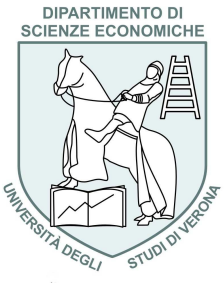

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CAN RISK AVERSE HOUSEHOLDS MAKE RISKY INVESTMENTS? THE ROLE OF TRUST IN OTHERS*

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Abstract

Using the 2006 wave of the Survey on Health, Ageing and Retirement in Europe (SHARE), this paper sheds light on the role jointly played by individuals' financial risk tolerance and their level of trust in others (generalized trust) in affecting their risky assets investments. We document that large variation in risk tolerance and trust exists across European countries and households and we show that risky assets investments are more frequent and larger in households featuring either risk tolerance or (to a smaller extent) a combination of risk aversion and trust. Trust thus acts as a substitute (albeit an imperfect one) for risk tolerance. Our findings have implications for our understanding of heterogeneity in household financial decisions as well as of the role that trust can play as a lubricant of the economic system.

Keywords: Portfolio Choice; Risk Tolerance; Generalized Trust.
JEL Classification: D14; D03; G11; D81.

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1. Introduction

In the last decades, several studies have been trying to assess the main determinants of investors' portfolio choice, and in particular with respect to the decision to invest in risky assets such as stocks. Earlier studies relate risky investment to basic socio-demographic characteristics, typically finding correlation with *individual-level* variables such as age, gender, education and wealth (e.g., Cohn et al., 1975; Friend and Blume, 1975.) More recently, researchers, in addition to providing further evidence on the relevance of individual characteristics for portfolio choice (e.g., Guiso and Paiella, 2008), focused on the link between portfolio choice and a variable directly dealing with the *interpersonal* dimension such as trust in others, finding that stock market participation is more likely among more trusting individuals (see Guiso et al., 2008; Georgarakos and Pasini, 2011.)

In this empirical paper, we will also concentrate on trust attitude measured at the household level but, unlike prior work, we take a different (and arguably complementary) path: we examine, to our knowledge for the first time, the empirical relationship between individual investors' financial risk attitude and their trust in others and shed light on the role that these variables *jointly play* in affecting portfolio decisions.

Investment in risky financial assets is driven by personal preferences toward risk according to the mean-variance framework (Markowitz, 1952), to the extent that observed portfolio composition is treated as a proxy for risk attitude (e.g., Riley and Chow, 1992; Bucciol and Miniaci, forthcoming.) It is by now common knowledge from the literature that financial risk attitude is widely heterogeneous in the population, it is highly correlated with individual characteristics (e.g., age, gender, education, wealth and cognitive ability; see, e.g., Guiso and Paiella, 2008) and, to some extent, genetically transmitted (Cesarini et al., 2010.) In this paper we rely on a self-reported measure of risk attitude to assess individuals' *risk tolerance*. Self-assessed measures have proven to be reliable indicators of risk attitude (e.g., Dohmen et al., 2011.)

Next, we focus on a variable capturing the degree of individuals' trust in others, i.e., so called 'generalized trust'. Trust plays a central role in almost all human relationships and it is extremely important in economic and financial ones: since trust can be viewed as "the belief a person has that his counterpart in a transaction will not

take advantage of him" (Guiso, 2010) and legal protection is typically imperfect and costly, it follows that even in advanced countries economic transactions call for a minimum amount of trust to effectively work. As dramatically confirmed by the recent financial crisis, this holds true also for the proper functioning of financial markets (Guiso, 2010.) Generalized trust can be viewed as a key component of so called 'social capital' and it has been described as an important lubricant of social systems (Arrow, 1974.) At the country level, trust has been shown to be related to important economic variables such as GDP growth, inflation, and the volume of trade between countries (respectively see Knack and Keefer, 1997; LaPorta et al., 1997; Guiso et al., 2009.)

In this paper, we assess the impact of both self-assessed risk attitude and the level of individuals' generalized trust on their portfolio choices.[1] More specifically, we focus on the *interplay* between the two variables, in their influence on investment decisions in risky financial assets (directly held stocks.) In principle, some may plausibly argue that, at the micro level, risk tolerance and trust are *complements*, in the sense that both are necessary to induce risky financial behavior. In contrast, it might instead be the case that they are *substitutes*, so that a high level of trust might (at least partly) compensate for the absence of risk tolerance and be enough for risky financial decisions to occur. In the latter case, the channel at work could be the following: high (resp., low) trust in others increases (resp., decreases) the expected return of financial investments, as individual investors' level of trust makes them more (resp., less) likely to believe that contracts will be respected by their counterparts. In other words, generalized trust may affect households' perception of the riskiness of a given investment. Therefore, in the presence of a high level of trust in others, even risk averse individuals might end up making risky investment choices.

