Financial Literacy and Attitudes to Redistribution

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Abstract:
This study proposes a conceptual framework on how financial literacy could play a key role in shaping individuals' attitudes for government's redistribution policies. Using novel data from the British Election Survey in 2014, we employ two distinct ordinal measures of attitudes to redistribution, capturing individual stated preferences on whether the government should redistribute incomes and whether the government should intervene in making incomes more equal. We find a significant negative relationship between financial literacy and attitudes in favour of government intervention for income redistribution. The effects are robust to several specifications, samples and when using instrumental variable regressions. Falsification tests show that these results are independent of generic attitudes towards other types of inequality/discrimination, e.g. based on gender of sexual orientation. An inquiry into the mechanisms driving the individual's attitude to redistribution suggests that financial literacy captures the *homo oeconmicus* effect. While the public value and social rivalry effects still play an independent role.

JEL Classification: D14 (Personal Finance); D31 (Personal Income, Wealth and their Distributions); D63 (Equity, Justice, Inequality and Other Normative Criteria and Measuremenent); H23 (Redistributive effects); I24 (Education and Inequality)

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1. Introduction

Government intervention to redistribute and limit income inequality is at the heart of recent debate in several countries around the world.[1] Individual preferences for redistribution lead to different transfer and tax systems. Economic models have focused on the impact of current and expected income, future prospects and mobility in influencing the demand for redistribution at individual level. The evidence suggests that the degree of redistribution desired by an individual is negatively correlated with income, wealth and future economic prospects. However, some variables employed in the literature, such as current and future income and education, are imperfect proxies for 'economic motivations' in that they do not completely capture the range of possible economic determinants.

The recent literature on financial literacy has shown that people's ability to process economic and financial information is linked with better financial planning, wealth accumulation, management of credit positions and pensions. We adhere to this literature by examining the impact of financial literacy on attributes toward redistributive policies. The choice of the tax and transfer system have direct consequences on current and future individual financial positions. Hence, our hypothesis is that financial literacy is an important determinant of redistributive attitudes. The development of financial literacy may also change someone's views of the social value of income equality, independently from their own economic circumstances, the same way that some scholars conjecture that economics education may lead people to hold more positive views of, say, greed (see e.g., Wang et al., 2011).

We use representative samples from two waves of the British Election Study (BES). The BES is an online questionnaire collected by Yougov and run by a consortium of British Universities. The survey includes a number of questions on attitudes towards redistribution and a module on financial literacy. In 2014 and 2015 two waves were administered in Great Britain as a whole, while a third wave collected a boosted sample of Scottish people with the motivation of tracking political and social perceptions following the referendum for Scottish independence of September 2014. Aiming for robustness, in our analysis we use two samples separately, the Great Britain (GB) sample, which consists of more than 5,000 respondents, and the boosted Scottish sample of over

[1] See for instance see Jones (2015) and Sturm and De Haan (2015).

6,000 participants. The survey offers weights that render our samples representative of the whole population in both samples. It includes two questions aiming to capture the individual's attitude towards redistribution. The respondent has to state whether she agreees with the following two statements "should the government try to make incomes more equal" and "the government should redistribute income from the better off to those who are less well off". Our key eplanatory variable is a financial litearcy index built using three questions included in wave 2 under suggestion of the authors as *playground items*. The questions included in the survey are the three primary financial literacy questions employed by the literature capturing the understanding of interest rates, inflation and risk diversification (see Lusardi and Mitchell, 2014). Finally, the survey also includes a rich set of individual characteristics, including income, education, age, gender, marital status, personality traits, risk attitudes, etc., which allow us to control for possible confounding factors.

Our analysis shows that individuals with higher degree of financial literacy are less supportive of redistributive policies and income equality in Britain. Financial literacy exerts an effect of about 25% on attitude towards redistribution, independently from other economic factors, such as education and income, and from a rich set of individual characteristics, including personality traits, risk attitudes, country of birth and of residence. This effect is economically important and it is also robust to a number of functional forms, specifications and interactions. In linear probability models, an additional correct answer to financially literacy questions leads to a negative effect of 9 percent on the probability to be supportive of "government intervention to make incomes more equal" and 3 percent of being in favour of redistributing income to the less well off. Ordered probit models add to this analysis by showing that financial literacy impacts on the probability of being in clear opposition to redistribution, i.e., it is more likely to be in *strongly* disagreement with redistributive policies than just slightly so and these effects are larger in magnitude, *i.e.* equivalent to 19-26%.

The identification assumption is that our financial literacy variable is uncorrelated with omitted factors that are not controlled for, but are determinants for tax and transfer preferences. Our econometric models include a comprehensive set of socio-economic determinants discussed in the literature. In particular, we account for the effect of both

education and income; these variables are defined using both very specific categories/classes and continuous variables (and their interactions). In order to validate our results, we run a series of falsification tests and show that financial literacy is not a determinant of generic attitudes to other types of inequality by running regressions of individual support to equal opportunities for females, ethnic minorities, gay and lesbians. In an effort to address endogeneity more directly, we experiment with different instrumental variables. The sign and statistical significance of the parameter of interest are confirmed.

In the second part of the analysis we investigate whether financial literacy works as an independent channel or can be though as a proxy for some of the channels already identified by the literature as key to understand preferences to redistribution. More explicitly, following Corneo and Grüner (2002) we can identify three set of explanatory factors; firstly attitudes towards redistribution can be driven by pure economic self-interest (*homo oeconomicus*); second, they could be related to the individual's position in reference to other peers' behavior (*social rivalry effect*), or they could be completely unrelated to economic circumstances (*public value effect*). Our analysis support the idea that these effects are indeed the main drivers to explain redistributive policies, but importantly we show that the *homo oeconomicus* channel can be fully captured by the level of the individual financial literacy.

The remainder of this study is organised as follows. *Section 2* reviews the relevant literature, *Section 3* presents the data definitions and summary statistics. Then, *Section 4* presents the empirical strategy and results. *Section 5* provides further robustness analysis, falsification tests and instrumental variables. Section 6 considers the possible mechanisms through which financial literacy impact the demand for redistribution. Finally, Section 7 concludes.

2. Review of existing literature

This section provides a brief overview of the literature on individual's attitudes toward redistribution; moreover, it proposes a conceptual framework on how financial literacy

can play a key role in shaping individual's attitude towards government's redistribution policies.

2.1 Attitudes for redistribution

The theoretical literature on redistribution rests on the original works of Romer (1975), Roberts (1977) and Meltzer and Richard (1983), in which the focus is on the median voter's utility derived from income. The idea is that, with rising inequality the distance between median and mean income rises, since the distribution is skewed to the right and the median lies below the mean. Hence, the median voter extracts a higher level of utility from income redistribution as inequality rises. Overall, the net benefit derived from redistribution is inversely correlated to income. Alesina and Angeletos (2005) and Benabou and Tirole (2006), among others, expand the theoretical framework so that other factors, such as fairness and expected social mobility, are accounted for. They show that if a society believes that income is driven by effort as opposed to luck, birth or social connections, then this society would have a lower propensity to redistributive policies. In other words, fairness and social mobility can account for large differences between redistributive policies.

The empirical literature on redistribution can be divided in broadly two branches. The first and relatively old branch tries to study attitudes towards redistribution at a country using aggregate data. The measures typically employed to capture inequality and attitudes in favour of redistribution are Gini coefficient and the fraction of median to mean income (see, Persson and Tabellini, 1994; Perotti, 1996; and Shelton, 2007; *inter alia*).[2] Overall the empirical evidence at the macroeconomic level does not offer empirical support of the impact of inequality on redistribution. A possible explanation for this pattern is the fact that there is more than one possible mechanism affecting the relationship between attitudes to redistribution and inequality and it is empirically challenging to capture all these mechanisms at once.

[2] More recently, Kerr (2014), using survey data from the International Social Security Programme across 38 countries, shows that a short-term increase in inequality is unlikely to prompt a vicious cycle where support for redistribution declines, thereby promoting further increase in inequality.

More recently, the second strand of the literature focuses on the use of microeconomic data to disentangle the determinants of attitudes towards redistribution. On one hand, Alesina and Giuliano (2011), Alesina and La Ferrara (2005), and Fong (2001; 2006) emphasize the role of current and expected income and social status; on the other, Andreoni and Miller, (2002) and Fong and Oberholzer-Gee (2011) highlight the role of altruism, while Gruber and Hungerman, (2007) focus their attention on the role of religion.

Corneo and Grüner (2002) propose a conceptual framework to categorize the possible channels through which preferences for redistribution can be understood. Specifically, they identify three mechanisms that could be at play. Firstly, individuals are driven by self-interest and their preferences are entirely shaped by their rank in the income scale (*homo oeconomicus effect*). Specifically, preferences against redistribution are inversely related to the gain that the individual obtain from governmental redistribution and on the individual's position on the income scale (see e.g. Meltzer and Richards (1981) and Benabou and Ok (2001)). Second, the *public value effect* states that preferences are not correlated to the level of income. Instead, they are more likely to be in the form of endowments, such as ethics, that an individual was born with.[3] The third channel is the *social rivalry effect*; here the focus is on the living standards of the individual relative to the peer group (neighbour). In this framework factors like the social composition of the area an individual lives in and/or the marital status become of primary importance.

Given the data availability enabling approximating such effects, the framework set up by Corneo and Grüner (2002) offers a series of hypotheses that can be tested empirically. Overall, the follow-up evidence is mixed. For instance Fong (2001) does not find an effect of self-interest on preferences towards redistribution. While using GSS data for the period 1978-2000, Keely and Tan (2008) find that only race, gender, age, and socioeconomic class are important classifiers for income redistribution, among identity

[3] This point was discussed in Piketty (1998) and Alesina and Angeletos (2005) among others. Alesina et al. (2001) propose a model where the individual's utility is dependent on the utilities of members of other ethnic groups. Their conclusion suggests that the individual's awareness of ethnic heterogeneity could be the drive for the difference in views on income redistribution across socio-economic groups.

markers. Similarly, Luttmer (2001) shows how financial self-interest is not the only determinant of attitudes to welfare spending, but other factors could be at play like for instance *racial group loyalty*. More recently, Luttmer and Singhal (2011) suggest that culture could be a key determinant in explaining differences in attitudes across Europe and the United States.

2.2 The role of financial literacy on attitudes towards redistribution

The literature has so far largely ignored the potential link between preferences toward inequality and financial literacy. This section tries to fill in the gap by laying out the conceptual channel though which financial literacy could affect individual attitude towards redistribution. As mentioned above, in the traditional literature preferences for redistribution depend on economic factors (e.g. Romer, 1975 and Meltzer and Richards, 1981). We simply argue that financial literacy is one of the most important, albeit overlooked, economic variables. The commonly accepted definition based on the US President's Advisory Council on Financial Literacy (PACFL, 2008) define financial literacy as "*the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being*" (Hung *et al.* 2009). In other words, financial literacy is about private benefits. In this context, we then should expect financial literacy to be associated with less favourable preferences to redistribution.

In particular, Jappelli and Padula (2013) sketch a life-cycle model of consumption where the level of financial literacy is endogenously determined. Here, individuals are modelled as rational agents who choose how much to save and how much to invest in financial literacy. The prediction is that financial literacy is strongly positively correlated with future wealth. Moreover, as showed by Lusardi *et al.* (2016), there is a positive correlation between the level of income inequality and the level of financial knowledge. The claim, supported by the evidence found in Jappelli (2010), is that there is a strong negative correlation between the average level of financial literacy within a country and how generous social security systems are. A more elaborate idea is that individuals with a higher level of financial literacy have higher expected income and may be driven by self-interest. In contrast, an individual with a low level of financial literacy have lower expected income and therefore be in favour of more progressive tax systems (see e.g.

Meltzer and Richards, 1981; and Banabou and Ok, 2001). This suggests that financial literacy should matter for attributes towards redistribution, even when controlling for standard income and educational attainment.

There are various mechanism that could be a play here. Firstly, financial literacy would work via the *home oeconomicus* channel, which is more financial literate individual could also put more emphasis on the role of effort as an additional incentive to achieve a specific socio-economic goal. The financially literate individual is more likely to attribute a personal economic success to both real and perceived level of effort. This level of effort would necessarily decrease the level of demand for redistribution. This idea is in line with the original model on redistribution proposed by Meltzer and Richards (1981), where individuals have various levels of productivity. Since one's wage is related to productivity, those who are not in the position to earn a higher wage than the median income will choose not to work. This line of thought seems to find some support on the works of Alesina and La Ferrara (2005), Fong (2001) and Krawczyk (2011). They show that individual preferences for redistribution are inversely correlated to the individual's belief that future success is determined by effort and talent. In contrast, those individuals who place more emphasis on the role of luck and social connections (e.g. help from others) generally do not oppose redistribution.

A recent strand of the redistribution literature assigns weights to the importance of beliefs, context and culture, as drivers that are independent from economic factors (Luttmer and Singhal, 2011). The interesting inference is that an individual with a high level of financial literacy should rely less on social beliefs derived from exogenously predetermined factors like family economic background, ethnicity, country's history and religiosity or on personal characteristics like gender and age. However, this is not to say that financial literacy should be independent of any public value effect. The prediction here is that the acquisition of financial literacy may change beliefs and values of the benefits of equality in the same way that some theories conjecture that economics study lead people to hold more positive views on self-interest (Wang et al., 2011).

