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by Giuseppe Albanese, Guido de Blasio and Paolo Sestito

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TRUST AND PREFERENCES: EVIDENCE FROM SURVEY DATA

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Abstract

This paper considers the role of preferences in explaining trust. By using the Bank of Italy's Survey on Household Income and Wealth (SHIW), the paper shows that time preferences and risk preferences are key covariates of self-reported trust. They both predict negatively a measure of *generalized* trust; however, risk aversion is positively correlated with an index of *particularized* trusting behaviour (which refers to family and friends). Moreover, the results are robust to using a different data source to gauge the role of social preferences and personality traits. The study highlights that neglecting preferences when analysing the role of trust in explaining socio-economic outcomes might pose serious challenges in terms of omitted variables.

JEL Classification: D1, D8, Z1.
Keywords: trust, preferences, survey data.

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The advantage of humankind of being able to trust one another, penetrates into every crevice and cranny of human life: the economical is perhaps the smallest part of it, yet even this is incalculable.
(John Stuart Mill, *Principles of Political Economy*, 1848)

Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence.
(Kenneth Arrow, *Gifts and Exchanges*, 1972)

1. Introduction[1]

A huge literature in the field of social sciences makes clear the importance of trust for economic transactions. It has been suggested that trust has a positive effect on economic growth (Knack and Keefer, 1997; Zak and Knack, 2001), international trade (Guiso et al., 2009), the development of financial markets (Guiso et al., 2004), and the functioning of the labour market (Aghion et al., 2011). Guiso et al. (2010) provides a recent review.

Notwithstanding, the definition and the measurement of trust has proven to be an elusive task. While trust is commonly identified in terms of beliefs about others' trustworthiness, recent literature highlights that trust might reflect preferences as well as beliefs. This might have important consequences. As preferences *per se* play a role in economic transactions, trust can be considered to matter only when beliefs about others' trustworthiness have an independent effect. Moreover, it is relevant to distinguish between the features that can be a policy target (such as beliefs) and those that cannot be changed (like preferences).

Surveys and experiments are increasingly being used to elicit trust. Needless to say, measures of trust based on experimental games have several advantages owing to the controlled environment. However, if survey questions capture exactly people's willingness to trust others, for the reason that answers are based on introspection about past behaviour, what we expect is that this measure will be influenced by the same factors that determine the daily act of trust. Moreover, survey data are widely available and have broad coverage, so that several papers use them when analysing the effect of trust at both micro level (e.g. financial decisions) and macro level (e.g. growth, regulation, etc.). It is crucial, therefore, to understand what the survey measures of trust actually capture, since both beliefs and preferences vary among individuals and populations.

The main purpose of this paper is to analyse the connection between trust and preferences in a large representative survey. We make use of the Bank of Italy's Survey on Household Income and Wealth (SHIW), in which a section on socio-economic behaviour was explicitly included for the purpose of this paper. Thus, our investigation represents the first of this type using Italian data and adds to those conducted so far for the US and Germany.

[1] We thank Luca Stanca, Luca Zarri, seminar participants at Bank of Italy (November 2012) and two anonymous referees for comments and suggestions, and Christine Stone for editorial assistance. Part of this work was undertaken when Giuseppe Albanese was visiting the Structural Economic Analysis Dept. of the Bank of Italy.

Throughout the analysis, the reference definition is that of trust as a behaviour. This formulation is based on Coleman (1990). More recently it has been restated by Fehr (2009), who shows that responses to the trust question might capture preferences other than beliefs about people's trustworthiness. We add to this literature in several ways. First, we show that not only risk preferences but also time preferences are key negative predictors of self-reported trusting behaviour. Second, we document that this role of preferences refers to generalized trust, while the impact on trust in known people is quite different. Third, we show that time and risk preferences remain important predictors of trust even when we control for measures of social preferences and personality traits. Fourth, we provide an example of a financial behaviour (credit card possession) that is commonly considered a trust-sensitive outcome and we show that the evidence on the importance of trust becomes mixed when preferences are accounted for. This example suggests that previous findings on the importance of trust, which do not account for time and risk preferences, might have been plagued by a severe problem of omitted variables. Finally, we speculate on the possible role of our results. We argue that if (i) the behavioural definition of trust is taken to be the right one and (ii) preferences are taken to be exogenously given, then, on empirical grounds, it appears that a reduced scope is left for trust as a determinant of socio-economic behaviour. However, the validity of both (i) and (ii) do not seem to be convincingly made yet.

The paper is structured as follows. The next section introduces the main argument: like other socio-economic behaviours, the decision to trust might depend on preferences. Section 3 provides the relevant empirical evidence, as to the role of economic preferences for measures of trust featured by different degrees of 'generalism'. This section also makes use of a different data source (the German Socio-Economic Panel, GSOEP) to gauge the role of social preferences and personality traits, for which no proxy is available in the SHIW. Section 4 provides an example of the likely overestimation of the role of trust, which occurs if preferences are omitted. The last section concludes with a discussion of our findings.

2. Trust, time and risk preferences

Economists have always recognized the central role of preferences. In particular, theoretical models usually posit preferences that are defined in terms of impatience and risk attitudes, as they are both shown to be crucial in understanding basic economic behaviour, such as consumption, saving and investment. More in general, a number of choices are made under

uncertainty and/or affect the present as well as the future. For instance, recent research has assessed the role of time and risk preferences as predictors for migration (Constant et al., 2011), occupational choices (Bonin et al., 2007), credit card borrowing (Meier and Sprenger, 2010), smoking and alcohol consumption (Chabris et al., 2008), and so on. Likewise, the empirical literature states that it is crucial to consider both time and risk preferences simultaneously (see, e.g., Anderhub et al. 2001; Andersen et al. 2008; Tanaka et al. 2010).[2]

While the concept of trust is traditionally identified in terms of beliefs about others' trustworthiness, recent studies (see, for instance, Fehr, 2009) highlight that preferences are one main cause of trusting behaviour. According to the behavioural definition of trust (Coleman, 1990), an individual (trustor or investor) trusts if (i) he or she voluntarily puts resources at the disposal of another party (the trustee) without any legal commitment on the part of the latter, and (ii) the act of trust is associated with an expectation that it will pay off in terms of the investor's goal (if the trustee is trustworthy (not trustworthy) the investor is better (worse) off than if trust had not been placed). Accordingly, this definition generates two testable propositions concerning the relationship between economic preferences and (behavioural) trust.