To the best of our knowledge, data on risk tolerance and generalized trust are separately available in several household surveys, but they are treated together only in the Survey on Health Ageing and Retirement in Europe (SHARE.) For this reason, SHARE is an ideal source of data for our purpose. Moreover, by exploiting the nature of the dataset, we will be able to make a cross-country comparison of the relationship between risk attitude, trust and portfolio decisions in thirteen European countries with large differences in terms of size, GDP, market capitalization and saving behavior.

[1] Recent work confirms that risk attitude and trust in others are governed by distinct cognitive processes (see, e.g. Ahern et al., 2014).

We document that wide variation in risk tolerance and trust exists across European countries and households. Our main results, in addition to confirming previous evidence on the correlation between portfolio decisions and socio-demographic characteristics, show that risky assets investment is more frequent in the presence of risk tolerance or high levels of trust. Interestingly, we document that risky assets investments are uncorrelated with trust in the presence of risk tolerance, and positively correlated with trust when households are risk averse – even though the size of this correlation is not as large as the one involving risky assets investment and risk tolerance. Hence, trust seems to act as a substitute (albeit an imperfect one) for risk tolerance.

The remainder of the paper is structured as follows. Section 2 contains a literature review on the importance of individuals' risk attitude and their trust in others for their financial decisions, while in Section 3 we present the data that we use to explore the topic. Section 4 contains the main findings of our analysis and Section 5 concludes.

2. Literature review

In this section, we recall some of the major findings obtained so far in the streams of economic literature dealing with the two dimensions that are central for our analysis of financial risk taking, that is *risk attitude* (Sub-section 2.1) and *trust* (Sub-section 2.2.)

2.1. Risk attitude

Many scholars have been putting their efforts in trying to understand what can affect the individuals' predisposition towards risk and, in turn, how risk attitude influences a large number of human behaviors. These behaviors include, among others, financial portfolio management (Xiao et al., 2001), purchase of insurance (e.g., Williams, 1966), preferences for gambles (Kahneman and Tversky, 1979), and even the distance from which people choose to toss a ring onto a pole (McClelland, 1967.) Even if the concept of risk attitude is relevant for several domains of application, in this paper we will exclusively concentrate our attention on the *financial* one. The predisposition or attitude toward risk has been called "risk tolerance".

In general, individuals' risk tolerance has been measured in one of three ways: from observable outcome choices such as investment decisions (e.g., Halek and Eisenhauer, 2001; Bucciol and Miniaci, 2011), from choices between hypothetical lotteries (e.g., Guiso and Paiella, 2008; Kimball et al., 2009) or from self-reported measures (e.g., Shaw, 1996; Dohmen et al., 2011.) In this paper, we develop our analysis using a *self-reported* measure of risk tolerance. Previous work comparing measures obtained from different sources suggests that simple self-reported measures are highly correlated with more complex measures derived from observable outcomes (Bucciol and Miniaci, 2011) or hypothetical lotteries (Dohmen et al., 2011) and, in the financial domain, they may even be better able to explain actual portfolio decisions than the alternative measures (Kapteyn and Teppa, 2011), as they are easier to understand.

In the literature, there is robust evidence that financial risk attitude is widely heterogeneous in the population and varies with individual characteristics such as age, gender, education and wealth (see, e.g., Barsky et al., 1997; Halek and Eisenhauer, 2001; Bucciol and Miniaci, 2011.) Recently, some scholars demonstrated the existence of a link also between portfolio choice and a variable directly related to the interpersonal dimension such as trust in others (Guiso et al., 2008.)

2.2. Trust

Trust plays a key role in almost all human relationships, from friendship and family ties to economic and financial interactions. Due to its relevance, this notion has attracted the interest of many scholars in different social sciences, and the attention for this topic has been steadily growing during the last decades. Some scholars contributed to the development of experimental tools for measuring trust (Fehr et al., 1993) and its determinants (Bohnet et al., 2004, 2008; Eckel and Wilson, 2004; Houser et al., 2008.) The growing availability of survey measures of trust in international panel data sets has stimulated both the analysis of the impact of institutions on trust (Bohnet and Huck, 2004; Brown et al., 2004) and cross-national comparisons of trust (Knack and Keefer, 1997; LaPorta et al., 1997; Guiso et al., 2009.) Knack and Keefer (1997) report positive correlations between a measure of trust and a country's average annual GDP growth rate between 1980 and 1992. LaPorta et al. (1997) show that a large share of trusting people is negatively correlated with inflation rates and positively correlated with GDP

growth across countries. More recently, Guiso et al. (2009) find that higher bilateral trust between two countries is associated with more trade between the countries and document that this effect is stronger for more trust-intensive goods.

