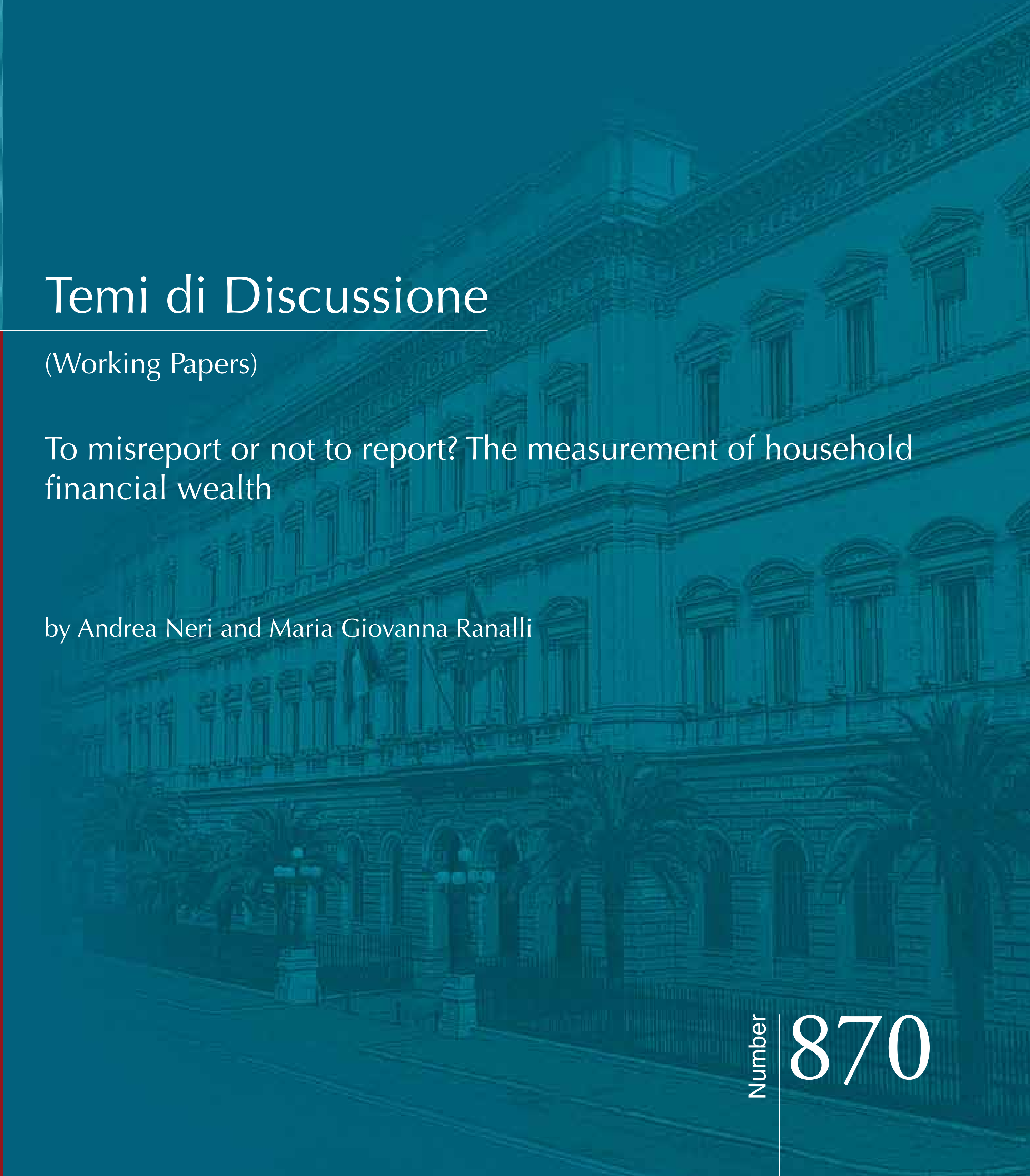
BANCA D'ITALIA

EUROSISTEMA



Temi di Discussione

(Working Papers)

To misreport or not to report? The measurement of household financial wealth

by Andrea Neri and Maria Giovanna Ranalli

July 2012

Number 870

BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working papers)

To misreport or not to report? The measurement of household financial wealth

by Andrea Neri and Maria Giovanna Ranalli

Number 870 - July 2012

TO MISREPORT OR NOT TO REPORT?
THE MEASUREMENT OF HOUSEHOLD FINANCIAL WEALTH

by Andrea Neri[i] and Maria Giovanna Ranalli[ii]

Abstract

The objective of the paper is to adjust for the bias due to unit non-response and measurement error in survey estimates of total household financial wealth. Sample surveys are a useful source of information on household wealth. Yet, survey estimates are affected by non-sampling errors. In particular, in the case of household wealth, unit non-response and measurement error can severely bias the estimates. Using the Italian Survey on Household Income and Wealth (SHIW), we exploit the available auxiliary information in order to assess the magnitude of this bias. We find evidence that for this kind of survey, non-sampling errors are a major issue, possibly more serious than sampling errors. Moreover, in the case of SHIW the potential bias due to measurement error seems to outweigh that induced by non-response.

JEL Classification: C2, C42, D31.
Keywords: unit non-response, measurement error, auxiliary information, subsampling, imputation.

Contents

[i] Economic and Financial Statistics Department, Banca d'Italia, Rome, Italy, andrea.neri@bancaditalia.it
[ii] Department of Economics, Finance and Statistics, University of Perugia, Italy.

1 Introduction[1]

Information on household financial wealth plays an important role in policy analysis. That available from the National Financial Accounts (NFAs) does not usually meet policy makers' needs since it does not allow account to be taken of household heterogeneity. Sample surveys are generally used to fill the gap, since they make it possible to evaluate the impact of shocks, policies and institutional changes on various groups of individuals (European Central Bank, 2009). Yet, the measurement of household financial wealth through sample surveys is a difficult task.

The data we use in this work are from the Survey on Household Income and Wealth (SHIW) conducted by the *Banca d'Italia* (the Italian central bank) every two years. The main objective of the SHIW is to study the economic behaviors of Italian households. The survey is used both for research and for the evaluation of economic policies. Previous studies show that survey estimates usually underestimate the corresponding aggregate figures. Even if national accounts can hardly be considered flawless, the comparison is useful because it highlights some quality issues in the microdata. In general, the main sources of error for this kind of survey are the low propensity of wealthy households to participate in the survey (D'Alessio and Faiella, 2002) and the measurement error that is likely to arise when collecting survey data of this type (Biancotti et al., 2008). These issues are particularly important in the case of financial wealth. First, financial assets and liabilities are highly concentrated in the hands of wealthy households. Second, the increasing complexity of households' financial portfolios increases respondents' difficulty in retrieving correct information.

From a data producer's point of view, it is crucial to study all the potential survey error components in order to allocate the limited financial resources where most needed (Biemer, 2010). The objective of the paper is to quantify the two main sources of error (non-response and measurement error) on the estimator of the components of total household wealth using the auxiliary information available from the SHIW survey. Previous studies have already investigated the issue of measurement error in relation to financial wealth (see for example D'Aurizio *et. al.*, 2006). The main contribution of the paper is to address both non response and measurement error, trying to disentangle the magnitudes of their effects. While the paper does not propose a systematic correction for the SHIW data, the methodology could be implemented to obtain such corrections, whenever external validation samples are available.

The analysis is based on two steps. We first deal with unit non-response. Non-response is considered as a second phase of sampling with unknown probabilities (see e.g. Särndal, Swensson and Wretman, 1992, Ch. 9). To this end, we use individual response propensities estimated using data coming from a survey conducted on a sub-sample of unwilling-to-participate households and from past surveys for panel households (see Little, 1986; Ekholm and Laaksonen, 1991; Kim and Kim, 2007, where estimation is conducted using logistic models). Secondly, we deal with measurement error using a survey of clients of a major Italian commercial bank, with survey data matched to the bank's administrative records. Measurement error is considered as a source of uncertainty modeled using propensities to misreport estimated on the validation sample. These propensities are then used to develop an adjustment process for SHIW asset data.

We find evidence that non-sampling errors are a major issue in the measurement of household wealth through sample surveys, especially compared to sampling errors. For instance, the relative standard

[1] The work of Ranalli is supported by the Research of National Interest Project no. 2007RHFBB3PRIN, awarded by the Italian government to the University of Perugia. The views expressed in the paper are solely those of the authors and do not necessarily correspond to those of the *Banca d'Italia*.

error for total household financial assets and liabilities is some 6.5 percent. After dealing with non-response and measurement error, the adjusted values are some 2.5-4.5 times higher than the initial estimate. Overall, the adjusted mean value of total financial assets is some three times higher than the value declared during the interview. Financial liabilities are affected to a lesser, though still significant, extent: the adjusted value is more than twice the unadjusted one. These results confirm the importance for data producers of finding external validation data with accurate estimates of household financial wealth.

The paper is organized as follows. In Section 2 the sampling design employed for SHIW is discussed. Section 3 describes the proposed methodology for tackling non-response. Different models are developed and considered to estimate response probabilities for panel and non-panel households on the basis of the available auxiliary information. It is shown that non-response is driven by different factors for the two types of households. Section 4 provides details on the models used to estimate misreporting propensities and to obtain imputed values for the variables of interest. Finally, in Section 5 a comparison of the alternative estimators obtained using the aforementioned techniques is provided, together with an appraisal of the role of the auxiliary information employed for non-response and measurement error adjustments on the estimates for the survey in question. Some concluding remarks are also provided on possible further and more general methodological developments suggested by the present application.

2 The sampling design used for the SHIW

The SHIW is a two-stage survey, with municipalities and households as primary and secondary sampling units, respectively. PSUs are stratified by administrative region (NUTS 1 level) and population size (less than 20,000 thousand inhabitants; between 20,000 and 40,000; 40,000 or more). Within each stratum, PSUs are selected to include all those with a population of 40,000 inhabitants or more and those with panel households (self-representing municipalities), while smaller municipalities are selected using probability-proportional-to-size sampling (without replacement). Individual households are then randomly selected from administrative registers.

Up to 1987 the survey was conducted with time-independent samples (cross sections) of households. In order to make it possible to analyze the change in the phenomena under investigation, since 1989 part of the sample has included households interviewed in previous surveys (panel households). The overall sample size for the 2008 edition was 7,977 households, with 4,345 panel households (54.5% of the sample). The rotation scheme for the panel component is as follows: households that have participated for at least two waves are all included in the sample, while the remaining panel households are selected randomly from among those interviewed only in the previous survey. As a result, the longitudinal component of the sample consists of a quite heterogeneous group of households as regards the year of the first interview and the number of waves. For example, of the 4,345 panel households in 2008, 28 had participated since 1987, 146 since 1989, 347 since 1991 and 1,143 came from the 2006 edition.

The questionnaire used in the survey has a modular structure. It is made up of a general part addressing aspects concerning all households and a series of additional sections containing questions that are relevant to specific subsets of households. Data collection is entrusted to a specialized company using about 200 professional interviewers. Substitutions are allowed under a strict protocol. In particular, interviewers have no influence on when a household can be dropped and which household to use as a substitute. Information is collected using the Computer-Assisted Personal Interviewing (CAPI) technique. Interviews last an average of 55 minutes. In addition, interviews are considered valid if they have no missing items on the questions regarding income and wealth. As a result, item non-response is negligible while, as will be seen below, unit non-response is a major issue.

