

Università degli Studi di Genova
DEP Working Papers Series
16126 Genova – via vivaldi 5 – Fax +39 010 209 5223



The role of financial position on consumer indebtedness. An empirical analysis in Italy

Barbara Cavalletti, Corrado Lagazio, Daniela Vandone, Elena Lagomarsino

wp n. 8
September 2012

“DEP Working Papers Series”
(formerly Istituto di Finanza and Disefin series)
series of economic working papers
published online by

Research Doctorate in
Public Economics
Ph.D School in New technologies and Social Sciences
University of Genoa

Founder:
Amedeo Fossati

Editor-in-Chief:
Marcello Montefiori

Editorial Board:
Paul De Grawe
Francesco Figari
Amedeo Fossati
Luca Gandullia
Eric Gaspérini
Rosella Levaggi
Carla Marchese
Andrea Monticini
Carlo Perroni

Web site:
<http://www.dep.unige.it/>

The role of financial position on consumer indebtedness. An empirical analysis in Italy

Barbara Cavalletti	Corrado Lagazio	Daniela Vandone	Elena Lagomarsino
University of Genoa, Italy	University of Genoa, Italy	University of Genoa, Italy	University of Genoa, Italy

Abstract

The paper focuses on the consumer credit market in Italy and on the related risk of over-indebtedness. Using survey panel data, we investigate the impact of over-indebtedness on consumption behaviour, evaluating in particular if consumer credit is used to cover gaps in income and if this is associated with an increased and diffused inadequacy of financial and economic conditions of indebted households. Results highlight that a relatively consistent part of consumer credit is concentrated in the hands of financially fragile individuals. Moreover, when considering the amount of debt measured in relative terms, being in a difficult financial position adds 1.0 percentage points to the risk of over-indebtedness compared to households without any financial and economic difficulty

Keywords: *household indebtedness, consumer credit, over-indebtedness, permanent income hypothesis*

Jel Classification: *C21, D12, D14, D91, G21*

1. Introduction

The recent financial and economic crisis has been characterized by one of the most significant decreases in GDP, in Europe as in the USA, which demonstrates to be very slow in recovering. This is due, among other things, to unsatisfactory trends in private consumption which highlights a worsening in the economic and financial situation of households. A growing number of families declare problems in making ends meet, are unable to face unexpected expenses, have arrears in paying utility bills or rent, and have problems in paying off loans. Such worsening trends are set in a context of median net wealth and household income contraction in real terms.

In Italy the financial and economic crisis has been associated with an increasing indebtedness of households: the proportion of households with debt has increased, while the number of loans undergoing repayment problems is growing; these patterns are particularly strong for consumer credit. A remarkable development on this specific market is that the range of products supplied has greatly enlarged over recent years and there has been an expansionary trend in non-specific purchase-targeted consumer credit products; these loans are not linked to specific purchases (i.e. revolving credit cards, salary loans) but are suitable to finance everyday consumption needs (Istat 2011, Banca d'Italia 2011). This tendency seems to show that households indebtedness in consumer credit does not face the purchase of investment goods but rather seems to be associated with the prevailing of liquidity shortage for daily needs.

Based on these considerations, one can argue that the growth of consumer credit may be associated with an increased and diffused inadequacy of financial and economic position of indebted households, which renders them vulnerable to possible adverse evolution of their income. This may drive to the consequence that an increasing quantity of consumer credit is taken on by high risk borrowers, with possible repercussion in terms of over-indebtedness.

Economic household characteristics and features of the local markets are key elements of the potential risk associated with the growth of the consumer credit. In this line, the aim of this paper is to examine how the attitudes towards consumer credit are related to households financial and economic positions and other socio-economic characteristics, evaluating, in particular, if debt holding is associated to the occurrence of financial fragility at the individual level and if this varies by household characteristics and geographic region.

Empirical estimates are based on individual data taken from the Survey of Household Income and Wealth (SHIW) carried out periodically by the Banca d'Italia and use a probit model of participation in the credit market. Our specific feature consist in extracting from the SHIW a specific regressor (labelled "Economic Position"), which refer to general economic conditions at the individual level and capture the ability/inability of making ends meet. Thus we define as "financially fragile" those households that report economic and financial difficulties to face the monthly outlay and to balance their budget, as they appear to be more exposed to possible future risks of over-indebtedness as a consequence of negative economic trends and drops in their income¹.

¹ The definition and measurement of financial fragility is still an open issue. Some authors relate financial fragility with the inability to repay financial debt (Jappelli et al. 2008, Betti et al. 2007); other authors relate it with the inability to engage in basic social activities such as meals with family and friends or arrears in paying utility bills (Worthington 2006); other studies extend this definition to situations of inability to face the monthly outlay and to balance the budget (Anderloni et al. 2011, McCarthy 2011, Lusardi 2011). Similarly, the measurement of financial fragility is itself an issue, although most studies proxy financial fragility with self-reported answers to questions related to the ability to make ends meet and generally available on household surveys.

We focus first on empirical determinants of participation in the consumer credit market in order to assess the role of the financial fragility at the individual level (as captured by the explanatory variable above on consumer borrowing). A positive association between debt and the occurrence of a difficult economic position of the household would indicate that consumer credit is diffused among high risk borrowers, which increases *per se* the risk associated with the growth of the market.

Second, we analyse the possible existence of a relationship between financial fragility at the individual level and the geographical area of residence (North, Centre, South and Islands) and the consequence of this interaction on consumer credit demand. Geography may be relevant in Italy as local discrepancies could both indicate different socio-economic and behavioural situations and entail specific features of credit supply which are not explicitly described by the variables in the SHIW.

Third, we investigate the correlation between individual household's characteristics and risk of over-indebtedness. To the extent to which consumer credit may be related to the occurrence of financial problems, we might expect that its greater diffusion raises the risk of over-indebtedness. No specific studies on this issue exist for the Italian market.

We use the ratio between consumer credit and current income as an indicator of financial distress and concentrate the analysis on the characteristics of those households whose ratio is above the conventional level of 0.5, beyond which the existence of financial fragility can be assumed. The limit is sample-based, because it corresponds approximately to the 90th percentile of the sample ratio distribution. In this way, we do not need to define an objective measure of over-indebtedness, an open problem in the relevant literature, because financial distress at the individual level is measured in relative terms.

