presumed to be in irregular labour i.e., those who declare that their current terms of employment are “regulated by a verbal agreement”. The self-employed make up around 25% of the total. On the basis of the size of real and financial assets, respondents were classified into four wealth groups: mass market: 58%; middle market: 22.4%; mass affluent: 15.1%; affluent: 6.6% [4]. As far as debt is concerned, 41.3% of households have no debt liabilities, whilst 31% have secured debt (mortgages) and 45% have unsecured debt (consumer credit).

As regards general conditions of economic and financial difficulty, 50% of respondents said that in the current situation they had some problems in “getting to the end of the month” and only just managed to make ends meet. More serious difficulties are experienced by 15% of respondents who, as a result had to use savings, and 6.1 % said that they had “a lot of problems” and had to ask for help or borrow. Only 2.8% reported a financial condition that allowed them to make ends meet without any difficulty, that allowing them to save quite a bit.

Difficulties are manifest in the fact that 20% of household heads are unable to cope with a substantial unexpected payment (the figure cited was 700 euros), 50% would have difficulty, whilst the remaining 28% i.e., those in conditions of economic comfort, would have no problems.

Conditions of economic and financial difficulties also emerged from problems in covering the cost of food (14.9% of respondents), essential clothing (24.9%), utilities such as gas and electricity (25.4%), house expenses (26.6%), rent or mortgage payments (26.6%), loan repayments (30.5%)[5]. In summary, around 40% of respondents stated that they had found themselves at least once in one of the conditions of difficulty mentioned above. Whilst 12.8% of those interviewed reported having problems in meeting commitments in one of the areas, figures for individuals experiencing multiple problems decreased according to the number of problems faced, with a range which goes from 8.5% for those experiencing two problems to 1.4% for those having difficulties with all six.

Payment arrears on a raft of household commitments is also evidence of problems in making ends meet: 61.9% of respondents declared being behind on gas and electricity bills, 74.6% had payment arrears relating to house expenses, 56.2% were behind on the rent, whilst 31.7% and 43.2% had past due positions on mortgages and loans, respectively.

Another indicator of financial well-being/fragility is a decision to go without specialised medical care: 28.4% of household heads stated that they had done so for economic reasons, whilst a significant 8.5% preferred not to reply.

In regard to adverse events causing an unexpected fall in income or rise in expenses, 21.2% said this was due to cuts in working times, with a further 12% stating redundancy as the cause. Other adverse events with significant shares were caring for the elderly (8.2%) and having been involved in accidents (6.9%). Other events in decreasing order were death and invalidity, theft, burglary or mugging, separation, etc.

The critical importance of financial literacy emerges from the replies given to questions expressed in extremely clear and simple terms relating to interest computation, assessment of the impact of inflation on purchasing power, the impact of changes in market interest rates on mortgage conditions, and the effects of stock market conditions on an investment share portfolio. On average, more than 20% declared that they were

not able to answer, with 7% of these being unable to solve correctly a simple question regarding the impact of inflation on purchasing power and the impact of changes on the stock market on financial wealth, and 11% being unable to answer correctly a test on the impact interest-rate changes will have on different types of mortgages.

Finally, analysis of our sample shows considerable differences between individuals' behavioural attitudes, therefore supporting at a first glance the idea that such attitudes may be determinants of household fragility or well-being. Particular attention was placed on behavioural traits indicative of impulsiveness, which induce individuals to evaluate incorrectly and underestimate the future consequences of spending or indebtedness decisions taken today. These elements are captured by various questions contained in the questionnaire. For example, 16% of individuals interviewed said that they had limited self-control; similarly, as regards strategies adopted to handle future uncertainties, although a substantial majority of the sample said that they "preferred to make sacrifices to have fewer worries tomorrow" (63%), a smaller but not insignificant proportion admitted to be "worried about the future but not prepared to make sacrifices today" (21.1%) and "live day-by-day with risks this involves for the future" (15.9%). Consistent with these figures, most respondents saw themselves in the face of risks as "cautious" (55.4%) or "someone who takes on risks only after being properly informed" (30.8%); however, 4% of individuals regarded themselves as "a true gambler" thereby strongly inclined to take risks.