3 Unit non-response

In 2008, 14,209 households were contacted and 7,977 were interviewed (56.1%), while 32.4% refused to cooperate and the remaining 11.5% consisted of non-contacts (see Table 1). Non-response mainly affects non-panel households; in fact 41.1% of such households refused to participate in the survey, while for panel households the percentage fell to 18.5%. To study the factors that drive non-response and try to adjust for non-response bias, we use a two-phase approach: the selected sample is considered as the first phase sample, while the set of respondents is considered as a second phase sample. Each unit in the population has attached a probability of inclusion for such second phase sample, that is a response probability and, therefore, an unknown characteristic.

More formally, given a finite population of N elements $U = \{1,\ldots,k,\ldots,N\}$, the aim is to estimate the vector of totals $\mathbf{t}_y = \sum_U \mathbf{y}_k$, where $\mathbf{y}_k$ is the value of the p-dimensional vector of variables of interest $\boldsymbol{y}$ for the k-th unit. We will use in general the shorthand $\sum_A$ for $\sum_{k\in A}$, with $A \subseteq U$ an arbitrary set. In our application $p = 6$: for each of two types of aggregated financial assets and for financial liabilities we have the number of households possessing the asset (or the liability) and the amount possessed. The two types of aggregated assets are: bonds (government + private bonds) and risky assets (shares + mutual funds + managed savings).

A sample s of size n is drawn from U according to the sampling design $p(s)$ that induces first order inclusion probabilities $\pi_k = P(k \in s)$. Since non-response occurs, the response set r of size n_r is obtained assuming the response mechanism given by the distribution $q(r \mid s)$, with $r \subseteq s$ and $n_r \leq n$. Let $\delta_k = 1$ if unit k responds and zero otherwise. Then, $\theta_k = P(k \in r \mid k \in s) = P(\delta_k = 1)$ is the probability that unit k responds given that it was included in the sample. Since θ_k is considered an individual characteristic defined for all units in the population, $\theta_k = P(k \in r \mid k \in s) = P(k \in r)$. If these probabilities were known, the two-phase estimator

$$\hat{\mathbf{t}}_{y,2} = \sum_r \frac{\mathbf{y}_k}{\pi_k \theta_k}$$

would be unbiased for $\mathbf{t}_y$.

When auxiliary information is available for all units in s, these probabilities can be estimated using response propensities. One of the most common and simple technique for handling non-response is given by constructing response-homogeneity groups: the population (or the sample s) is partitioned into groups such that units belonging to the same group are assumed to have the same response propensity. In the SHIW such propensities are currently estimated for a PSU l by the ratio between the effective number of components in the respondents set m_{lr} and the number of components in the original sample m_{ls}. Therefore, the estimated response propensity for household k is given by $\hat{\theta}_k^S = m_{l(k)r} / m_{l(k)s}$, with $l(k)$ denoting the PSU to which household k belongs to. Then, the estimator of the total is computed as

$$\hat{\mathbf{t}}_{y,\ SHIW} = \sum_r \frac{\mathbf{y}_k}{\pi_k \hat{\theta}_k^S}. \qquad (1)$$

Another common and more flexible approach is to use a logistic model for the response indicator δ_k under the assumption of the classical binomial response model that δ_k is independent of δ_j for $k \neq j$, i.e. $\theta_{kj} = P(k \,\&\, j \in r) = \theta_k \theta_j$ (Little, 1986; Ekholm and Laaksonen, 1991).More in general, the response probability can be assumed to be the inverse of a known link function of an unknown (but estimable) linear combination of model variables (Folsom, 1991; Fuller et al., 1994; Kott, 2006). Asymptotic properties in the case of a logistic link are explored in (Kim and Kim, 2007). This is a reasonable approach here too, because the design foresees the sampling of full households. Note that response homogeneity groups and logistic models provide the same response propensities when the auxiliary variables used in the logistic model are the response group indicator variables.

In this application, two different models and data sources have been employed for panel and non-panel households. In particular, we can partition the original sample *s* (and the respondents set *r*) into two sub-samples given by s_p and s_{np} (and by r_p and r_{np}) corresponding to panel and non-panel households, respectively, so that $s_p \cup s_{np} = s$ (and $r_p \cup r_{np} = r$). Once models have been selected, estimates of θ_k for $k \in r_p$ and $k \in r_{np}$ are obtained and denoted by $\hat{\theta}_k^M$. The estimator of the total is then computed as

$$\hat{\mathbf{t}}_{y,\ NR} = \sum_r \frac{\mathbf{y}_k}{\pi_k \hat{\theta}_k^M}. \qquad (2)$$

3.1 Response model for panel households

To estimate response probabilities for panel households, we exploit the information from the previous interview(s) and use additive logistic regression (Ruppert, Wand and Carrol, 2003).

In general terms, household economic conditions, although included in the model as available auxiliary information, do not appear to have a direct effect on the response propensity once the number of waves the household has been interviewed is taken into account. The only household attributes that have an association with the response rate are the number of members and the place where they live: numerous households and those living in the city center are more likely to continue to participate, while those living in larger municipalities show higher attrition.[2]

For panel households, responding appears to be mainly a matter of trust. In fact, a major determinant of response propensity is the number of waves the household has already been interviewed successfully.[3] Old panel households are more willing to continue to participate. For instance, households who entered the panel

---

[2] Cannari and D'Alessio (1992) found that non-response characterizes households in urban areas and in the North, and that participation rates decline as income rises and household size decreases.

[3] A similar result is found by Giraldo *et al.* (2001). Using the SHIW, the authors show that a key determinant of attrition is the number of waves households have been interviewed. Moreover, they show that after this determinant is taken into account in the weighting process, the level of income inequality changes significantly.

in 2006 have an estimated response probability of about 0.68. This figure jumps to about 0.90 for households that have been in the panel for more than 5 waves. One likely explanation is the establishment of a trust relationship between respondents and the interviewer. Households become progressively aware that there is no risk of a breach of confidentiality. At the same time, their identification with survey aims increases as time passes. In order to preserve this link with respondents, panel households are usually assigned to the same interviewer.

Moreover, a climate judged as "good" by the interviewer at the previous interview is associated with greater household cooperation. Other important variables affecting the response rate are related to the characteristics of the interviewer. Those with a relatively high degree of education, who take larger workloads and have participated in a larger number of editions of the survey have better results. The estimated function of age and coefficients from Table 2 are used to predict response probabilities $\hat{\theta}_k^M$ for all $k \in r_p$, i.e. for the 4,345 interviewed panel households to be used in estimator (2).

As for the effect of the age of the interviewer, it has been modeled using non-parametric regression via p-splines since there was evidence of a more complex relationship than a linear one. Figure 1 shows the shape of the effect of the age of the interviewer on the linear predictor scale. In general, younger interviewers tend to obtain lower response rates. Table 2 shows the coefficients for the other variables found to be significant through model selection from all those available.

3.2 Response model for non-panel households

In 2008, 8,732 non-panel households were contacted and 3,632 (41.6%) were interviewed. About 70% of the 5,100 non-participating households explicitly refused to cooperate, while the remaining 30% was not found at the address.

Modeling the response propensity for non-panel households is a difficult task as, by definition, auxiliary information is not easily available for non-respondents. In the following, three different approaches are examined and the robustness of the results obtained is discussed.

The first approach is based on an *ad hoc* source of auxiliary information. Since 2006, the survey agency has carried out a survey among non-panel households that refuse to participate. It is a telephone survey (CATI technique) run on a sample of non-respondents. This survey is conducted during the fieldwork, while trying to convert refusals. If the attempt is not successful, the interviewers ask whether the household is at least willing to reply to a five minute telephone questionnaire. The survey agency has to contact all the non-participating households. Among non-participating households, only 316 have agreed to the telephone interview, about 6% of the households originally selected but unwilling to participate.

For non-panel households, auxiliary information is not known for each unit in the original sample s_{np}, but only for the respondents r_{np} and a subsample of units of $s_{np} \setminus r_{np}$. Nonetheless, we propose to estimate response probabilities using weighted logistic regression on a dataset made up of the sub-sample of non-respondents and the sample of respondents. In general, (i) non-respondents should be given a weight equal to the inverse of the inclusion probability deriving from the sub-sampling design, while (ii) respondents should be given a weight equal to 1. For the case at hand, since the sub-sample of non-respondents is not a probabilistic sample, a sort of post-stratification is employed in which (i) non-respondents are given a weight whose sum is the total number of non-respondents by geographical area and size of the municipality resulting from the sample register file, while (ii) respondents are given a weight equal to 1 (Laaksonen and

Chambers, 2006, use a similar approach when the variable of interest is observed on a sub-sample of non-respondents – follow-up sample). This approach assumes that sub-sampling is at random and that non-respondents in the sub-sample can be considered similar to the others in the same post-stratum. In Section 5 we discuss whether these assumptions can be considered valid in our case.

Response probabilities are then estimated as a function of a set of variables that are available for both samples using additive logistic regression as for panel households. In particular, we modeled the effect of the age of the head of the household using non-parametric regression via p-splines since there was evidence of a more complex relationship than a linear one. Figure 2 shows the estimated function of age on the linear predictor scale, while Table 3 shows the estimated coefficients for the other variables found to be significant.

The propensity to respond decreases steadily with age until the age of 30 where it stabilizes, after which it decreases again. A slight increase is detected between 65 and 75. The horizontal dotted line shows that households with heads who are 50 or younger are more willing to participate than those with heads who are older than 50. Table 3 shows that response probabilities decrease for households whose head is self-employed, a home owner, a graduate, or retired. In addition, households living in the North or in the Centre of Italy and those with a larger number of members are less willing to participate. By contrast, response propensity increases for households who live in smaller municipalities. Finally, households with two (three ore more) wage earners are less (more) likely to respond than those with only one.

In the response model for panel households, information about the interviewer was found to be significant. For non-panel households, such information is not available. Indeed the interviewers for the CATI survey are different from those running the CAPI survey. The only useful information is that of the workload of the original interviewer measured by the number of households to be interviewed. Those with a larger workload tend to have higher response rates than the others. A likely explanation for this result is that the survey agencies usually allocate a larger number of households to their best interviewers.

Note that no explicit income related items are surveyed on the sub-sample of non-respondents given their refusal to participate in the SHIW. Therefore, there is no information available on this to be incorporated in the response model for non-panel households. Nevertheless, some of the variables found to be significant that are related to the head of the household are usually good predictors of wealthier households (being a graduate, self-employed, a home owner). The estimated function of age and the estimated coefficients are then used to compute estimated response probabilities $\hat{\theta}_k^M$ for all $k \in r_{np}$, i.e. for all the 3,632 non-panel respondents to be used in estimator (2).

A second model used to estimate the non-response propensity of non-panel households is based on the call attempts file where interviewers also collect some paradata information for non-respondents (i.e. nationality, external condition of the dwelling and location of the dwelling. Table 3a shows that response propensity is higher for immigrants, for those living in the South and for houses with poor external condition. It is also higher for households living in city centers, probably because they are easier to reach.