A second possible channel though which financial literacy may come into play is the *social rivalry* effect. Financial literacy could improve the accuracy of subjective

evaluation of one's own income position within income distribution, thus reducing biases (Cruces *et al.*, 2013). We also know from the literature that there is a positive correlation between the level of net worth and the level of financial literacy (see e.g. van Rooij *et al.*, 2012) hence she would have a lower level to redistribution than her neighbor.

Finally, it is important to highlight that the definition of financial literacy proposed here has a clear private financial planning aspect and ignores any other potential effects or aggregate considerations. If, however, financial literacy embeds also strong elements of economic literacy then one can expect negative views on redistribution to arise from other reasons. Individuals with a high level of economic knowledge may believe that a high level of inequality can have positive spillover effects on growth. The rationale is that it can provide an incentive to both innovation and entrepreneurship (Lazear and Rosen (1981)), or it may increase saving and investment given that wealthier individuals have a higher propensity to save (Kaldor (1957).[4]

3. Data and Summary Statistics

We use data from waves of 'The British Election Study' (BES) conducted in 2014 and 2015. This database contains information on both financial literacy and attitudes towardsredistribution, alongside a rich set of individual characteristics. The survey was conducted by Yougov and is managed by a consortium of Universities. Although the BES includes more than 30,000 individuals, the financial literacy module that we used in this paper was administered to a representative subset of respondents. We conduct our analysis using items from two separate samples for robustness purposes: a standard sample of Great Britain (which includes England, Wales and Scotland) and a separate (boosted) sample of Scotland.[5] The latter were interviewed at a different time for reasons related t the conduct of the referendum for Scottish independence of September 2014. The total amount of observations used depends on outcome variable used and ranges from 4,000 to 6,000 for the GB sample and from 3,700 to 6,200 for the Scottish sample.

[4] An opposite view could suggest that a homo oeconomicus might also recognize that inequality may have long-term negative consequences on growth, because it may reduce the accumulation of human capital and could bring economic and political instability, which in turn reduces investment (see e.g. Galor and Moav, 2004; Aghion, Caroli, and Garcia-Penalosa, 1999; Alesina and Perotti, 1996). Hence, we should expect that an individual who is economically (but not necessarily financially) literate is more averse to conservative policies. This would make the expected direction of the relation ambiguous.

[5] The standard sample uses wave 2 while the boosted sample uses wave 4.

For our dependent variables, we rely on two specific questions as indicators of the support that individuals give to redistribution. The first question asks: "*Some people feel that government should make much greater efforts to make people's incomes more equal. Other people feel that government should be much less concerned about how equal people's incomes are. Where would you place yourself on this scale?*" The respondent is provided with a scale to choose from that goes from zero to ten. We use the reversed version f the scale, where zero reads "*Government should try to make incomes equal*" and ten as "*Government should be less concerned about equal incomes*". The second question asks: "*How much do you agree or disagree with the following statements? Government should redistribute income from the better off to those who are less well off*", the respondents can choose among "Strongly disagree", "Disagree", "Neither agree nor disagree", "Agree", "Strongly agree", "Don't know".

Table 2 provides summary statistics on the distribution of the responses for attitudes to redistribution. In the first row of Panel A we notice that for about 10% of the British respondents government should not try to make income more equal; this percentage lowers to 6 points when looking at the boosted Scottish sample. On the other hand of the spectrum, we see that 13.5% and 24.5%, in Britain and Scotland respectively, are strongly in favour of redistribution. If we consider the middle of the distribution of the British sample, we notice that 46% of the interviewees report to be in favour or mildly in favour of redistribution (5-9 on the scale), while 30% think that the government should be less concern about equal incomes (1-4 on the scale). Similar percentages are recorded for the Scottish sample. Looking now at the second question identifying the attitude towards redistribution (Panel B in Table 2) we report that 24% of the British respondents Disagree or Strongly Disagree with the proposition that the government should redistribute income. This contrasts with the 52% of the respondents that are either in favour or strongly in favour.

3.1 Financial literacy in Great Britain

As shown in Lusardi and Mitchell (2014, p.10), the financial literacy questions should capture "(i) numeracy and capacity to do calculations related to interest rates, such as compound interest; (ii) understanding of inflation; and (iii) understanding of risk diversification." These are the basic skill required to make long term decisions on the level of savings and investment. Hence the financial literacy index is based on three questions, which have become standard in the literature. The first question asks: "*Suppose you have £100 in a savings account with an interest rate of 2% per year. If you never withdrew any money from this account, how much do you think there would be after 5 years?*" The respondent has three possible answers: "More than £102", "Exactly £102", "Less than £102", "Don't know", "Prefer not to say". The second question is "*Suppose inflation is 2% per year and you have put money into a savings account with an interest rate of 1% per year. Assuming that you buy the same things today and in one year's time, do you think you would be able to buy more with the money in this account in one year than today, less in one year than today, or do you think you would be able to buy exactly the same things in one year as today?*" The five possible answers are: "More than today", "Exactly the same as today", "Less than today", "Don't know", "Prefer not to say". The final question is "*Which one of the following do you think is the riskier asset to invest in?*" Here the possible answers are "An individual share in a company", "A portfolio of different company shares", "The risk is the same", "Don't know", "Prefer not to say".

The responses to the three questions are combined to form an index Table 1 gives a snapshot of the level of financial literacy in Britain in 2014; about 40% of the people surveyed answered correctly to all three questions while about 11% responded incorrectly to all questions. The question with the highest number of correct responses was regarding inflation, with 80% of the interviewees responding correctly, while the question assessing the understanding of risk received 28% of incorrect answers. Although the overall index is slightly higher for Great Britain than for Scotland, we see that the patter of right and wrong answers is similar.

3.2 Controls

The British Electoral Study comprises of a rich set of questions that allow us to control for the individual's personal and family characteristics. Table 3 gives an overview of the data. The average person on our sample is 47 years old; he/she has twelve years of education and a personal income of about £21,000 and a household income of £32,350. 30% of the individual interviewed are home owners while 28% have mortgage. In our sample we have a 3.5% of people unemployed, this percentage increases.

The table also shows for two subset; FLH represents individuals with high level of financial literacy (i.e. two and three correct responses at the financial literacy question), FLL represents individual with low level of financial literacy (zero or one correct response). FLH individuals exhibit only one extra year of education, are more likely to be married and have a higher personal income. Overall the data in Table 3 corroborate the existing finding of the financial literacy literature in that individuals with low levels of financial literacy are more likely to be inactive or unemployed, to have a lower income; furthermore, they are less likely to work in the private sector and to live in urban areas. Finally, personality traits do not appear to be statistically significant between individuals with high and low financial literacy.[6]

4. Empirical strategy and results

We estimate specifications of the following form for attitudes towards redistribution:

$$RD_i = \beta_1 (FL_i) + \beta_2 X_i + \theta_r + \varepsilon_i, \quad (1)$$

where: RD_i denotes attitudes towards redistribution for individual i, FL_i is a variable capturing the degree of financial literacy, $\boldsymbol{X}_i$ is a vector of individual characteristics, θ_r is a fixed effect for region of residence. As described above we capture preferences to redistribution (RD_{ik}) by using two separate ordinal outcomes (k). The first one (RD_{i1}) captures individual demand for direct government intervention to make incomes more equal, while the second one (RD_{i2}) asks whether the participant believes that the government should redistribute income from the better off to the less well off. The vector ($\mathbf{X}_i$) includes a rich set of individual characteristics such as personal and household income, education, age, gender, marital status, household size, number of children at

[6] *Table A1* in the Appendix shows the correlation matrix between some of the main variables.

preschool and school age, occupation status (whether self-employed, employed, unemployed, inactive or retired), trade union membership, ethnicity, country of birth (Scotland, Wales, Northern Ireland, Republic of Ireland, Commonwealth, European Union, Rest of the World), house ownership, whether the respondent has experienced an income shock last year, preferences to risk taking (i.e., a risk taking index from 1, low, to 4, high), political orientation (from 0, left, to 10, right), social desirability[explain this] (from 0, low, to 4, high), a variable indicating the degree of religiosity, the big 5 personality traits and finally whether the individual live in an urban area. In an attempt to isolate the effect of financial literacy from potential confounding factors we take advantage of the richness of the survey and experiment with different functional forms, specifications and interactions of income, education and age variables.

For robustness purposes, equation (1) is estimated using both OLS and ordered probit to account for the ordinal nature of the dependent variables. These two estimation methods yield very similar results. All estimates presented are based on representative sampling weights and robust standard errors. *Table 4* and *Table 5* present results for Great Britain and Scotland, respectively; Panels A and B summarize the estimates for the two outcome variables: 'Government should make incomes more equal' (Panel A) and 'Government should redistribute to the less well off' (Panel B). Each column presents different specification of equation (1). The bottom panel indicates the set of control variables used in each specification.

In columns 1 and 7 of *Table 4* we start with the simplest specification, in which attitudes towards redistribution is run on financial literacy without any control variables. Then, we incorporate control variables for confounding factors such as education, income and other individual characteristics in the remaining columns. This provides an idea on the robustness of the finding and the influence of omitted variables. The relationship between financial literacy and attitude towards redistribution is negative and statistically significant at the 1% level, suggesting that financial literacy is associated with preferences against redistribution. Specifically, an additional correct response to the financial literacy question is associated with -0.537 (more than half point) on the 10-point scale for the first RD1. The relationship is also economically relevant when compared to the (linear) probability of 5.147; the effect is equivalent to 10 percent. In the RD_{i2} of

column 7 in Panel B of the same table, the effect is highly statistically significant but smaller, equivalent to 4 percentage points

As the relevant literature has previously suggested there is a direct relationship between income, education and financial literacy. To avoid the possibility that our results are entirely the product of such a relation, the following columns presents the results including different specifications of income, education and age, together with a large set of other control variables that we have described above.[7] Columns 2 for RD_1 and 8 for RD_2 include individual's personal characteristics plus personal income, education and age as dummy variables; the next column includes the continuous version of these variables. In particular, the categorical variable 'income class' has been transformed in a continuous variable by assigning to respondents the midpoint value of their selected income class (what about top coding?); educational attainment has been converted into years of schooling on the basis of how many years are required to attain a certain qualification on average in the UK; finally we take the logarithm of the respondent's age.

One may argue that what matters in the financial literacy-redistribution relationship is the combination of household and personal income. Some individuals with high financial literacy might decide for a vocational job that earns less if their partner/spouse can compensate for that loss. Columns 4 and 10 include both personal and household income, their polynomial orders to control for potential nonlinearities and their interaction to account for all the possible combinations of personal and household income within households. Furthermore, in an effort to show that financial literacy is not picking up any education effects, in columns 5 and 11 we interact financial literacy with years of education. The coefficient reported is the main effect of the interaction, so its size cannot be directly compared with the other coefficients. This is notable because it does tell that financial literacy impacts preferences even when is completely disentangled from education.

Finally, in order to isolate the effect of financial literacy for all potential confounding factors, a fully saturated model in which financial literacy interacts with

[7] *Table A3* in the Appendix for the full set of estimated coefficients obtained using the ordered probit.

years of education, the logarithm of personal income and the logarithm of age are included. The coefficient reported shows the main effect of the interaction.

All the specifications across the two questions provide strong support to the idea that a higher level of financial literacy is related to weaker attitudes towards redistribution. An additional correct response in the financial literacy question decreases the probability to agree to the idea that the "Government should try to make incomes more equal" and that the "Government should redistribute income from the better off to those who are less well off" by about 0.4 points on the 10-point scale, and 0.1 points on the 5-point scale, respectively. These effects are equivalent to 9 percent and 3.4 percent, respectively.

Similar conclusions can be drawn when analyzing the boosted Scottish sample for both outcome variables, these are shown in Table 5. For parsimony we present three specifications only, as in columns 2, 4 and 6 in Table 4. The coefficients are all negative and statistically significant at the 1% level. Their effect is equivalent to 5 and 2.3 percent, respectively. We interpret these results as a further robustness check that confirms our main hypothesis.

We then take the specification that includes income, education and age dummy variables – along with the full set of individual characteristics and region fixed effects – and estimate an ordinal probit regression to account for the ordinal nature of the response variables.[8] Table 6 reports average marginal effects (AME), the predicted probability and the financial literacy effect (i.e., in percentage term the ratio between the average marginal effect of financial literacy and predicted probability, multiplied by hundred. We do this for both outcomes variables (Panel A for RD_1 and Panel B for RD_2). The model is estimated on both the GB and Scottish samples. In addition, Figure 1 plots the average marginal effects and their 95% confidence intervals. These estimates reinforce previous findings but also add important insight into the analysis. In particular financial literacy exerts a sizeable negative impact on the probability of strongly agreeing with redistributive policies. Focusing on the GB sample, the probability of answering 'Yes' to the first question declines by 0.033, while the probability of answering 'No' goes up by

[8] These specifications are columns 2 and 8 in *Table 4* and columns 1 and 4 in *Table 5*.