#### **4. The financial vulnerability index**

In order to analyse jointly the different features of household financial distress, we propose an indicator of financial vulnerability. Such indicator reflects the overall vulnerability of a household, resulting from the overlap of different components: expenditure vulnerability, income and saving vulnerability, commercial and financial loan commitments vulnerability.

In Table 1 we identify those variables that specifically address household financial vulnerability. Some of these variables are self-reported, specifically the question Q18 "Is your household's monthly income enough for you to get through the month?" [6]

and the question Q21: “Are you able to cope with an unexpected expense of 700 euros today?” [7]. Although we argue that those variables are an important source of information on the well-being of households, we are aware that this type of self-reported attitudinal indicator is difficult to interpret as different people may have different attitudes to the same economic circumstances (8). Consequently, to build our financial vulnerability indicator we add more “objective” and comprehensive (albeit, still likely to be self-reported) measures of financial difficulties.

This can benefit the analysis not only for the issue of bias in the subjective perception of financial insecurity, but also because, by adding different profiles of financial distress, we can measure the extent of household vulnerability, as explained later in this section. Specifically, we consider whether application for bank credit was turned down (Q12); we also consider whether over the last twelve months the household had problems even once in shopping for food, buying essential clothing, paying utility bills, rent, or paying off loans or mortgages (Q22) and whether such difficulties turned into objective real problems in the form of late or non-payment (Q23). We finally consider the decision to go without specialised medical care (Q24).

*Table 1. Financial vulnerability variables*

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Q12. Over the last twelve months have you or a member of your household applied to a bank or finance company for loan but this application was turned down? [loan\_rejection]

- Yes (=1)
- No (=0)

Q18. Your household’s monthly income currently allows you to get to the end of the month: [ends\_meet]

- Very easily, I manage to save a fair amount (=0)
- Easily, I manage to save something (=0.25)
- With some difficulty, I only just manage to make ends meet (=0.50)
- With difficulty, I have to withdraw from savings(=0.75)
- With great difficulty, I have to borrow(=1)

Q21. Would your household be able to cope with an unexpected expense of 700 euros today? [unexp\_expenses]

- Yes, very easily (=0)
- Yes, easily (=0.25)
- Yes, but with some problems(=0.50)
- Yes, but with great difficulty (=0.75)
- No (=1)

Q22. Over the last twelve months has your household had problems even once : [difficulties]

1. shopping for food (yes=1; no=0)
  2. buying essential clothing (yes=1; no=0)
  3. paying gas, electricity, phone bills, etc. (yes=1; no=0)
  4. paying condominium administration charges(yes=1; no=0)
  5. paying the rent (yes=1; no=0)
  6. paying the mortgage on your home (yes=1; no=0)
  7. paying off loans (other than a mortgage if you have one) for the purchase of cars, televisions, computers, etc. (yes=1; no=0)
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- Q23. In particular, have you got behind in paying: [arrears]
1. gas, electricity, phone bills, etc. (yes=1; no=0)
  2. condominium administration charges (yes=1; no=0)
  3. rent (yes=1; no=0)
  4. paying the mortgage on your home (yes=1; no=0)
  5. paying off loans (other than a mortgage if you have one) for the purchase of cars, televisions, computers, etc (yes=1; no=0)
- Q24. Over the last twelve months have you or any member of your household had to, even once, go without specialised medical care for economic reasons? [medical care]
- Yes(=1)
  - No (=0)
- 

Managing all these aspects of financial distress can represent a problem from a statistical point of view. In order to reduce and compact the dimensionality of the problem, we have used a Principal Component Analysis (PCA). The aim is to check for a reduced number of appropriate combinations of the original variables that summarize the households vulnerability from different points of view. Qualitative replies were converted into quantitative data by assigning each one with a vulnerability score (in brackets, Table 1).