As a robustness check, we estimated a model using difficult respondents as a proxy of non-respondents (a similar approach is used in D'Alessio and Faiella, 2002). Difficult respondents are those who have been interviewed after more than 3 calls on different days and at different hours. The results are shown in Table 3b. They confirm that response propensity is higher among less well-off households. In fact it increases for those living in the South, for those with a low level of education and for those belonging to the lowest wealth classes.

Overall, the model based on the survey of non-respondents provides a better fit than the others. It will therefore be used in the remaining steps. However, we also compute two alternative sets of adjustment weights based on the other models to see their final effect on the estimates (Table 11). All in all, the estimates are fairly in line.

4 Measurement error

Financial assets collected in the SHIW are also likely to be affected by misreporting of the financial tools and amounts by households. Such misreporting may well be malicious, with underreporting being the most likely outcome. However, it can also be done in *bona fides*, given respondents' difficulty in retrieving correct information due to the increased complexity of households' financial portfolios. For these reasons, the value for the variables of interest reported by unit k, which we will denote by $\tilde{\mathbf{y}}_k$, may differ from the true value $\mathbf{y}_k$.

Bias caused by measurement error could be adjusted for by selecting a subsample m of respondents where a more accurate measurement of the study variable(s) is taken (e.g. Lessler and Kalsbeek, 1992). When the sub-sample is selected using a probabilistic sampling design, the framework is another example of two-phase sampling. When non-response is present, as is the case of the SHIW, a three-phase framework arises: $m \subset r \subseteq s$ of dimension $n_m < n_r \leq n$ is selected using the design $p_m(m \mid r, s)$ with conditional inclusion probabilities $\tau_k = P(k \in m \mid k \in r)$. Then, the three phase estimator

$$\hat{\mathbf{t}}_{y,3} = \sum_m \frac{\mathbf{y}_k}{\pi_k \theta_k \tau_k}$$

would be unbiased for $\mathbf{t}_y$. Of course the efficiency of $\hat{\mathbf{t}}_{y,3}$ depends on the dimension of m: a compromise choice can be made according to how expensive it is to retrieve the correct information on units. The unbiased estimator $\hat{\mathbf{t}}_{y,3}$ is constructed using the subsample m alone. Other estimators that make better use of the information on the respondents set r (given by the correlated surrogate variable $\tilde{\mathbf{y}}_k$ and some auxiliary information) can be proposed in a model-assisted framework to improve efficiency, using GREG-type or model-calibration-type estimators (e.g. see the hint in Wu and Luan, 2003, Section 6, in a two-phase framework). However, these extensions are beyond the scope of this paper.

For this survey we have no such data available on a sub-sample of r and the three-phase approach cannot be used as described earlier. However, we have data available from an independent experimental survey carried out by the Bank of Italy and a major Italian banking group on a sample of the latter’s customers. The experiment was carried out in 2003 on a sample of 1,681 households where at least one member was a customer of the banking group. In order to get data comparable with that coming from the SHIW, the questionnaire and the survey design were as close as possible to those used in the most recent edition of the SHIW (2002). Interviews were carried out by the same survey agency using the same interviewers and CAPI technique.

The survey data were then matched with the customer database containing the amount of assets actually held by the individuals selected in the sample. Since these amounts and those declared in the interview referred to the same period (year 2002), they were fully comparable. The two sets of data were then merged by exact record linkage. The resulting dataset will be referred to as our “validation sample”.

Although temporally misaligned, the validation sample allows us to study misreporting behavior and to attempt to extrapolate it to the SHIW sample. This is accomplished in a two-step fashion. In fact, household wealth reporting in surveys is generally a two-stage process involving first the reporting of ownership of assets and liabilities and then the reporting of the amounts owned (Moore et al., 2000). Errors can occur at one or both of the two stages. An entire financial instrument can be either omitted or reported even if it is not actually owned. Alternatively, the ownership may be reported correctly but the amount may be misreported. Even if the respondent has fully understood the question, he/she may fail to retrieve the correct information. Lack of knowledge is the main cause of misreporting. Even if in the SHIW the respondent is selected as the most knowledgeable person in the household, he or she may not know the true situation of all the other components.

In the final stage, after retrieving the requested information, the respondent adopts a response strategy. Deliberate underreporting because of fear of fraud or the tax authorities, is probably the major cause of response error at this stage. Nonetheless, besides deliberate prevarication, there are other possible sources of error, such as those deriving from the interaction between the interviewer and the respondent. For instance, if the respondent belongs to a very rich household, he/she may decide to underreport wealth because of a need for “social conformability” with the interviewer. This could be considered as a special case of the so-called “social desirability bias” (Bagozzi, 1994), namely, the tendency for an individual to present himself in a way that indicates compliance with cultural norms or standards. On the opposite side, over-reporting may arise from a respondent wishing to impress the interviewer.

We consider three types of aggregate financial assets – deposits, bonds and risky assets – and financial liabilities. For each of these four items we therefore have two related variables: possession and amount possessed. For the former, we have in particular two variables defined as follows:

$$y_{pk} = \begin{cases} 1 & \text{if unit } k \textit{ possesses} \text{ financial instrument } p = 1,2,3 \\ 0 & \text{otherwise} \end{cases}$$

and

$$\tilde{y}_{pk} = \begin{cases} 1 & \text{if unit } k \textit{ declares to possesses} \text{ financial instrument } p = 1,2,3 \\ 0 & \text{otherwise} \end{cases} .$$

The validation sample then allows us to identify, in the first phase, households declaring they did not own a given financial asset, but likely to have owned it and to have provided incorrect data and, symmetrically, to identify households declaring they owned a financial asset, but unlikely to possess it. This is accomplished by estimating a logistic model for $P(y_{pk} = 1)$ using a vector of socio-economic characteristics both at the household and at the head of household level as covariates, together with the declared value $\tilde{y}_{pk}$.

Tables 4, 5 and 6 report the results from the models for the variables bonds, risky assets and financial liabilities, respectively.[4] The tables also show the p-values for the covariates considered and an overall measure of goodness of fit. Note that these models are fit with the aim of imputation. Therefore, model selection is based on the performance of out-of-sample predictions rather than on the amount of variability explained by the covariates. For this reason, also non-significant covariates can be found in the aforementioned Tables.

From Table 4, the probability of holding bonds increases for less wealthy households, those living in the North or in the Center of Italy and those living in smaller municipalities. In addition, it increases with the

[4] We cannot model the probability of ownership of a deposit since the external validation sample consists of bank customers. However the proportion of households declaring deposits is above 80 per cent.

age of the head of the household and with his/her level of educational attainment. From Table 5, on the other hand, the probability of owning risky assets increases for wealthier households with few components, which live in the town outskirts or in rural areas. Finally, Table 6 shows that the probability of owning financial liabilities decreases for less wealthy households living in the North or in the Centre of Italy, for households living in smaller municipalities or for those living in rural areas of in the town outskirts.

In a second phase misreporting on the amount held is estimated through a separate model for deposits and for each of the three financial tools considered above. In particular, for all the variables of interest y_p, we consider the ratio $r_{pk} = y_{pk}/\tilde{y}_{pk}$ of actual to declared amount by household *k*. Then $\log r_{pk}$ is modeled for each unit of the validation sample on a set of household characteristics, including household income and wealth classes, a synthetic judgmental variable on the reliability of the information provided in the interview expressed by the interviewer (a score ranging from 1 to 10), and the declared amount. Tables 7, 8 and 9 report the results from the models for deposits, bonds and risky assets, respectively. For financial liabilities the number of available observations is too small for fitting a similar model. Then a common mean model for the ratio is estimated, whose value is 1.064 for all the units in the sample.

The measurement error on deposits increases for the wealthy. The higher the declared amount of deposits and household income, the higher the response error. When it comes to bonds and risky assets, the results are less clear cut but seem to go in the opposite direction. In both cases, the higher the declared amount, the lower the level of measurement error. Moreover employees seem to have a higher propensity towards misreporting than self-employed. Yet, those with a high level of education seem to have a higher propensity to misreport the amount of risky assets.

These two sets of models can be used to adjust measurement error in the SHIW as follows. If we assume that the misreporting behavior of the households in the bank experiment is the same as that of those in the SHIW, then parameter estimates from these two sets of models can be used to stochastically impute micro data for households in the SHIW (imputation for measurement error correction for distribution function estimation is explored in Durrant and Skinner, 2006). In particular, profiles of households given by unique combinations of covariate values are constructed from the SHIW, then predictions $\hat{\mathbf{y}}_k$ are obtained using parameter estimates from the aforementioned models that substitute the surveyed values $\tilde{\mathbf{y}}_k$. A random error term is then added to preserve variability. In particular, in the models for asset ownership a Bernoulli experiment is conducted to assign the imputed possession of a given asset class. As for the models related to the amount possessed, a random draw from a zero-mean normal distribution is added to the imputed value; the variance of the normal distribution is given by that of the residuals of the model fitted in the validation sample.

In 2008 Italy entered a period of economic stagnation. It could therefore be argued that in 2008 households may have had a higher propensity to underreport compared to previous years. One assumption of the adjustment process is that the underreporting behaviour observed in 2002 remained unchanged in 2008. Some indirect evidence in support of this assumption comes from the comparison between micro and macro data in Table 10. The ratio of the unadjusted SHIW estimate of total household financial assets to the corresponding item of the financial accounts in 2002 was very close to that in 2008. A similar result holds for financial liabilities.

Nevertheless, in the final step of the adjustment we constrain the estimated ratio between the values of bonds to risky assets and the ratio of liabilities to financial assets to reproduce the ones observed in the financial accounts. These two constraints are meant to limit the potential problems due to the fact that we are using a 2002 survey to predict underreporting behaviour in 2008.

The final estimator of the total of the variables of interest adjusted for measurement error is essentially a two-phase estimator, and takes the two following forms according to whether non-response is adjusted for the use of the logistic models or not:

$$\hat{\mathbf{t}}_{\hat{y},ME} = \sum_r \frac{\hat{\mathbf{y}}_k}{\pi_k \hat{\theta}_k^S}, \quad (3)$$

$$\hat{\mathbf{t}}_{\hat{y},NRME} = \sum_r \frac{\hat{\mathbf{y}}_k}{\pi_k \hat{\theta}_k^M}. \quad (4)$$

5 Results and concluding remarks

In this section we report the final estimates of the variables of interest (deposits, bonds, risky assets, financial liabilities and net financial wealth) obtained using the alternative estimators discussed in the previous sections. Table 10 reports the estimates of the total of the first three variables of interest ($p = 1,2,3$), i.e. the number of households holding the financial instrument, plus the estimate for the number of households holding either bonds or risky assets, or both (*total financial assets*). Note that the first two estimators are computed as in equations (1) and (2), respectively, in which $\mathbf{y}_k$ is replaced by the observed surrogate value $\tilde{\mathbf{y}}_k$. Table 10 reports, on the other hand, the estimates of the total amounts of financial instruments held (in billions of euros) by households, plus the estimate of the total financial assets owned. As a measure of the coverage of each estimate, the ratio of its value with respect to the corresponding estimate based on the National Financial Accounts (NFAs) is also computed.