The same authors also provide microeconomic evidence on the role of trust in financial markets (Guiso et al., 2004, 2008.) In their 2008 paper, for example, they show that less trusting individuals are less likely to buy stock, and, when they do so, they buy less of it. The authors suggest that lack of individual trust in the stock market could partly explain the so called "participation puzzle" – that is, why so few people take advantage of the existence of a stock market. Georgarakos and Pasini (2011) offer evidence that both regional trust and sociability are important determinants of stock market participation in Europe. Pevzner et al. (forthcoming) examine the effect of societal trust on investor reactions to corporate earnings announcements and find that these reactions are significantly higher in more trusting countries. They also document that the positive effect of trust is stronger when a country's investor protection and disclosure requirements are weaker.

A further, closely related question that needs to be addressed in empirical work on trust is the following: what is the best way to measure it? In the last years, trust has been frequently assessed through laboratory experiments based on the classic 'trust game' design (Berg et al., 1995) or by means of survey data based on self-reported measures of individuals' levels of trust in others. A large number of papers generally measure trust relying on the answer to the World Values Survey (WVS) and General Social Survey (GSS) question: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?"[2] Our analysis makes use of a similar variable. Therefore, we will consider a self-reported measure of so called 'generalized trust', i.e., the amount of trust that individuals have in people they *do not personally know*. Unlike variables capturing trust in friends or relatives (that matter in relational contracts), generalized trust is the component of social capital that has been shown to play an important role for the efficiency of *large-scale*, *anonymous* market economies, as it turned out to be associated with financial development (Guiso et al.,

[2] In the past few years, scholars tried to validate the power of this measure to give an accurate evaluation of individuals' trust. Fehr et al. (2002), using a large sample of German households, show that the sender behavior in a trust game is correlated with other survey-based measures of trust. Glaeser et al. (2000), however, challenge this result suggesting that the question provides a measure of trustworthiness rather than trust.

2004) and economic growth (Knack and Keefer, 1997.) In other words, to borrow Putnam's (2000) terminology, we will look at a form of *bridging* – rather than *bonding* – social capital, that is what so far seems the most economically relevant type of social capital.[3]

3. Data

We employ data from the Survey on Health, Ageing and Retirement in Europe (SHARE), collected between 2006 and 2007 (2006 wave)[4]. SHARE is an interdisciplinary survey run every two years since 2004 on a sample of households whose head is aged 50 or more in a host of several European countries (see Börsch-Supan et al., 2008.)[5] The thirteen countries surveyed in the 2006 wave range from the North (Sweden and Denmark) to the South (Italy, Spain and Greece), from the West (Austria, Belgium, France, Germany, the Netherlands and Switzerland) to the East (Poland, Czech Republic.) In the year under investigation the countries showed large differences in terms of population size (from 5 million inhabitants of Denmark to 84 million inhabitants of Germany[6]), per capita GDP (from 18 thousand USD of Poland to 53 thousand USD of Switzerland), stock market capitalization (from 31% of GDP for Czech Republic to 283% of GDP for Switzerland) and saving habits (from 14% of GDP for Greece to 39% of GDP for Switzerland[7])

The sample is roughly balanced across the different countries, which means that smaller countries are over-represented. For this reason, and to make our analysis

[3] The survey with the most comprehensive information on trust is the World Value Survey. Narrowing the sample to the period and the countries under investigation in this paper, it is possible to show that generalized trust is positively highly correlated with measures of trust in specific persons (e.g., family, neighbourhood) or institutions (e.g., press, government.)

[4] Data are freely available at www.share-project.org. In this paper we use version 2.6 of the dataset.

[5] The 2006 wave was also run in one non-European country, Israel. We chose to exclude this country to focus on Europe only. In the aggregate, the Israelian sample is characterized by levels of risk attitude, trust and investment in risky assets that are in line with the average of the other countries.

[6] United Nations – World Population Prospects: http://esa.un.org/unpd/wpp/Excel-Data/population.htm.

[7] Source for this and the previous three statistics: World Bank World Bank – World Development Indicators: http://data.worldbank.org/indicator/.

representative of the actual situation in Europe, our subsequent analysis makes use of the weights provided by SHARE.[8]

From the original SHARE sample we focus on the household heads, excluding those aged more than 80 who are deliberately over-sampled in the SHARE design, and households with net worth below 10 thousand euros (purchasing power parity adjusted.) Our final sample is made of 13,227 observations with full information on our variables of interest. Unfortunately we cannot expand our dataset to include other waves in addition to the 2006 one. Questions on risk attitude and trust in others – the two key dimensions in this study – are asked for the first time in the 2006 wave; they are then asked in the 2010 wave, but only to the individuals newly entered in the sample, that were selected to be younger than the original sample (in order to reduce the overall sample age and let it constant over waves.) By including the 2010 wave in the analysis we would then look at two samples with different individual characteristics and observed in two periods with largely different economic conditions (before and during the financial crisis.) Moreover, there would be a consistency problem if we used the 2010 dataset together with the 2006 one: in fact, imputations of missing data were based on a different procedure.[9]

In the remainder of this section we provide summary statistics on the sample variables (Sub-section 3.1) and specifically on risk attitude and trust (Sub-section 3.2.)