The role of financial fragility, as captured by the explanatory variable above, in explaining the probability of the consumer credit-income ratio exceeding the limit is then investigated.

Results show first that financial fragility at the individual level increases the probability of being indebted on the consumer credit market. The result in itself highlights that a relatively consistent part of consumer credit is concentrated in the hands of financially fragile households.

The influence of geography onto the probability of participating in the consumer credit market is not particularly evident. For households in the North and in the Centre, the geographical area of residence exerts a positive influence on the probability of incurring debt and increases when moving from the North to the Centre by about 2.4%. Moreover, being in a difficult economic position significantly increases the probability of being indebted and marginal effects are of about the same magnitude in the three areas (2.3% in the North, 3.0% in the Centre and 2.1% in the South) with the highest value in the Centre. This result seems to be driven by the demand side, as credit demand may be induced by the need to plug gaps in situations of economic difficulties.

Finally, being in a difficult financial and economic position adds 1.0 percentage points to the risk of over-indebtedness (i.e. to the probability of being above the 90th percentile of households with any debt) compared to households without any financial and economic difficulty.

The paper is organised as follows. Section 2 reviews some of the main contributions of theoretical and empirical studies on the subject. Section 3 illustrates the estimation procedure and describes the data-base and the variables used to the purpose of our analysis and Section 4 develops the results of the econometric analysis. Section 5 draws some concluding remarks.

2. Literature review

The credit market has been investigated on both the demand and the supply side in an increasing number of theoretical and empirical studies. Some recent contributions in applied studies use microdata from surveys on households² to focus on specific topics such as the determinants of participation in the credit market and the size of households debts (for Italy, Magri 2007; for the United Kingdom, Leece 2000, Del Rio and Young 2005a and numerous studies for the US including Cox and Jappelli 1993, Duca and Rosenthal 1993, Grop, Sholtz and White 1997), cross-country differences (Crook and Hochguertel 2005, Crook 2006), the existence of liquidity constraints (Cox and Jappelli 1993, Cannari and Ferri 1997, Fabbri and Padula 2004, Guiso, Jappelli and Terlizzese 1994, Zeldes 1989, Mayfield 1989), the risk of over-indebtedness and financial distress due to the rapid expansion of the credit market in general and of consumer credit in particular (Del Rio and Young 2005b).

The purposes of these analyses are manifold. A specific goal is to investigate how individual characteristics can affect the structure and the evolution of the market. The implications concern both the policy approach to sector regulation and the possible consequences on market policies by lenders, for example to set up and calibrate credit scoring procedures and to assess the risk connected with specific financial policies.

In this line, some studies focus on the determinants of participation in the credit market and the amount borrowed. Other studies use the same approach to investigate the existence of liquidity constraints and analyse the effects produced on the amount borrowed, on the type of purchases financed and on the allocation of the household portfolio.

² The Survey of Consumer Finances (SCF) for the United States, the Survey of Household Income and Wealth for Italy and the British Household Panel Survey (BHPS) for the United Kingdom.

A recent study by Del Rio and Young (2005a) focuses on unsecured debt in the UK. Using the BHPS³ data from 1995 to 2000 the authors concentrate on the determinants of participation in the market and the amount borrowed in order to determine any relations with the economic, financial and subjective characteristics of the borrowers. The results show that the determinants explaining participation in the market are the same as those explaining the amount borrowed and that the growth in the spread of unsecured debt and in the amount borrowed is explained by the increase in household income in the period considered. On this basis, consumer credit proves to be more sensitive to temporary income variations than other forms of borrowing and this is consistent with its technical characteristics and with the characteristics of the purchases financed with it. However, there is no evidence that the growth in unsecured debt is concentrated in specific household categories. Indeed, it would seem to be a generalised phenomenon concerning all individuals who have a positive probability of having debt.

The only application to Italy of a similar approach for the assessment of the individual characteristics of household indebtedness is the study by Magri (2007)⁴. Based on data taken from the SHIW for the years 1989, 1991, 1993, 1995 and 1998 the author focuses both on the determinants of consumer credit and on the amount of desired debt. As for the former, Magri discriminates between secured and unsecured debt and reports some interesting results for the purpose of our analysis. Firstly, the effect of income is positive and significant for consumer credit, while it is much less

³ British Household Panel Survey.

⁴ Studies applied to Italy, in relation to participation in the credit market, have used different approaches, such as consumption attitudes (Jappelli and Pagano 1988, Jappelli and Pagano 1989; Guiso, Jappelli and Terlizzese 1994). Other studies have focused, for Italy, on estimates of the probability of being liquidity-constrained by finance companies (Cannari and Ferri 1997, Fabbri and Padula 2001).

important for mortgages. Furthermore, the latter are sensitive to net wealth⁵, which has a positive and significant effect only on the probability of participation in the mortgage market. Lastly, net wealth is significant and positive for mortgages, and significant but negative for consumer credit⁶.

Overall, Magri's results are consistent with the interpretations deriving from the study of Del Rio and Young for the United Kingdom. Unlike other forms of borrowing (mainly mortgages), consumer credit appears to be more sensitive to variations in current income than suggested by the theory. This, moreover, is consistent with the requirements needed to empirically verify that households borrow in order to finance current consumption (Cox and Jappelli 1993).

Furthermore, since no evidence currently suggests that the risk level connected with the expansion of consumer credit increases, a plausible interpretation of the trend in progress is that it has been to a large extent driven by the expansion of income and that this has acted in the same direction on both the supply and the demand side.

In this kind of analysis however, the distinction between secured and unsecured debt is difficult to capture empirically because consumers tend to move from one market to another according to relative cost, which substantially depends on the interest rates applied and on the resources and liquidity constraints that operate both on

⁵ Captured by the level of education.

⁶ Cox and Jappelli (1993) find that the effect of current income on the probability of debt is positive, but only marginally significant. Fabbri and Padula (2004) find that the effect is positive, while Leece (2000), who focuses on secured markets, finds that income is not significant. The level of education positively influences the demand for credit for Grant (2003) and for Fabbri and Padula (2004), while it is not significant in Cox and Jappelli (1993). As regards net wealth, on the other hand, Leece (2000) finds that for mortgages the effect is positive; also for Fabbri and Padula (2004) the effect of wealth on the probability of borrowing is significant, while for Cox and Jappelli (1993) it is not significant.

the supply and demand side. There may therefore be situations in which secured and unsecured debt move in opposite directions in response to changes in circumstances. For example, more restrictive policies on mortgages, with a strengthening in the liquidity constraints, could induce an expansion in consumer credit. The same could occur as a consequence of auto-selection processes resulting from constraints on the available resources due to changes in the financial, economic and personal situation of the household.