Proposition 1*: As the act of trust involves probabilities of yield and loss, then it is negatively correlated with aversion to risk.*

This issue has been investigated mainly through experiments in the laboratory and the field. However, results are mixed. Some studies show that higher trust correlates with less risk aversion (see, e.g., Karlan, 2005; Schechter, 2007), while others find no relationship between trust and behavioural measures of attitudes to risk (see, e.g., Eckel and Wilson, 2004; Ashraf et al., 2006; Houser et al., 2010; McEvily et al., 2012). By contrast, little is known about the validity of Proposition 1 in large and heterogeneous populations. A notable exception is Fehr (2009) who shows that responses to the trust question in the German Socio-economic Panel capture risk preferences, other than beliefs about people's trustworthiness.

Proposition 2*: Since trusting behaviour sets future benefits against present costs (investment), then it is negatively related to impatience.*

Proposition 2 has been less investigated in the experimental literature. Nguyen et al. (2012) find no relationship between time preferences and behaviour in a trust game. By contrast,

[2] Moreover, the interest in modelling preferences remains strong and scholars debate how these parameters could be introduced in economic models (see, e.g., recent contributions by Masatlioglu and Ok, 2007; Netzer, 2009; Benhabib et al. 2010) and the importance of distinguishing between them (Andreoni and Sprenger, 2012).

Fehr and Leibbrandt (2011) examine the role of impatience in cooperation in the field, finding that it is an important and independent predictor of individual behaviour in a common-pool resource problem. We are not aware of any survey evidence for or against this.

3. Empirical Evidence

The Survey of Household Income and Wealth (SHIW) is a representative survey of the Italian population conducted by the Bank of Italy since 1965. In the 2010 wave about 8,000 households were interviewed. The unit of observation is the family, which is defined so as to include all persons sharing a common dwelling and related by blood, adoption or marriage. The SHIW collects detailed information on socio-demographics and economic characteristics, household consumption and income, and real and financial wealth. Questions regarding the whole household are answered by the head of the family (or by the person most knowledgeable about the family finances). Explicitly for the purpose of our research project, in the 2010 wave of the SHIW we included a small set of questions on individual trust attitudes.[3] In this paper we make use of two of them: the standard trust question and an additional question that tries to elicit how trust varies according to the distance between the respondent and the trustee (from relatives to immigrants). Note also that the SHIW is well equipped to measures risk and time preferences as the survey is largely devoted to capturing financial choices.

3.1 Trust and preferences

For the standard *trust question*, the SHIW includes the following: "*Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?*".[4] This question is the same as the one usually adopted in all the most important social surveys (*World Values Survey*, *General Social Survey*, *European Values Surve*y, *European Social Survey*) and we are therefore aware of its pros and cons. Since the scoring for the SHIW question is a 10-point scale (from "You can't be too careful" to "Most people can be trusted"), we can ignore the issue of ambiguity, which is instead typical of a binary measure (see Yamagishi et al. 1999; Miller and Mitamura, 2003); also, the problem of different interpretations among different societies is negligible as we consider only Italians (see again Miller and Mitamura for a cross-country example

[3] For considerations of cost-effectiveness these questions are only put to half of the households interviewed.

[4] The complete wording of the question is: "*Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please answer on a score of 1 to 10, where 1 means you can't be too careful and 10 means that most people can be trusted*."

with American and Japanese interviewees). Notwithstanding, subjective attitudes from survey data could suffer from measurement error, linked to social desirability issues, which arise when respondents want to avoid looking bad in front of the interviewer, and to cognitive problems, related to the order of the questions, their wording, and the mental effort required to answer (Bertrand and Mullainathan, 2001). However, we deal with these issues below, using factor analysis to detect and assess latent sources of (true) variation in some additional measures of trust.

Based on the SHIW, we measure *risk aversion* using a qualitative indicator using the following question: "*When managing your financial investments, do you consider yourself to be more oriented to investments that offer the possibility of: (1) a very high return, with a very high risk; (2) high return with a moderate degree of safety; (3) moderate return and a high degree of safety; (4) low return and no risk*". This is similar to the indicator present in the US Survey of Consumer Finances and has been used in several studies on risk attitudes (see, e.g., Jianakoplos and Bernasek, 1998; Guiso et al., 2011). Moreover, Dohmen et al. (2011) validate the reliability of survey measures of risk attitudes with a field experiment. We measure *time preferences* (that is, impatience) using a qualitative indicator based on the following sentence: "*Suppose you were told you had won on the lottery the equivalent of your households net annual income. The sum will be paid to you in a year's time. However, if you give up part of the sum you can have the rest immediately*", which gives the respondent the chance to choose between five options (from 20 to 0 per cent) for the fraction they are willing to give up. This question is a widely used way to elicit time preferences from a survey (Frederick et al., 2002).

Descriptive statistics are reported in Table 1. Our sample includes 3,569 people born and living in Italy.[5] The average respondent is 60 years old (s.d.= 15 years) and with 9.5 years of formal schooling; 45 per cent are female. Some 57 per cent of the respondents have at most a junior school diploma, while high school and college graduates represent respectively 31 and 12 per cent of the sample. Married respondents account for 62 per cent, while widows/widowers or separated/divorced people represent about 26 per cent of the sample.

To investigate Proposition 1 and 2 empirically we use the following simple specification:

$$(1) \qquad Trust\ Index_{ia} = \alpha_0 + \alpha_1\ Impatience_i + \alpha_2\ Risk\ Aversion_i + X_i\beta + \varphi_a + \varepsilon_{ia}$$

[5] A total of 3,816 individuals responded to the subset of questions relating to trust. We exclude 247 individuals who were born abroad or with missing origin so as to ensure maximum comparability.

where the dependent variable can be respectively, the standard, the generalized, or the particularized measure of trust (see below). *Impatience* and *Risk Aversion* are our two proxies for preferences, X is a vector of individual observable characteristics, which include age, gender and education, and φ is a set of area fixed effect.