0.028. The predicted probabilities for those categories are 0.135 and 0.106, respectively. Hence the marginal effect is in the order of 26 and -25 percent. A similar pattern is suggested when looking at the second question (RD_2), financial literacy decreases the probability to strongly agree with redistributing income to those who are less well off by 14.3 percent and raises the probability to strongly disagree with that statement by 21.2 percent. An identical pattern is uncovered when looking at the Scottish sample effects (17.4% and -9.6%, respectively). The impact of financial literacy on redistribution preferences is slightly smaller for the Scottish sample.

Figure 1 visualizes the probability changes across each outcome category. The average marginal effects are all statistically significant with the exception of the mid-category for the first question. There is a robust negative trend emerging when considering both samples and redistribution definitions. The higher is the individual's level of financial literacy the lower will be the probability that the individual will have a negative attitude towards the role of government in redistributing income.

This plot makes more evident the larger impact that financial literacy exerts on the extreme responses ('*Yes*', '*No*' and '*Strongly Agree*' or '*Strongly Disagree*'). This finding is in line with the concept that financial literacy reduces uncertainty and provides more confidence when it comes to provide opinion that requires the use of a degree of numeracy.

Figure 2 and *Figure 3* show how the impact of financial literacy varies across education and income, respectively. The take home message is that the negative effect exerted by financial literacy is quite homogenous over income and education dimensions. Interestingly, opposition to government intervention to redistribute or make incomes equal is stronger for individuals with high financial literacy but low education. When looking at narrow education qualification, a financial literate with a degree has the same negative view on redistribution as, say, someone with no formal qualifications in the GB sample. Similar homogeneity can be found when looking at income groups, whereby financial literacy makes someone less favorable of government intervention to make inocmes more equal no matter what level of income. For the individual with high degree

of financial literacy and incomes the opposition is stronger when asked directly about redistribution of incomes (RD2) in both GB and Scottish samples.

5. Falsification and robustness tests

A concern in our analysis is that financial literacy may be correlated with the error term in Eq. (1) via omitted factors measuring generic preferences against equality or equal opportunity. As a falsification exercise, we test whether financial literacy is independent of generic attitudes towards other types of inequality/discrimination. We do so by estimating models of attitudes against equal opportunities to the following groups (a) gay and lesbians, (b) women and (c) ethnic minorities. Specifically we use the following questions from the questionnaire: "*Please say whether you think these things have gone too far or have not gone far enough in Britain. Attempts to give equal opportunities to ethnic minorities. Attempts to give equal opportunities to women. Attempts to give equal opportunities to gays and lesbians*". The respondent has five possible answers: "*Not gone nearly far enough*", "*Not gone far enough*", "*About right*", "*Gone too far*", "*Gone much too far*". If our financial literacy variable is well defined – and the model well specified – we should not expect it to be systematically related to any of the preferences analysed here. Panel A of *Table 7* reports estimated coefficients of financial literacy from separate OLS regressions run on the GB sample and on the boosted Scottish sample. All the coefficients are small in size and statistically insignificant, confirming that financial literacy is not capturing feelings of general aversion to equity, which we see as a validation of our strategy.

The second falsification exercise consists of running our priare specification, i.e. that of Table 4 column 2, using the number of incorrect responses to the financial literacy question and the number of "*Don't knows*" and "*Prefer not to say*" (instead of number of correct responses). These estimate are presented in Panel B of Table 7 using our two redistribution variables as outcomes (RD_1 and RD_2). Interestingly, these results provide a completely different picture. As the number of incorrect answers or "*Don't knows*" and "*Prefer not to say*" increase, the likelihood of being in favour of redistribution and income equality also increases. This is also taken as a validation of our strategy.

We experiment with instrumental variable regressions in *Table 8*. The choice of valid instruments for financial literacy for the year 2014 in the UK is complicated, as the exclusion restrictions needed to justify the use of traditional instrumental variable methodology is hard to find. For this reason, the first estimates reported are based on Lewbel (2012) that worked out a method in which instrumental variable approach is applied when without traditional instruments. In particular, the first-stage exclusion restriction is generated by the control variables which we know are heteroskedastic; the greater the degree of heteroskedasticity in the error process, the higher will be the correlation of the generated instruments with the included endogenous variables. Aiming for robustness, these estimates are accompanied by three more instrumental variable regressions, in which three standard instruments (P.F. section, FinEdu and both, George to define this) are used as traditional instruments [Perhaps acknowledging that these instruments are not that convincing would help? They are not as "good as randomly assigned" to use a Angrist and Pischke terminology, the choice of receiving financial education and or reading a paper could be determined by the same unobservable that is driving financial literacy in the first place]. The battery of tests confirms that three out of four instruments are strong (F-test of the excluded instruments is well above the rule of thumb of 10 and Kleibergen-Paap *rk* Wald statistics is large). The results confirm our previous analysis in that the estimated coefficients are negative and statistically significant. It is worth noting that Lewbel's (2012) method provides estimates in which the size is comparable with our previous estimates, while the other methods have very large, and perhaps unreasonable, sizes – as is sometimes typical with instrumental variable regressions. To this end, we take Lewbel (2012) as a valid approach and if anything as a further robustness check that our analysis is valid.

6. Mechanisms

In the previous section we have found that the link between attitude towards redistribution and financial literacy is robust to the choice of economic controls and to a different samples, functional forms and specifications. Although this result has important implications *per se*, we can have a more complete picture by dissecting the mechanisms

through which financial literacy may impact attitudes for income equality and redistribution. In particular our interest lies on whether the previous link between financial literacy and redistributive policies can be captured by any of the traditional channels or whether mitigates or amplifies any of these mechanisms. The aim of this section is also to disentangle these channels for individuals with high and low financial literacy; as defined in the data section, we consider high financial literate an individual who answers correctly to the two or three financial literacy questions, the individual with zero or one correct response would be classified as having low financial literacy.

To this end we make use of the categorization proposed by Corneo and Grüner (2002) and the analysis presented in Section 2. This involves a broad set of three specific mechanisms by which the agents form their views on public policies. Firstly there is the *homo-oeconomicus effect*, as specified by the traditional literature for a self-driven individual, for whom what matters is the level of personal income. Here the individual cares only about his/her personal gains from the redistribution. In the absence of a direct measure of the pecuniary gains from redistribution, we build a variable (HOE) which measures the logarithmic distance between the personal income to the regional median income.

The second channel is commonly referred as the *public value effect*. Here the agent's attitudes towards a particular policy are shaped by the public values. As presented in Corneo and Gruner (2002) the mechanism may be expressed by some type of a social welfare function. The literature has proposed various measures to capture this type of information. For instance Alesina and La Ferrara (2005) measure the extent of future income prospects in the U.S., finding a positive link between conservative policies and one's position in the social ladder. Looking at the differences between US and Europe, Alesina and Glaeser (2004) detail how different cultures may have different social functions and therefore emphasize in different ways the merits of equality and individualism. Other factors derived from personal and family history may also be relevant (Piketty, 1995; Bénabou and Tirole, 2006). In order to test the *public value effect* we construct a variable, PVE, which combines the answers from the two questions asking the interviewees whether they '*Strongly disagree*', '*Disagree*', '*Neither agree nor disagree*', '*Agree*', '*Strongly agree*', '*Don't know*' two statements capturing the

individual attitude toward effort. The two statements utilized are "*When someone is unemployed, it's usually through no fault of their own" and "In business, bonuses are a fair way to reward hard work*".

Finally, the third mechanism as in Corneo and Gruner (2002) is the *social rivalry effect*. Here the key point is the relative living standard of the individual. In absence of a specific variable capturing the occupational status, we build an index, SRE, based on a combination of personal income and education.

[George to include formulas and definition]

The estimates incorporating these mechanisms are presented are presented in *Table 9*. We fist include the three channels alongside the financial literacy measure; in column (1). The results show that even after the inclusion of the three mechanisms reduces its size from -0.537 in Table 4 to -0.427. However, the relationship is still strongly statistically significant, indicating that financial literacy is capturing aspects that are orthogonal to these standard proxies. As expected, HOE enters with a statistically significant negative sign, suggesting that there is a negative effect between an individual's relative income and his preferences for conservative policies on redistribution. PVE and SRE also are found to display a negative and statistically significant relation, in line with our previous hypothesis.

Columns (2) and (3) split the sample between individuals with high and low financial literacy. Some interesting results emerge from this analysis. All three channels appear still to be negative and significant for the FLH. The order of magnitude of the coefficients is comparable with those of Corner and Gruner (2002) with the exception of SRE which is found to be stronger, in absolute value, in our database [not sure these are comparable across studies].

The picture changes dramatically when we look at those individuals that have scored a low level of financial literacy (FLL). For them the only channel driving their preferences toward redistribution is the *public value effect*. The results do not change when we enter separately the DVD and the UVD variables. The disappearance of the HOE and the SRE channels can be interpreted as financial literacy interacting with the

two aspects (HOE and SRE), capturing the individual self-awareness. Hence preferences for higher redistribution among the individuals with low financial literacy could be explained by the fact that these agents have more difficulty to place themselves or their peers well in the income scale.

7. Concluding remarks and implications

This study examines the relationship financial literacy shapes attributes towards redistribution. We show that the level of the individual's financial literacy could have a statitically significant impact in shaping her attitudes towards the need for the governemnt to actively intervene and redistribute income. More specifically we show show that the individuals who are more financially literate are less likely to be in support of greater income redistribution. Our analysis also shows that the size of these effects is economically important and that financial literacy exerts a strong influence on 'extreme responses'.

The results are robust under various specifications, a rich set of controls and interactions with income and education. We experiment with instrumental variable regressions that confirm our analysis too.

The importance of financial literacy in modern economies cannot be overemphasized. Financial literacy has a clear public good element to it as it is linked with macroeconomic financial stability. Our analysis suggests that intervention to improve financial literacy in this realm can lead to lower demand for redistribution. This may be taken into account when designing the intervention by including elements on economics of inequality with the objective to provide a broader view on the subject.

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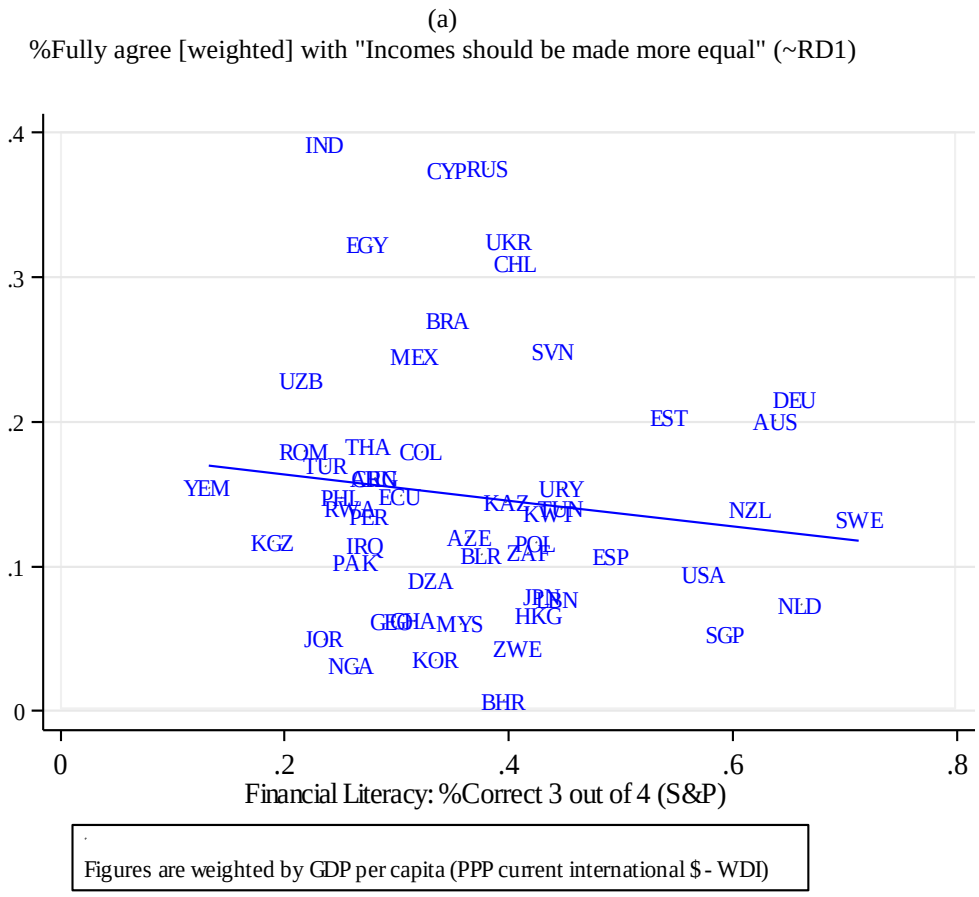
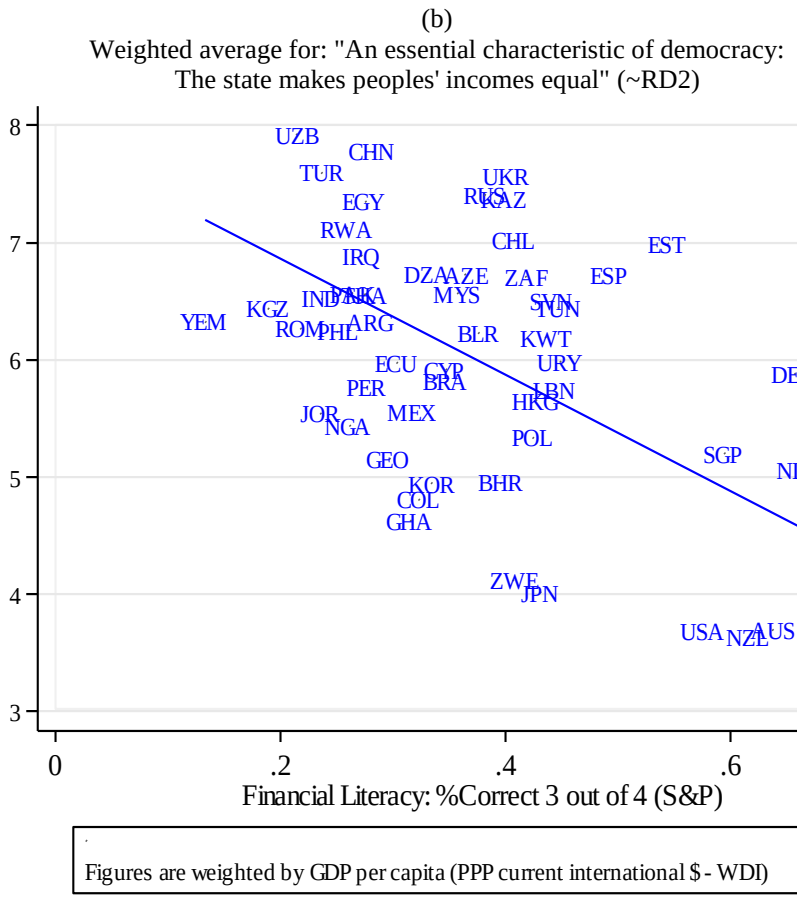
Figure 0