The existence of restrictions on the possibility of borrowing leads to a corresponding restriction on the possibility of realising optimal consumption plans. However, the ways and the extent to which liquidity constraints reflect on the current budget constraint and on consumption are not unambiguous (Jappelli 1990).

On the whole, two specific issues emerge. First, there are groups, like young consumers or low-wealth households, who are liquidity constrained on the credit market more than other agents (Cox and Jappelli 1993, Zeldes 1989). Second, credit rationing applies mainly to purchases of durables, such as houses (Zeldes, 1989, Mayfield 1989). This leads to the conclusion that an adverse selection may exist according to which agents who are liquidity constrained on the secured market are then unconstrained on the unsecured market. In this situation even low-income households can borrow considerably with possible consequences on the risk of over-indebtedness.

A recent analysis on financial distress was performed by Del Rio and Young (2005b) for the UK market using the BHPS for the years 1995-2000. The authors use a self-reported indicator of financial distress and analyse the probability of households who hold unsecured debt reporting problems with repayment. The 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.

3. Data and empirical models

The Survey of Household Income and Wealth is conducted every two years by the Banca d'Italia and collects information on social, demographic and economic characteristics of a representative sample of Italian households.

For our intents we use the waves covering the years 2002, 2004, 2006, 2008 and 2010 and construct a panel data including those households who have been interviewed at least twice in the whole period, that is 3,604 households in the period 2002-2004; 3,957 in the period 2004-2006; 4,345 in the period 2006-2008 and 4,621 in the period 2008-2010. The number of households who have been interviewed in every single wave in the whole period is 1,834 as it can be seen in Table 1.

The dependent variable is based on a question in which households are requested to indicate whether and to what extent they borrow money from banks or finance companies to purchase for personal consumption: a) real goods (such as jewellery, gold, etc.), b) motor vehicles, c) furniture, electrical household appliances or similar and, lastly, d) non-durable goods (holidays, furs, etc.). The percentage of households who declare to have a debt for consumer credit ranges from 11.2% in 2002 to 13.1% in 2008, with an average amount that varies from a minimum of 6,515 euros in 2002 to a peak of 8,037 euros in 2008.

The empirical model estimates how the probability of observing an increase of consumer credit debt between two consecutive

waves varies according to individual characteristics and socio-economic context as follows:

$$\text{Model 1} \quad P[(D_{t+1} - D_t) > 0] = \Phi(\beta'X_t)$$

where D_t represents the level of indebtedness for consumer credit related to the period t , D_{t+1} the same level but related to the period $t+1$, Φ is the distribution function of standard normal random variable, β includes the effects of determinants both on the demand side and on the supply side (that are not separately identifiable) and, finally, the set X_t includes the factors that determine the participation to the consumer credit market.

A further important aspect consists in assessing the characteristics of the most indebted households, in order to identify some determinants of over-indebtedness. No specific studies on this issue exist for the Italian market. However, related studies in this line of research have focused on identifying the determinants of financial distress and probability of default. Debt-income ratio turns out to be the main indicator in empirical analyses. Del Rio and Young (2005b) show a positive association between debt-income ratio and repayment difficulties. Rinaldi and Sanchis-Arellano (2006) focus on the correlation between debt-income ratio and repayments arrears. Bridges and Disney (2006) point out low income as the main determinant of over-indebtedness and default. May et al. (2004) find that debt problems are concentrated among renters, who are consistently more likely to report problems servicing their unsecured debt than homeowners.

We concentrate on the ratio between consumer credit and current income of indebted households and we first analyse the distribution of its value within each single wave and observe that this is highly

stable among them⁷. Then we focus on the 10% of the most indebted households which are characterized by a ratio higher than 0.5. This means that for the 10% of the most indebted households, the debt for consumer credit amounts to at least 50% of their current income. It is worth noticing that this can be considered a rather high level of indebtedness, in particular when considering the specific type of debt and of purchases financed.

We model the probability of over-indebtedness as follows⁸:

$$\text{Model 2} \quad P[R_t > 0.5] = \Phi(\alpha'X_{t-1})$$

where R_t indicates the debt/income ratio⁹.

The models include different explanatory variables commonly used in applied literature to analyse the determinants of consumer credit on both the demand and supply side.

Our specific feature consists in extracting from SHIW one additional explanatory variable in order to capture households' financial fragility, that is the *Economic position* which refers to the general economic condition at the individual level.

The *Economic position* reports the subjective perception of the adequacy of household income with respect to the monthly outlay. Every wave since 2002 of the SHIW has contained the following question "is your household's disposable income enough for you to get through the month?" Suggested answers are: "with great deal of

⁷ For the wave 2010 the distribution is shifted towards significantly higher values of the ratio.

⁸ Since the model can be estimated only on those subjects who hold positive consumer credit, in the absence of corrections the estimates of the parameters are biased. For this reason, the parameters α were estimated using Heckman's selection equation method, adapted to the case of a binary response variable (Heckman 1979, Greene 2007).

difficulty, with difficulty, not easily, fairly easily, easily, very easily”. To the purpose of our analysis, households who declare to get through the month not easily, with difficulty and with great difficulty are labelled as “financial fragile” in their subjective perception.

The surveys available do not include a specific question that identifies an objective measure of the household finance. Only in the wave 2004 a specific question (c29) ascertains the ability to balance the family budget without incurring debts and without withdrawing from savings. Based on this single wave 2004, we evaluated the association between the subjective measure of the economic position and the objective measure of the household finance, that turned out to be very high (Table 2).

Household economic position is used in the model to analyse possible situations of over-indebtedness in consumer credit: a positive correlation between financial fragility and consumer credit indicates that consumer credit is diffused among financially fragile borrowers, which increases *per se* the probability of over-indebtedness.