*Table 2. Principal Component analysis*

Component	Eigenvalue	Explained Variability (%)		Cumulative (%)		
Comp1	3.188	53.1		53.1		
Comp2	0.953	15.9		69.0		
Comp3	0.673	11.2		80.3		
Comp4	0.603	10.0		90.3		
Comp5	0.379	6.3		96.7		
Comp6	0.200	3.3		100		
Principal components (eigenvectors)						
Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
Loan rejection	0.2113	0.8844	0.3245	0.2595	0.0038	0.0242
Ends meet	0.4285	-0.2176	0.4771	-0.2151	0.7036	0.0084
Unexp expenses	0.4280	-0.2629	0.4865	-0.0655	-0.6938	0.1592
Difficulties	0.4958	0.0692	-0.3182	-0.1674	-0.1067	-0.7802
Arrears	0.4427	0.1828	-0.5188	-0.3898	0.0125	0.5910
Medical care	0.3830	-0.2515	-0.2448	0.8379	0.1097	0.1262

In Table 2 we present the results of the Principal Component Analysis. In the upper part of the table we report the eigenvalues associated to each component, the percentage of variability explained by each component, and the associated cumulative percentage in the last column. It emerges that the first factor explains more than 50% of the phenomenon while all the others seem to play a less relevant role. In the lower part of the table, instead, we report the eigenvectors associated to each eigenvalue. The first vector, which is associated to the more relevant component, indicates that all the variables taken into account for the construction of the indicator of financial vulnerability – with the exception of the one relating to access to credit (loan rejection) – have substantially the same statistical importance. The second component, instead, presents a remarkable value for the loan rejection variable, while relatively lower weights for the others. All the other components are more complicated in terms of an economic interpretation, and, in any case, jointly explain a limited quantity of variability. In terms of interpretation, we explain the first component as an indicator of financial vulnerability, and, interestingly, all the variables, apart from loan rejection, seem to be important with the same magnitude. The PCA analysis thus, provides a clear message indicating that the broad and complex phenomenon of households' financial vulnerability cannot be confined to a single variable that in general in the literature is associated to the financial debt.

Such strong evidence allows us to define the financial vulnerability index as a function of the following factors: congruity of income and monthly expenses (ends meet); capacity to cope with unexpected expenses (unexp expenses); difficulties (difficulties); arrears (arrears); decision to go without specialised medical care (medical care).

Using the factors scores as weights reported in Table 2, we construct a financial vulnerability index for each individual  $i$  as follow:

$$\text{Financial Vulnerability Index} = \sum_{p=1}^n a_p X_{pi}$$

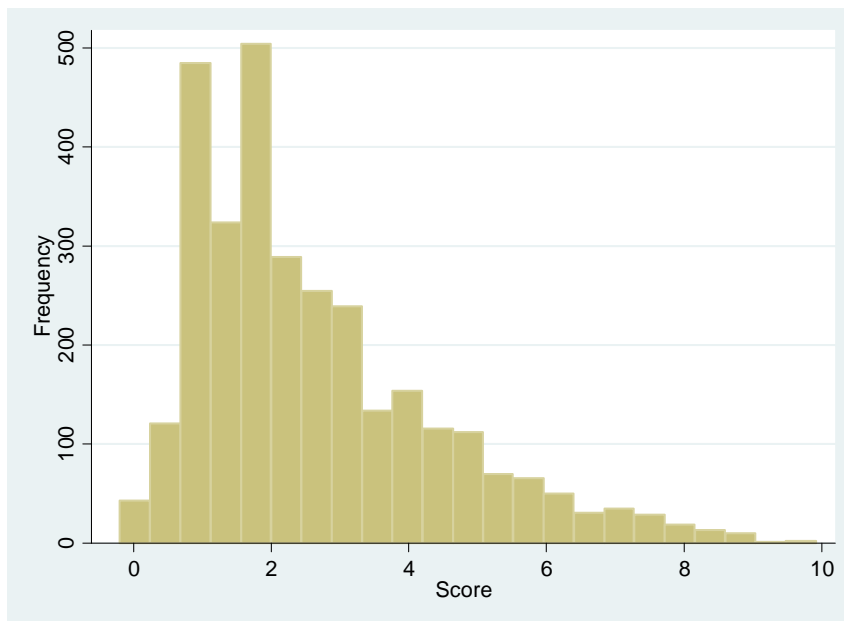
where  $X_{pi}$  is the standardized value for the  $p$ th variable and  $a_p$  is its corresponding factor score. A variable with a higher score is associated with a higher level of financial vulnerability and vice versa. For the sake of convenience and immediacy in the