3.1. Summary statistics

Our analysis makes use of the variables whose summary statistics are reported in Table 1. In addition to the variables on risk attitude and trust, described in detail in Sub-section 3.2, we have information on the standard socio-demographic variables (e.g., age, gender, education) and economic variables (home-ownership, net worth adjusted for purchasing power parity.)[10] The table documents that the average individual is aged 63

[8] SHARE provides a list of weights, differing along several dimensions (e.g., the unit of observation, the sample type.) We use the calibrated cross-sectional weights at the household level in the main sample, which are more appropriate for our analysis.

[9] A relevant example is the imputation of asset holdings. In this paper we are interested in direct stock holdings of each household. Unfortunately, such information is no longer available in the imputed dataset of the 2010 wave, where only a broader asset category (including bond, stocks and mutual fund jointly) has been imputed.

[10] Variables on net worth and amounts invested in single financial assets come from the imputation file of SHARE. Imputed data are estimates of monetary values of interest for individuals who did not supply an

and likely to own the house she lives in. Since the respondents are 50 years old or more, most of them are married and have children. For the same reason, only a relatively small fraction of individuals is still working. As for education attainment, roughly half of the sample does not have high school or higher degree. This variable can have a great impact on the level of risk attitude since, as pointed out in Sub-section 2.1, the lack of financial literacy significantly increases aversion to risk and decreases the probability of buying risky assets. Individuals with limited education background may not have the necessary knowledge to be able to acquire an adequate level of financial literacy.

TABLE 1 ABOUT HERE

In this paper we measure portfolio decisions as follows. First, we consider the financial portfolio as made of bank accounts, contractual savings, life insurances, government and corporate bonds, retirement accounts, mutual funds and stocks, i.e., the financial instruments recorded in SHARE. We then focus on the riskiest category – directly held stocks – that we generically label risky assets. In the analysis we define two variables, namely the *risky assets holding* and the *risky assets share*. The former is a binary variable equal to one if the household owns any risky assets, while the latter is the share of the financial portfolio held in risky assets.

Figure 1 depicts for each SHARE country the proportion of households holding risky assets (panel a) and the average portfolio share in risky assets (panel b.) The pattern shows wide heterogeneity, going from a 3% holders and a 1% share in Greece to a 72% holders and a 26% share in Sweden. In general, Southern and Eastern European countries are less likely to own risky assets than Northern and Western countries. This heterogeneity may result from variations in financial literacy and development of the financial sector, from risk attitude and (possibly) levels of trust in others.

FIGURE 1 ABOUT HERE

answer and coincide with observed data in all the other cases. Ignoring the observations with missing data would lead to inefficient and possibly biased estimates; the imputed data are computed taking into account the information the respondent directly supplies in the survey.

3.2. Risk attitude and trust

SHARE asks the following question to detect individuals' self-assessed attitude towards financial risk. The question is the same as in the US Survey of Consumer Finances:

> *"When people invest their savings they can choose between assets that give low return with little risk to lose money, for instance a bank account or a safe bond, or assets with a high return but also a higher risk of losing, for instance stocks and shares. Which of the statements on the card comes closest to the amount of financial risk that you are willing to take when you save or make investments?*
>
> *1. Take substantial financial risks expecting to earn substantial returns*
> *2. Take above average financial risks expecting to earn above average returns*
> *3. Take average financial risks expecting to earn average returns*
> *4. Not willing to take any financial risks"*

Given the high concentration of answers (75.60%) in the last option, in our analysis we consider a binary variable equal to 0 if the individual is "not willing to take any financial risks" and 1 otherwise. As a result the variable, that we label *risk tolerance*, indicates whether the individual is risk tolerant or not. Panel a) of Figure 2 displays the proportion of risk tolerant individuals in each country according to this variable. The proportion ranges from 10% for Spain to 49% for Denmark. It is immediately clear a large difference across European areas: we indeed find more frequent risk tolerance in Northern and Western Europe, and less frequent tolerance in Eastern end Southern countries, in a way similar to the distribution of risky assets shown in Figure 1.

SHARE also asks the respondent to state her own level of trust in others (i.e., generalized trust.) The question is similar to the one included in the World Value Survey[11]:

[11] The only difference is that, in our data, the answer is reported in a 0-10 scale rather than as "yes" or "no".

"I would now like to ask a question about how you view other people. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?
Please tell me on a scale from 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted."