Table 3 synthesizes the social, demographic and economic characteristics of the panel concerning the variables used. All the variables considered are categorical, either because of their nature (educational qualifications, professional status, geographical area of residence, bank or post office current account, credit card, economic situation) or because they were coded so as to identify any nonlinearities in relation to the probability of having debt. In particular, with regards to age we used the same categories as those used by the Banca d’Italia; the number of income earners was represented by separating the households with one single earner from those with more than one; three quartiles were used as a cut-offs for current income and net wealth.

4. Empirical results

Model 1 refers to the probability of increasing debt in the consumer credit market and results are presented in Table 4. In this model we include a particular variable labelled *Year* which refers to the period considered and captures the effects of the general macroeconomic trend.

Among the results, the one related to financial fragility is the most interesting one: the variable *Economic position* is significant and has a positive sign. This means that the probability of increasing consumer credit debt rises for financially fragile borrowers. The marginal effect, 2.4 percentage points, is not negligible. The results in itself highlights that a relatively consistent part of consumer credit is concentrated in the hands of financially fragile individuals. The positive correlation between consumer credit and financial fragility supports the idea that consumer credit may be used to plug the gap in case of economic difficulties, i.e. in order to deal with inadequateness of resources and to make the ends meet.

In accordance with the theoretical life cycle model of consumption, the *Age of the head* is significant and has the predicted sign, i.e. the probability of increasing consumer credit debt is higher for younger individuals and drops as age increases. Furthermore, this variable is the one that most influences the probability of having unsecured debts: for individuals under the age of 30, the probability of having consumer credit debts increases by approximately 10 percentage points compared to individuals older than 65.

The *Education of the head* is not significant. This result is in line with those reported by Cannari and Ferri (1997) and Magri (2002). In line with Magri (2002), our result might indicate that consumer credit is not fully consistent with the lifecycle and the interpretation of the PIH, in accordance with other results which emerge in our study. On the other hand, this result may indicate that the decision to borrow may also be affected by variables which are market and country specific and which are not explicitly considered in our

model. This may explain the difference in our results compared to Del Rio and Young (2005a), who analyse the English market.

The *Net wealth* variable is significant and the sign is negative, i.e. the probability of having unsecured debts increases as wealth diminishes. In the PIH this result is consistent with determinants on the demand side, i.e. the higher levels of wealth allow individuals to cope more independently with consumption needs. The wealth and the probability of increasing consumer credit debt, then, are inversely correlated and the effect of rationing has no influence on this type of variable. Looking at the marginal effects, the probability of having unsecured debt drops by 1.9% moving from the first quartile (wealth below 30,000 euros) to the fourth quartile (wealth above 262,000 euros) of net wealth.

The *Current income* has a positive sign: this means that the probability of rising debt increases as income increase. A possible interpretation is that determinants acting on the supply side of the market prevail: as income increases, liquidity constraints reduce and individuals are less rationed. This effect might, then, be amplified on the demand side. In particular, for low and medium income levels the marginal propensity to consume is relatively higher and the increase in income and consumption may drive the increase in the demand for debt. As regards the marginal effects, if we compare 25% of the poorest (income up to 16,000 euros) with the 25% of the wealthiest individuals (income above 36,000 euros), the probability of increasing consumer credit increases by 3.4%.

Among those variables which capture the effect of income stability, the *Work status* is significant and has a negative sign: the risk of increasing debt rises for employees compared to other work categories with an average marginal effect of 2.6 percentage points. The *Number of income earners* is significant but with a positive sign, i.e. if there is more than one wage-earner in the family, the probability of having unsecured debt is higher. The increase in marginal effects is remarkable moving from one to three income

earners as it measures approximately 2.5 percentage points. We can conclude that being unemployed reduces the probability of debt as employees are the less rationed individuals and, in the same way, an increase in the number of income earners makes households more creditworthy in the eyes of banks and finance companies.

The *Geographical area* of residence indicates that people in the Centre are significantly more indebted than in the North. Quite surprisingly however, the influence of geography onto the probability of participating in the consumer credit market is not statistically relevant for the South, as we might expect economically fragile households to be relatively more concentrated in that area. For a better understanding of the interactions between consumer credit, economic fragility and geographical area of residence, Table 5 reports the estimates of Model 1, separately for each geographical area. Financially fragile households are more likely to incur debt, as being in a difficult economic position significantly increases the probability of being indebted in all the three areas. Moreover, marginal effects are of about the same magnitude (2.3% in the North, 3.0% in the Centre and 2.1% in the South) with the highest value in the Centre. The overall interpretation of the results seems to drive to the conclusion that the relatively high magnitude of the effect for the Centre is driven by the demand side, as credit demand may be induced by the need to plug gaps in situations of economic difficulties. If the supply effect prevailed, the weakness of the economic context should reasonably imply a lower participation due to the credit rationing by banks and finance companies. The same considerations explains, symmetrically, the results for the South area. The presence of a relatively higher consumer rationing seems to be supported by the sign and the magnitude of the marginal effect due to the presence of *Mortgages* both in Table 4 and Table 5. The positive sign means that the existence of an already established relationship of trust between lender and borrower has a greater impact than the actual riskiness of the latter. Moreover,

looking at the marginal effects in Table 5 we can note that the size is almost doubled for the centre and the South compared to the North.

Turning to Table 4, *Bank or post office current account* and *Credit cards* are both significant and positive. On the demand side, having a current account indicates the existence of a relationship and facilitates access to the consumer credit market, while a credit card may be itself a credit instrument. On the supply side, holding a current account with a bank or a post office reduces information asymmetries for the purpose of creditworthiness assessment and favours cross-selling strategies by lenders.

Access to *Informal credit* has a considerable effect. Grant and Padula (2006), analysing consumer credit in Italia for 1995-1999, find a positive effect due to the fact that households who hold loans from friends and family are both more confident in applying for credit and consider possible non repayment less problematic.

Table 6 presents the estimation results of Model 2 that is specifically devoted to investigate the risk of over-indebtedness according to individual households characteristics.

Unlike the previous estimates, we consider the amount of debt instead of the probability of incurring new debt and construct an indicator of over-indebtedness based on the ratio between consumer credit and current income. We concentrate the analysis on the characteristics of those households whose ratio is particularly high compared to the rest of the sample. This level is conventionally fixed at 0.5, because about 90% of the sample shows a ratio below that level. If financially fragile households have a significantly higher probability to be above that level (i.e. they have a relatively higher debt/income ratio compared to the rest of the sample) we can argue that consumer credit is concentrated in the hands of borrowers particularly exposed to the risk of over-indebtedness.