Our main findings may be summarized as follows. Underreporting and unit non-response emerge as particularly serious issues for financial assets. The estimator $\hat{\mathbf{t}}_{\hat{y},\ NRME}$ of the total adjusted for both non-response and measurement error is 2.1 and 3.4 times higher than the unadjusted $\hat{\mathbf{t}}_{\tilde{y},\ SHIW}$ when *bonds* and *risky assets* are considered (Table 10). When it comes to the estimation of the amounts held (Table 11), the bias increases: the SHIW estimates for the variables bonds and risky assets should be inflated by factors from 5.9 to 6.6 in order to get the figures obtained with $\hat{\mathbf{t}}_{\hat{y},\ NRME}$. The latter are those closest to the estimates based on the NFAs (last two columns of Table 11).[5]

Correction for non-response and measurement error for financial liabilities seems to be less effective. As far as the amount is concerned, this may be due to the very simple measurement error model employed for this variable. In addition, the information on liabilities is generally easier to recall and less sensitive than the information on assets. This usually results in a lower measurement error.

In order to give a sense of the magnitude of the impact of non-response and measurement error, it is useful to compare it with the magnitude of sampling errors: the relative standard error for total financial assets and for financial liabilities is about 6.5 percent. These figures are negligible compared to the ones shown in the aforementioned tables. The main implication is that surveys on households' wealth require data

---

5 All in all, the effects of the adjustments are fairly in line with the results of previous studies. D'Alessio and Faiella (2002) find that, after adjusting for non-response, the imputed values of financial assets are from 15 to 31 per cent higher than the unadjusted values. In our paper we find an estimate of 26 per cent. Moreover, Cannari and D'Alessio (2002) find that the imputed average household income is some 5 per cent higher than the unadjusted one. As regards measurement error, D'Aurizio *et al.* (2006) find that the adjusted estimates of financial assets and liabilities are some

producers to pay more attention to non-sampling errors than to sampling error alone. Our results are likely driven by the specific features of the SHIW. Yet, when it comes to households' wealth, sampling errors are likely to play a negligible role compared to non-sampling errors. Data producers should therefore allocate their limited financial resources accordingly.

Moreover, when it comes to financial assets, the bias due to measurement error far outweighs that due to unit non-response. This result is in part due to how the survey on non-respondents is designed. The response rate for this survey is very low and there is likely a severe issue of self-selection in the sampling of non-respondents. In fact, the respondents for this survey may be very different from those who refused to participate to both surveys. For this reason the adjustment for unit non-response should be considered as a lower bound. Yet, the modest effect of non-response is also confirmed by the analysis conducted using two alternative weighting adjustments described in Section 3.2 (see Table 13).

Finally, measurement error has been dealt with by imputation using model estimates based on an external validation sample. It would certainly be of interest to investigate the properties of an estimator based on a sub-sample of households on which an accurate measurement of the variables of interest can be taken. More study is required to determine the sub-sampling design and dimension. Finally, as with imputation for item non-response, a full-weighting or an imputation approach can be used to determine the final estimates. Both approaches have pros and cons. The former requires the dissemination of a different set of weights for each variable of interest for which accurate measurements are taken. The latter, on the other hand, allows the computation of a single set of weights, but requires the dissemination of imputed values for units not in the sub-sample.

As a result of the adjustment process the mean value of total financial assets is 4.5 times higher than the value declared during the interview. For financial liabilities, the adjusted value is about 2.5 times the unadjusted one (see Table 14). Larger adjustments are found for households in the lowest quintiles of the declared income distribution, for those with a low level of educational attainment and for those living in the Centre of Italy. Moreover, the adjustment for persons not-employed and employees is larger than that for the self-employed. Overall, the adjustment process seems to have a higher impact on households at the center/bottom of the wealth distribution. Indeed, the level of inequality slightly decreases after the imputation. This result is consistent with that found by D'Aurizio *et al.* (2006).

3.7 and 1.4 per cent higher than the initial ones. We find that the figures are 5.1 and 2.1.

Tables and figures

Table 1: Households contacted in 2008 and reasons for non-participation.

	Panel		Non-panel		Total	
	Number	%	Number	%	Number	%
Respondents	4,345	*79.3*	3,632	*41.6*	7,977	*56.1*
Refusals	1,012	*18.5*	3,589	*41.1*	4,601	*32.4*
Not at home	120	*2.2*	1,511	*17.3*	1,631	*11.5*
Total	5,477	*100.0*	8,732	*100.0*	14,209	*100.0*
Ineligible *	150	*2.7*	629	*6.7*	779	*5.2*

* Households not found at their address (wrong address, death, change of address).

Table 2: Logistic response probability model for panel households - estimated coefficients, standard errors and *p*-values.

Variables	Coeff	Std. Err.	p-value
Intercept	-1.48	0.21	< .001
Municipalities with more than 500,000 inhabitants	-0.58	0.12	< .001
Household living in the city center	0.34	0.10	< .001
Number of waves (household)	0.18	0.02	< .001
Number of members of household	0.11	0.03	< .001
High level of education (interviewer)	0.34	0.10	< .001
Number of waves (interviewer)	0.03	0.01	< .001
Good climate at previous interview	0.20	0.02	< .001
Workload of interviewer 21 - 100	-0.06	0.09	0.481
Workload of interviewer 101 - 300	-0.43	0.13	< .001
Workload of interviewer > 300	0.50	0.15	< ..001

Pseudo $R^2 = 0.085$; 5,625 obs.

Figure 1: The estimated effect of the age of the interviewer (and 95% confidence bounds) on the linear predictor scale from the additive logistic response probability model for panel households.

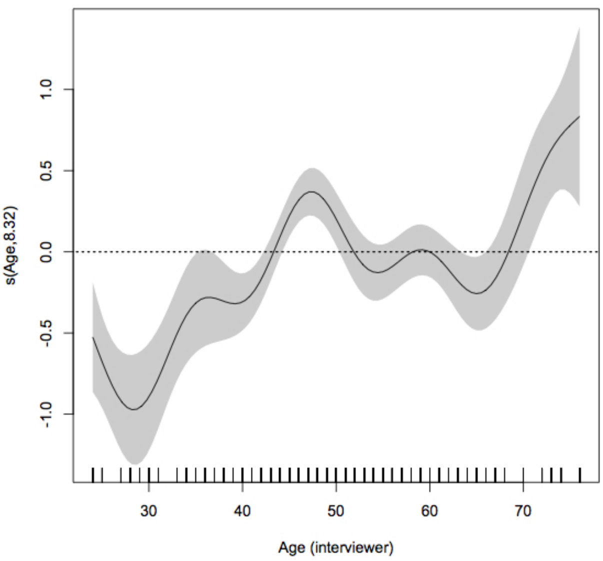


Figure 2: The estimated effect of age (and 95% confidence bounds) on the linear predictor scale from the logistic response probability model for non-panel households.

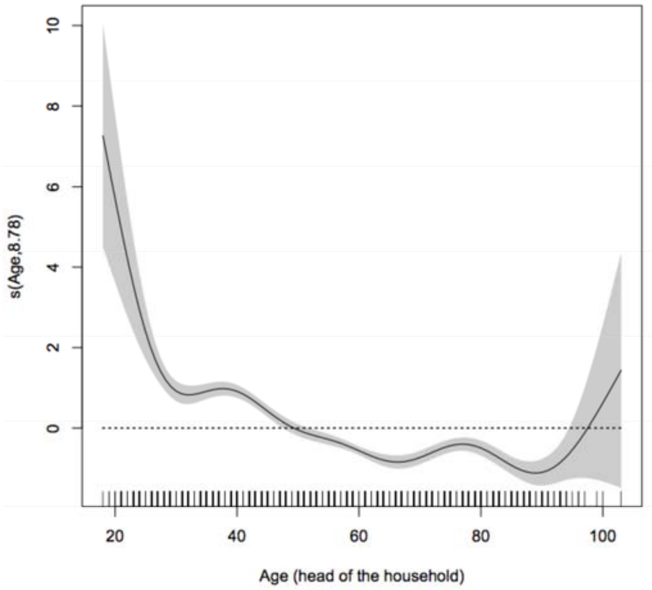


Table 3: Logistic response probability model for non-panel households - estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	1.599	0.117	< .0001
Living in the North/Centre of Italy	-0.744	0.058	< .0001
Municipality with less than 500,000 inhabitants	0.362	0.059	< .0001
Household originally selected (vs substitute)	-0.280	0.057	< .0001
Workload of interviewer 21 -- 100	0.361	0.058	< .0001
Workload of interviewer 101 -- 300	0.880	0.077	< .0001
Workload of interviewer > 300	1.912	0.110	< .0001
Self-employed	-0.482	0.084	< .0001
Graduate	-0.265	0.078	0.0007
Retired	-0.291	0.109	0.0073
Home owner	-0.658	0.058	< .0001
Number of members of the household	-0.368	0.028	< .0001
Number of income earners = 2	-0.103	0.055	0.0639
Number of income earners ≥ 3	0.525	0.099	< .0001

* Demographic characteristics refer to the head of the household; Pseudo $R^2 = 0.357$; 3,948 obs.

Table 3a: Logistic response probability model for non-panel households using call attempts file- estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	0.19	0.18	0.3107
Age (interviewer)	-0.00	0.00	0.1235
Gender (interviewer)	0.14	0.07	0.0325
Self-employed (interviewer)	-0.51	0.06	<.0001
High level of education (interviewer)	0.29	0.06	<.0001
Workload of interviewer 21 -- 100	-0.35	0.04	<.0001
Workload of interviewer 101 -- 300	-0.26	0.05	<.0001
Workload of interviewer > 300	1.21	0.08	<.0001
Living in the North of Italy	-0.41	0.06	<.0001
Living in the Centre of Italy	-0.16	0.08	0.0420
Household living in the city center	0.30	0.06	<.0001
Dwelling: poor external conditions	0.79	0.09	<.0001
Italian nationality	-0.14	0.07	0.0493

* Demographic characteristics refer to the head of the household; Pseudo R^2 = 0.0594; 9342 obs.

Table 3b: Logistic response probability model for non-panel households using difficult respondents - estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	1.30	0.57	0.0214
Age	-0.02	0.02	0.2730
Age squared	-0.00	0.00	0.1512
Low level of education	0.24	0.10	0.0214
Living in the North of Italy	-0.72	0.12	<.0001
Living in the South of Italy	0.70	0.14	<.0001
Municipality with less than 20,000 inhabitants	0.34	0.11	0.0032
Household wealth class: 2nd quintile	0.02	0.10	0.8832
Household wealth class: 3rd quintile	0.22	0.10	0.0309
Quintiles of household wealth: 2nd quintile	0.13	0.09	0.1569
Quintiles of household wealth: 3rd quintile	-0.44	0.09	<.0001
Quintiles of household wealth: 4th quintile	0.03	0.00	<.0001
Quintiles of household wealth: 5th quintile	-0.42	0.15	0.0054
Age (interviewer)	-0.42	0.09	<.0001
High level of education (interviewer)	-0.02	0.11	0.8862
Workload of interviewer 21 -- 100	1.11	0.17	<.0001
Workload of interviewer 101 -- 300	0.32	0.20	0.0996
Workload of interviewer > 300	1.30	0.57	0.0214
Dwelling: poor external conditions	-0.02	0.02	0.2730

* Demographic characteristics refer to the head of the household; Pseudo R^2 = 0.144; 3630 obs.