Table 2 describes the results we obtain by regressing the standard measure of trust (TRUST) on our proxies for preferences. Note that in each specification we introduce a full set of dummies for region of residence to partial out systematic differences between different geographical areas in Italy (see, e.g., Guiso et al., 2008; de Blasio and Nuzzo, 2010). The first column shows that more impatient and risk averse people trust less. Column 2 (our baseline specification) considers other (individual) characteristics traditionally associated with trust. For instance, a broad literature addresses the effects of age, gender and education on trust (see, e.g., Alesina and La Ferrara, 2002; Helliwell and Putnam, 2007; Buchan et al., 2008). Their inclusion in our specifications is necessary as the same features have been shown to influence also risk and time preferences (see, e.g., Borghans et al., 2009; Dohmen et al., 2012). From Column 2 we observe that women tend to trust less than men, even if this effect is not significant. We also find a weak positive effect of age, such that older persons trust more, while education is confirmed to be a significant predictor of trust. Note that the results in Column 2 show that risk preferences do not robustly predict differences in trust attitudes, in contrast with Proposition 1.

The remaining columns provide a number of robustness checks. In Column 3 we also control for family wealth, as previous empirical evidence suggests that time and risk preferences are related to the household's prosperity (see, e.g., respectively Donkers et al., 2001; Harrison et al., 2002). Columns 4-5 present additional experiments by including, respectively, a quadratic specification for age, interactions between sex and age, and a series of dummies for educational achievements (instead of the index of average years of schooling). The coefficients for impatience and risk aversion remain very stable. In Column 6 we use additional information on place of birth and family background (geographical origin, education and labour status of parents), which have been shown to relate to risk and trust attitudes (Dohmen et al., 2011) and impatience (Kosse and Pfeiffer, 2012). This inclusion dramatically reduces our sample because of missing data. However, previous results stay unchanged. Finally, Table 3 considers Ordered Probit regressions to take into account the ordinal nature of the dependent variable. The results yield the same conclusions.

Overall, the findings from Tables 2 and 3 suggest that time preferences can be safely considered a negative predictor of self-reported trust, in line with Proposition 2. As for the role of

risk preference, our results are more mixed: risk aversion always enters with a negative sign, but its statistical significance is often weak.

3.2 Generalized vs particularized trust

Glaeser et al. (2000) provides a test for the relationship between the standard survey measure of trust and trusting behaviour in an experimental game. As is well known, they do not find any correlation.[6] Possibly, a way to reconcile survey and game evidence is to acknowledge that survey answers could differ depending on the way in which respondents understand the wording "most people" in the question. A useful distinction is between generalized and particularized trust, where the former refers to trust in strangers and the latter indicates trust in known others. The exchange in the market takes place often among unknown (or also anonymous) parties; accordingly, generalized trust is the concept we should refer to when analysing the role of preferences for trusting behaviour. A correlation between survey and experimental trust has been observed in studies which consider anonymous participants on a large scale and use the survey measure of trust in strangers (Fehr at al., 2003; Bellemare and Kröger, 2007; Naef and Schupp, 2009). Furthermore, Gächter et al., (2004) show that experimental trust is correlated with questions about trust in strangers and not with the standard question. Note also that in the case of Italy, the potential for mistakenly referring the trust question to the inner circle of relatives and friends can be even by maximized by the presence of the occurrence of the '*Amoral Familism*' described in Banfield (1958).[7] To check whether responses to the standard trust question measure generalized trust we exploit the SHIW question on trust towards different kinds of people. The question is "*How much trust do you have in: 1) relatives; 2) friends; 3) neighbours; 4) people from your same region; 5) people from other Italian regions; 6) people from EU countries; 7) people from outside EU*", where respondents have to rate their trust for each different category and, as for the standard trust question, the possible answers range on a 10-point scale.

We use the factor analysis to verify whether the 7 single-item indices measure the same "latent" feature. According to the most common criterion (that is, retaining factors with an eigenvalue higher than one), there are two latent factors explaining almost 75 per cent of the total

[6] This result has been replicated in other studies (see, e.g., Gächter et al., 2004; Ashraf et al., 2006), while others again have found the opposite result (see, e.g., Holm and Danielson, 2005; Sapienza et al., 2007).

[7] Supported by the results of in-the-field research on the residents of a small village near Potenza (fictionally called Montegrano), Banfield (1958) concludes that "extreme poverty and backwardness is to be explained largely . . . by the inability of the villagers to act together for their common good or, indeed, for any end transcending the immediate material interest of the nuclear family" (Banfield, 1958, p. 38).

variation. Therefore, we can reasonably conclude that these 7 indicators are measuring two distinct dimensions. Table 4 reports the factor loadings for each variable. The first dimension is related to the responses about trust in people who are more distant from the respondent, while the second dimension is linked to the answers referring to the small circle of family and friends. In the light of this analysis, we get two different indices of trusts: TRUSTGEN (a measure of generalized trust) from the first factor, and TRUSTPAR (an index of particularized trust) from the second factor.[8]

As we verified, TRUSTGEN is significantly correlated with our standard index of trust (0.36), while TRUSTPAR is negatively correlated with it (-0.10). This confirms that the standard trust question is more linked to the component of trust in strangers rather than to trust in people one knows well. This result is reminiscent of Uslaner (2002) and, in the same vein, we observe that low factor loadings on the family/friends variables for TRUSTGEN, compared with the higher ones for the other variables, do not indicate that people trusting strangers do not trust their family and friends. On the contrary, people who believe that distant people can be trusted place on average high trust also in friends and family.[9] The main difference in the two dimensions therefore is that we observe higher generalized trust if trust is placed in everyone, whereas particularized trust is placed only in people one knows well.[10]

Table 5 replicates the specifications of Table 2 using TRUSTGEN as dependent variable[11]. As seen in Column 2, both Propositions 1 and 2 now hold. The estimates suggest that one standard deviation increase in impatience reduces generalized trust by about 0.057 of standard deviation, while one standard deviation increase in risk aversion reduces generalized trust by about 0.076 of a standard deviation. With regard to the other individual features, age and education strongly affect the level of generalized trust, consistent with the fact that experience and education should increase both the willingness and the ability to interact profitably with others.