Estimates in Table 4 report the probability of the consumer credit/income ratio exceeding the limit above.

As a general remark, we can note that the number of significant variables is slightly reduced compared to Model 1 and the size of the marginal effects is relatively smaller, because estimated probabilities are smaller too.

The most remarkable result is that the variable *Economic position* is significant and has a positive effect, confirming that the risk of over-indebtedness increases for financially fragile households. The marginal effect is about 1%, which is in the same order of magnitude of the other significant effects.

As expected, the variables connected with the theoretical life cycle model of consumption exert the same influence on over-indebtedness as in Model 1: the *Age of the head* indicates that the probability of over-indebtedness is higher for young people while *Net wealth* is significant with a negative sign.

On the contrary, the variables that capture the stability of income are less significant than in Model 1. This result indicates that these regressors mainly concern the access to credit and the probability of incurring debt rather than the risk of over-indebtedness.

The variables which capture possible channels for easier access to credit on both the demand and the supply side are all positive and significant as in Model 1. *Mortgages*, however, have a negative sign. In Model 1 the existence of a consolidated relationship between the bank and the consumer implies a lower rationing on the consumer credit market and, consequently, an increase in the probability of incurring debt. However, those who possess a mortgage and decide to borrow on the consumer credit market, don't exceed the 50 % of the ratio consumer credit/disposable income. The most reasonable explanation is that these borrowers have a relatively low risk profile, as they have been already allowed on the mortgage credit market.

When considering the sole indebted households, the risk of exceeding the limit of over-indebtedness is higher when moving from the North to the Centre and to the South. On the whole, the influ-

ence of the *Geographical area* of residence onto the probability of over-indebtedness is coherent with the result of Model 1; that is households in the South are less indebted than in the North and in the Centre, due to a higher credit rationing; however, those who have debt for consumer credit are more likely to exceed the 50 % of the ratio consumer credit/disposable income, due the weakness of the economic context and due to the likely higher financial fragility. Marginal effects however are the lowest..

Finally, the variable *Year* is significant and has a positive effect in connection with the beginning of the economic crisis. Moving from 2002-2004 to 2008-2010, the risk of over-indebtedness increases by about 1%, *ceteris paribus*. This is mainly due to the shift of the debt-income ratio distribution towards higher values ,observed in the wave 2010, and enforces the main argument of the paper, that is that the growth of consumer credit may be associated with an higher incidence of a difficult financial and economic position of indebted households.

5. Conclusions

The analysis developed in this paper sought to investigate households' financial behaviour according to socio-economic characteristics at the individual level, using panel survey data. The goal is to evaluate the empirical determinants of participation in the consumer credit market and the related risk of over-indebtedness. To date, the empirical distribution of the risk of over-indebtedness has so far not been investigated for Italy, while it is attracting a growing interest in applied studies. The paper investigates the impact of over-indebtedness on consumption behaviour, evaluating in particular if consumer credit is used to cover gaps in liquidity and if this is associated with an increased and diffused inadequacy of financial and economic position of indebted households. Financial fragility, linked to the occurrence of economic and financial problems, has

been captured by a specific explanatory variable, extracted from the SHIW, labelled *Economic position* that reports the subjective perception of the adequacy of household income respect to the monthly outlay. Although the surveys do not include an objective measure of the household finance for the whole period considered, when this is available (the wave 2004), it shows a strong association with the subjective measure of the economic position we used in the estimates.

The most interesting result is that being in a difficult financial position adds about 2.39 percentage points to the risk of having debt, compared to households without any financial and economic difficulty. The result in itself supports the idea that consumer credit may be used to plug the gap in situations of economic troubles and highlights that a relatively consistent part of consumer credit is concentrated in the hands of financially fragile individuals.

Moreover, when considering the indebted households, the financial fragility plays a significant role on the risk of exceeding the limit of over-indebtedness, that we based on the ratio between consumer credit and current income and fixed at the level 50%.

Furthermore, financial fragility increases the probability of being indebted regardless of the geographical area of residence. Households in the Centre are significantly more indebted than in the North, although when considering the sole indebted households, the risk of exceeding the limit of over-indebtedness is higher when moving from the North to the Centre and the South.

The statistically significant association between specific household characteristics, temporary financial difficulties and probability of over-indebtedness and default contributes new discussion issues on the matter.

A first insight is that consumer credit is relatively difficult to interpret within the PIH. In particular, correlation between current income and consumer credit induces the conclusion that liquidity constraints exist. In addition, we also observe a positive correlation

between consumer credit holding and financial fragility. This may be due, among other things, to the fact that consumer credit enables the access to credit to households that on other market segments (i.e. mortgages) would instead be rationed. Hence the relationship between credit holding and financial fragility may lead to the conclusion that consumer credit is used to cover gaps in income in situations of financial and economic difficulties. Moreover, the positive correlation between financial fragility and consumer credit and the higher frequency of financially fragile households within the low-income quartiles suggest that the effects of income distribution on the distribution of consumer debt should be further investigated as there might be problems of making ends meet.

These considerations are consistent with that shown by Hayashi (1985) and Jappelli (1991) in relation to the financial behaviour of households with negative savings and converge on the conclusion that in the presence of financial fragility, as well as in the presence of negative savings, the PIH model is scarcely able to interpret the households financial behaviour. These two situations are indeed not much dissimilar when considering the way we financial fragility, that is as an increased and diffused inadequacy of financial and economic position of indebted households, which renders them vulnerable to possible adverse evolution of their income. In the presence of financial fragility, however, the sensitivity of consumer to current income offers a more complex relationship than the mere presence of liquidity constraints in what it suggests a misuse of the financial instrument of consumer credit, with possible repercussion on the risk of over-indebtedness.

Both the considerations discussed above indicate additional directions for future research in order to ascertain if and how individual characteristics of borrowers have changed and to explain which individual characteristics can lead to over-indebtedness.