Table 4: Logistic response probability model for ownership of bonds – estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	-4.67	0.98	< .0001
Self-reported ownership of bonds	2.50	0.17	< .0001
Self-reported ownership of risky assets	0.45	0.12	0.0003
Employee	0.21	0.19	0.2589
Self-employed	0.23	0.20	0.2502
Secondary school diploma	0.39	0.15	0.0086
University degree	0.55	0.19	0.0045
Age	0.06	0.03	0.0477
Age^2	-0.01	0.03	0.6520
Living in municipalities with more than 30,000 inhabitants	-0.26	0.13	0.0432
Living in the North/Centre of Italy	0.86	0.20	< .0001
Living in a rural area	-0.51	0.24	0.0315
Living in the town outskirts	-0.36	0.23	0.1133
Number of income earners	0.02	0.05	0.6610
First quartile of household income	-0.05	0.16	0.7792
Fourth quartile of household income	-0.16	0.16	0.3139
First quartile of household real wealth	0.35	0.15	0.0203
Fourth quartile of household real wealth	0.06	0.16	0.7051
Client of more than one bank	0.06	0.13	0.6171
Respondent’s level of understanding of the questions	0.01	0.07	0.8899
Respondent’s ability to answer the questions	0.00	0.07	0.9935
Reliability of the information provided by the respondent	-0.03	0.04	0.4168

* Demographic characteristics refer to the head of the household; Pseudo $R^2 = 0.364$; 1,681 obs.

Table 5: Logistic response probability model for ownership of risky assets - estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	-2.27	0.89	0.0105
Self-reported ownership of bonds	0.18	0.16	0.2640
Self-reported ownership of risky assets	2.65	0.15	< .0001
Employee	0.56	0.19	0.0038
Self-employed	0.07	0.21	0.7455
Secondary school diploma	0.31	0.15	0.0347
University degree	0.13	0.20	0.5184
Age	0.04	0.03	0.2298
Age^2	-0.01	0.03	0.6452
Municipalities with more than 30,000 inhabitants	0.09	0.13	0.4904
Living in the North/Centre of Italy	0.19	0.17	0.2667
Living in a rural area	0.41	0.25	0.0906
Living in the town outskirts	0.50	0.23	0.0332
Number of income earners	-0.12	0.06	0.0322
First quartile of household income	-0.20	0.16	0.2149
Fourth quartile of household income	0.23	0.17	0.1795
First quartile of household real wealth	-0.01	0.15	0.9243
Fourth quartile of household real wealth	0.45	0.17	0.0092
Client of more than one bank	0.04	0.13	0.7346
Respondent's level of understanding of the questions	-0.07	0.07	0.3640
Respondent’s ability to answer the questions	0.03	0.08	0.6768
Reliability of the information provided by the respondent	-0.04	0.04	0.2953

* Demographic characteristics refer to the head of the household; Pseudo $R^2 = 0.393$; 1,681 obs.

Table 6: Logistic response probability model for ownership of financial liabilities - estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	-5.93	1.94	0.0022
Self-reported ownership of liabilities	4.43	0.30	<.0001
Employee	-0.87	0.39	0.0255
Self-employed	0.40	0.40	0.312
Secondary school diploma	-0.18	0.30	0.5413
University degree	0.05	0.42	0.9063
Age	0.25	0.07	0.0009
Age^2	0.00	0.00	0.0003
Municipalities with more than 30,000 inhabitants	0.10	0.27	0.7211
Living in the North/Centre of Italy	0.00	0.34	0.9894
Living in a rural area	-1.43	0.46	0.0021
Living in the town outskirts	-0.94	0.41	0.0227
Number of income earners	0.12	0.11	0.2999
First quartile of household income	0.15	0.34	0.6562
Fourth quartile of household income	0.41	0.33	0.2146
First quartile of household real wealth	-0.18	0.31	0.5698
Fourth quartile of household real wealth	-0.04	0.35	0.8968
First quartile of household financial assets	0.44	0.29	0.1328
Fourth quartile of household financial assets	-0.73	0.36	0.046
Respondent's level of understanding of the questions	-0.33	0.17	0.0494
Respondent’s ability to answer the questions	0.31	0.17	0.0714
Reliability of the information provided by the respondent	-0.08	0.09	0.3653

* Demographic characteristics refer to the head of the household; Pseudo R^2= 0.403; 949 obs.

Table 7: Regression model for log of ratio between actual and declared amount of deposits - estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	-0.76	0.12	<.0001
Second quartile of household financial wealth in deposits	0.74	0.02	<.0001
Third quartile of household financial wealth in deposits	1.18	0.02	<.0001
Fourth quartile of household financial wealth in deposits	2.10	0.02	<.0001
Employee	-0.02	0.03	0.5677
Self-employed	-0.04	0.03	0.1884
Secondary school diploma	-0.03	0.02	0.1379
University degree	-0.04	0.03	0.1383
Age	0.00	0.00	0.5686
Age^2	0.00	0.00	0.3513
Living in the North/Centre of Italy	-0.03	0.03	0.1980
First quartile of household income	0.01	0.02	0.5669
Fourth quartile of household income	0.05	0.02	0.0157
First quartile of household real wealth	0.02	0.02	0.3330
Fourth quartile of household real wealth	0.02	0.02	0.4315
Client of more than one bank	-0.02	0.02	0.3407
Reliability of the information provided by the respondent	0.00	0.00	0.3152

* Demographic characteristics refer to the head of the household; Pseudo R^2 = 0.864; 1332 obs.

Table 8: Regression model for log of ratio between actual and declared amount of bonds - estimated coefficients, standard errors and p-values.

Variables *	Coeff	Std. Err.	p-value
Intercept	0.85	0.69	0.2197
Second quartile of household financial wealth in *bonds*	-0.63	0.12	<.0001
Third quartile of household financial wealth in *bonds*	-0.64	0.12	<.0001
Fourth quartile of household financial wealth in *bonds*	-1.09	0.12	<.0001
Employee	0.38	0.13	0.0038
Self-employed	0.25	0.13	0.062
Secondary school diploma	-0.02	0.10	0.8718
University degree	-0.06	0.12	0.6204
Age	-0.02	0.02	0.5034
Age^2	0.00	0.00	0.2413
Living in the North/Centre of Italy	0.23	0.17	0.1666
First quartile of household income	-0.02	0.11	0.8534
Fourth quartile of household income	0.11	0.10	0.2782
First quartile of household real wealth	-0.08	0.11	0.4769
Fourth quartile of household real wealth	0.07	0.10	0.5081
Client of more than one bank	0.03	0.08	0.7526
Reliability of the information provided by the respondent	0.01	0.02	0.703

* Demographic characteristics refer to the head of the household; Pseudo R^2 = 0.453; 482 obs.

Table 9: Regression model for the log of ratio between actual and declared amount of risky assets - estimated coefficients, standard errors and p-values

Variables *	Coeff	Std. Err.	p-value
Intercept	0.43	0.31	0.1634
Second quartile of household financial wealth in risky assets	-0.04	0.07	0.5864
Third quartile of household financial wealth in risky assets	-0.34	0.06	<.0001
Fourth quartile of household financial wealth in risky assets	-0.32	0.07	<.0001
Employee	-0.08	0.08	0.3025
Self-employed	-0.04	0.08	0.6245
Secondary school diploma	0.14	0.06	0.0174
University degree	0.16	0.07	0.0318
Age	0.00	0.01	0.9866
Age squared	0.00	0.00	0.802
Living in the North/Centre of Italy	0.00	0.08	0.9887
First quartile of household income	0.13	0.07	0.0578
Fourth quartile of household income	0.12	0.06	0.0416
First quartile of household real wealth	-0.07	0.06	0.2726
Fourth quartile of household real wealth	-0.04	0.06	0.5137
Client of more than one bank	0.00	0.05	0.9368
Reliability of the information provided by the respondent	-0.04	0.01	0.0009

* Demographic characteristics refer to the head of the household; Pseudo R^2 = 0.126; 876 obs.

Table 10: Ratio between survey estimates and NFAs of total amount held (percentages)

Instrument	2002	2004	2006	2008
Deposits	37,6	31,2	33,6	32,5
Bonds	15,2	12,2	17,8	17,4
Risky assets	15,6	14,5	17,3	15,2
Total financial assets	21,8	18,8	22,3	21,7
Financial liabilities	34,3	40,3	38,1	41,2

* The figures exclude: cash, technical insurances, other accounts receivable, trade credits and debts and other accounts payable.

Table 11: Number of households (millions) holding a financial instrument using different estimators

Instrument	$\hat{\mathbf{t}}_{\tilde{y},\, SHIW}$	$\hat{\mathbf{t}}_{\tilde{y},\, NR}$	$\hat{\mathbf{t}}_{\hat{y},\, ME}$	$\hat{\mathbf{t}}_{\hat{y},\, NRME}$	$\frac{\hat{\mathbf{t}}_{\hat{y},\, NRME}}{\hat{\mathbf{t}}_{\tilde{y},\, SHIW}}$
Deposits	19.473	19.724	19.473	19.724	1.0
Bonds	3.532	3.875	7.143	7.438	2.1
Risky assets	2.745	3.086	8.985	9.304	3.4
Total financial assets	19.564	19.831	19.083	19.433	1.0
Financial liabilities	5.918	6.127	6.005	6.217	1.1

Table 12: Total amount held (billions of euros) using different estimators, estimate based on the NFAs, and ratio between survey estimates and the NFAs (percentages).

Instrument	$\hat{\mathbf{t}}_{\tilde{y},\, SHIW}$	*% of NFAs*	$\hat{\mathbf{t}}_{\tilde{y},\, NR}$	*% of NFAs*	$\hat{\mathbf{t}}_{\hat{y},\, ME}$	*% of NFAs*	$\hat{\mathbf{t}}_{\hat{y},\, NRME}$	*% of NFAs*	NFAs *
Deposits	322.1	*32,5*	374.4	*38.4*	843.3	*86.5*	1010.8	*103.6*	975.2
Bonds	133.6	*17,4*	162.7	*21.1*	669.7	*87.0*	710.8	*92.4*	769.6
Risky assets	173.4	*15,2*	223.5	*19.6*	967.3	*84.8*	1.086.7	*95.3*	1140.3
Total financial assets	629.1		760.6	*39.8*	2.480.4	*86.0*	2.820.3	*97.8*	2.885.1
WHY ITALICS?-		*21,7*							
Financial liabilities	253.0	*41,7*	290.2	*47.9*	518.4	*85.5*	594.9	*98.2*	606.1

* The figures exclude: cash, technical insurances, other accounts receivable, trade credits and debts and other accounts payable.