Table 6 uses TRUSTPAR as dependent variable. As shown, there are now fundamental differences. While impatience continues to have a (weak) negative effect, risk aversion now predicts particularized trust positively and very significantly, so that Proposition 1 does not apply

[8] The distinction between particularism and generalism has a long tradition in the sociological literature, but economists have almost neglected this dichotomy (for an exception, see Sestito, 2011). Empirically, the existence of these two different dimensions is highlighted in de Blasio et al., 2012.

[9] This is validated by the correlation between TRUSTGEN and the average of the 7 single indices (0.97)

[10] This statement is supported by the fact that TRUSTPAR is strongly positively correlated with the difference between trust in family and in non-EU citizens (0.76) that are the extreme bounds of the categorization.

[11] In the remainder of the section, we report only OLS estimates, since TRUSTGEN and TRUSTPAR are continuous variables.

to the case of known others. This result might be interpreted by considering the circle of family and friends as a safe alternative for risk averse people. Finally, the role of the remaining covariates is very limited. The fact that TRUSTGEN and TRUSTPAR are two different dimensions is thus confirmed by the circumstance that their determinants are different as well.

Overall, our result supports the view that generalized trust depends on the individual's willingness to accept the risks involved and their time preferences. This is exactly what a behavioural definition of trust would suggest.

3.3 Dealing with social preferences and personality traits

Until now, we have restricted our set of preferences to include only impatience and risk aversion. However, there could be additional determinants of trust for which we have failed to control.

First, a recent literature provides evidence that social preferences - the concern that people have for the outcomes achieved by others - play a role in human behaviour. Several papers show the influence of other-regarding preferences on economic choices (see Bowles and Polania-Reyes, 2012, for a review). In the case of trust, an important role is played by betrayal aversion, that is the dislike for non-reciprocated trust (see, e.g., Bohnet and Zeckhauser, 2004; Cox, 2004; and Bohnet et al., 2008). Again, Fehr (2009) shows that survey measures of trust are predicted by measures of betrayal aversion and altruism.

Second, additional personality traits may also play a role. Borghans et al. (2008) and Almlund et al. (2011) show that psychological measures of personality are good predictors of socio-economic behaviour. They argue that preferences might depend on personality, but also vice versa, with the link being unclear. However, Rustichini et al. (2012) and Becker et al. (2012) evaluate the predictive power of economic preferences and psychological measures of personality, individually and jointly, in explaining a number of economic outcomes, and show that preferences and personality traits have a comparable predictive power.

We are concerned that if we do not control for social preferences and personality traits, the regressions of trust on measures of risk and time preferences could suffer from noise and omitted variable bias. Unfortunately, for these additional controls we have no measures available in the SHIW. To gauge the importance for our results from having omitted social preferences and personality traits, this section exploits a different source of data. We first replicate our SHIW results using data from the German Socio-Economic Panel (GSOEP) and illustrate that the findings are very similar. Then, we probe robustness by including the measures for social preferences and

personality traits that are available in the GSOEP. Clearly, the extent to which the evidence found for German data applies to the Italian sample could be highly debatable. However, for the time being this appears to be the only option at hand (which can be verified only when Italian data on social preferences becomes available).

The appendix describes the GSOEP data. It also illustrates the procedure we follow to construct GSOEP variables to ensure they are as similar as possible to those collected with the SHIW. Table 7 provides the estimates we obtain with the German data. Column 1 shows that generalized trust is inversely correlated with both impatience and risk aversion. Column 2 presents the results for a specification that replicates the SHIW baseline, which includes age, sex, education and dummies for the state of residence. Note that size of the effects for time and risk preferences are to some extent comparable with those found with the SHIW. In particular, one standard deviation increase in time (risk) preferences is associated with 0.090 (0.095) of a standard deviation decrease in generalized trust with German data and 0.057 (0.076) decrease with Italian data. Column 3 includes a set of controls for social preferences. We introduce both positive and negative reciprocity as they have been found to be barely correlated (Dohmen et al., 2008). Betrayal aversion (that is, negative reciprocity) indicates that people have a dislike of non-reciprocated trust, i.e. a preference for punishing non-reciprocal behaviour,[12] while positive reciprocity is the intention to repay those who have been kind or helpful to us. Finally, we consider also altruism.[13] Columns 3 shows that time and risk preferences remain robust predictors of generalized trust when the covariates for social preferences are included, with the point estimates decreasing only slightly. Finally, BETRAYAL and ALTRUISM enter very significantly (with the expected sign), while RECIPROCITY does not appear to be a significant predictor of trusting behaviour. Note also that the inclusion of the controls for social preferences increases the Adjusted R2 of the regression only very slightly (from .093 to .105).

Next, we add to our previous specification a large number of measures of personality traits that are included in GSOEP. In column 4, we refer to the most widely used taxonomy of character traits, the *Big Five* model. The traits are OPENNESS, CONSCIENTIOUSNESS, EXTRAVERSION, AGREEABLENESS, and NEUROTICISM. It has been shown that measures of the Big Five model are

[12] Bohnet et al. (2008) show that betrayal aversion leads people to be less willing to take risk when a person rather than nature determines the outcome.

[13] Altruistic reasons were found to affect trusting behaviour in the laboratory and in the field (see, e.g., Cox, 2004; Carter and Castillo, 2011). As discussed in Fehr and Gächter (2000), reciprocity and altruism are different, as the former emerging as a response to another action, while the latter is a form of unconditional kindness.

related to trust attitudes (Dohmen et al. 2008),[14] but the contemporary role of preferences and personality traits have not been explored. However, as discussed in Almlund et al. (2011), there is a large debate concerning the existence of other dimensions of personality outside the Big Five. Thus, in Column 5, we introduce two additional traits. LOCUS OF CONTROL refers to the extent to which individuals think that they have control of what happens in their life. OPTIMISM is the generalized expectation of positive over negative outcomes; as such, it is conducive to biasing beliefs and overestimating the probability of good outcomes (Brunnermeier and Parker, 2005).[15] As for the results, we find that time and risk preferences remain robust predictors of generalized trust, even in the specification that includes all the personality traits we can control for using the GSOEP. With regard to these psychological measures, we find that OPENNESS, LOCUS OF CONTROL and OPTIMISM are significantly and positively related to generalized trust, while CONSCIENTIOUSNESS and NEUROTICISM are negative predictors of trusting behaviour. Compared with our baseline, the specification in Column 5 displays an Adjusted R2 that is roughly 50 per cent higher.