Attitudes to inequality and financial literacy around the world - World Values Survey (Wave 6) & S&P Financial Literacy Survey (2014)

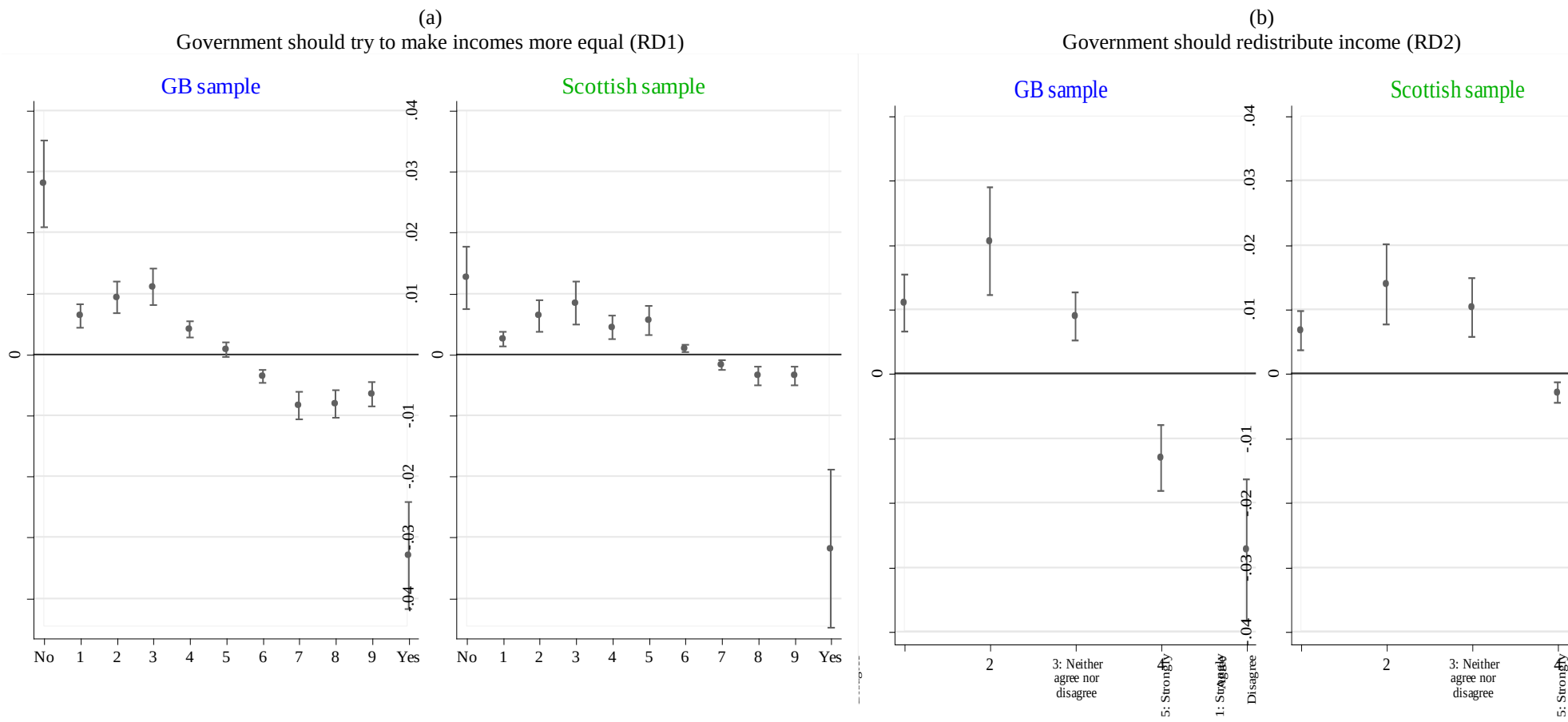




Notes: Figures are weighted by GDP per capita (PPP-adjusted current $international), from the World Development Indicators 2014.

Figure 1

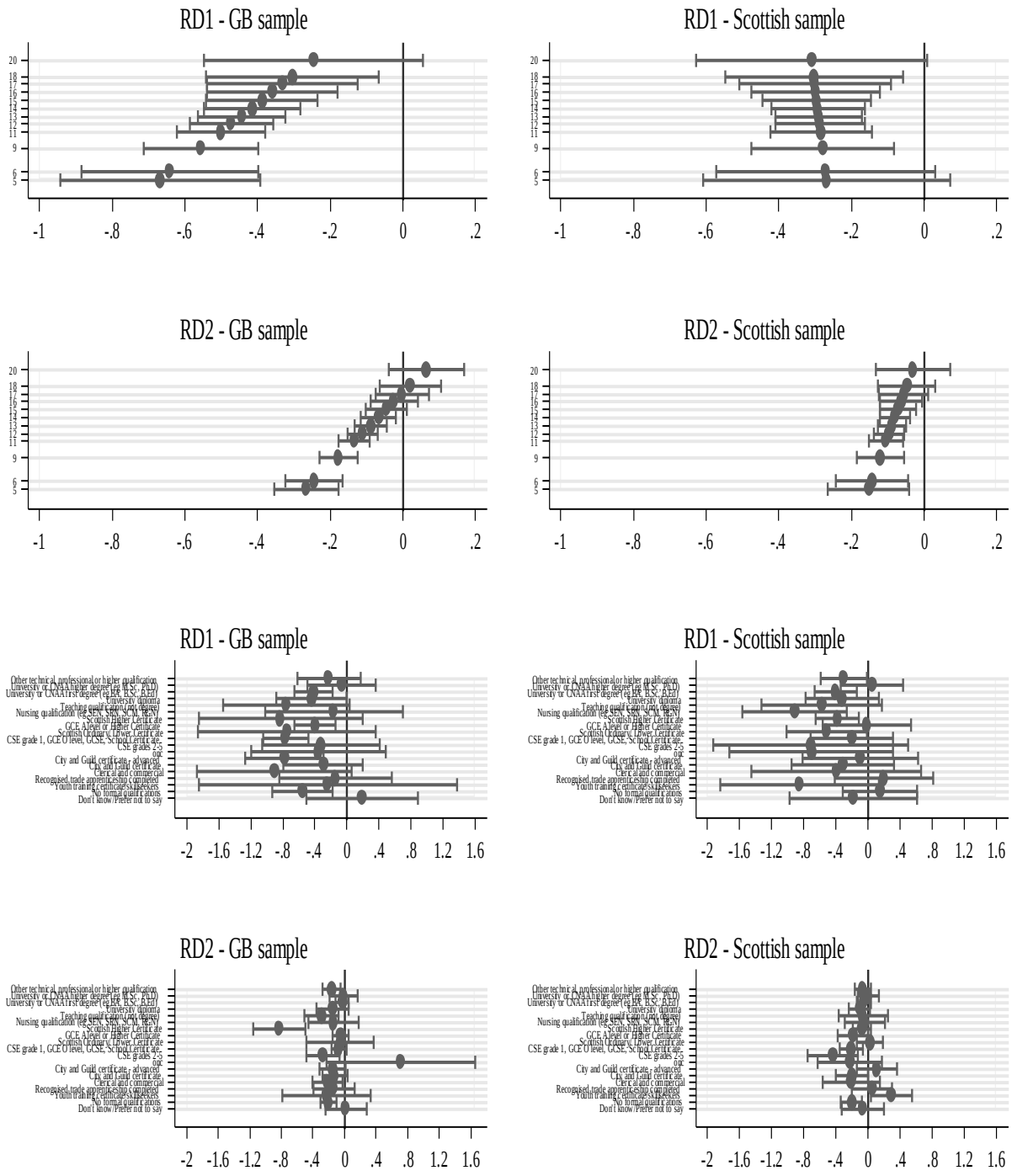
Average marginal effects of financial literacy on attitudes towards redistribution from ordered probit regressions (Great Britain, 2014)



Notes: Each graph plots average marginal effects of financial literacy on attitudes to redistribution along with 95% confidence intervals. The estimates are from separate ord regressions of the redistribution variables, i.e. RD_1 and RD_2 respectively, on financial literacy and a rich set of control variables. The estimates are presented in the Appendix Table A. weighted using population level weights and utilize robust standard errors. .

Figure 2

Average marginal effects of financial literacy on attitudes towards redistribution by education



Notes: Each graph plots the impact of financial literacy on attitudes to redistribution, as education varies. The effects presented are from linear regressions that incorporate interaction terms between financial literacy and education variables. The specifications used are those of Columns 2 and 3 of Table 4. The first set of 4 plots uses a continuous variable for years of education, while the bottom set of 4 plots uses educational qualification dummy variables.

Figure 3

Average marginal effects of financial literacy on attitudes towards redistribution by income

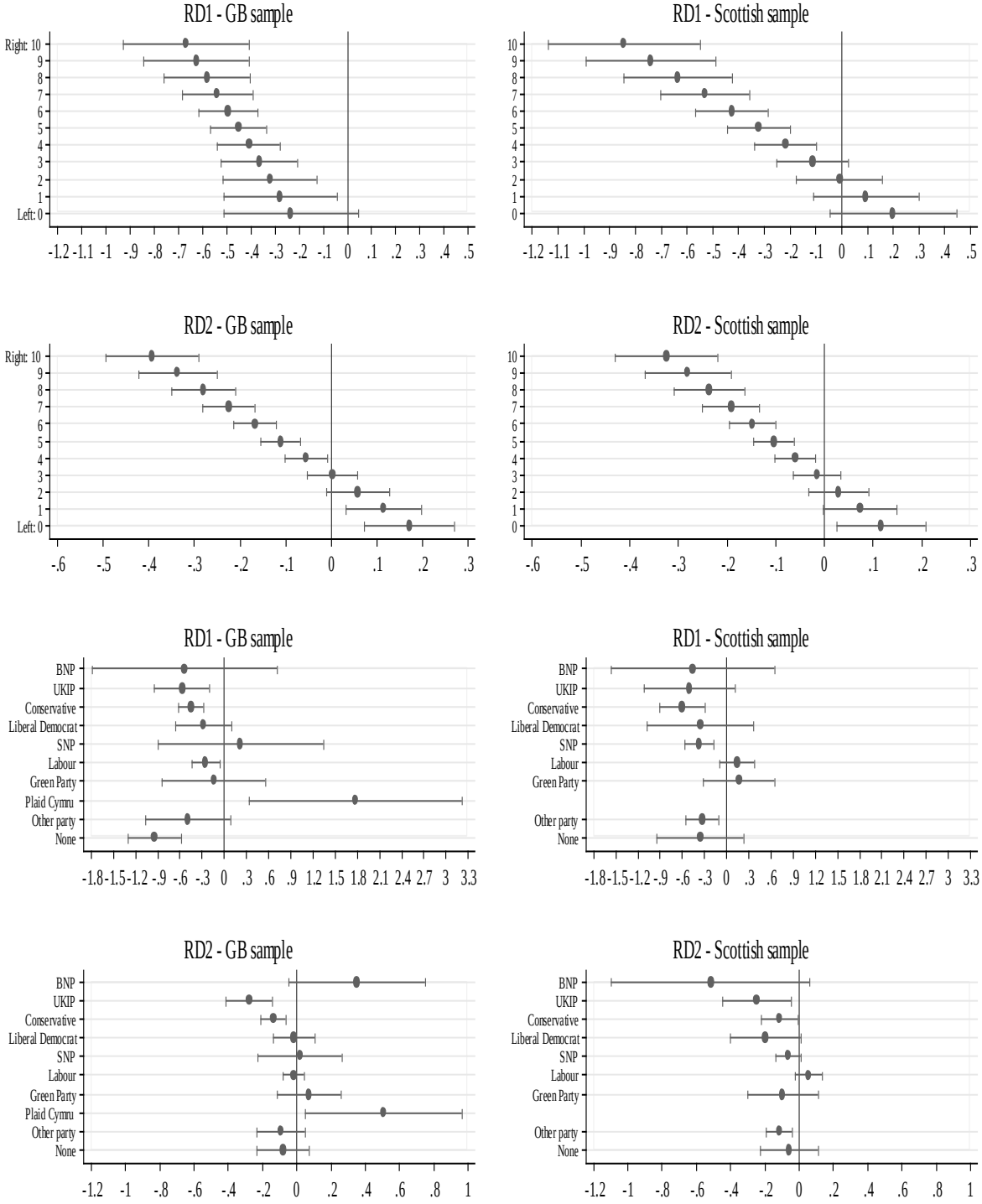
Notes: Each graph plots the impact of financial literacy on attitudes to redistribution, as personal income varies. The effects presented are from linear regressions that incorporate interaction terms between financial literacy and income variables. The specifications used are those of Columns 2 and 3 of Table 4. The first set of 4 plots uses a continuous variable for personal income, while the bottom set of 4 plots uses 15 personal income dummy variables.