interpretation, we rescaled the indicator in order to obtain 0 as the starting value (minimum vulnerability). A statistical description of the Financial vulnerability index is provided in Table 3 and Figure 1.

*Table 3. Descriptive statistics of the financial vulnerability index*

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std Dev</b>	<b>Median</b>	<b>Min</b>	<b>Max</b>
Vulnerability index	3,102	2.60	1.78	2.09	0	9.5

*Figure 1. Frequency distribution of the financial vulnerability index*





As is clear from Figure 1, the distribution of the index is asymmetrical, with a reduced frequency for very low values, a clustering around average vulnerability levels and a progressively decreasing frequency for higher vulnerability levels.

It is worth noting that only around zero can the index be considered an indicator of economic and financial well-being: in fact, an analysis of the data shows that only those households with an index below 0.9 – corresponding to 6% of the sample – are able to make ends meet or face up to an unexpected expense easily or very easily and do not have problems in covering expenses and paying bills. Vice versa, the rest of the sample presents elements of vulnerability, which are rapidly growing; e.g. at the median index value (2.09) the corresponding high percentages of households that have some problems getting to the end of the month (59%) or even those that find it difficult or very difficult (31%). In addition, 5% of households with a median index are in no way capable of facing an unexpected expense, whilst more than 60% would be able to bear the cost but would find it difficult.

## 5. On the determinants of household financial vulnerability

In this section we investigate the determinants of the financial vulnerability index. We use a linear regression model where the vulnerability index is the dependent variable and the structure of the regressors can be seen as:

$$FVI_i = \beta_0 + \beta_1'FD_i + \beta_2'FL_i + \beta_3'BE_i + \beta_4'IS_i + \beta_5'O_i + \varepsilon_i$$

where  $FD_i$  indicates a set of variables aimed at describing the effects of financial debt on the vulnerability of  $i$ -th household; equivalently,  $FL_i$  measures the impact of financial literacy,  $BE_i$  refers to behavioural variables,  $IS_i$  accounts for income and negative shocks affecting the households, while  $O_i$  contains all the other variables included in order to model all the other aspects of the vulnerability that are not of direct interest in the paper. The  $\beta$ 's are the related coefficient and  $\varepsilon_i$  is the residual term. All the estimates are performed by OLS with standard errors robust to heteroskedasticity.

We propose different specifications in order to check for the robustness of the results, and to verify whether the inclusion/exclusion of some regressors alters the magnitude and significance of the other effects. All the results are reported in Table 4.

First set of independent variables are typically used in the analysis of financial distress (Del Rio and Young 2008, Duygan and Grant 2006, Bridges and Disney 2004). In order to measure in which way the debt impacts the financial vulnerability, we include the level of debt servicing, that is the ratio between debt instalment payments to income, on a monthly basis. Such indicator, which is available in our database, is more meaningful than the debt to income ratio normally used for household level analysis, since it highlights the amount of income that is left for expenditure and/or saving after the repayment of debt instalments. Following Del Rio and Young (2008), we also include separately the logarithm of the household monthly income, so as not to restrict income to affect the reporting of debt problems only through the debt servicing to income ratio: it is expected that those with higher income would be less likely to consider debt to be a problem for a given level of the debt servicing to income ratio. Among the other information included in the model, we consider a dummy variable indicating whether the household owns their home or are renting, as well as the household real and financial wealth. Demographic factors and other characteristics of the household, such as the number of children, the age, the education and the marital status of the household head, have also been included. Given the remarkable cultural and economic differences among the Italian macro-regions, we include macro-regional dummies in order to account for these geographical effects.