Overall, the results in Table 7 provide some reassurance that the estimates for risk and time preferences are not driven by the omission of social preferences or psychological measures. Our estimates suggest that the inclusion of social preferences has very minor implications for the role of our preference variables. As for the personality traits, the possibility that their effect can be picked up by impatience and risk aversion in specifications where the former are not controlled for is a more pressing concern. However, the psychological measures of personality are likely to be endogenously determined with preferences and therefore it is unclear whether they should be considered independent predictors of trusting behaviour.

4. Preferences as omitted variables

This section analyses the importance of considering preferences when estimating the effect of trust on economic outcomes. Omitting to control for preferences can lead into a classical omitted variable problem, as trust endowments and socio-economic behaviour can both be affected by preferences. This problem, of course, is not peculiar to this field: for instance, previous literature

[14] In particular, Dohmen et al. (2008) find that trust is related positively to agreeableness and openness to experience, and negatively to conscientiousness and neuroticism.

[15] Accordingly, it is important to disentangle the influence of optimism from that of risk tolerance and patience as the former can explain different risk perceptions or different beliefs about the future (see, e.g., Ben Mansour et al., 2008).

(see Barsky et al., 1997) has shown that risk and time preferences may determine both health status and socio-economic outcomes, thereby causing the correlation between those variables.

To illustrate this point, we consider a simple example of a trust-sensitive outcome: the probability of holding a credit card, as measured in the SHIW. As many authors have shown (see, e.g., Bertaut and Haliassos, 2006; Castronova and Hagstrom, 2007; Zinman, 2009), electronic payments are often characterized by the geographical separation of buyers and sellers and the absence of a physical real-time exchange. Therefore, credit card usage depends on beliefs about other's trustworthiness: those who trust others less will refrain from using credit cards. Note also that focusing on a financial outcome is very much in line with the way risk and time preferences are measured in the SHIW (see Section 3.1): both proxies are based on responses regarding portfolio choices.

In Table 8 we use our SHIW measure TRUSTGEN to shed light on the effect of generalized trust on the likelihood of holding a credit card. Column 1 shows that the univariate correlation between TRUSTGEN and the probability of holding a credit card is positive and highly significant. This relationship is also robust (Columns 2 and 3) to the inclusion of some of the individual determinants usually considered by the literature (such as age, sex, education, marital status, urban residence etc.). Note, however, that by including these additional individual covariates the point estimates for TRUSTGEN decrease to about 1/3, although remaining highly significant. Column 4 augments the specification of Column 3 by controlling for impatience and risk aversion.[16] Crucially, the effect of TRUSTGEN becomes no longer significant as the point estimates decreases from 0.28 to 0.22.

5. Conclusions

This paper considers the role of preferences in explaining trust. By using results from Italy's survey data, it has shown that both risk preferences and time preferences are important predictors of trust. The paper has also documented that this role of preferences refers to generalized trust, while the impact of preferences on trust in known people is quite different. It has also analysed the possible magnitude of the contribution of social preferences and other psychological indices of personality on trust (which cannot be measured with Italian data). Finally, the paper has provided

[16] For related work on the appropriateness of including risk and time preferences see Laibson et al. (2000) and Meier and Sprenger (2010).

a simple example of what might happen if preferences are taken into account when trust is taken to be a predictor of a given financial behaviour.

We believe that our results can be useful to inform the current debate on the definition and measurement of trusting behaviour. If one is willing to accept that both (i) *the relevant definition of trusting behaviour is the behavioural one* and (ii) *preferences are exogenously given,* then our results highlight that omitting (time and risk) preferences when analysing the role of trust in explaining socio-economic outcomes might pose serious omitted variable challenges.

However, neither proposition (i) nor proposition (ii) seem to have been convincingly proved yet. As for the relevant definition of trust, it has been suggested, for instance, that trust is a property of large groups rather than individuals (see Putnam, 1993, and Fukuyama, 1995) and the act of trust is related to persistent and shared belief and values that help a group to pursue socially valuable targets (see Guiso et al., 2010). As for the role of exogenously given preferences, recent studies (see Fehr and Hoff, 2011) suggest that rather than being considered primitive, preferences reflect social influences. Note that this last argument poses a challenge for the behavioural definition of trust, as the rationale of separating preferences from beliefs loses importance as both become malleable by the social context.

Tables

Table 1. Descriptive Statistics (SHIW data)

	Mean	St. dev.	Min	Max	Obs.
		Trust variables			
Generally speaking do you trust others?	5.621	2.438	1	10	3569
Trust in family	9.176	1.313	1	10	3569
Trust in friends	7.382	1.926	1	10	3569
Trust in neighbours	6.473	2.068	1	10	3569
Trust in people from same region	6.264	1.889	1	10	3569
Trust in people from other regions	5.994	1.859	1	10	3569
Trust in people from EU	5.411	2.014	1	10	3569
Trust in people from outside EU	4.729	2.192	1	10	3569
		Basic individual characteristics			
Age	59.574	15.391	19	99	3569
Female	0.458	0.498	0	1	3569
Edu in yrs	9.481	4.654	0	20	3569
Impatience	1.813	1.488	0	4	3569
Risk Aversion	3.289	0.790	1	4	3569
		Additional individual characteristics			
Wealth	289.435	662.239	-43.500	2612.222	3569
Disposable income	33.818	25.900	0	587.784	3569
Credit card	0.330	0.470	0	1	3569
Marital status:					
Never married	0.120	0.325	0	1	3569
Married	0.619	0.486	0	1	3569
Separated/divorced/widowed	0.261	0.439	0	1	3569
Education:					
Elementary or less	0.299	0.458	0	1	3569
Junior high school	0.276	0.447	0	1	3569
High school	0.308	0.462	0	1	3569
Bachelor degree	0.117	0.321	0	1	3569