Figure 4

Average marginal effects of financial literacy on attitudes towards redistribution by age

Notes: Each graph plots the impact of financial literacy on attitudes to redistribution, as age varies. The effects presented are from linear regressions that incorporate interaction terms between financial literacy and age variables. The specifications used are those of Columns 2 and 3 of Table 4. The first set of 4 plots uses a continuous variable for age, while the bottom set of 4 plots uses 7 age-group dummy variables.

Figure 5
Average marginal effects of financial literacy on attitudes towards redistribution by political orientation and party voting



Notes: Each graph plots the impact of financial literacy on attitudes to redistribution, as political orientation varies. The effects presented are from linear regressions that incorporate interaction terms between financial literacy and political orientation. The specifications used are those of Columns 2 and 3 of Table 4. The first set of 4 plots uses a continuous variable for left-right orientation [0-10], while the bottom set of 4 plots uses 10 political-party dummy variables.

Table 1
Financial literacy in 2014 Great Britain

Panel A: Financial literacy measures

	#Correct responses	*#Wrong responses*	*#DK/DA responses*	*At least one "Don't know"*
GB sample	1.99	0.49	0.52	31.25%
Scottish sample	1.93	0.51	0.56	33.91%

Panel B: Financial literacy: #Correct responses

	All 3 correct	*2 correct*	*1 correct*	*0 correct*
GB sample	40.22%	29.45%	19.55%	10.78%
Scottish sample	37.28%	31.15%	19.12%	12.45%

Panel C: Distribution of financial-literacy responses

	Correct	*Incorrect*	*Don't know*	*Refuse*
GB: Compound interest	81.32%	8.88%	9.80%	3.10%
GB: Inflation	69.09%	12.48%	18.43%	3.18%
GB: Stock risk	48.68%	27.93%	23.38%	2.41%
Scotland: Compound interest	80.87%	7.96%	11.17%	2.68%
Scotland: Inflation	65.81%	14.33%	19.85%	2.81%
Scotland: Stock risk	46.57%	28.57%	24.86%	2.43%

Panel D: International comparison (Lusardi and Mitchell, 2014)

Country	*Survey year*	*Interest rate*	*Inflation*	*Risk*	*All 3 correct*	*At least 1 "Don't know"*
USA	2009	64.9%	64.3%	51.8%	30.2%	42.4%
Netherlands	2010	84.8%	76.9%	51.9%	44.8%	37.6%
Germany	2009	82.4%	78.4%	61.8%	53.2%	37.0%
Japan	2010	70.5%	58.8%	39.5%	27.0%	61.5%
Australia	2012	83.1%	69.3%	54.7%	42.7%	41.3%

Notes: Weighted averages from the British Election Survey (2014)

Table 2

Frequencies: Attitudes towards redistribution and financial literacy in 2014 Great Britain

Panel A: RD_1 – "*Government should try to make incomes more equal*" (%)												
		No: 0 –	*– 1 –*	*– 2 –*	*– 3 –*	*– 4 –*	*– 5 –*	*– 6 –*	*– 7 –*	*– 8 –*	*– 9 –*	*– 10: Yes*
GB sample [BES: Wave 2]		*10.39*	*3.73*	*6.66*	*11.7*	*7.59*	*17.49*	*8.07*	*9.94*	*6.7*	*4.17*	*13.56*
Fin. literacy: #Correct responses	– 0 –	6.59	1.86	5.07	7.42	5.97	22.18	7.38	8.16	5.25	5.76	24.37
	– 1 –	7.31	3.50	4.61	9.20	6.50	20.31	5.60	8.37	8.03	4.89	21.69
	– 2 –	10.11	3.24	6.92	11.83	7.83	17.58	7.56	9.84	6.82	4.53	13.73
	– 3 –	12.65	4.53	7.68	13.52	8.21	15.3	9.61	11.03	6.33	3.31	7.82
Scottish sample [BES: Wave 4]		*6.34*	*1.66*	*5.10*	*8.83*	*6.31*	*13.60*	*8.55*	*11.06*	*8.32*	*5.68*	*24.55*
Fin. literacy: #Correct responses	– 0 –	4.37	1.04	5.41	3.30	6.41	18.94	5.28	7.89	5.48	7.13	34.75
	– 1 –	5.25	1.54	4.01	6.99	5.99	13.42	5.68	7.08	8.22	6.19	35.63
	– 2 –	5.35	1.03	4.61	8.97	5.43	13.34	9.09	11.51	8.76	5.79	26.12
	– 3 –	8.24	2.40	5.94	11.15	7.17	12.41	10.4	13.50	8.80	4.95	15.04

Panel B: RD_2 – "*Government should redistribute income from the better off to those who are less well off*" (%)						
		Strongly Disagree		*Neither agree nor disagree*		*Strongly Agree*
		– 1 –	*– 2 –*	*– 3 –*	*– 4 –*	*– 5 –*
GB sample [BES: Wave 2]		*5.10*	*18.32*	*24.60*	*32.68*	*19.31*
Fin. literacy: #Correct responses	– 0 –	3.12	8.12	26.88	36.77	25.11
	– 1 –	4.78	13.55	24.16	33.70	23.80
	– 2 –	3.91	18.24	25.59	33.95	18.30
	– 3 –	6.52	22.83	23.59	30.41	16.64
Scottish sample [BES: Wave 4]		*3.77*	*12.85*	*20.75*	*33.60*	*29.03*
Fin. literacy: #Correct responses	– 0 –	1.49	9.07	24.89	31.83	32.72
	– 1 –	3.59	9.74	20.32	34.52	31.83
	– 2 –	2.85	11.60	20.04	35.06	30.44
	– 3 –	5.29	16.43	20.27	32.54	25.48

Notes: This table shows the distribution of responses to different questions about attitudes towards redistribution in the British Election Survey 2014/5 and their break down by the number of correct responses in the financial-literacy questions. All statistics are weighted using population level weights.

Table 3
Sample averages and mean differences

	Great Britain [BES Wave 2:*5,552 obs.*]			Scotland [BES Wave 4: *5,387 obs.*]		
	All	*FLH*	*FLL*	*All*	*FLH*	*FLL*
	(1)	(2)	(3)	(4)	(5)	(6)
RD_1	5.15	4.86	5.92***	6.23	5.98	6.84***
RD_2	3.43	3.35	3.63***	3.71	3.67	3.82***
Male	49.4%	53.4%***	40.1%	47.7%	53.0%***	36.1%
Age	47.45	49.42***	42.93	46.61	47.68***	44.28
Years of education	12.66	13.06***	11.74	12.66	13.23***	11.42
Married	58.5%	62.2%***	50.0%	60.8%	62.3%**	57.5%
Single	22.6%	19.7%	29.3%***	27.8%	26.8%	29.9%
Widowed/divorced/separated	10.5%	10.3%	11.1%	11.4%	10.9%	12.6%
Household size	2.56	2.51	2.66***	12.80	7.23	24.91*
Has young children	21.4%	20.5%	23.5%*	20.5%	19.7%	22.3%
Urban region	60.2%	58.6%	64.1%***	35.4%	35.5%	35.1%
White	91.0%	92.9%***	86.7%	96.5%	96.9%	95.7%
Personal income	21,041.0	22,983.8***	16,579.7	16,709.0	18,691.3***	12,401.8
Household income	32,350.5	35,387.1***	25,377.6	29,580.0	32,627.3***	22,958.8
House owner	30.7%	34.4%***	22.3%	27.6%	30.7%***	20.8%
Has mortgage	28.5%	31.0%***	22.8%	29.4%	32.2%***	23.1%
Income shock	14.8%	13.5%	17.9%***	9.9%	8.8%	12.3%**
Risk-taking	2.54	2.54	2.54	2.60	2.63***	2.53
Left-right orientation	5.14	5.19**	5.03	4.65	4.62	4.73
Social desirability	1.94	1.98***	1.82	1.89	1.91	1.83
Religious	55.2%	55.0%	55.6%	51.4%	50.3%	53.9%*
Employed	56.3%	57.6%**	53.4%	51.6%	54.2%***	46.0%
Student	5.9%	5.0%	7.8%**	8.1%	8.0%	8.4%
Inactive	11.5%	9.7%	15.6%***	14.8%	11.4%	22.2%***
Unemployed	3.5%	2.7%	5.2%***	4.3%	3.9%	5.2%
Retired	22.8%	24.9%***	17.9%	20.9%	22.4%***	17.7%
Self-employed	11.3%	12.7%***	8.1%	2.1%	2.6%***	1.1%
Private sector	39.4%	40.2%	37.7%	1.4%	1.7%*	0.8%
Public sector	28.4%	28.9%	27.0%	5.3%	4.4%	7.3%**
Third sector	4.4%	4.4%	4.6%	0.4%	0.5%	0.3%
Other work	5.8%	4.5%	8.8%***	4.3%	3.4%	6.0%**
No work	2.9%	2.2%	4.5%***	2.4%	2.0%	3.3%*
Union	44.8%	49.7%***	33.4%	6.7%	7.0%	6.1%
Agreeableness	6.06	6.06	6.06	6.03	5.98	6.14**
Conscientiousness	6.75	6.87***	6.49	6.49	6.60***	6.27
Extraversion	4.16	4.07	4.36***	4.14	4.06	4.31***
Neuroticism	3.76	3.61	4.10***	3.83	3.68	4.16***
Openness	5.50	5.53*	5.42	5.53	5.59***	5.41
Home oeconomicus effect [HOE]	0.000	0.115***	-0.265	0.003	0.086***	-0.176
Public value effect [PVE]	0.000	0.035***	-0.081	0.059	0.064	0.050
Social rivalry effect [SRE]	0.000	0.033***	-0.076	0.022	0.016	0.035
Downward value differential [DVD]	0.000	0.041***	-0.093	0.012	0.015	0.006
Upward value differential [UVD]	0.000	-0.015	0.034	-0.024	-0.011	-0.051

Notes: Weighted averages from the British Election Study. HOE, PVE, SRE, DVD and UVD are in normalized values. Asterisks denote the following levels of significance of the difference between FLH and FLL, from weighted t-tests: *** p<0.01, ** p<0.05, * p<0.1.