Similar to Duygan and Grant (2006), we then include in the regression the effect of adverse shocks, since it is likely that unexpected changes in income affect household financial vulnerability. Specifically, we include two dummies: a) job loss and b) other adverse events (illness, death, invalidity, etc.).

We finally include two other variables which are available in our dataset and that we argue have an effect on financial vulnerability: the level of financial literacy and a behavioural trait, i.e. impulsivity.

As far as financial literacy, we use a dummy equal to 1 if the household is able to answer at least three out of four questions used by Bank of Italy in the 2008 Survey on Income and Wealth and introduced in our questionnaire. As explained, we argue that the

level of financial literacy – which is different from the level of education, normally included in survey analysis - may affect vulnerability, since it is likely that individuals that have higher level of financial literacy are better able to manage their money and to take appropriate investment and indebtedness decisions, thus reducing the probability of incurring arrears or financial distress.

Impulsivity is included among explanatory variables since, as has already been explained in Section 2, in literature there is evidence that behavioural attitudes can influence individuals' consumption, investment and indebtedness decisions and, in turn, their degree of financial vulnerability. Specifically, according to Franken et al. (2008) and Zermatten et al. (2005) there is a link between impulsivity and impaired decision-making since highly impulsive individuals are biased towards immediate rewards during option evaluation and are less sensitive to the negative consequences of their choice. Such a link, for example, may induce individuals, in the moment they have to decide whether to purchase on credit terms or not, to opt for immediate purchase, despite the fact that the individual is rationally able to judge that the level of debt taken on is unsustainable in comparison to future income receipts (Meier and Sprenger, 2007; Siemens, 2007; Ottaviani and Vandone 2010).

The results of the estimation procedures in Table 4 show that, even when controlled for traditional demographic variables, there is clear evidence that an increase in the debt servicing to income ratio raises household financial vulnerability.

While the outstanding aggregate stock of unsecured debt of the household sector, mainly in the form of credit cards and personal loans, is small compared to secured debt, it is possible that unsecured debt is held by individuals not able to borrow elsewhere because they have either exhausted their mortgage capacity or are considered high risk (Del Rio and Young, 2006). Thus, we interact the debt servicing ratio with a dummy equal to one if the household holds unsecured debt. The result of the interaction is significant and positive. One possible explanation is that while secured debt decisions last for a long time and well follow the life-cycle, consumer credit may be inconsistent with the optimising behaviour of intertemporal consumption and may instead be associated, at least for some categories of borrowers and/or in some local contexts, with the increased inadequacy of the financial and economic positions of indebted

households, which renders them vulnerable to possible adverse evolution of their income.

Income and wealth do matter as well: having financial and real assets reduces financial vulnerability, so do higher levels of monthly income.

Amongst the socio-demographic determinants, married status plays a significant role in impacting vulnerability levels. More specifically, being separated or, to a lesser extent, divorced raises the level of financial vulnerability. Having children, taking into account the number of income earner, also increases the vulnerability of the household, while a higher level of education helps to increase the well-being of individuals.

Geographic area of residence is also an important factor since living in the south of the country increases financial vulnerability; financial vulnerability also increases for people living on rental. The impact of external shocks on vulnerability levels is significant too, and the result holds both for adverse events related to job loss and to other adverse events. Job loss or other negative events, generally associated with unexpected income loss and/or higher expenses, induce fragility and increase the level of financial vulnerability.

The empirical analysis highlights the positive role of financial literacy in reducing household vulnerability. Indeed, financial literacy can positively impact vulnerability in at least three ways. Firstly, financial literacy seeks to improve an individuals' capacity to understand financial information, raise awareness about the risks and consequences of their investment and borrowing decisions. Secondly, financial education also sets out to limit the negative impact that unexpected events can have on household finances. Increased financial knowledge in fact helps individuals to manage their finances more effectively and put into place, for instance, and where possible according to the level of the household income, savings or insurance solutions designed to safeguards their financial future. Thirdly, financial education targets behaviour patterns due to inability, irresponsibility or short-sightedness that lead individuals into impaired decision-making and money management.