Table 2. The impact of Risk and Time Preferences on TRUST

	(1)	(2)	(3)	(4)	(5)	(6)
Impatience	--.097***	--.085***	--.085***	--.085***	--.087***	--.093***
	(.017)	(.017)	(.017)	(.017)	(.017)	(.020)
Risk Aversion	--.044**	--.027	--.026	--.027	--.028	--.013
	(.017)	(.017)	(.017)	(.017)	(.017)	(.020)
Age		.002*	.002	--.001	.001	.004***
		(.001)	(.001)	(.011)	(.001)	(.002)
Female		--.018	--.016	--.030	--.025	--.004
		(.034)	(.034)	(.427)	(.034)	(.039)
Edu in yrs		.024***	.022***	.023***		
		(.004)	(.004)	(.004)		
Wealth			.000*	.000*	.000*	.000
			(.000)	(.000)	(.000)	(.000)
Age squared				.000		
				(.000)		
Age*Female				--.002		
				(.015)		
Age squared*Female				.000		
				(.000)		
Junior high school					.023	.013
					(.049)	(.059)
High school					.145***	.162***
					(.050)	(.062)
Bachelor degree					.283***	.283***
					(.063)	(.078)
Region of residence	YES	YES	YES	YES	YES	YES
Region of birth	NO	NO	NO	NO	NO	YES
Family background	NO	NO	NO	NO	NO	YES
Observations	3569	3569	3569	3569	3569	2820
Adj R2	.047	.056	.056	.056	.055	.053

Notes. Source: SHIW. OLS regressions. Robust standard errors are in parenthesis. * (**) [***] denotes significance at the 10% (5%) [1%] level. Family background includes dummies for origin, education and occupation of parents. Trust, Impatience and Risk Aversion are standardized to be mean zero and standard deviation one.

Table 3. The impact of Risk and Time Preferences on TRUST

	(1)	(2)	(3)	(4)	(5)	(6)
Impatience	--.111***	--.100***	--.100***	--.100***	--.102***	--.110***
	(.018)	(.018)	(.018)	(.018)	(.018)	(.021)
Risk Aversion	--.051***	--.036*	--.035*	--.036*	--.037**	--.019
	(.018)	(.019)	(.019)	(.019)	(.019)	(.022)
Age		.002*	.002	--.002	.001	.004**
		(.001)	(.001)	(.011)	(.001)	(.002)
Female		--.007	--.004	.041	--.014	.003
		(.035)	(.035)	(.449)	(.036)	(.041)
Edu in yrs		.024***	.022***	.023***		
		(.004)	(.004)	(.004)		
Wealth			.000*	.000*	.000*	.000
			(.000)	(.000)	(.000)	(.000)
Age squared				.000		
				(.000)		
Age*Female				--.004		
				(.016)		
Age squared*Female				.000		
				(.000)		
Junior high school					.018	.015
					(.052)	(.062)
High school					.132**	.165**
					(.052)	(.065)
Bachelor degree					.276***	.285***
					(.068)	(.085)
Region of residence	YES	YES	YES	YES	YES	YES
Region of birth	NO	NO	NO	NO	NO	YES
Family background	NO	NO	NO	NO	NO	YES
Observations	3569	3569	3569	3569	3569	2820
Pseudo R2	.012	.014	.014	.014	.014	.021

Notes. Source: SHIW. Ordered Probit regressions. Robust standard errors are in parenthesis. * (**) [***] denotes significance at the 10% (5%) [1%] level. Family background includes dummies for origin, education and occupation of parents. Trust, Impatience and Risk Aversion are standardized to be mean zero and standard deviation one.

Table 4. Factor loadings for the dimensions of Trust (SHIW data)

	FIRST FACTOR	*SECOND FACTOR*
TRUST IN FAMILY	-0.064	**0.804**
TRUST IN FRIENDS	0.270	**0.422**
TRUST IN NEIGHBOURS	**0.339**	0.270
TRUST IN PEOPLE FROM SAME REGION	**0.426**	0.099
TRUST IN PEOPLE FROM OTHER REGIONS	**0.454**	-0.006
TRUST IN PEOPLE FROM EU	**0.468**	-0.181
TRUST IN PEOPLE FROM OUTSIDE EU	**0.448**	-0.242

Notes. Factor analysis using the principal-component method and orthogonal varimax rotation. Correlation coefficients between the variables and factors are reported for factors with eigenvalues higher than one.

Table 5. The impact of Risk and Time Preferences on TRUSTGEN

	(1)	(2)	(3)	(4)	(5)	(6)
Impatience	--.066***	--.057***	--.057***	--.057***	--.059***	--.042**
	(.017)	(.017)	(.017)	(.017)	(.017)	(.020)
Risk Aversion	--.081***	--.076***	--.076***	--.077***	--.077***	--.060***
	(.016)	(.017)	(.017)	(.017)	(.017)	(.019)
Age		.006***	.006***	--.011	.005***	.008***
		(.001)	(.001)	(.011)	(.001)	(.002)
Female		--.015	--.015	--.223	--.020	--.039
		(.032)	(.032)	(.402)	(.032)	(.037)
Edu in yrs		.023***	.023***	.024***		
		(.004)	(.004)	(.004)		
Wealth			.000	.000	.000	.000
			(.000)	(.000)	(.000)	(.000)
Age squared				.000		
				(.000)		
Age*Female				.006		
				(.014)		
Age squared*Female				--.000		
				(.000)		
Junior high school					.061	.043
					(.047)	(.057)
High school					.171***	.170***
					(.048)	(.058)
Bachelor degree					.273***	.245***
					(.060)	(.078)
Region of residence	YES	YES	YES	YES	YES	YES
Region of birth	NO	NO	NO	NO	NO	YES
Family background	NO	NO	NO	NO	NO	YES
Observations	3569	3569	3569	3569	3569	2820
Adj R2	.119	.129	.128	.129	.126	.133

Notes. Source: SHIW. OLS regressions. Robust standard errors are in parenthesis. * (**) [***] denotes significance at the 10% (5%) [1%] level. Family background includes dummies for origin, education and occupation of parents. Trust, Impatience and Risk Aversion are standardized to be mean zero and standard deviation one.