Table 4

Regressions: Attitudes towards redistribution and financial literacy in Great Britain

Panel A: Dependent variable − RD_1: "*Government should try to make incomes more equal*"						
	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy: #Correct responses	-0.537***	-0.458***	-0.448***	-0.411***	-0.683***	-0.628***
	[0.058]	[0.059]	[0.059]	[0.060]	[0.154]	[0.137]
% Financial-literacy effect	*-10.43%*	*-8.92%*	*-8.73%*	*-8.01%*	*-13.30%*	*-12.23%*
Linear prediction	*5.1465*	*5.1341*	*5.1341*	*5.1341*	*5.1341*	*5.1341*
#Observations	*5,066*	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*
R^2	*0.029*	*0.231*	*0.220*	*0.224*	*0.225*	*0.225*
Panel B: Dependent variable − RD_2: "*Government should redistribute income from the better off to those who are less well off*"						
	(7)	(8)	(9)	(10)	(11)	(12)
Financial literacy: #Correct responses	-0.151***	-0.117***	-0.119***	-0.107***	-0.282***	-0.199***
	[0.020]	[0.022]	[0.022]	[0.022]	[0.058]	[0.056]
% Financial-literacy effect	*-4.41%*	*-3.42%*	*-3.47%*	*-3.12%*	*-8.23%*	*-5.81%*
Linear prediction	*3.4277*	*3.4249*	*3.4249*	*3.4249*	*3.4249*	*3.4249*
#Observations	*5,297*	*5,101*	*5,101*	*5,101*	*5,101*	*5,101*
R^2	*0.017*	*0.244*	*0.233*	*0.236*	*0.239*	*0.237*
Control variables for both Panels A and B:						
Individual characteristics	–	+	+	+	+	+
Education (dummy variables)	–	+	–	–	–	–
Age (dummy variables)	–	+	–	–	–	–
Personal income (dummy variables)	–	+	–	–	–	–
Years of education	–	–	+	+	+	+
Log(Age)	–	–	+	+	+	+
Log(Personal income)	–	–	+	+	+	+
Log(Personal income)^2 and ^3	–	–	–	+	+	+
Log(Household income)	–	–	–	+	+	+
Log(Household income)^2	–	–	–	+	+	+
Log(Personal income)*Log(Household income)	–	–	–	+	+	+
Financial literacy*Years of education	–	–	–	–	+	–
Fin. literacy*Log(Personal income)*Years of education*Log(Age)	–	–	–	–	–	+

Notes: Individual characteristics are shown in detail in Appendix Table A3 and discussed in Section 3. All estimates are weighted using population level weights. Robust standard errors in parenthesis. Asterisks denote the following levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 5

Attitudes to redistribution and financial literacy in Scotland (BES, 2014, Wave 4)

Panel A: Dependent variable − *RD_1:* "Government should try to make incomes more equal"			
	(1)	(2)	(3)
Financial literacy: #Correct responses	-0.287***	-0.254***	-0.369**
	[0.061]	[0.062]	[0.157]
% Financial-literacy effect	*-4.60%*	*-4.07%*	*-5.91%*
Linear prediction	*6.2387*	*6.2387*	*6.2387*
#Observations	*4,989*	*4,989*	*4,989*
R^2	*0.254*	*0.253*	*0.253*
Panel B: Dep. var. − *RD_2:* "Government should redistribute income from the better off to those who are less well off"			
	(4)	(5)	(6)
Financial literacy: #Correct responses	-0.089***	-0.072***	-0.154***
	[0.021]	[0.020]	[0.058]
% Financial-literacy effect	*-2.40%*	*-1.94%*	*-4.15%*
Linear prediction	*3.7191*	*3.7191*	*3.7105*
#Observations	*4,986*	*4,986*	*4,986*
R^2	*0.237*	*0.238*	*0.237*
Individual characteristics	+	+	+
Education (dummy variables)	+	–	–
Age (dummy variables)	+	–	–
Personal income (dummy variables)	+	–	–
Years of education	–	+	+
Log(Age)	–	+	+
Log(Personal income)	–	+	+
Log(Personal income)^2 and ^3	–	+	+
Log(Household income)	–	+	+
Log(Household income)^2	–	+	+
Log(Personal income)*Log(Household income)	–	+	+
Financial literacy*Log(Personal income)*Years of education*Log(Age)	–	–	+

Notes: Individual characteristics include the set of controls, which is shown in detail in Appendix Table A3 and discussed in Section 3. All estimates are weighted using population level weights. Robust standard errors in parenthesis. Asterisks denote the following levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 6

Predicted probabilities and financial literacy effects

Panel A: Dependent variable − *RD_1:* "*Government should try to make incomes more equal*"											
	No − 0	*− 1 −*	*− 2 −*	*− 3 −*	*− 4 −*	*− 5 −*	*− 6 −*	*− 7 −*	*− 8 −*	*− 9 −*	*Yes − 10*
GB sample [Wave 2]											
Fin. literacy AME	0.028***	0.006***	0.009***	0.011***	0.004***	0.001	-0.004***	-0.008***	-0.008***	-0.007***	-0.033***
	[0.004]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.004]
Predicted probability	*0.106*	*0.036*	*0.066*	*0.116*	*0.076*	*0.176*	*0.079*	*0.101*	*0.066*	*0.042*	*0.135*
% Fin. literacy effect	*26.33%*	*17.55%*	*14.22%*	*9.53%*	*5.35%*	*0.44%*	*-4.50%*	*-8.28%*	*-12.29%*	*-15.41%*	*-24.51%*
#Observations	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*	*4,895*
Scottish sample [Wave 4]											
Fin. literacy AME	0.014***	0.003***	0.006***	0.008***	0.004***	0.005***	0.001***	-0.002***	-0.004***	-0.004***	-0.031***
	[0.002]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]	[0.005]
Predicted probability	*0.070*	*0.018*	*0.052*	*0.090*	*0.064*	*0.137*	*0.084*	*0.111*	*0.082*	*0.055*	*0.237*
% Fin. literacy effect	*19.21%*	*14.12%*	*12.09%*	*9.02%*	*6.40%*	*3.53%*	*0.64%*	*-1.85%*	*-4.43%*	*-6.42%*	*-12.98%*
#Observations	*4,989*	*4,989*	*4,989*	*4,989*	*4,989*	*4,989*	*4,989*	*4,989*	*4,989*	*4,989*	*4,989*

Panel B: Dependent variable − *RD_2:* "*Government should redistribute income from the better off to those who are less well off*"					
	1 − Strongly Disagree	*− 2 −*	*3 − Neither agree nor disagree*	*− 4 −*	*5 − Strongly Agree*
GB sample [Wave 2]					
Fin. literacy AME	0.011***	0.021***	0.009***	-0.013***	-0.027***
	[0.002]	[0.004]	[0.002]	[0.003]	[0.006]
Predicted probability	*0.052*	*0.184*	*0.244*	*0.329*	*0.191*
% Fin. literacy effect	*21.19%*	*11.17%*	*3.67%*	*-3.97%*	*-14.30%*
#Observations	*5,101*	*5,101*	*5,101*	*5,101*	*5,101*
Scottish sample [Wave 4]					
Fin. literacy AME	0.007***	0.014***	0.010***	-0.003***	-0.028***
	[0.002]	[0.003]	[0.002]	[0.001]	[0.006]
Predicted probability	*0.038*	*0.133*	*0.203*	*0.336*	*0.291*
% Fin. literacy effect	*17.43%*	*10.46%*	*5.06%*	*-0.88%*	*-9.55%*
#Observations	*4,986*	*4,986*	*4,986*	*4,986*	*4,986*

Notes: Each panel shows the predicted probability of each response category of RD_1 and RD_2, from ordered probit regressions reported in the Appendix Table A3. The categories are 0-10 for RD_1, and 1-5 for RD_2, respectively. Probability changes due to an additional correct financial-literacy response (*i.e.* the average marginal effect) are reported, along with the percentage effect of financial literacy (*i.e.* the ratio between the average marginal effect and the predicted probability for each category). The estimates are weighted and robust standard errors of the AME are reported in parentheses. Asterisks denote the following levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 7
Falsification tests and counterfactual hypotheses

Panel A: Financial literacy and attitudes to equality rights

Please say whether you think these things have gone too far or have not gone far enough in Britain: [1: Not gone nearly far enough - 5: Gone much too far]

	GB sample			Scottish sample		
Dep. Variable: Attempts to give equal opportunities to...	*Gays and lesbians*	*Women*	*Ethnic minorities*	*Gays and lesbians*	*Women*	*Ethnic minorities*
	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy: #Correct responses	-0.001	-0.021	-0.030	-0.009	0.027	-0.028
	[0.022]	[0.018]	[0.021]	[0.021]	[0.019]	[0.021]
Linear prediction	*3.142*	*2.735*	*3.392*	*2.992*	*2.561*	*3.207*
#Observations	*5,007*	*5,104*	*4,988*	*4,872*	*4,974*	*4,857*
R^2	*0.215*	*0.143*	*0.213*	*0.251*	*0.149*	*0.210*

Panel B: Financial illiteracy and attitudes to redistribution: # Incorrect and #DK/DA responses

	GB sample				Scottish sample			
Dependent. Variable:	*RD1*		*RD2*		*RD1*		*RD2*	
	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Financial illiteracy: #Wrong responses	0.252***	–	0.103***	–	0.217***	–	0.109***	–
	[0.084]		[0.030]		[0.082]		[0.029]	
Financial illiteracy: #DK/DA responses	–	0.444***	–	0.075***	–	0.213***	–	0.039
		[0.071]		[0.026]		[0.077]		[0.024]
% Financial-illiteracy effect	*4.91%*	*8.65%*	*3.01%*	*2.19%*	*3.48%*	*3.41%*	*2.93%*	*1.05%*
Linear prediction	*5.1341*	*5.1341*	*3.4249*	*3.4249*	*6.2387*	*6.2387*	*3.7191*	*3.7191*
#Observations	*4,895*	*4,895*	*5,101*	*5,101*	*4,989*	*4,989*	*4,986*	*4,986*
R^2	*0.217*	*0.225*	*0.239*	*0.238*	*0.250*	*0.250*	*0.236*	*0.233*

Notes: The remaining specification is identical to Column 2 of Table 4, and the comments there apply. Asterisks denote the following levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 8

Instrumental variables: Financial literacy and attitudes to redistribution in Great Britain

	GB sample				Scottish sample			
Instrument:	*Lewbel*	*P.F. section*	*FinEdu*	*P.F. section, FinEdu*	*Lewbel*	*P.F. section*	*FinEdu*	*P.F. section, FinEdu*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Dependent variable – *RD_1:* "*Government should try to make incomes more equal*"								
Financial literacy: #Correct responses	-0.577***	-0.964*	-1.135*	-1.037**	-0.217*	-0.947*	-1.675***	-1.284***
	[0.097]	[0.497]	[0.684]	[0.414]	[0.112]	[0.561]	[0.638]	[0.418]
% Financial-literacy effect	*-11.24%*	*-18.78%*	*-22.11%*	*-20.20%*	*-3.48%*	*-15.18%*	*-26.85%*	*-20.58%*
Linear prediction	*5.134*	*5.134*	*5.134*	*5.134*	*6.239*	*6.239*	*6.239*	*6.239*
# Observations	*4895*	*4895*	*4895*	*4895*	*4989*	*4989*	*4989*	*4989*
R^2	*0.229*	*0.211*	*0.195*	*0.204*	*0.254*	*0.218*	*0.095*	*0.172*
F-statistic	*12.93*	*12.17*	*11.96*	*12.11*	*17.68*	*16.46*	*13.90*	*15.50*
Partial R^2 of excluded instruments:	0.373	0.008	0.006	0.015	0.325	0.008	0.007	0.015
F-Test of excluded instruments	25.73***	36.07***	19.36***	27.12***	21.03***	36.06***	27.08***	30.85***
(a) Kleibergen-Paap rk LM statistic χ^2	447.18***	33.67***	19.22***	49.51***	395.53***	35.62***	26.41***	57.17***
(b) Kleibergen-Paap rk Wald χ^2	2018.9***	36.65***	19.68***	55.12***	1671.4***	36.64***	27.52***	62.71***
(c) Anderson-Rubin Wald test: F	2.24***	3.79***	2.89*	3.14**	1.72***	2.97*	7.80***	5.40***
(c) Stock-Wright LM S-statistic: χ^2	109.29***	3.76*	2.92*	6.38**	91.24	2.94*	7.77***	10.59***
(d) Hansen J statistic χ^2	78.479	–	–	0.042	90.25	–	–	0.74
Panel B: Dependent variable – *RD_2:* "*Government should redistribute income from the better off to those who are less well off*"								
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Financial literacy: #Correct responses	-0.073*	-0.427**	-0.411	-0.421***	-0.072**	-0.283	-0.560***	-0.441***
	[0.037]	[0.178]	[0.308]	[0.161]	[0.036]	[0.207]	[0.197]	[0.138]
%Financial-literacy effect	*-2.14%*	*-12.53%*	*-12.06%*	*-12.35%*	*-1.93%*	*-7.61%*	*-15.06%*	*-11.86%*
Linear prediction	*3.409*	*3.409*	*3.409*	*3.409*	*3.719*	*3.719*	*3.719*	*3.719*
# Observations	*5292*	*5292*	*5292*	*5292*	*4986*	*4986*	*4986*	*4986*
R^2	*0.238*	*0.175*	*0.182*	*0.178*	*0.237*	*0.213*	*0.094*	*0.157*
F-statistic	*15.25*	*13.7*	*13.76*	*13.74*	*15.32*	*14.44*	*12.36*	*13.37*
Partial R^2 of excluded instruments:	0.366	0.009	0.015	0.014	0.339	0.007	0.010	0.017
F-test of excluded instruments	31.40***	48.84***	17.49***	33.70***	21.73***	33.67***	38.48***	34.51***
(a) Kleibergen-Paap rk LM statistic χ^2	463.55***	45.86***	17.52***	62***	394.6***	32.13***	36.25***	61.41***
(b) Kleibergen-Paap rk Wald χ^2	2457.1***	49.57***	17.75***	68.42***	1727.1***	34.21***	39.10***	70.14***
(c) Anderson-Rubin Wald test: F	2.06***	6.16**	1.89	3.94**	1.23*	1.89	9.13***	5.74***
(c) Stock-Wright LM S-statistic: χ^2	107.89***	6.19**	1.90	8.02**	78.61	1.89	9.11***	11.38***
(d) Hansen J statistic χ^2	106.13**	–	–	0.002	73.95	–	–	0.885