Table 13: Effect of different non-response weighting adjustments

Instrument	$\hat{\mathbf{t}}_{\tilde{y},\, SHIW}$	$\hat{\mathbf{t}}_{\tilde{y},\, NR} / \hat{\mathbf{t}}_{\tilde{y},\, SHIW}$	$\hat{\mathbf{t}}_{\tilde{y},\, NR1} / \hat{\mathbf{t}}_{\tilde{y},\, SHIW}$	$\hat{\mathbf{t}}_{\tilde{y},\, NR2} / \hat{\mathbf{t}}_{\tilde{y},\, SHIW}$
Deposits	322.1	1.2	1.1	1.0
Bonds	133.6	1.2	1.0	1.0
Risky assets	173.4	1.3	1.2	1.2
Total financial assets	629.1	1.2	1.1	1.1
Financial liabilities	253.0	1.1	1.1	1.1

$\hat{\mathbf{t}}_{\tilde{y},\, NR1}$ :: non-response adjustment based on the call attempts file. $\hat{\mathbf{t}}_{\tilde{y},\, NR2}$: non-response adjustment based assuming difficult respondents as proxy of non respondents

Table 14: Comparison between adjusted and unadjusted estimates
(averages €, ratios)

Characteristics	Total financial assets			Financial liabilities		
	$\hat{\bar{\mathbf{t}}}_{\tilde{y},\,SHIW}$	$\hat{\bar{\mathbf{t}}}_{\tilde{y},\,NRME}$	$\hat{\mathbf{t}}_{\tilde{y},\,NRME}/\hat{\mathbf{t}}_{\tilde{y},\,SHIW}$	$\hat{\bar{\mathbf{t}}}_{\tilde{y},\,SHIW}$	$\hat{\bar{\mathbf{t}}}_{\tilde{y},\,NRME}$	$\hat{\mathbf{t}}_{\tilde{y},\,NRME}/\hat{\mathbf{t}}_{\tilde{y},\,SHIW}$
Gender						
Male	29,477	129,272	4.4	11,818	27,029	2.3
Female	19,363	90,437	4.7	7,861	19,677	2.5
Age						
34 and under	13,079	57,701	4.4	18,883	41,589	2.2
35 - 44	16,962	75,197	4.4	19,782	46,186	2.3
45 - 54	24,453	102,411	4.2	15,633	39,507	2.5
55 - 64	41,929	171,661	4.1	8,161	19,920	2.4
over 65	23,824	119,334	5.0	1,421	4,100	2.9
Educational qualification						
none	5,838	21,289	3.6	454	1,393	3.1
primary school certificate	10,756	69,044	6.4	2,246	6,459	2.9
lower secondary school certificate	18,071	93,489	5.2	10,910	25,294	2.3
upper secondary school diploma	36,936	147,456	4.0	15,854	37,744	2.4
university degree	67,470	246,046	3.6	17,198	35,733	2.1
Work status						
Employee	20,017	94,142	4.7	13,610	29,814	2.2
Self-employed	59,486	178,039	3.0	27,262	58,662	2.2
Not employed	23,481	116,379	5.0	1,919	4,968	2.6
Household size						
1 member	15,624	72,579	4.6	4,167	9,468	2.3
2 members	31,970	136,680	4.3	8,006	16,500	2.1
3 members or more	29,039	128,009	4.4	16,135	37,170	2.3
Quintiles of household income						
1st quintile	3,537	29,864	8.4	3,784	9,617	2.5
2nd quintile	8,305	58,179	7.0	6,250	14,858	2.4
3rd quintile	13,181	71,556	5.4	11,994	24,634	2.1
4th quintile	23,358	104,045	4.5	13,085	27,249	2.1
5th quintile	83,390	279,514	3.4	17,869	42,037	2.4
Town size						
up to 20,000 inhabitants	24,331	99,875	4.1	11,371	25,082	2.2
20,000 - 40,000	24,907	129,147	5.2	7,555	20,907	2.8
40,000 - 500,000	24,804	107,949	4.4	8,754	21,572	2.5
more than 500,000	38,535	196,886	5.1	15,056	36,305	2.4
Geographical area						
North	37,510	149,554	4.0	13,752	32,573	2.4
Centre	22,323	134,529	6.0	8,836	19,563	2.2
South and Islands	11,660	59,247	5.1	6,861	16,622	2.4
Total	26,349	118,121	4.5	10,595	24,918	2.4
Gini index	0.786	0.763	0.97	0.911	0.909	1.00

References

Bagozzi, R. (1994). Measuring in market research: basic principles of questionnaire design. *Principles of Marketing Research in: Blackwell Business.*

Biancotti, C., G. D'Alessio, and A. Neri (2008). Measurement error in the Bank of Italy's survey of household income and wealth. *Review of Income and Wealth,* 54-3.

Biemer, P. (2010). Total survey error: design, implementation, and evaluation. *Public Opinion Quarterly* 74, pp. 817-848.

Cannari, L., G. D'Alessio, (1992), Mancate interviste e distorsione degli stimatori, *Temi di Discussione* 172, Banca d'Italia.

D'Alessio, G. and I. Faiella (2002). Nonresponse behaviour in the Bank of Italy's survey of household income and wealth. *Temi di Discussione* 462, Banca d'Italia.

D'Aurizio, L., Faiella, I., Iezzi, S. and Neri, A (2006). The underreporting of financial wealth in the Survey on Household Income and Wealth. *Temi di Discussione* 610, Banca d'Italia.

Durrant, G. B. and C. Skinner (2006). Using missing data methods to correct for measurement error in a distribution function. *Survey Methodology,* 32-1, pp. 25-36.

Ekholm, A. and S. Laaksonen (1991). Weighting via response modeling in the Finnish Household Budget Survey. *Journal of Official Statistics* 7, 325-337.

European Central Bank (2009). Survey data on household finance and consumption. ECB, *Occasional paper series* 100.

Folsom, R. E. (1991). Exponential and logistic weight adjustments for sampling and nonresponse error reduction. In ASA *Proceedings of the Social Statistics Section*, pp. 197-202.

Fuller, W. A., M. M. Loughin, and H. D. Baker (1994). Regression weighting in the presence of nonresponse with application to the 1987-1988 Nationwide Food Consumption Survey. *Survey Methodology* 20, pp. 75-85.

Giraldo A., E. Rettore and U. Trivellato (2001), *Attrition bias in the Bank of Italy's Survey of Households' Income and Wealth*, International Conference on Quality in Official Statistics, Stockholm, 14-15 May.

Kim, J. K. and J. J. Kim (2007). Nonresponse weighting adjustment using estimated response probability. *The Canadian Journal of Statistics* 35 (4), pp. 501-514.

Kott, P. S. (2006). Using calibration weighting to adjust for nonresponse and coverage errors. *Survey Methodology* 32 (2), pp. 133-142.

Laaksonen S. and R. Chambers (2006) Survey estimation under informative nonresponse with follow-up, *Journal of Official Statistics* 22, pp. 81-95

Lessler, J. T. and W. D. Kalsbeek (1992). *Nonsampling Error in Surveys*. John Wiley & Sons.

Little, R. J. A. (1986). Survey nonresponse adjustments for estimates of means. *International Statistical Review* 54, pp. 139-157.

Moore, J., L. Stinson, and E. Welniak (2000). Income measurement error in surveys: A review. *Journal of Official Statistics* 16, pp. 331-361.

Ruppert, D., M. P.Wand, and R. Carroll (2003). *Semiparametric Regression*. Cambridge University Press, Cambridge, New York.

Särndal, C.-E., B. Swensson, and J. Wretman (1992). *Model Assisted Survey Sampling*. Springer, Berlin, New York.

Wu, C. and Y. Luan (2003). Optimal calibration estimators under two-phase sampling. *Journal of Official Statistics* 19, pp. 119-131.

RECENTLY PUBLISHED "TEMI" (*)

N. 848 – *Bank balance sheets and the transmission of financial shocks to borrowers: evidence from the 2007-2008 crisis*, by Emilia Bonaccorsi di Patti and Enrico Sette (January 2012).

N. 849 – *The role of financial investments in agricultural commodity derivatives markets*, by Alessandro Borin and Virginia Di Nino (January 2012).

N. 850 – *Mapping local productivity advantages in Italy: industrial districts, cities or both?*, by Valter Di Giacinto, Matteo Gomellini, Giacinto Micucci and Marcello Pagnini (January 2012).

N. 851 – *The impact of monetary policy shocks on commodity prices*, by Alessio Anzuini, Marco J. Lombardi and Patrizio Pagano (February 2012).

N. 852 – *Statistical models for measuring job satisfaction*, by Romina Gambacorta and Maria Iannario (February 2012).

N. 853 – *Forecasting world output: the rising importance of emerging economies*, by Alessandro Borin, Riccardo Cristadoro, Roberto Golinelli and Giuseppe Parigi (February 2012).

N. 854 – *Entry dynamics as a solution to the puzzling behaviour of real marginal costs in the Ghironi-Melitz model*, by Alberto Felettigh (February 2012).

N. 855 – *Trade openness and international fragmentation of production in the European Union: the new divide?*, by Paolo Guerrieri and Filippo Vergara Caffarelli (February 2012).

N. 856 – *Optimal dynamic public communication*, by Marcello Miccoli (February 2012).

N. 857 – *Modelling loans to non-financial corporations in the euro area*, by Christoffer Kok Sørensen, David Marqués Ibáñez and Carlotta Rossi (February 2012).

N. 858 – *Economic (in)stability under monetary targeting*, by Luca Sessa (March 2012).

N. 859 – *Optimal fiscal policy when agents fear government default*, by Francesco Caprioli, Pietro Rizza and Pietro Tommasino (March 2012).

N. 860 – *The effects of unemployment benefits in Italy: evidence from an institutional change*, by Alfonso Rosolia and Paolo Sestito (March 2012).

N. 861 – *Monetary policy and the flow of funds in the euro area*, by Riccardo Bonci (March 2012).

N. 862 – *Does gender matter for public spending? Empirical evidence from Italian municipalities*, by Massimiliano Rigon and Giulia M. Tanzi (April 2012).

N. 863 – *House price cycles in emerging economies*, by Alessio Ciarlone (April 2012).

N. 864 – *Measuring the underground economy with the currency demand approach: a reinterpretation of the methodology, with an application to Italy*, by Guerino Ardizzi, Carmelo Petraglia, Massimiliano Piacenza and Gilberto Turati (April 2012).

N. 865 – *Corporate geography in multi-plant firms*, by Rita Cappariello, Stefano Federico and Roberta Zizza (April 2012).

N. 866 – *Don't stand so close to me: the urban impact of immigration*, by Antonio Accetturo, Francesco Manaresi, Sauro Mocetti and Elisabetta Olivieri (April 2012).

N. 867 – *Disinflation effects in a medium-scale New Keynesian model: money supply rule versus interest rate rule*, by Guido Ascari and Tiziano Ropele (April 2012).