Finally, results show that impulsivity positively influences vulnerability. In other words, the more impulsive individuals are, the more this will increase their degree of financial vulnerability, as impulsive individuals will pay less attention to the consequences of their financial and spending decisions. This result is in line with findings in the field of

behavioural economics and psychology, which suggests a link between impulsivity and impaired decision making (Franken et al. 2008, Zermatten et al. 2005). Household debt decisions, in particular consumer credit decisions, may also be influenced by impulsivity traits, considering that impulsivity is associated with a decreased reflection on the consequences of our own choices. Thus, we interact impulsivity with a dummy which is equal to 1 if the household holds unsecured debt. The result is significant and positive, that is unsecured debt holding is not itself a cause of vulnerability, but it may become a determinant for impulsive individuals, who are pushed to choose “buy now, pay later” solutions that bring immediate gratification at a future cost, without being fully aware off the sustainability of debt taken on.

*Table 4 . Estimation results for different specifications (dependent variable: financial vulnerability index)*

	1	2	3	4	5
Debt service to income (log)	0.059***	0.054***	0.054***	0.034***	0.034***
Unsecured debt (dummy)				0.300***	0.183**
inter_debt_unsec				0.079***	0.080***
inter_imp_debt					0.061*
Financial literacy			-0.061**	-0.059**	-0.060**
Impulsivity			0.152***	0.147***	0.110**
Job loss		0.424***	0.423***	0.415***	0.415***
Other shock		0.315***	0.314***	0.312***	0.310***
Wealth (log)	-0.357***	-0.341***	-0.329***	-0.335***	-0.334***
Income (log)	-0.420***	-0.372***	-0.362***	-0.340***	-0.341***
Single	-0.070	-0.009	-0.004	0.012	0.011
Widow	-0.132*	-0.133**	-0.128*	-0.120*	-0.121*
Separate	0.115**	0.122***	0.127***	0.133***	0.138***
Divorced	0.086	0.106*	0.109*	0.118**	0.123**

Children number	0.103***	0.103***	0.106***	0.104***	0.103***
Age	0.001	0.002	0.002	0.002	0.002
Years of education	-0.017***	-0.015***	-0.014***	-0.013***	-0.013***
Home ownership	0.061	0.078	0.083	0.093	0.096
Home rent	0.348***	0.332***	0.333***	0.326***	0.326***
North-West	-0.055	-0.049	-0.049	-0.043	-0.045
North-East	0.048	0.045	0.042	0.047	0.045
South	0.088**	0.098**	0.096**	0.094**	0.094**
Constant	4.227***	3.590***	3.492***	3.153***	3.163***
Observations	2,689	2,689	2,689	2,689	2,689
R-squared	0.313	0.359	0.363	0.369	0.370

Robust standard errors - \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Omitted categories: married, low impulsivity, centre

## 6. Conclusions

The analysis developed in this paper sought to investigate the financial instability of households according to socio-economic characteristics at the individual level, using survey data. The novelty of this work is the creation of an indicator of financial vulnerability aimed at synthesizing different profiles of household financial instability. We then analysed the determinants of the financial vulnerability index at a household level, with a specific focus on financial debt.

Empirical estimates show quite interesting results. We note that, in a scale between 0 (minimum vulnerability) and 9.5 (maximum vulnerability), the median value of the financial vulnerability index is 2.09. For this level of the index, households already exhibit some important symptoms of financial vulnerability: 59% just manage to make ends meet and 31% have to withdraw from saving since monthly income does not last until the end of the month. Moreover, 5% of households are in no way capable of facing

an unexpected expense. For higher levels of the financial vulnerability index, the situation is worsening up to the extent that households are in arrears on utility payments, rent, financial debt and are no able to afford specialised medical care.