Notes: Individual characteristics include the set of controls, which is shown in detail in Appendix Table A3 and discussed in Section 3. Estimates are weighted using population level weights. Robust standard errors in parenthesis. Asterisks denote the following levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Table 9

Mechanisms: Financial literacy and attitudes to redistribution in Great Britain (RD_1)

	Great Britain					Scotland				
	All	*All*	*All*	*FLH*	*FLL*	*All*	*All*	*All*	*FLH*	*FLL*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial literacy: number of correct responses	-0.429***	-0.429***	–	–	–	-0.296***	-0.297***	–	–	–
	[0.059]	[0.059]				[0.061]	[0.061]			
High financial literacy [FLH]	–	–	-0.819***	–	–	–	–	-0.505***	–	–
			[0.133]					[0.129]		
Homo oeconomicus effect [HOE]	-0.258***	-0.258***	–	-0.318***	-0.177	-0.148**	-0.145**	–	-0.146**	-0.152
	[0.066]	[0.066]		[0.071]	[0.143]	[0.061]	[0.061]		[0.066]	[0.128]
Public value effect [PVE]	-0.504***	-0.504***	–	-0.468***	-0.596***	-0.680***	-0.679***	–	-0.850***	-0.349***
	[0.063]	[0.064]		[0.071]	[0.132]	[0.060]	[0.060]		[0.065]	[0.115]
Social rivalry effect [SRE]	-0.215***	–	–	-0.271***	-0.075	-0.237***	–	–	-0.189***	-0.325***
	[0.051]			[0.055]	[0.121]	[0.052]			[0.050]	[0.118]
Downward value differential [SRE^{DVD}]	–	-0.131**	–	–	–	–	-0.183***	–	–	–
		[0.054]					[0.058]			
Upward value differential [SRE^{UVD}]	–	0.125**	–	–	–	–	0.102**	–	–	–
		[0.058]					[0.051]			
HOE* FLH	–	–	-0.282***	–	–	–	–	-0.149**	–	–
			[0.069]					[0.067]		
HOE*(1- FLH)	–	–	-0.215*	–	–	–	–	-0.155	–	–
			[0.125]					[0.116]		
PVE*FLH	–	–	-0.473***	–	–	–	–	-0.834***	–	–
			[0.070]					[0.065]		
PVE*(1- FLH)	–	–	-0.599***	–	–	–	–	-0.327***	–	–
			[0.128]					[0.112]		
SRE*FLH	–	–	-0.267***	–	–	–	–	-0.196***	–	–
			[0.055]					[0.050]		
SRE*(1- FLH)	–	–	-0.048	–	–	–	–	-0.325***	–	–
			[0.128]					[0.125]		
Linear prediction	*5.1277*	*5.1277*	*5.1277*	*4.8504*	*5.9101*	*6.2336*	*6.2336*	*6.2336*	*5.9791*	*6.861*
# Observations	*4,826*	*4,826*	*4,826*	*3,817*	*1,009*	*4,861*	*4,861*	*4,861*	*3,810*	*1,051*
Pseudo R^2	*0.248*	*0.248*	*0.246*	*0.249*	*0.251*	*0.291*	*0.291*	*0.294*	*0.332*	*0.241*

Notes: HOE, PVE and SRE are normalized measures of the homo-oeconomicus, public value and social rivalry effects, respectively. These are described in Section 5 In detail. characteristics include the set of controls, which is shown in detail in Appendix Table A3 and discussed in Section 3. All estimates are weighted using population level weights. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 10

Mechanisms: Financial literacy and attitudes to redistribution in Great Britain (RD_2)

	Great Britain					Scotland				
	All	*All*	*All*	*FLH*	*FLL*	*All*	*All*	*All*	*FLH*	*FLL*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial literacy: number of correct responses	-0.102***	-0.102***	–	–	–	-0.078***	-0.078***	–	–	–
	[0.023]	[0.023]				[0.021]	[0.021]			
High financial literacy [FLH]	–	–	-0.185***	–	–	–	–	-0.130***	–	–
			[0.054]					[0.044]		
Homo oeconomicus effect [HOE]	-0.040	-0.038	–	-0.088***	0.015	0.004	0.006	–	-0.011	0.042
	[0.025]	[0.025]		[0.027]	[0.046]	[0.022]	[0.022]		[0.024]	[0.043]
Public value effect [PVE]	-0.222***	-0.222***	–	-0.223***	-0.198***	-0.235***	-0.235***	–	-0.292***	-0.135***
	[0.022]	[0.022]		[0.025]	[0.043]	[0.021]	[0.021]		[0.023]	[0.040]
Social rivalry effect [SRE]	-0.162***	–	–	-0.151***	-0.164***	-0.088***	–	–	-0.078***	-0.095**
	[0.018]			[0.020]	[0.036]	[0.018]			[0.019]	[0.038]
Downward value differential [SRE^{DVD}]	–	-0.108***	–	–	–	–	-0.073***	–	–	–
		[0.021]					[0.020]			
Upward value differential [SRE^{UVD}]	–	0.086***	–	–	–	–	0.033*	–	–	–
		[0.020]					[0.019]			
HOE* FLH	–	–	-0.062**	–	–	–	–	-0.005	–	–
			[0.027]					[0.023]		
HOE*(1- FLH)	–	–	0.020	–	–	–	–	0.028	–	–
			[0.046]					[0.040]		
PVE*FLH	–	–	-0.241***	–	–	–	–	-0.293***	–	–
			[0.025]					[0.023]		
PVE*(1- FLH)	–	–	-0.173***	–	–	–	–	-0.112***	–	–
			[0.044]					[0.038]		
SRE*FLH	–	–	-0.159***	–	–	–	–	-0.085***	–	–
			[0.020]					[0.019]		
SRE*(1- FLH)	–	–	-0.171***	–	–	–	–	-0.094**	–	–
			[0.038]					[0.038]		
Linear prediction	3.4194	3.4194	3.4194	3.3405	3.6284	3.7118	3.7118	3.7118	3.6557	3.8462
# Observations	4,314	4,314	4,314	3,337	977	4,855	4,855	4,855	3,774	1,081
Pseudo R^2	0.294	0.294	0.294	0.336	0.283	0.273	0.273	0.277	0.317	0.239

Notes: HOE, PVE, SRE, (SRE^{DVD} and SRE^{UVD}) are normalized measures of the homo-oeconomicus, public value and social rivalry effects (downward-value differential and upward-value differential), respectively. These are described in Section 5 In detail. The specification is identical to Column 2 of Table 4, excluding the personal income dummies, which can not be used simultaneously with HOE. All estimates are weighted. Robust standard errors are shown in parentheses.

Appendix

Appendix Table A1

Full sample and financial-literacy subsample comparisons

	Understanding Society		BES Wave 2			BES Wave 4		
	Unweighted	Weighted	Full sample (GB)	Fin. Lit. sub-sample (GB)	*Sig. Diff.*	Full sample (GB)	Fin. Lit. sub-sample (Scotland)	*Sig. Diff.*
#Observations	*42,070*	*27,922*	*33,588*	*5,552*		*39,719*	*5,387*	
RD_1	–	–	5.32	5.15	***	5.53	6.23	***
RD_2	–	–	3.45	3.43		3.45	3.42	***
Household income	46,309.7	45,452.5	31,797.3	32,493.9	**	33,418.6	30,096.7	***
Personal income	21,569.3	21,784.0	20,639.1	21,078.3	***	21,117.0	16,709.8	***
Personal income: missing	5.3%	4.1%	21.9%	21.8%		22.1%	21.1%	
-"-: £0-£4,999 per year	10.3%	9.6%	8.9%	9.2%		9.1%	9.4%	
-"-: £5,000-£9,999 per year	14.0%	14.3%	10.9%	10.0%	*	11.1%	12.8%	***
-"-: £10,000-£14,999 per year	17.0%	18.0%	11.5%	11.0%		11.7%	12.5%	
-"-: £15,000-£19,999 per year	14.8%	15.3%	11.0%	10.8%		11.0%	11.6%	
-"-: £20,000-£24,999 per year	10.6%	10.6%	9.8%	10.0%		9.7%	9.1%	
-"-: £25,000-£29,999 per year	7.9%	7.8%	8.0%	8.6%		7.8%	7.0%	*
-"-: £30,000-£34,999 per year	5.5%	5.5%	5.6%	6.0%		5.5%	5.8%	
-"-: £35,000-£39,999 per year	4.0%	4.1%	3.7%	3.4%		3.9%	3.6%	
-"-: £40,000-£44,999 per year	2.9%	2.8%	2.5%	2.3%		2.5%	2.3%	
-"-: £45,000-£49,999 per year	1.7%	1.8%	1.7%	2.2%	*	1.6%	1.2%	**
-"-: £50,000-£59,999 per year	2.1%	2.0%	1.9%	1.9%		1.8%	1.7%	
-"-: £60,000-£69,999 per year	1.3%	1.4%	1.0%	1.2%		0.9%	0.9%	
-"-: £70,000-£99,999 per year	1.5%	1.6%	1.1%	1.3%		1.0%	0.8%	**
-"-: >£100,000 per year	1.0%	1.1%	0.6%	0.5%	*	0.6%	0.4%	***
Years of education	11.30	11.23	12.73	12.66		12.65	12.66	
Education: None of the below	12.6%	15.7%						
-"-: No education	17.5%	1.0%	10.8%	11.2%		10.3%	10.8%	
-"-: Level 1	1.8%	2.2%	4.5%	4.4%		4.5%	7.9%	***
-"-: Level 2	27.1%	31.6%	36.2%	35.6%		36.8%	31.1%	***
-"-: Apprenticeship	1.2%	1.4%	1.5%	1.4%		1.5%	2.1%	**
-"-: Level 3	3.9%	4.9%	2.3%	2.4%		2.5%	1.7%	***
-"-: Level 4	11.7%	14.3%	14.7%	15.0%		14.4%	14.6%	
-"-: University	15.6%	18.7%	23.1%	23.7%		22.7%	23.8%	
-"-: Graduate	7.4%	8.6%	6.7%	6.3%		6.5%	7.1%	*
Age	47.63	48.81	46.32	47.45	***	45.74	46.61	***
Age: 15-25	15.3%	13.5%	15.0%	13.3%	***	16.2%	13.7%	***
-"-: 26-35	14.2%	15.0%	17.7%	16.7%		17.6%	15.4%	***
-"-: 36-45	17.3%	16.5%	15.1%	15.2%		15.2%	17.1%	***
-"-: 46-55	18.0%	17.8%	16.4%	16.9%		16.6%	18.9%	***
-"-: 56-65	15.0%	15.3%	20.5%	21.8%	**	19.6%	20.7%	*
-"-: 66-75	12.3%	12.5%	13.1%	13.8%	*	12.7%	12.5%	
-"-: >76	7.8%	9.5%	2.2%	2.4%		2.1%	1.7%	*
Male	46.5%	47.6%	48.5%	49.4%		48.1%	47.7%	
Marital status: Single	27.1%	32.6%	23.1%	22.6%		27.9%	27.8%	
-"-: Married/Cohabiting/Civil partnership	38.2%	46.6%	55.3%	58.5%	***	61.0%	60.8%	
-"-: Widowed/Divorced/Separated	12.6%	16.4%	10.8%	10.5%		11.2%	11.4%	
Household size	2.96	2.80	2.59	2.56		32.80	12.80	***
Children at preschool and school age	–	–	20.7%	21.4%		21.8%	20.5%	
Occupation: Student	0.8%	0.4%	6.5%	5.9%		6.9%	8.1%	**
-"-: Employed	55.7%	55.5%	56.6%	56.3%		55.9%	51.6%	***
-"-: Inactive	16.2%	14.7%	11.7%	11.5%		12.4%	14.8%	***