N. 868 – *The economic costs of organized crime: evidence from southern Italy*, by Paolo Pinotti (April 2012).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

"TEMI" LATER PUBLISHED ELSEWHERE

2009

F. PANETTA, F. SCHIVARDI and M. SHUM, *Do mergers improve information? Evidence from the loan market*, Journal of Money, Credit, and Banking, v. 41, 4, pp. 673-709, **TD No. 521 (October 2004).**

M. BUGAMELLI and F. PATERNÒ, *Do workers' remittances reduce the probability of current account reversals?*, World Development, v. 37, 12, pp. 1821-1838, **TD No. 573 (January 2006).**

P. PAGANO and M. PISANI, *Risk-adjusted forecasts of oil prices*, The B.E. Journal of Macroeconomics, v. 9, 1, Article 24, **TD No. 585 (March 2006).**

M. PERICOLI and M. SBRACIA, *The CAPM and the risk appetite index: theoretical differences, empirical similarities, and implementation problems*, International Finance, v. 12, 2, pp. 123-150, **TD No. 586 (March 2006).**

R. BRONZINI and P. PISELLI, *Determinants of long-run regional productivity with geographical spillovers: the role of R&D, human capital and public infrastructure,* Regional Science and Urban Economics, v. 39, 2, pp.187-199, **TD No. 597 (September 2006).**

U. ALBERTAZZI and L. GAMBACORTA, *Bank profitability and the business cycle,* Journal of Financial Stability, v. 5, 4, pp. 393-409, **TD No. 601 (September 2006).**

F. BALASSONE, D. FRANCO and S. ZOTTERI, *The reliability of EMU fiscal indicators: risks and safeguards*, in M. Larch and J. Nogueira Martins (eds.), Fiscal Policy Making in the European Union: an Assessment of Current Practice and Challenges, London, Routledge, **TD No. 633 (June 2007).**

A. CIARLONE, P. PISELLI and G. TREBESCHI, *Emerging Markets' Spreads and Global Financial Conditions*, Journal of International Financial Markets, Institutions & Money, v. 19, 2, pp. 222-239, **TD No. 637 (June 2007).**

S. MAGRI, *The financing of small innovative firms: the Italian case*, Economics of Innovation and New Technology, v. 18, 2, pp. 181-204, **TD No. 640 (September 2007).**

V. DI GIACINTO and G. MICUCCI, *The producer service sector in Italy: long-term growth and its local determinants*, Spatial Economic Analysis, Vol. 4, No. 4, pp. 391-425, **TD No. 643 (September 2007).**

F. LORENZO, L. MONTEFORTE and L. SESSA, *The general equilibrium effects of fiscal policy: estimates for the euro area*, Journal of Public Economics, v. 93, 3-4, pp. 559-585, **TD No. 652 (November 2007).**

Y. ALTUNBAS, L. GAMBACORTA and D. MARQUÉS, *Securitisation and the bank lending channel*, European Economic Review, v. 53, 8, pp. 996-1009, **TD No. 653 (November 2007).**

R. GOLINELLI and S. MOMIGLIANO, *The Cyclical Reaction of Fiscal Policies in the Euro Area. A Critical Survey of Empirical Research*, Fiscal Studies, v. 30, 1, pp. 39-72, **TD No. 654 (January 2008).**

P. DEL GIOVANE, S. FABIANI and R. SABBATINI, *What's behind "Inflation Perceptions"? A survey-based analysis of Italian consumers,* Giornale degli Economisti e Annali di Economia, v. 68, 1, pp. 25-52, **TD No. 655 (January 2008).**

F. MACCHERONI, M. MARINACCI, A. RUSTICHINI and M. TABOGA, *Portfolio selection with monotone mean-variance preferences,* Mathematical Finance, v. 19, 3, pp. 487-521, **TD No. 664 (April 2008).**

M. AFFINITO and M. PIAZZA, *What are borders made of? An analysis of barriers to European banking integration*, in P. Alessandrini, M. Fratianni and A. Zazzaro (eds.): The Changing Geography of Banking and Finance, Dordrecht Heidelberg London New York, Springer, **TD No. 666 (April 2008).**

A. BRANDOLINI, *On applying synthetic indices of multidimensional well-being: health and income inequalities in France, Germany, Italy, and the United Kingdom,* in R. Gotoh and P. Dumouchel (eds.), Against Injustice. The New Economics of Amartya Sen, Cambridge, Cambridge University Press, **TD No. 668 (April 2008).**

G. FERRERO and A. NOBILI, *Futures contract rates as monetary policy forecasts,* International Journal of Central Banking, v. 5, 2, pp. 109-145, **TD No. 681 (June 2008).**

P. CASADIO, M. LO CONTE and A. NERI, *Balancing work and family in Italy: the new mothers' employment decisions around childbearing,* in T. Addabbo and G. Solinas (eds.), Non-Standard Employment and Qualità of Work, Physica-Verlag. A Sprinter Company, **TD No. 684 (August 2008).**

L. ARCIERO, C. BIANCOTTI, L. D'AURIZIO and C. IMPENNA, *Exploring agent-based methods for the analysis of payment systems: A crisis model for StarLogo TNG,* Journal of Artificial Societies and Social Simulation, v. 12, 1, **TD No. 686 (August 2008).**

A. CALZA and A. ZAGHINI, *Nonlinearities in the dynamics of the euro area demand for M1*, Macroeconomic Dynamics, v. 13, 1, pp. 1-19, **TD No. 690 (September 2008).**

L. FRANCESCO and A. SECCHI, *Technological change and the households' demand for currency*, Journal of Monetary Economics, v. 56, 2, pp. 222-230, **TD No. 697 (December 2008).**

G. ASCARI and T. ROPELE, *Trend inflation, taylor principle, and indeterminacy*, Journal of Money, Credit and Banking, v. 41, 8, pp. 1557-1584, **TD No. 708 (May 2007).**

S. COLAROSSI and A. ZAGHINI, *Gradualism, transparency and the improved operational framework: a look at overnight volatility transmission*, International Finance, v. 12, 2, pp. 151-170, **TD No. 710 (May 2009).**

M. BUGAMELLI, F. SCHIVARDI and R. ZIZZA, *The euro and firm restructuring*, in A. Alesina e F. Giavazzi (eds): Europe and the Euro, Chicago, University of Chicago Press, **TD No. 716 (June 2009).**

B. HALL, F. LOTTI and J. MAIRESSE, *Innovation and productivity in SMEs: empirical evidence for Italy*, Small Business Economics, v. 33, 1, pp. 13-33, **TD No. 718 (June 2009).**

2010

A. PRATI and M. SBRACIA, *Uncertainty and currency crises: evidence from survey data*, Journal of Monetary Economics, v, 57, 6, pp. 668-681, **TD No. 446 (July 2002).**

L. MONTEFORTE and S. SIVIERO, *The Economic Consequences of Euro Area Modelling Shortcuts*, Applied Economics, v. 42, 19-21, pp. 2399-2415, **TD No. 458 (December 2002).**

S. MAGRI, *Debt maturity choice of nonpublic Italian firms* , Journal of Money, Credit, and Banking, v.42, 2-3, pp. 443-463, **TD No. 574 (January 2006).**

G. DE BLASIO and G. NUZZO, *Historical traditions of civicness and local economic development*, Journal of Regional Science, v. 50, 4, pp. 833-857, **TD No. 591 (May 2006).**

E. IOSSA and G. PALUMBO, *Over-optimism and lender liability in the consumer credit market*, Oxford Economic Papers, v. 62, 2, pp. 374-394, **TD No. 598 (September 2006).**

S. NERI and A. NOBILI, *The transmission of US monetary policy to the euro area,* International Finance, v. 13, 1, pp. 55-78, **TD No. 606 (December 2006).**

F. ALTISSIMO, R. CRISTADORO, M. FORNI, M. LIPPI and G. VERONESE, *New Eurocoin: Tracking Economic Growth in Real Time*, Review of Economics and Statistics, v. 92, 4, pp. 1024-1034, **TD No. 631 (June 2007).**

U. ALBERTAZZI and L. GAMBACORTA, *Bank profitability and taxation*, Journal of Banking and Finance, v. 34, 11, pp. 2801-2810, **TD No. 649 (November 2007).**

M. IACOVIELLO and S. NERI, *Housing market spillovers: evidence from an estimated DSGE model,* American Economic Journal: Macroeconomics, v. 2, 2, pp. 125-164, **TD No. 659 (January 2008).**

F. BALASSONE, F. MAURA and S. ZOTTERI, *Cyclical asymmetry in fiscal variables in the EU*, Empirica, **TD No. 671**, v. 37, 4, pp. 381-402 **(June 2008).**

F. D'AMURI, O. GIANMARCO I.P. and P. GIOVANNI, *The labor market impact of immigration on the western german labor market in the 1990s,* European Economic Review, v. 54, 4, pp. 550-570, **TD No. 687 (August 2008).**

A. ACCETTURO, *Agglomeration and growth: the effects of commuting costs,* Papers in Regional Science, v. 89, 1, pp. 173-190, **TD No. 688 (September 2008).**

S. NOBILI and G. PALAZZO, *Explaining and forecasting bond risk premiums,* Financial Analysts Journal, v. 66, 4, pp. 67-82, **TD No. 689 (September 2008).**

A. B. ATKINSON and A. BRANDOLINI, *On analysing the world distribution of income*, World Bank Economic Review , v. 24, 1 , pp. 1-37, **TD No. 701 (January 2009).**

R. CAPPARIELLO and R. ZIZZA, *Dropping the Books and Working Off the Books,* Labour, v. 24, 2, pp. 139-162 ,**TD No. 702 (January 2009).**

C. NICOLETTI and C. RONDINELLI, *The (mis)specification of discrete duration models with unobserved heterogeneity: a Monte Carlo study,* Journal of Econometrics, v. 159, 1, pp. 1-13, **TD No. 705 (March 2009).**

L. FORNI, A. GERALI and M. PISANI, *Macroeconomic effects of greater competition in the service sector: the case of Italy*, Macroeconomic Dynamics, v. 14, 5, pp. 677-708, **TD No. 706 (March 2009).**

V. DI GIACINTO, G. MICUCCI and P. MONTANARO, *Dynamic macroeconomic effects of public capital: evidence from regional Italian data,* Giornale degli economisti e annali di economia, v. 69, 1, pp. 29-66, **TD No. 733 (November 2009).**

F. COLUMBA, L. GAMBACORTA and P. E. MISTRULLI, *Mutual Guarantee institutions and small business finance,* Journal of Financial Stability, v. 6, 1, pp. 45-54, **TD No. 735 (November 2009).**

A. GERALI, S. NERI, L. SESSA and F. M. SIGNORETTI, *Credit and banking in a DSGE model of the Euro Area,* Journal of Money, Credit and Banking, v. 42, 6, pp. 107-141, **TD No. 740 (January 2010).**

M. AFFINITO and E. TAGLIAFERRI, *Why do (or did?) banks securitize their loans? Evidence from Italy*, Journal of Financial Stability, v. 6, 4, pp. 189-202, **TD No. 741 (January 2010).**

S. FEDERICO, *Outsourcing versus integration at home or abroad and firm heterogeneity*, Empirica, v. 37, 1, pp. 47-63, **TD No. 742 (February 2010).**

V. DI GIACINTO, *On vector autoregressive modeling in space and time*, Journal of Geographical Systems, v. 12, 2, pp. 125-154, **TD No. 746 (February 2010).**

L. FORNI, A. GERALI and M. PISANI, *The macroeconomics of fiscal consolidations in euro area countries,* Journal of Economic Dynamics and Control, v. 34, 9, pp. 1791-1812, **TD No. 747 (March 2010).**