Answers are split along the whole scale, although nearly 62% of the respondents declare a trust level between 5 and 8, with a mode on 5 (chosen by 24% of the respondents.) The variable is highly correlated with risk tolerance: on average it is equal to 5.71 among risk tolerant households, and 5.15 among risk averse households. The difference is significant according to a mean-comparison F-test (p-value <0.01.)

Panel b) of Figure 2 displays the average level of trust in the countries we analyze. Trust ranges from 4.61 for France to 7.35 for Denmark, and its ranking is in line with that from other sources.[12] The pattern identified by this variable is indeed similar to the one of risk tolerance: it turns out that Northern countries overall display high levels of trust, while Southern countries display low levels of trust. Our graphical evidence from Figure 2 then reveals the existence of a positive correlation between generalized trust and risk tolerance, and the comparison with Figure 1 suggests that both dimensions are positively correlated with the decision to invest in risky assets.

FIGURE 2 ABOUT HERE

The main goal of this paper is to explore the role *jointly played* by risk attitude and trust in others in influencing risky portfolio choices. To gain further insights on this, in Table 2 we then split the thirteen countries in four groups based on their aggregate levels of risk tolerance and trust. That is, we exploit the high degree of heterogeneity that characterizes European countries with regard to risk tolerance and trust in others, and rank the countries in terms of risk tolerance and trust in others: this allows us to classify the countries into four groups, that is countries endowed with (1) risk tolerance

[12] For instance, ranking countries based on the answer to the analogous WVS question (wave 2005-2009), countries in the first four positions are identical; statistics are available upon request. It is worth noting, however, that WVS treats only eight out of the thirteen countries surveyed in SHARE.

and high trust; (2) risk tolerance and low trust; (3) risk aversion and high trust and (4) risk aversion and low trust.

Group 1 includes Czech Republic, Denmark, Sweden and Switzerland, i.e., those countries ranking in the first five positions on both risk tolerance and trust. Group 4 includes Greece, Italy and Poland, i.e., those countries ranking in the last five positions on both risk tolerance and trust. The remaining countries are assigned to either Group 2 or Group 3 depending on the dimension on which they rank higher. Group 2 on risk tolerance and low trust thus includes Belgium, France and Germany, while Group 3 on risk aversion and high trust includes Austria, the Netherlands and Spain.

Table 2 reports, for each group, the average levels of risk tolerance, trust and risky assets investments. We notice that, not surprisingly, risky assets investment is much more widespread in the countries characterized by more widespread risk tolerance (i.e., Groups 1 and 2.) [13]

However, risky assets are more frequent in Group (1) than in Group (2), and in Group (3) than in Group (4), that is, in those countries featuring high trust compared to countries with low trust and similar risk tolerance. In particular, Table 2 also reveals that trust plays a key role in countries where it is high and risk tolerance is infrequent: if we compare two groups of countries characterized by a similarly low frequency of risk tolerance but endowed with different levels of trust (Groups 3 and 4), we notice that in the group where trust is relatively high (i.e., Austria, Netherlands and Spain), both the holding and the share indicators are significantly higher than in the group where trust is relatively low (i.e., Greece, Italy and Poland.)

TABLE 2 ABOUT HERE

From this preliminary analysis we can conclude that there seems to be a positive link between risk attitude and trust in others, and that risky investments are more frequent in the presence of trust. In Section 4 we explore this relationship controlling for risk tolerance as well as socio-demographic and economic variables.

[13] The difference in the average levels of risky assets holding and share is statistically significant according to a one-way analysis of variance test of mean equality (p-value <0.01) and to separate paired t-tests on the equality of the mean in any pair of groups (p-value <0.01 for each test.)

4. Empirical analysis

In this section we relate different measures of financial risky assets investments to socio-demographic variables and the self-assessed levels of risk tolerance and trust in others. We consider several regression models, differing in the dependent variable and in the specification. In the following we comment only on average marginal effects that are significant at least at the 5% level.

In Table 3 we report average marginal effects from logit regressions taking as dependent variable a binary indicator equal to one if the household owns risky assets (directly held stocks)[14] in its financial portfolio.

The first model, reported in Column (1), takes as explanatory variables standard socio-demographic characteristics of the individuals plus a set of country dummies to capture existing cross-country differences. We confirm most of the results known in the literature, with risky assets holding being positively correlated with higher education and wealth, and negatively correlated with home ownership, being a female or older (see, e.g., Bucciol and Miniaci, forthcoming.) The age effect is somewhat stronger than in other papers (10 years of age reduce by 2.1% the probability to hold risky assets), because our sample includes only a limited age range (50-80.)