One possible direction to be explored is the application of the vulnerability index to different countries, in order to exploit cross-country differences and to highlight differences in national institutions, e.g. local financial and judicial systems. Another interesting area for future research might be the appointment of a panel sample, so as to monitor

changes in the distribution of the index and / or socio-economic characteristics of families that show higher levels of profitability.

As far as the determinants of the financial vulnerability index is concerned, as expected, a mix of factors is relevant in determining household financial vulnerability. Among those results, there are three factors that, in our opinion, need to be pointed out. First, even controlling for demographic characteristics, the empirical analysis highlights that household debt servicing, i.e. debt instalment payments to income ratio, is one of the most relevant determinant of household vulnerability. The interaction with unsecured debt shows that the effect of debt on vulnerability is even stronger when a household holds consumer credit. Although borrowing certainly gives individuals the possibility of improving lifestyles by smoothing consumption over their life time, there are also concerns that parts of the outstanding debt are held by the economically and socially weakest members of society, which may find themselves in a situation of over-indebtedness and, in turn, financial vulnerability. This risk of over-indebtedness should be carefully addressed by policy makers and governments, for the social and economic repercussions that it can have for society as a whole, in order to identify which policies should be adopted to prevent the phenomenon and contain ex post its effect.

Second, impulsive individuals are more liable to experience financial vulnerability. Although this result needs further analyses with more sophisticated psychological instruments, what is relevant is that it is in line with findings in the field of behavioural economics that underline how emotions may influence household decision-making and deflect individuals from the “rational choice” model of standard economic theories. In particular, it is more likely that impulsive individuals, all things being equal, adopt impatient, short-sighted behaviour patterns which make it difficult for them to be fully

aware of the consequences of their spending decisions, money management and sustainability of personal debt. In relation to this last point, the interaction between impulsivity and unsecured debt confirms the relevance of impulsivity on consumer credit decisions; unsecured debt decisions may be determined by short term benefits and decision-making is more influenced by behavioural patterns such as impatience, materialism and satisfaction, which may lead the individual to buy on credit terms to achieve immediate gratification without necessarily being fully aware of the sustainability of the debt. Some credit products, e.g. credit cards, facilitate impulse purchase; the impatience behind sudden consumption choices can later lead to vulnerability.

Third, financial literacy reduces household vulnerability, since it is likely that it increases individuals' ability to manage money and risk, and to take appropriate saving and indebtedness decisions. This evidence is relevant for policy makers who are increasingly engaged in the development of financial vulnerability programs that motivate positive change, although it is clear that such programs should be monitored periodically for their effectiveness.



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## Endnotes

[1] The response rate was 78% and compares favourably with other similar Surveys: e.g., in the last wave of the Bank of Italy Survey on Household Income and Wealth the response rate was 56%.

[2] A full copy of the questionnaire is available from authors on request. Where possible, we aligned the questions with those in the Bank of Italy Survey on Household Income and Wealth and in the ISTAT Survey on Living Conditions and Income Distribution, in order to allow comparisons with them.

[3] The questions in the SHIW 2008 were D34, D35, D36 and D37.

[4] Our finding is in line with GFK-Eurisko's Financial Survey of households (*Multifinanziaria Retail Market*) that, in 2009, reported that 55% of Italian households belonged to the main market segment, 27.4% middle market, 12.8% mass affluent and 4% affluent.

[5] The last three figures refer to those having had to face these costs.

[6] This question is contained in the Italian Survey of Household Income and Wealth (SHIW), in the British Household Panel Survey (BHPS) and in the Spanish Survey of Household Finances and is used by Del Rio and Young (2005) as self-indicator of financial fragility.

[7] This question is contained in ISTAT Survey on Living Conditions and Income Distribution, and the figure is updated on a yearly basis.

[8] For example, studies in the field of psychology report that it is likely that respondents who are depressed or anxious may perceive a given set of financial circumstances in a different light from individuals who are not depressed or anxious (Hatcher 1994. See also Bridges and Disney (2010) for a discussion on the issue of bias in on the adoption of self-reported or "objective" measure.