S. MOCETTI and C. PORELLO, *How does immigration affect native internal mobility? new evidence from Italy*, Regional Science and Urban Economics, v. 40, 6, pp. 427-439, **TD No. 748 (March 2010).**

A. DI CESARE and G. GUAZZAROTTI, *An analysis of the determinants of credit default swap spread changes before and during the subprime financial turmoil*, Journal of Current Issues in Finance, Business and Economics, v. 3, 4, pp., **TD No. 749 (March 2010).**

P. CIPOLLONE, P. MONTANARO and P. SESTITO, *Value-added measures in Italian high schools: problems and findings*, Giornale degli economisti e annali di economia, v. 69, 2, pp. 81-114, **TD No. 754 (March 2010).**

A. BRANDOLINI, S. MAGRI and T. M SMEEDING, *Asset-based measurement of poverty*, Journal of Policy Analysis and Management, v. 29, 2 , pp. 267-284, **TD No. 755 (March 2010).**

G. CAPPELLETTI, *A Note on rationalizability and restrictions on beliefs*, The B.E. Journal of Theoretical Economics, v. 10, 1, pp. 1-11,**TD No. 757 (April 2010).**

S. DI ADDARIO and D. VURI, *Entrepreneurship and market size. the case of young college graduates in Italy*, Labour Economics, v. 17, 5, pp. 848-858, **TD No. 775 (September 2010).**

A. CALZA and A. ZAGHINI, *Sectoral money demand and the great disinflation in the US*, Journal of Money, Credit, and Banking, v. 42, 8, pp. 1663-1678, **TD No. 785 (January 2011).**

2011

S. DI ADDARIO, *Job search in thick markets*, Journal of Urban Economics, v. 69, 3, pp. 303-318, **TD No. 605 (December 2006).**

F. SCHIVARDI and E. VIVIANO, *Entry barriers in retail trade*, Economic Journal, v. 121, 551, pp. 145-170, **TD No. 616 (February 2007).**

G. FERRERO, A. NOBILI and P. PASSIGLIA, *Assessing excess liquidity in the Euro Area: the role of sectoral distribution of money*, Applied Economics, v. 43, 23, pp. 3213-3230, **TD No. 627 (April 2007).**

P. E. MISTRULLI, *Assessing financial contagion in the interbank market: maximun entropy versus observed interbank lending patterns*, Journal of Banking & Finance, v. 35, 5, pp. 1114-1127, **TD No. 641 (September 2007).**

E. CIAPANNA, *Directed matching with endogenous markov probability: clients or competitors?*, The RAND Journal of Economics, v. 42, 1, pp. 92-120, **TD No. 665 (April 2008).**

M. BUGAMELLI and F. PATERNÒ, *Output growth volatility and remittances*, Economica, v. 78, 311, pp. 480-500, **TD No. 673 (June 2008).**

V. DI GIACINTO e M. PAGNINI, *Local and global agglomeration patterns: two econometrics-based indicators*, Regional Science and Urban Economics, v. 41, 3, pp. 266-280, **TD No. 674 (June 2008).**

G. BARONE and F. CINGANO, *Service regulation and growth: evidence from OECD countries*, Economic Journal, v. 121, 555, pp. 931-957, **TD No. 675 (June 2008).**

R. GIORDANO and P. TOMMASINO, *What determines debt intolerance? The role of political and monetary institutions*, European Journal of Political Economy, v. 27, 3, pp. 471-484, **TD No. 700 (January 2009).**

P. ANGELINI, A. NOBILI e C. PICILLO, *The interbank market after August 2007: What has changed, and why?*, Journal of Money, Credit and Banking, v. 43, 5, pp. 923-958, **TD No. 731 (October 2009).**

L. FORNI, A. GERALI and M. PISANI, *The Macroeconomics of Fiscal Consolidation in a Monetary Union: the Case of Italy*, in Luigi Paganetto (ed.), Recovery after the crisis. Perspectives and policies, VDM Verlag Dr. Muller, **TD No. 747 (March 2010).**

A. DI CESARE and G. GUAZZAROTTI, *An analysis of the determinants of credit default swap changes before and during the subprime financial turmoil*, in Barbara L. Campos and Janet P. Wilkins (eds.), The Financial Crisis: Issues in Business, Finance and Global Economics, New York, Nova Science Publishers, Inc., **TD No. 749 (March 2010).**

A. LEVY and A. ZAGHINI, *The pricing of government guaranteed bank bonds*, Banks and Bank Systems, v. 6, 3, pp. 16-24, **TD No. 753 (March 2010).**

G. BARBIERI, C. ROSSETTI and P. SESTITO, *The determinants of teacher mobility: evidence using Italian teachers' transfer applications,* Economics of Education Review, v. 30, 6, pp. 1430-1444, **TD No. 761 (June 2010).**

G. GRANDE and I. VISCO, *A public guarantee of a minimum return to defined contribution pension scheme members*, The Journal of Risk, v. 13, 3, pp. 3-43, **TD No. 762 (June 2010).**

P. DEL GIOVANE, G. ERAMO and A. NOBILI, *Disentangling demand and supply in credit developments: a survey-based analysis for Italy*, Journal of Banking and Finance, v. 35, 10, pp. 2719-2732, **TD No. 764 (June 2010).**

G. BARONE and S. MOCETTI, *With a little help from abroad: the effect of low-skilled immigration on the female labour supply,* Labour Economics, v. 18, 5, pp. 664-675, **TD No. 766 (July 2010).**

A. FELETTIGH and S. FEDERICO, *Measuring the price elasticity of import demand in the destination markets of italian exports,* Economia e Politica Industriale, v. 38, 1, pp. 127-162, **TD No. 776 (October 2010).**

S. MAGRI and R. PICO, *The rise of risk-based pricing of mortgage interest rates in Italy*, Journal of Banking and Finance, v. 35, 5, pp. 1277-1290, **TD No. 778 (October 2010).**

M. TABOGA, *Under/over-valuation of the stock market and cyclically adjusted earnings*, International Finance, v. 14, 1, pp. 135-164, **TD No. 780 (December 2010).**

S. NERI, *Housing, consumption and monetary policy: how different are the U.S. and the Euro area?*, Journal of Banking and Finance, v.35, 11, pp. 3019-3041, **TD No. 807 (April 2011).**

V. CUCINIELLO, *The welfare effect of foreign monetary conservatism with non-atomistic wage setters*, Journal of Money, Credit and Banking, v. 43, 8, pp. 1719-1734, **TD No. 810 (June 2011).**

A. CALZA and A. ZAGHINI, *welfare costs of inflation and the circulation of US currency abroad,* The B.E. Journal of Macroeconomics, v. 11, 1, Art. 12, **TD No. 812 (June 2011).**

I. FAIELLA, *La spesa energetica delle famiglie italiane*, Energia, v. 32, 4, pp. 40-46, **TD No. 822 (September 2011).**

R. DE BONIS and A. SILVESTRINI, *The effects of financial and real wealth on consumption: new evidence from OECD countries,* Applied Financial Economics, v. 21, 5, pp. 409–425, **TD No. 837 (November 2011).**

F. CAPRIOLI, P. RIZZA and P. TOMMASINO, *Optimal fiscal policy when agents fear government default,* Revue Economique, v. 62, 6, pp. 1031-1043, **TD No. 859 (March 2012).**

2012

M. PERICOLI and M. TABOGA, *Bond risk premia, macroeconomic fundamentals and the exchange rate,* International Review of Economics and Finance, v. 22, 1, pp. 42-65, **TD No. 699 (January 2009).**

G. ASCARI and T. ROPELE, *Disinflation in a DSGE perspective: sacrifice ratio or welfare gain ratio?*, Journal of Economic Dynamics and Control, v. 36, 2, pp. 169-182, **TD No. 736 (January 2010).**

A. ACCETTURO and G. DE BLASIO, *Policies for local development: an evaluation of Italy's "Patti Territoriali",* Regional Science and Urban Economics, v. 42, 1-2, pp. 15-26, **TD No. 789 (January 2011).**

FORTHCOMING

M. BUGAMELLI and A. ROSOLIA, *Produttività e concorrenza estera,* Rivista di politica economica, **TD No. 578 (February 2006).**

F. CINGANO and A. ROSOLIA, *People I know: job search and social networks*, Journal of Labor Economics, **TD No. 600 (September 2006).**

M. BRATTI, D. CHECCHI and G. DE BLASIO, *Does the expansion of higher education increase the equality of educational opportunities? evidence from Italy,* Labour, **TD No. 679 (June 2008).**

S. MOCETTI, *Educational choices and the selection process before and after compulsory school*, Education Economics, **TD No. 691 (September 2008).**

P. SESTITO and E. VIVIANO, *Reservation wages: explaining some puzzling regional patterns*, Labour, **TD No. 696 (December 2008).**

P. PINOTTI, M. BIANCHI and P. BUONANNO, *Do immigrants cause crime?*, Journal of the European Economic Association, **TD No. 698 (December 2008).**

F. LIPPI and A. NOBILI, *Oil and the macroeconomy: a quantitative structural analysis,* Journal of European Economic Association, **TD No. 704 (March 2009).**

F. CINGANO and P. PINOTTI, *Politicians at work. The private returns and social costs of political connections*, Journal of the European Economic Association, **TD No. 709 (May 2009).**

Y. ALTUNBAS, L. GAMBACORTA, and D. MARQUÉS-IBÁÑEZ, *Bank risk and monetary policy*, Journal of Financial Stability, **TD No. 712 (May 2009).**

A. FINICELLI, P. PAGANO and M. SBRACIA, *Ricardian selection*, Journal of International Economics, **TD No. 728 (October 2009).**

G. BARONE and S. MOCETTI, *Tax morale and public spending inefficiency*, International Tax and Public Finance, **TD No. 732 (November 2009).**

I. BUONO and G. LALANNE, *The effect of the Uruguay Round on the intensive and extensive margins of trade*, Journal of International Economics, **TD No. 835 (February 2011).**

G. BARONE, R. FELICI and M. PAGNINI, *Switching costs in local credit markets*, International Journal of Industrial Organization, **TD No. 760 (June 2010).**

L. MONTEFORTE and G. MORETTI, *Real-Time forecasts of inflation: the role of financial variables*, Journal of Forecasting, **TD No. 767 (July 2010).**

E. COCOZZA and P. PISELLI, *Testing for east-west contagion in the European banking sector during the financial crisis*, in R. Matoušek; D. Stavárek (eds.), Financial Integration in the European Union, Taylor & Francis, **TD No. 790 (February 2011).**

S. NERI and T. ROPELE, *Imperfect information, real-time data and monetary policy in the Euro area*, The Economic Journal, **TD No. 802 (March 2011).**

M. AFFINITO, *Do interbank customer relationships exist? And how did they function in the crisis? Learning from Italy*, Journal of Banking and Finance, **TD No. 826 (October 2011).**

O. BLANCHARD and M. RIGGI, Why are the 2000s so different from the 1970s? A structural interpretation of changes in the macroeconomic effects of oil prices, Journal of the European Economic Association, **TD No. 835 (November 2011).**

R. CRISTADORO and D. MARCONI, *Households Savings in China*, Chinese Economic and Business Studies, **TD No. 838 (November 2011).**