Column (2) enriches the specification by including a variable on the level of trust, as already done in the literature. The variable is highly significant although its effect is quantitatively small: one more point in the 0-10 scale leads to a 0.3% increase in the probability to hold risky assets. Moreover, the other coefficients are roughly unchanged with respect to Column (1) and the overall fit of the model, as measured by the pseudo-R^2 statistic, is virtually unchanged with respect to Column (1).

Column (3) further adds to the specification a binary variable on risk tolerance. The newly added variable is highly significant and its effect is quantitatively large; being risk tolerant increases the probability to hold risky assets by 12.8% – more than twice the effect of being college graduate. This is a large amount, if we consider that only 14.22% of the observations in the sample own risky assets. Furthermore, the introduction of the risk tolerance variable makes the coefficients on age and gender insignificant (confirming that risk tolerance also varies with socio-demographic

[14] Results are similar if we take as dependent variable an extended definition of risky assets, i.e., the holding of stocks, bonds and mutual funds. The output is available upon request.

characteristics, as in Halek and Eisenhauer, 2001) and improves the overall fit of the model, with the pseudo-R^2 increasing by about 26% from Column (2). The effect of the variable on trust is still significant, but it is now negligible. Hence, in contrast with previous literature, trust does not seem to capture a key dimension to explain portfolio choice – plausibly because of its high correlation with risk tolerance.

Our major goal, however, is to understand whether trust *alone*, in the presence of risk averse households, correlates with risky assets investment. To reach this goal, Column (4) replaces the trust variable from the previous specification with two interaction terms between trust and the binary variable for risk tolerance. In so doing we end up with the variables *trust with risk tolerance*, isolating the contribution of trust in the presence of risk tolerance, and *trust with risk aversion*, denoting the contribution of trust in the absence of risk tolerance. Interestingly we find that the effect of trust with risk tolerance is insignificant, while the effect of trust with risk aversion is significantly positive and equal to 0.004. Although significant, the size of this effect is quantitatively small: going from the bottom to the top of the trust scale (i.e., from 0 to 10) would increase the probability to hold risky assets by 4%, about one fourth of the effect of being risk tolerant (16%.)

Taken together, the evidence in Column (4) suggests that trust acts as a *substitute* for risk tolerance: when risk tolerance is present, trust is irrelevant on the decision to hold risky assets; however, when households are risk averse, trust does play a role and has a positive impact on risky assets holdings. Thanks to trust, people are willing to take financial risks despite the lack of risk tolerance. However, the trust substitute is an imperfect one, as the highest possible level of trust has an effect on the holding that is far from the one of risk tolerance.

TABLE 3 ABOUT HERE

In Table 4 we replicate the analysis taking as dependent variable the financial portfolio share in risky assets rather than the binary variable informing on the holding. In this case, therefore, we are interested in examining the intensity of the investment decision rather than the decision itself. Since the new variable is a fraction, we employ a fractional response logit model estimated with Bernoulli quasi-maximum likelihood and robust standard errors as in Papke and Wooldridge (1996.) The main advantage of this

model, compared to alternatives such as an OLS regression, is to acknowledge that the dependent variable takes values within the 0-1 range, possibly with a mass of observations concentrated at the boundaries. Table 4 shows average marginal effects from this model; estimates based on the OLS model provide similar results and are available upon request.

This new analysis supports our previous findings, and indicates that trust contributes to explain risky assets investments only when risk tolerance is absent. Specifically, a one-point rise in the trust scale increases the portfolio share in risky assets by 0.076% – again, well below the increase due to risk tolerance (1.97%.)

TABLE 4 ABOUT HERE

5. Conclusion

Individuals' behavior towards financial investments has been attracting the attention of a number of scholars since a long time. Previous evidence shows that financial portfolio composition is widely heterogeneous in the population, and correlates with a number of individual-level characteristics. In this paper we wondered whether it is also affected by a key component of 'social capital' such as *trust in others*. Our empirical analysis, based on SHARE survey data collected in year 2006, explores the connection between risk tolerance and trust in others to examine their impact on portfolio choice across European countries.

In contrast to previous work dealing with a similar research question (e.g., Guiso et al., 2004, 2008), our major goal was to disentangle the contribution of trust from that of risk tolerance. Our findings indicate that trust matters only when the household is risk averse, in which case risky assets investment is more frequent when there is higher trust. We then argue that trust acts as a substitute for risk tolerance: it becomes important for portfolio decisions only when households are risk averse. This substitute, however, is imperfect as its effect on risky assets investment is quantitatively much smaller than that of risk tolerance.

As Sapienza and Zingales (2011) observe: "Because financial contracts require trust, differential levels of social capital may have important consequences for the way

that financial markets develop." Our research, showing that trust in risk averse environments helps to increase risky assets investments, sheds light on a specific channel through which trust can act as a lubricant of the economic system: its ability to act as a substitute (albeit an imperfect one) for risk tolerance in shaping individuals' portfolio decisions. This suggests that promoting interpersonal trust – and not only improving person-specific attributes such as one's level of financial literacy – could contribute to the development of financial markets.