Table 6. The impact of Risk and Time Preferences on TRUSTPAR

	(1)	(2)	(3)	(4)	(5)	(6)
Impatience	--.029	--.027	--.026	--.027	--.026	--.023
	(.018)	(.019)	(.019)	(.019)	(.019)	(.020)
Risk Aversion	.080***	.087***	.088***	.086***	.088***	.052**
	(.017)	(.018)	(.018)	(.018)	(.018)	(.020)
Age		--.002	--.002	.002	--.002	--.000
		(.001)	(.001)	(.011)	(.001)	(.001)
Female		--.050	--.048	.496	--.048	--.047
		(.033)	(.034)	(.415)	(.034)	(.036)
Edu in yrs		.001	--.000	.001		
		(.004)	(.004)	(.004)		
Wealth			.000	.000	.000	.000
			(.000)	(.000)	(.000)	(.000)
Age squared				--.000		
				(.000)		
Age*Female				--.024		
				(.015)		
Age squared*Female				.000*		
				(.000)		
Junior high school					--.010	--.044
					(.049)	(.056)
High school					.021	--.060
					(.050)	(.059)
Bachelor degree					--.045	--.120
					(.064)	(.077)
Region of residence	YES	YES	YES	YES	YES	YES
Region of birth	NO	NO	NO	NO	NO	YES
Family background	NO	NO	NO	NO	NO	YES
Observations	3569	3569	3569	3569	3569	2820
Adj R2	.050	.050	.051	.052	.050	.036

Notes. Source: SHIW. OLS regressions. Robust standard errors are in parenthesis. * (**) [***] denotes significance at the 10% (5%) [1%] level. Family background includes dummies for origin, education and occupation of parents. Trust, Impatience and Risk Aversion are standardized to be mean zero and standard deviation one.

Table 7. Preferences and Generalized Trust (GSOEP data)

	(1)	(2)	(3)	(4)	(5)
Impatience	--.085***	--.090***	--.077***	--.055***	--.054***
	(.010)	(.009)	(.009)	(.010)	(.010)
Risk Aversion	--.111***	--.095***	--.095***	--.075***	--.065***
	(.010)	(.010)	(.010)	(.010)	(.010)
Age		.001*	.000	.001**	.002***
		(.001)	(.001)	(.001)	(.001)
Female		.083***	.066***	.103***	.102***
		(.017)	(.017)	(.018)	(.018)
Edu in yrs		.090***	.083***	.078***	.073***
		(.003)	(.003)	(.003)	(.003)
Betrayal			--.091***	--.088***	--.073***
			(.009)	(.010)	(.010)
Reciprocity			--.001	.016*	.017*
			(.009)	(.009)	(.009)
Altruism			.060***	.056***	.054***
			(.009)	(.008)	(.008)
Openness				.020**	.016*
				(.010)	(.010)
Conscientiousness				--.100***	--.109***
				(.010)	(.010)
Extraversion				.008	--.005
				(.010)	(.010)
Agreeableness				.015	.010
				(.010)	(.010)
Neuroticism				--.116***	--.079***
				(.010)	(.010)
Locus of Control					.056***
					(.010)
Optimism					.098***
					(.010)
State of residence	YES	YES	YES	YES	YES
Observations	12709	12709	12709	12709	12709
Adj. R2	.034	.093	.105	.123	.135

Notes. Source: GSOEP. OLS regressions. Robust standard errors are in parenthesis. * (**) [***] denotes significance at the 10% (5%) [1%] level. Generalized Trust, Impatience, Risk Aversion, Betrayal, Reciprocity, Altruism and all the personality traits are standardized to be mean zero and standard deviation one.

Table 8. Generalized Trust and credit card ownership

	(1)	(2)	(3)	(4)
Trustgen	.061***	.028**	.028**	.022
	(.011)	(.013)	(.013)	(.013)
Age		.033***	.024*	.024*
		(.012)	(.013)	(.013)
Age squared		--.000***	--.000***	--.000***
		(.000)	(.000)	(.000)
Female		--.123**	--.077	--.069
		(.052)	(.060)	(.060)
Edu in yrs		.087***	.071***	.069***
		(.007)	(.007)	(.007)
Ln(disposable income)		.837***	.813***	.793***
		(.054)	(.059)	(.059)
Impatience				--.057***
				(.018)
Risk Aversion				--.068**
				(.033)
Additional controls	NO	NO	YES	YES
Observations	3569	3564	3564	3564
Pseudo R2	.007	.273	.287	.290

Notes. Source: SHIW. Probit regressions of holding (at least) a credit card. Robust standard error in parenthesis. * (**) [***] denotes significance at the 10% (5%) [1%] level. The last two specifications include also dummies for urban residence, marital status and occupation.

Appendix. Data construction for Table 7

The GSOEP is a longitudinal survey representative of the resident German population. We focus mainly on the 2008 wave because it includes most of the questions we have to use to replicate SHIW findings.[17] Respondents are asked for personal information, which includes demographics, socio-economic characteristics, attitudes and preferences on a wide range of topics. Our sample includes 12,709 people. Descriptive statistics are reported in Table A1. The average respondent is 51 years old (s.d.= 16 years) and with 12.3 years of formal schooling; 52 per cent are female. Some 14 per cent of the respondents have at most a junior school diploma, while high school and college graduates represent respectively 62 and 24 per cent of the sample. Married respondents represent 64 per cent, while widows/widowers or separated/divorced people make up about 17 per cent of the sample.