References

- Anderloni L., Bacchiocchi E. Vandone D., (2012) "Household financial vulnerability: an empirical analysis," *Research in Economics*, in press.
- Banca d'Italia. (2011) Annual Report.
- Barro Robert J. (1974) "Are Government Bonds Net Wealth", *Journal of Political Economy*, 82, 1095-1118.
- Betti, Gianni Dourmashkin Neil Rossi Mariacristina Yin Ya Ping, (2007). "Consumer over-indebtedness in the EU: measurement and characteristics," *Journal of Economic Studies*, Emerald Group Publishing, vol. 34(2), pages 136-156, May.
- Bridges, Sarah, Richard Disney e Andrew Henley. (2006) "Housing wealth and the accumulation of financial debt: evidence from the UK households". In *The economics of consumer credit*, edited by Giuseppe Bertola, Richard Disney and Charles Grant, pp. 135-180. Cambridge, MA: MIT Press.
- Cannari Luigi e Giovanni Ferri. (1997) "Determinanti e andamento ciclico dei vincoli di liquidità per le famiglie italiane". In *Ricerche quantitative per la politica economica*, pp. 491-522. Rome: Banca d'Italia.
- Casolaro, Luca Leonardo Gambacorta e Luigi Guiso. (2006) "Regulation, formal and informal enforcement and the development of the household loan market. Lesson from Italy". In *The economics of consumer credit*, edited by Giuseppe Bertola, Richard Disney and Charles Grant, pp. 93-134. Cambridge, MA: MIT Press.
- Cavalletti, Barbara C. Lagazio, D. Vandone (2011), "Credito al consumo e fragilità finanziaria". *Economia dei servizi*, vol. VI, P. 79-94.
- Cox, Don e Tullio Jappelli. (1993) "The effect of borrowing constraints on consumer liabilities". *Journal of Money, Credit and Banking*, 25, 197-213.

- Crook, J., Hochguertel, S. (2005). "Household debt and credit constraints: Evidence from OECD Countries". Working Paper Series No 05/02.
- Crook, Jonathan N. Stefan Hochguertel. (2007) "US and European household debt and credit constraints". Tinbergen Institute Discussion Paper No. 2007-087/3.
- Crook, Jonathan N. (2006) "Household Debt Demand and Supply". In *The economics of consumer credit*, edited by Giuseppe Bertola, Richard Disney and Charles Grant, pp. 63-92. Cambridge, MA: MIT Press.
- Crook, Jonathan N., David B. Edelman e Lyn C. Thomas. (2007) "Recent developments in consumer credit risk assessment". *European Journal of Operational Research*, 183, 1447-1465.
- Del Rio Ana e Garry Young. (2006) "The Determinants of Unsecured Borrowing: Evidence from the British Household Panel Survey". *Applied financial economics*, 15, 1119-1144.
- Del Rio Ana, e Garry Young (2008) "The Impact of Unsecured Debt on Financial Pressure Among British Households". *Applied financial economics*, 18, 1209-1220
- Duca, John V. e Stuart S. Rosenthal. (1993) "Borrowing constraints, household debt and racial discrimination in loan markets". *Journal of Financial Intermediation*, 3, 77-103.
- Fabbri, Daniela & Mario Padula (2001) "Judicial Costs and Household Debt". CSEF Working Papers 65, Centre for Studies in Economics and Finance (CSEF).
- Fabbri, Daniela e Mario Padula. (2004) "Does poor legal enforcement make households credit-constrained". *Journal of Banking and Finance*, 28, 2369-2397.
- Grant, Charles e Mario Padula. (2006) "Informal credit markets, judicial costs and consumer credit: evidence from firm level data". CSEF – Centre for Studies in Economics and Finance Working Paper n.155.

- Grant, Charles. (2007) "Estimating credit constraints among US households". *Oxford Economic Papers*, 59, 583–605.
- Greene, William H. (2007) *Econometric analysis*. VI ed., Prentice Hall.
- Gropp, Reint, John K. Scholz e Michelle J. White. (1997) "Personal bankruptcy and credit supply and demand". *Quarterly Journal of Economics*, 112, 217-252.
- Guiso, Luigi, Tullio Jappelli e Daniele Terlizzese. (1994) "Why is Italy's saving rate so high?". In *Saving and the accumulation of wealth*, edited by Albert Ando, Luigi Guiso and Ignazio Visco, pp. 23-69. Cambridge: Cambridge University Press.
- Jappelli, Tullio e Marco Pagano. (1988) "Liquidity-Constrained Households in an Italian Cross-Section," CEPR Discussion Papers 257, C.E.P.R. Discussion Papers.
- Jappelli, Tullio e Marco Pagano. (1989) "Aggregate Consumption and Capital Market Imperfections: An International Comparison". *American Economic Review*, 79, 1088-1105.
- Jappelli, Tullio. (1990) "Who is credit constrained in the US economy". *Quarterly Journal of Economics*, 105, 219–234.
- Jappelli, Tullio e Marco Pagano. (2002) "Information Sharing, Lending, and Defaults: Cross-country Evidence". *Journal of Banking and Finance*, 26, 2017–2045.
- Tullio Jappelli, Tullio Marco Pagano Marco di Maggio,(2008). "Households' Indebtedness and Financial Fragility," CSEF Working Papers 208.
- Hall, Robert E. (1978) "Stochastic implications of the life cycle – permanent income hypothesis: theory and evidence". *Journal of Political Economy*, 86, 971-987.
- Hayashi, Fumio. (1985) "The effects of liquidity constraints on consumption: a cross-sectional analysis". *Quarterly Journal of Economics*, 100, 183-206.
- Heckman, James. (1979) "Sample selection bias as a specification error". *Econometrica*, 47, 153-161.