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Table 1. Summary statistics (13,227 observations)

Variable	Mean	Std. dev.	Min.	Max.
Age	63.172	8.727	50	80
Female	0.521	0.500	0	1
Foreign	0.069	0.254	0	1
High school	0.368	0.482	0	1
College	0.197	0.398	0	1
Worker	0.295	0.456	0	1
Married	0.716	0.451	0	1
With children	0.882	0.323	0	1
Home owner	0.851	0.356	0	1
Net worth (k euros)	609.680	2,100.577	10.010	107,000
Variables of interest				
Risky asset holding	0.142	0.349	0	1
Risky asset share	0.039	0.127	0	1
Self-assessed risk tolerance	0.244	0.429	0	1
Trust	5.288	2.551	0	10

Table 2. Risk taking by country group

Group	Risky asset holding	Risky asset share	Risk tolerance	Trust
(1) Risk tolerance, High trust *(Czech Republic, Denmark, Sweden, Switzerland)*	0.304	0.069	0.392	6.481
(2) Risk tolerance, Low trust *(Belgium, France, Germany)*	0.184	0.049	0.299	5.138
(3) Risk aversion, High trust *(Austria, Netherlands, Spain)*	0.095	0.030	0.159	5.694
(4) Risk aversion, Low trust *(Greece, Italy, Poland)*	0.055	0.018	0.165	4.887
TOTAL	*0.142*	*0.039*	*0.244*	*5.288*

Note: Countries are grouped based on their ranking on the frequency of risk tolerance and average trust. We include in Group 1 the countries that always rank in the first five positions on both risk tolerance and trust. We include in Group 4 the countries that always rank in the last five positions on both risk tolerance and trust. The remaining countries are included in Group 2 if they rank higher on risk tolerance, or in Group 3 if they rank higher on trust. One-way analysis of variance and paired t-tests always reject the null hypothesis of identical holding and share of risky assets in any pair of groups.

Table 3. Average marginal effects on risky asset holdings

	(1)	(2)	(3)	(4)
Risk tolerance			0.128***	0.160***
			(0.010)	(0.016)
Trust		0.003***	0.001**	
		(0.001)	(0.001)	
Trust with risk tolerance				-0.002
				(0.001)
Trust with risk aversion				0.004***
				(0.001)
Age/10	-0.015**	-0.016**	-0.009	-0.009
	(0.008)	(0.008)	(0.006)	(0.006)
Female	-0.026***	-0.027***	-0.011*	-0.011*
	(0.008)	(0.008)	(0.006)	(0.006)
Foreign	-0.016**	-0.016**	-0.009	-0.008
	(0.007)	(0.007)	(0.006)	(0.006)
High school	0.045***	0.044***	0.031***	0.031***
	(0.009)	(0.009)	(0.007)	(0.007)
College	0.076***	0.073***	0.053***	0.053***
	(0.012)	(0.012)	(0.012)	(0.012)
Worker	-0.009	-0.010	-0.015	-0.014
	(0.008)	(0.009)	(0.012)	(0.012)
Married	0.023***	0.023***	0.023***	0.023***
	(0.008)	(0.008)	(0.007)	(0.007)
With children	-0.014	-0.014	-0.011	-0.011
	(0.020)	(0.020)	(0.018)	(0.018)
Home owner	-0.097***	-0.096***	-0.082***	-0.083***
	(0.024)	(0.024)	(0.017)	(0.017)
Ln(Net worth)	0.072***	0.072***	0.060***	0.060***
	(0.008)	(0.008)	(0.006)	(0.006)
Country dummies	YES	YES	YES	YES
Avg. dependent variable	0.142	0.142	0.142	0.142
Pseudo-R^2	0.188	0.189	0.238	0.239
Observations	13,227	13,227	13,227	13,227

Note: The table reports average marginal effects from a logit regression. Standard errors clustered at the country level in parentheses; *** p<0.01, ** p<0.05, * p<0.1

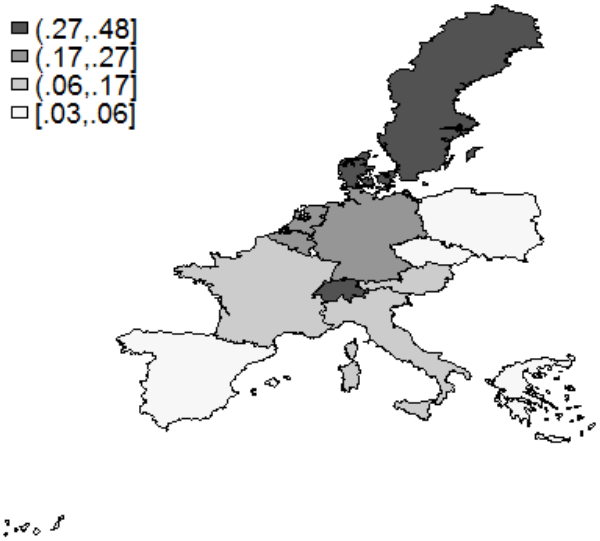
Table 4. Average marginal effects (multiplied by 100) on risky asset share