Table A1. Descriptive statistics (GSOEP data)

	Mean	St. dev.	Min	Max	Obs.
Trust variables					
On the whole one can trust people	2.377	0.662	1	4	12709
Nowadays one can't rely on anyone	2.633	0.762	1	4	12709
If one is dealing with strangers, it is better to be careful before one can trust them	1.714	0.719	1	4	12709
Basic individual characteristics					
Age	51.151	16.200	20	99	12709
Female	0.522	0.499	0	1	12709
Edu in yrs	12.337	2.730	7	18	12709
Impatience	3.897	2.258	0	10	12709
Risk aversion	5.694	2.268	0	10	12709
Additional individual characteristics					
Marital status					
Never married	0.190	0.392	0	1	12709
Married	0.644	0.479	0	1	12709
Separated/divorced/widowed	0.166	0.372	0	1	12709
Education:					
Less than high school	0.135	0.342	0	1	12709
High school	0.623	0.485	0	1	12709
Bachelor degree	0.242	0.428	0	1	12709

[17] However, we exploit the panel structure of the data to obtain some information from previous waves. In particular, we use the 2005 wave to measure social preferences and the other personality traits.

To replicate our SHIW results, we need a measure of trust. The GSOEP contains a battery of questions about the trust attitudes of individuals. Respondents are asked to what extent they separately agree with the following three statements: *a) In general, you can trust people; b) Nowadays, you can't rely on anybody; c) If dealing with strangers, it is better to be careful about trusting them*. In all cases, people have the chance to choose between four possibilities (from "disagree strongly" to "agree strongly"). Factor analysis (see Table A2) indicates how likely these items are to measure the same dimension. Naef and Schupp (2009) show that the GSOEP composite measure of trust is a valid and reliable measure of trust in strangers and that it correlates with trusting behaviour in an experiment game. They prove again that this dimension is distinct from trust in institutions and trust in known others. The first component might therefore be seen as the German counterpart of the TRUSTGEN based on SHIW (unfortunately, the GSOEP does not include questions to derive a counterpart for TRUSTPAR).

Table A2. Factor loadings for Generalized Trust (GSOEP data)

ON THE WHOLE ONE CAN TRUST PEOPLE	**0.605**
NOWADAYS ONE CAN'T RELY ON ANYONE	**-0.635**
IF ONE IS DEALING WITH STRANGERS, IT IS BETTER TO BE CAREFUL BEFORE ONE CAN TRUST THEM	**-0.481**

Notes: Factor analysis using the principal-component method. Correlation coefficients between the variables and factors are reported for the only factor with eigenvalue higher than one.

We measure attitudes towards risk using a qualitative indicator based on the question: *"Are you generally willing to take risks, or do you try to avoid them? Please tick a box on the scale, where the value 0 means risk averse and the value 10 means fully prepared to take risks"*. Impatience is measured by responses to the following statement: *"Are you generally an impatient person, or someone who always shows great patience? Please tick a box on the scale, where the value 0 means very impatient and the value 10 means very patient"*. Both these items have been considered in several studies using GSOEP data (see, e.g., Dohmen et al. 2010, 2011; Jaeger et al., 2010).

With regard to social preferences, in line with Fehr (2009) we consider betrayal aversion, positive reciprocity and altruism. Betrayal aversion means that people have a dislike of non-reciprocated trust. Accordingly, it is typically associated with negative reciprocity, i.e. to a

preference for punishing non-reciprocal behaviour. To measure it, we consider three statements included in the GSOEP: *a) If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost; b) If somebody puts me in a difficult position, I will do the same to him/her; c) If somebody offends me, I will offend him/her back*. Responses are on a 7-point scale from "does not apply to me at all" to "applies to me perfectly". We combine the information from each of the three statements using principal component analysis to obtain BETRAYAL. Positive reciprocity is the intention to repay those who have been kind or helpful to us. In this case, we consider three other questions included in the GSOEP: *d) If someone does me a favour, I am prepared to return it; e) I go out of my way to help somebody who has been kind to me before; f) I am ready to undergo personal costs to help somebody who helped me before.* Again, responses are on a 7-point scale from "does not apply to me at all" to "applies to me perfectly". RECIPROCITY combines them by using principal components analysis. Finally, we also consider some other-regarding preferences like altruism. To measure it, we consider the frequency with which respondents perform voluntary work and thus the variable ALTRUISM is coded on a 5-point scale from "never" to daily".

Finally, we consider other personality traits that are included in GSOEP. First, we refer to the most widely used taxonomy of character traits, which is the *Big Five* model. To introduce the *Big Five* facets in our analysis, in line with previous work, we consider a short (15-item) personality test included in the 2005 wave of the GSOEP. Each of the 15 statements begins with "I see myself as someone who" and responses are on a 7-point scale from "does not apply to me at all" to "applies to me perfectly". AGREEABLENESS, CONSCIENTIOUSNESS, EXTRAVERSION, NEUROTICISM and OPENNESS are derived from principal component analysis and combine responses to five separate groups of questions.[18] However, there is a large debate about the existence of other dimensions of personality outside of the *Big Five*. Accordingly, we consider two additional traits that are locus of control and optimism. Locus of control refers to the extent to which individuals think that they have control of what happens in their life. In the GSOEP this trait is measured by a 10-item test. The statements assess how much people believe life outcomes depend on their actions or are determined by luck and destiny. Each question is answered on a 7-point scale

[18] AGREEABLENESS combines: a) has a forgiving nature; b) is considerate and kind to others; c) is sometimes somewhat rude to others (with reversed sign). CONSCIENTIOUSNESS combines: d) does a thorough job; e) does things effectively and efficiently; f) tends to be lazy (with reversed sign). EXTRAVERSION combines: g) is communicative, talkative; h) is outgoing, sociable; i) is reserved (with reversed sign). NEUROTICISM combines: j) is relaxed, handles stress well (with reversed sign); k) gets nervous easily; l) worries a lot. OPENNESS combines: m) is original, comes up with new ideas; n) has an active imagination; o) values artistic experiences. Note that letters do not correspond to the ordering in the original questionnaire, which is not clustered by group of items.

ranging from “disagree completely” to “agree completely”. We combine the information using principal component analysis to obtain LOCUS OF CONTROL. In particular, higher values indicate a stronger belief that the person can determine their life course. Finally, optimism is the generalized expectation of positive over negative outcomes. Accordingly, OPTIMISM is measured by the following question: *“When you think about the future, are you optimistic, more optimistic than pessimistic, more pessimistic than optimistic, pessimistic?”*.

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