- Hubbard Glenn R. e Kenneth L. Judd. (1986). "Liquidity constraints, fiscal policy, and consumption". *Brookings Papers on Economic Activity*, 1986(1), 1-50.
- King, Mervyn A. e Jonathan I. Leape. (1998) "Wealth and portfolio composition: Theory and evidence". *Journal of Public Economics*, 69, 155-193.
- Istat (2011), Annual Report.
- Leece, David. (2000) "Choice of mortgage instrument, liquidity constraints and the demand for housing debt in the UK". *Applied Economics*, 32, 1121-1132.
- Lusardi, Annamaria Schneider Daniel J. Tufano Peter (2011) "Financially fragile households: evidences and implications". NBER Working Paper No. 17072
- McCarthy, Yvonne (2011) "Behavioural characteristics and financial distress," Working Paper Series 1303, European Central Bank
- Magri, Silvia. (2002) "Italian households' debt: determinants of demand and supply". Banca D'Italia, Temi di discussione, n. 454.
- Magri, Silvia. (2007) "Italian households' debt: determinant of demand and supply". *Empirical Economics*, 33, 401-426.
- May, O., Tudela, M., Young, G., 2004. British household indebtedness and financial stress: a household-level picture. Bank of England Quarterly Bulletin, 29 Winter 414-428.
- Mayfield Scott E. (1989) "Borrowing constraints under secured loan contracts". *Boston College Working Paper* n. 189.
- Nieto, Fernando. (2007) "The determinants of household credit in Spain". Banco de España Working Papers 0716.
- Rinaldi, Laura e Alicia Sanchis-Arellano. (2006) "Household debt sustainability - What explains household non-performing loans? An empirical analysis". European Central Bank, Working Paper Series, n. 570.

- Worthington, AC (2006) "Debt as a source of financial stress in Australian households", *International Journal of Consumer Studies*, 30(1),2-15.
- Zeldes, Stephen P. (1989) "Consumption and Liquidity Constraints: An Empirical Investigation". *Journal of Political Economy*, 97, 305-46.

Appendix

Table 1: Households interviewed between 2002 and 2010.

Yea	2002	2004	2006	2008	2010
2002	8011	3604	2623	2207	1834
2004		4408	1334	995	786
2006			3811	1143	856
2008				3632	1145
2010					3330
	8011	8012	7768	7977	7951

Table 2: Household finance / Economic position in 2004.

		Household finance		
		Debt	No debt	
Economic position	Difficult	4372	662	5034
	Easy	736	2242	2978
		5108	2904	8012

Table 3: Households social, demographic and economics characteristics.

Year	Freq. 2002- 2004	%	Freq. 2004- 2006	%	Freq. 2006- 2008	%	Freq. 2008- 2020	%
Dependent Variables								
Increase in consumer credit debt								
No	3258	90.40	3578	90.42	3891	89.55	4213	91.17
Yes	346	9.60	379	9.58	454	10.45	408	8.83
Ratio between consumer credit and current income								
Less than 50%	3513	97.47	3848	97.24	4208	96.84	4471	96.75
More than 50%	91	2.53	109	2.74	137	3.16	150	3.25
Explanatory Variables								
Age of the head								
Up to 30	101	2.80	117	2.96%	115	2.65%	109	2.36
31 to 40	461	12.79	469	11.85	486	11.19	480	10.39
41 to 50	719	19.95	761	19.23	840	19.33	903	19.54
51 to 65	1191	33.05	1311	33.13	1408	32.41	1466	31.72
Older than 65 (ref.)	1131	31.38	1299	32.83	1496	34.43	1663	35.99
Education of the head								
Elementary school	1315	36.49	1366	34.52	1402	32.27	1409	30.49
Middle school	1164	32.30	1334	33.71	1499	34.50	1634	35.36
High school	806	22.36	936	23.65	1064	24.49	1124	24.32
University degree	319	8.85%	321	8.11%	80	1.84%	454	9.82
Household net wealth								
Up to 30.170	873	24.22	876	22.14	1009	23.22	1041	22.53
30.170-138.000	1064	29.52	1019	25.75	893	20.55	846	18.31
138.000-262.000	889	24.67	1006	25.42	1072	24.67	1226	26.53
More than 262.000	778	21.59	1056	26.69	1371	31.55	1580	34.19
Household current income								
Up to 15.822	931	25.83	918	23.20	850	19.56	834	18.05
15.822-24.200	818	22.70	959	24.24	1062	24.44	1085	23.48
24.200-37.225	959	26.61	1018	25.73	1139	26.21	1258	27.22
More than 37.225	896	24.86	1062	26.84	1294	29.78	1444	31.25
Work status								
Employee	1165	22.84	1264	31.94	1476	33.97	1544	33.41
Self-employed	398	7.80%	414	10.46	423	9.74%	438	9.48
Not employed	2041	40.02	2280	57.62	2446	56.29	2639	57.11
Number of income earners								

1 earner	1546	42.90	1769	44.71	1947	44.81	2121	45.90
2 earners	1522	42.23	1656	41.85	1855	42.69	1985	42.96
More than 2 earners	536	14.87	532	13.44	543	12.50	515	11.14
Residence ownership								
No	1008	27.97	1079	27.27	1193	27.46	1246	26.96
Yes	2596	72.03	2878	72.73	3152	72.54	3375	73.04
Mortgages								
No	3227	89.54	3504	88.55	3891	89.55	4111	88.96
Yes	377	10.46	453	11.45	454	10.45	510	11.04
Geographical area								
North	1667	46.25	1770	44.73	2037	46.88	2117	45.81
Centre	786	21.81	832	21.03	872	20.07	877	18.98
South	1151	31.94	1355	34.24	1436	33.05	1627	35.21

Robust standard errors in parenthesis

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5 Model 1 – Probability of participation in the consumer credit market with respect to Geographical area. Marginal effects.

Geographical area	North			Centre			South		
	Mar g. ef	Stan d. er		Mar g. ef	Stan d. er		Mar g. ef	Sta nd. er	
Age of the head (Ref:									
Up to 30	0.10	(0.0	*	0.14	(0.0	*	0.07	(0.0	*
31 to 40	0.06	(0.0	*	0.08	(0.0	*	0.07	(0.0	*
41 to 50	0.08	(0.0	*	0.05	(0.0	*	0.06	(0.0	*
51 to 65	0.04	(0.0	*	0.05	(0.0	*	0.06	(0.0	*
Education of the head									
Middle school	0.01	(0.0		0.02	(0.0		0.00	(0.0	
High school	0.00	(0.0		0.01	(0.0		-	(0.0	
University degree	-	(0.0		-	(0.0		0.02	(0.0	
Net wealth (Ref=Up to									
30.170-138.000	-	(0.0	*	0.01	(0.0		-	(0.0	
138.000-262.000	-	(0.0	*	-	(0.0		-	(0.0	
More than 262.000	-	(0.0		-	(0.0		-	(0.0	
Current income (Ref=Up									
15.822-24.200	0.01	(0.0		-	(0.0	*	0.02	(0.0	*
24.200-37.225	0.02	(0.0	*	0.01	(0.0	*	0.04	(0.0	*
More than 37.225	0.04	(0.0	*	0.02	(0.0		0.01	(0.0	
Work status									
Self –employed	-	(0.0	*	-	(0.0		-	(0.0	
Not employed	-	(0.0	*	-	(0.0	*	-	(0.0	*
Number of income earn-									
2 earners	0.00	(0.0		0.03	(0.0		0.00	(0.0	
More than 2 earners	0.02	(0.0		0.03	(0.0		0.02	(0.0	
Residence ownership	-	(0.0		-	(0.0		-	(0.0	
Mortgages (Ref=No)	0.03	(0.0	*	0.06	(0.0	*	0.07	(0.0	*