	(1)	(2)	(3)	(4)
Risk tolerance			1.391***	1.970***
			(0.160)	(0.324)
Trust		0.033*	0.024	
		(0.017)	(0.019)	
Trust with risk tolerance				-0.025
				(0.027)
Trust with risk aversion				0.076**
				(0.035)
Age/10	0.013	0.010	0.080	0.091
	(0.092)	(0.090)	(0.097)	(0.097)
Female	-0.315***	-0.321***	-0.262**	-0.257**
	(0.091)	(0.092)	(0.106)	(0.104)
Foreign	-0.166***	-0.171***	-0.164	-0.157
	(0.057)	(0.062)	(0.117)	(0.118)
High school	0.378***	0.367***	0.343***	0.337***
	(0.094)	(0.088)	(0.095)	(0.095)
College	0.651***	0.627***	0.597***	0.594***
	(0.123)	(0.121)	(0.151)	(0.149)
Worker	-0.228	-0.233	-0.352	-0.332
	(0.201)	(0.204)	(0.304)	(0.312)
Married	0.034	0.035	0.044	0.044
	(0.117)	(0.118)	(0.136)	(0.134)
With children	-0.178	-0.172	-0.214	-0.216
	(0.231)	(0.232)	(0.307)	(0.303)
Home owner	-0.686***	-0.692***	-0.809***	-0.814***
	(0.240)	(0.238)	(0.236)	(0.234)
Ln(Net worth)	0.469***	0.472***	0.508***	0.515***
	(0.092)	(0.091)	(0.101)	(0.097)
Country dummies	YES	YES	YES	YES
Avg. dependent variable	0.039	0.039	0.039	0.039
Pseudo-R^2	0.108	0.109	0.145	0.146
Observations	13,227	13,227	13,227	13,227

Note: The table reports average marginal effects from a fractional response logit model. Standard errors clustered at the country level in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Figure 1. Distribution of risky assets investments

a) Fraction of risky assets holders



b) Average risky assets share

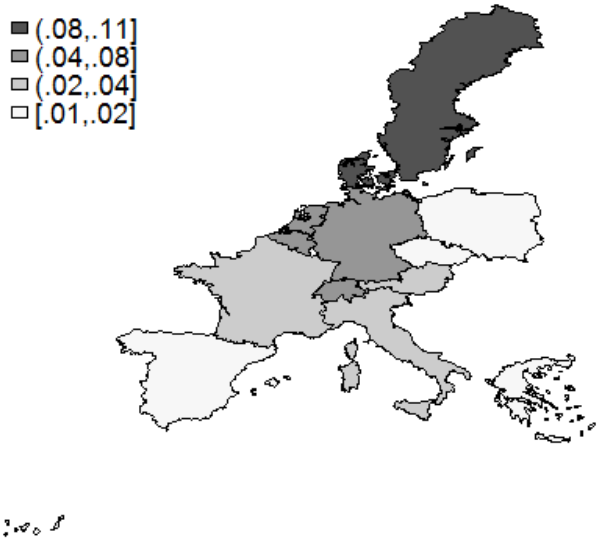
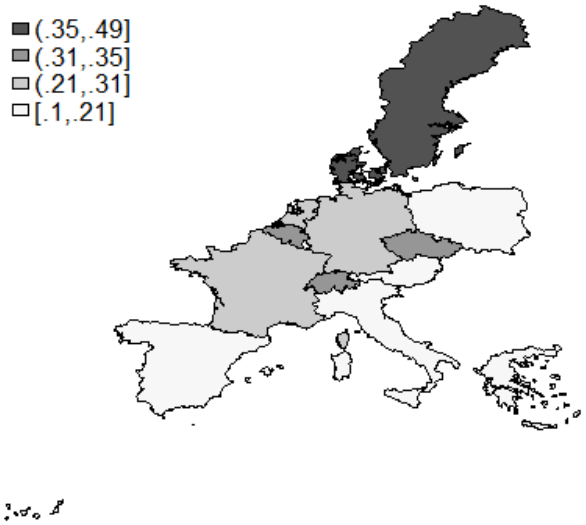


Figure 2. Distribution of risk tolerance and trust

a) Fraction of risk tolerant households



b) Average trust level