Bank or Post office ac-	0.03	(0.0	*	0.00	(0.0	0.01	(0.0	*
Credit cards (Ref=No)	0.00	(0.0		0.02	(0.0	-	(0.0	
Informal credit (Ref=No)	0.08	(0.0	*	0.06	(0.0	0.05	(0.0	
Economic position	0.02	(0.0	*	0.02	(0.0	0.02	(0.0	*
Year (Ref=2002-2004)								
2004-2006	0.00	(0.0	*	-	(0.0	-	(0.0	
2006-2008	0.02	(0.0		-	(0.0	0.00	(0.0	*
2008-2010	-	(0.0		0.01	(0.0	-	(0.0	*

Robust standard errors in parenthesis

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6 Model 2 – Probability of over-indebtedness. Marginal effects

Variables	Marginal effects	Standard errors	
Age of the head (Ref: Older than 65)			
Up to 30	0.015	(0.004)	**
31 to 40	0.015	(0.003)	**
41 to 50	0.012	(0.003)	**
51 to 65	0.010	(0.002)	**
Education of the head (Ref: Elementary school)			
Middle school	0.002	(0.002)	
High school	-	(0.002)	
University degree	-	(0.003)	
Net wealth (Ref=Up to first quartile)			
30.170-138.000	-	(0.003)	**
138.000-262.000	-	(0.003)	**
More than 262.000	-	(0.004)	**
Work status (Ref=Employee)			
Self –employed	0.010	(0.002)	**
Not employed	0.003	(0.002)	
Number of income earners (Ref=One)			
2 earners	0.000	(0.001)	
More than 2 earners	0.002	(0.002)	
Residence ownership (Ref=No)	0.001	(0.003)	
Mortgages (Ref=No)	-	(0.003)	**
Bank or Post office account (Ref=No)	0.010	(0.002)	**
Credit cards (Ref=No)	0.005	(0.002)	**
Informal credit (Ref=No)	0.009	(0.003)	**

Economic position (Ref=No)	0.010	(0.002)	**
Geo-			
Centre	0.005	(0.002)	**
South	0.006	(0.002)	**
Year (Ref=2002-2004)			
2004-2006	0.004	(0.002)	*
2006-2008	0.004	(0.002)	
2008-2010	0.008	(0.002)	**

Robust standard errors in parenthesis

* significant at 10%; ** significant at 5%; *** significant at 1%

Working Papers recently published

(The complete list of working papers can be found at
<http://www.dep.unige.it>)

- n.7/2012 Barbara Cavalletti, Corrado Lagazio, Riccardo Podestà, "A methodology to estimate the workforce outflows due to retirements in the public sector: the case of the Regione Liguria health system for the period 2012-2025", September 2012
- n.6/2012 Luca Gandullia, "The Role of Direct Taxes in Fiscal Decentralization", ISBN: 978-88-905582, September 2012
- n.5/2012 Rosella Levaggi, Marcello Montefiori, "Predicting Hospital's Costs to Treat Emergency Patient", August 2012
- n.4/2012 Enrico di Bella, Lucia Leporatti, Luca Persico, "The Statistical Analysis of Crime Data at Street Level: Models Comparison", May 2012
- n.3/2012 Rosella Levaggi, Francesco Menoncin, "Paternalistic Goods to Improve Income Distribution: a Political Economy Approach", April 2012
- n.2/2012 Gabriele Cardullo, "Public Sector Wage Bargaining, Unemployment, and Inequality ", February 2012
- n.1/2012 Amedeo Fossati, "The Italian Tradition in Public Finance: an Annotated Bibliography of Mauro Fasiani", January 2012
- n.7/2011 Amedeo Fossati, Marcello Montefiori, "Adverse Selection in Elderly Care", November 2011
- n.6/2011 Paolo Cremonesi, Enrico di Bella, Marcello Montefiori, Luca Persico, "A self-reported work sampling to assess the Emergency Department's costs", October 2011
- n.5/2011 Enrico di Bella, Luca Persico, Matteo Corsi, "A Multi-variate Analysis Of The Space Syntax Output For The Definition Of Strata In Street Security Surveys", September 2011
- n.4/2011 E. Briata, "Marginal tax rates, tax revenues and inequality. Reagan's fiscal policy", July 2011

- n.4/2011 Elena Briata, "Marginal tax rates, tax revenues and inequality. Reagan's fiscal policy", July 2011
- n.3/2011 Francesco Copello, Cristiana Pellicanò, "Esemplificazione della Data Envelopment Analysis per la valutazione di efficienza in una grande azienda ospedaliera universitaria"
- n.2/2011 Stefano Capri, Rosella Levaggi, "Shifting the risk in pricing and reimbursement schemes? A model of risk-sharing agreements for innovative drugs"
- n.1/2011 Cinzia Di Novi, "The Indirect Effect of Fine Particulate Matter on Health through Individuals' Life-style"
- n.4/2010 Angelo Baglioni, Andrea Monticini, "Why does the Interest Rate Decline Over the Day? Evidence from the Liquidity Crisis"
- n.3/2010 Amedeo Fossati: "The double taxation of savings: the Italian debate revisited"
- n.2/2010 Andrea Monticini, David Peel, Giacomo Vaciago: "The impact of ECB and FED announcements on the Euro Interest Rates"
- n.1/2010 Amedeo Fossati: "Vilfredo Pareto and the methodology of the Italian tradition in public finance"