Table A1 continued in next page

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	Unweighted	Weighted	Full sample (GB)	Fin. Lit. sub-sample (GB)	*Sig. Diff.*	Full sample (GB)	Fin. Lit. sub-sample (Scotland)	*Sig. Diff.*
-"-: Unemployed	4.6%	4.4%	3.8%	3.5%		3.8%	4.3%	
-"-: Retired	23.4%	25.3%	21.4%	22.8%	**	21.1%	20.9%	
Last work: Self-employed	–	–	10.3%	11.3%		2.6%	2.1%	*
-"-: Private sector	–	–	39.0%	39.4%		1.8%	1.4%	
-"-: Public sector	–	–	27.1%	28.4%	*	6.2%	5.3%	*
-"-: Third sector	–	–	4.6%	4.4%		0.6%	0.4%	
-"-: Other	–	–	5.3%	5.8%		4.4%	4.3%	
-"-: Never worked	–	–	2.8%	2.9%		2.4%	2.4%	
Trade union member (current or past)	–	–	39.6%	44.8%	***	6.1%	6.7%	
Ethnicity: White	79.9%	87.5%	91.0%	91.0%		91.3%	96.5%	***
-"-: Black	1.7%	1.1%	2.0%	2.0%		1.9%	0.1%	***
-"-: Mixed	8.8%	4.3%	1.3%	1.2%		1.3%	0.6%	***
-"-: Asian	2.1%	1.2%	3.6%	3.8%		3.6%	0.8%	***
-"-: Other	0.4%	0.2%	2.2%	2.0%		1.8%	2.0%	
Immigrant	13.0%	10.4%	7.2%	6.7%		5.8%	3.9%	***
Country of birth: Scotland	–	–	79.1%	88.0%	***	63.4%	13.4%	***
-"-: Wales	–	–	8.8%	3.1%	***	26.2%	81.8%	***
-"-: Northern Ireland	–	–	4.5%	1.7%	***	4.2%	0.5%	***
-"-: Republic of Ireland	–	–	0.5%	0.5%		0.4%	0.5%	
-"-: Commonwealth	–	–	0.5%	0.5%		0.5%	0.2%	***
-"-: European Union	–	–	1.8%	1.7%		1.6%	1.2%	*
-"-: Rest of World	–	–	1.8%	1.8%		1.4%	1.4%	
Home owner: outright	32.0%	32.8%	3.0%	2.6%		2.4%	1.2%	***
Mortgage: leasehold/freehold	38.4%	35.8%	28.2%	30.7%	***	29.4%	27.6%	**
Experienced income shock in last year	–	–	28.0%	28.5%		29.1%	29.4%	
Risk-taker: 1 (Low) - 4 (High)	–	–	15.6%	14.8%		7.3%	9.9%	***
Political orientation: 0 (left) - 10 (Right)	–	–	5.06	5.14	**	5.07	4.65	***
Social desirability: 0 (Low) - 4 (High)	–	–	1.94	1.94		1.95	1.89	***
Religiousness	–	–	0.54	0.55	*	0.58	0.51	***
BIG5: Agreeableness	5.62	5.62	6.06	6.06		6.07	6.12	
-"-: Conscientiousness	5.47	5.46	6.65	6.75	***	6.68	6.62	
-"-: Extraversion	4.60	4.59	4.24	4.16	**	4.24	4.07	***
-"-: Neuroticism	3.56	3.57	3.79	3.76		3.76	3.73	
-"-: Openness	4.56	4.56	5.54	5.50	*	5.55	5.58	
Urban region	77.3%	77.7%	56.5%	60.2%	***	56.4%	35.4%	***
Region: Northeast	3.9%	4.5%	4.5%	5.3%	**	–	–	
-"-: Northwest	10.3%	11.2%	11.1%	12.4%	**	–	–	
-"-: Yorkshire & Humber	8.7%	9.0%	9.0%	9.7%		–	–	
-"-: East Midlands	8.2%	7.7%	7.8%	9.0%	**	–	–	
-"-: West Midlands	8.5%	8.8%	8.7%	10.5%	***	–	–	
-"-: East England	9.1%	10.2%	9.4%	10.5%	**	–	–	
-"-: Greater London	12.8%	11.7%	13.0%	14.7%	***	–	–	
-"-: South East	12.7%	14.1%	14.1%	16.3%	***	–	–	
-"-: South West	8.4%	9.3%	8.2%	9.7%	***	–	–	
-"-: Wales	7.9%	5.0%	5.4%	0.8%	***	–	–	
-"-: Scotland	9.3%	8.4%	8.9%	1.2%	***	–	–	
Region: Borders	–	–	–	–		1.6%	0.3%	***
-"-: Central	–	–	–	–		6.6%	1.4%	***
-"-: Dumfries and Galloway	–	–	–	–		1.5%	0.3%	***
-"-: Fife	–	–	–	–		6.4%	1.4%	***

Table A1 continued in next page

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	Unweighted	Weighted	Full sample (GB)	Fin. Lit. sub-sample (GB)	*Sig. Diff.*	Full sample (GB)	Fin. Lit. sub-sample (Scotland)	*Sig. Diff.*
-"-: Grampian	–	–	–	–		6.0%	1.3%	***
-"-: Highland	–	–	–	–		3.3%	0.7%	***
-"-: Lothian	–	–	–	–		10.9%	2.3%	***
-"-: Orkney	–	–	–	–		0.4%	0.1%	***
-"-: Strathclyde	–	–	–	–		30.3%	6.5%	***
-"-: Tayside	–	–	–	–		4.8%	1.0%	***
-"-: Western Isles	–	–	–	–		0.3%	0.1%	
-"-: Rest of Great Britain	–	–	–	–		27.9%	84.5%	***

Notes: Weighted averages from the British Election Study

Table A2
Correlation matrix

	RD_1	RD_2	Financial literacy	Male	Age	Years of Education	Log (Pers. income)	Log (Hous. income)	Single	Employed	Urban region	Homeowner	White	HOE	PVE	SRE	DVD	UVD
RD_1	**1.00**	*0.54**	*-0.15**	*-0.02*	*-0.02*	*-0.11**	*-0.08**	*-0.21**	*0.05**	*-0.05**	*0.04**	*-0.10**	*-0.03**	*0.00*	*-0.32**	*-0.12**	*-0.11**	*0.09**
RD_2	0.43*	**1.00**	*-0.09**	*0.04**	*0.01*	*-0.07**	*-0.03**	*-0.15**	*0.02*	*-0.05**	*0.06**	*-0.07**	*-0.04**	*0.01*	*-0.32**	*-0.13**	*-0.11**	*0.10**
Financial literacy	-0.17*	-0.13*	**1.00**	*0.20**	*0.09**	*0.23**	*0.21**	*0.25**	*-0.04**	*0.08**	*0.00*	*0.12**	*0.01*	*0.13**	*0.02*	*0.00*	*0.01*	*0.00*
Male	-0.04*	0.02*	0.17*	**1.00**	*-0.02**	*0.02*	*0.18**	*0.16**	*0.05**	*0.08**	*0.03**	*0.00*	*-0.03**	*0.07**	*-0.03**	*-0.03**	*0.00*	*0.04**
Age	-0.03*	0.01	0.17*	-0.02	**1.00**	*-0.33**	*0.00*	*-0.07**	*-0.46**	*-0.20**	*-0.16**	*0.50**	*0.08**	*-0.03**	*-0.14**	*0.00*	*0.00*	*0.00*
Years of Education	-0.07*	-0.07*	0.17*	-0.03*	-0.36*	**1.00**	*0.18**	*0.28**	*0.16**	*0.19**	*0.09**	*-0.12**	*0.05**	*0.10**	*0.01*	*0.01*	*0.07**	*0.04**
Log(Pers. income)	-0.13*	-0.12*	0.20*	0.22*	0.08*	0.17*	**1.00**	*0.49**	*-0.11**	*0.43**	*0.06**	*-0.09**	*0.12**	*0.82**	*0.05**	*0.00*	*0.02**	*0.03**
Log(Hous. income)	-0.16*	-0.17*	0.25*	0.10*	-0.08*	0.27*	0.62*	**1.00**	*-0.23**	*0.44**	*0.03**	*0.00*	*0.06**	*0.21**	*0.12**	*0.01*	*0.04**	*0.01*
Single	0.06*	0.04*	-0.08*	0.09*	-0.42*	0.17*	-0.17*	-0.20*	**1.00**	*-0.05**	*0.13**	*-0.22**	*-0.04**	*-0.02*	*0.00*	*-0.02*	*-0.02*	*0.01*
Employed	0.00	-0.04*	0.05*	0.07*	-0.30*	0.19*	0.46*	0.42*	0.01	**1.00**	*0.03**	*-0.18**	*-0.02*	*0.21**	*0.13**	*0.01*	*0.02*	*0.00*
Urban region	0.03*	0.04*	-0.06*	0.00	-0.14*	0.02	-0.01	-0.01	0.10*	0.03*	**1.00**	*-0.13**	*-0.04**	*0.04**	*0.00*	*0.01*	*0.03**	*0.00*
Homeowner	-0.08*	-0.06*	0.13*	-0.02	0.44*	-0.10*	0.00	0.00	-0.10*	-0.23*	-0.08*	**1.00**	*0.02*	*-0.09**	*-0.06**	*0.01*	*0.02*	*0.00*
White	-0.02	-0.03*	0.10*	-0.04*	0.19*	-0.08*	0.02	0.04*	-0.09*	-0.01	-0.15*	0.08*	**1.00**	*0.05**	*0.01*	*0.01*	*0.00*	*-0.02*
HOE	-0.13*	-0.12*	0.19*	0.21*	0.08*	0.17*	0.98*	0.61*	-0.17*	0.45*	-0.01	0.00	0.03*	**1.00**	*0.01*	*-0.02*	*0.02**	*0.06**
PVE	-0.25*	-0.32*	0.06*	-0.01	-0.12*	0.05*	0.10*	0.15*	0.00	0.10*	0.00	-0.04*	0.00	0.09*	**1.00**	*0.07**	*0.05**	*-0.07**
SRE	-0.13*	-0.22*	0.05*	0.00	0.00	0.05*	0.04*	0.07*	0.00	0.01	0.03*	0.02	0.01	0.05*	0.13*	**1.00**	*0.82**	*-0.83**
DVD	-0.11*	-0.20*	0.05*	0.00	0.00	0.06*	0.07*	0.07*	0.01	0.03*	0.02	0.01	0.01	0.08*	0.11*	0.82*	**1.00**	*-0.37**
UVD	0.11*	0.16*	-0.03*	0.00	0.01	-0.03*	0.00	-0.04*	0.00	0.00	-0.03*	-0.01	0.00	0.00	-0.11*	-0.83*	-0.38*	**1.00**

Notes: Weighted correlation matrix. Cells below the diagonal are for Great Britain. Cells above the diagonal are for Scotland.

Table A3

Financial literacy and attitudes to redistribution in 2014 Great Britain and Scotland – Ordered probit regressions

	RD_1^{GB}		RD_2^{GB}		$RD_1^{Scotland}$		$RD_2^{Scotland}$	
Financial literacy: #Correct responses	-0.175***	[0.023]	-0.119***	[0.024]	-0.120***	[0.025]	-0.097***	[0.023]
Personal income: missing	-0.248***	[0.084]	-0.211**	[0.088]	-0.091	[0.098]	-0.020	[0.095]
-"-: £0-£4,999 per year	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: £5,000-£9,999 per year	-0.037	[0.103]	-0.014	[0.097]	-0.011	[0.105]	0.134	[0.102]
-"-: £10,000-£14,999 per year	0.073	[0.095]	0.056	[0.104]	0.058	[0.104]	0.062	[0.100]
-"-: £15,000-£19,999 per year	-0.125	[0.099]	-0.041	[0.102]	-0.030	[0.106]	0.094	[0.103]
-"-: £20,000-£24,999 per year	-0.229**	[0.099]	-0.122	[0.104]	-0.133	[0.111]	0.037	[0.106]
-"-: £25,000-£29,999 per year	-0.189*	[0.100]	-0.111	[0.107]	-0.163	[0.113]	0.073	[0.114]
-"-: £30,000-£34,999 per year	-0.319***	[0.115]	-0.166	[0.112]	-0.13	[0.116]	0.030	[0.116]
-"-: £35,000-£39,999 per year	-0.296**	[0.123]	-0.342***	[0.126]	-0.245**	[0.123]	-0.093	[0.139]
-"-: £40,000-£44,999 per year	-0.382***	[0.146]	-0.205	[0.148]	-0.387***	[0.138]	-0.092	[0.142]
-"-: £45,000-£49,999 per year	-0.254*	[0.146]	-0.102	[0.148]	-0.125	[0.160]	0.232	[0.169]
-"-: £50,000-£59,999 per year	-0.492***	[0.126]	0.024	[0.170]	-0.484***	[0.169]	-0.162	[0.147]
-"-: £60,000-£69,999 per year	-0.421**	[0.164]	-0.204	[0.268]	-0.426**	[0.178]	-0.187	[0.186]
-"-: £70,000-£99,999 per year	-0.698***	[0.151]	-0.421**	[0.207]	-0.540***	[0.180]	-0.421**	[0.208]
-"-: >£100,000 per year	-0.220	[0.267]	-0.716***	[0.190]	-0.871***	[0.219]	-0.432*	[0.235]
Education: None	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: Level 1	0.064	[0.118]	-0.155	[0.166]	0.087	[0.113]	-0.024	[0.110]
-"-: Level 2	-0.014	[0.080]	-0.151**	[0.075]	-0.216**	[0.090]	-0.088	[0.085]
-"-: Apprenticeship	0.147	[0.140]	0.307*	[0.167]	-0.276	[0.220]	-0.262	[0.171]
-"-: Level 3	0.272*	[0.141]	-0.025	[0.128]	0.122	[0.185]	0.029	[0.170]
-"-: Level 4	-0.083	[0.091]	-0.243***	[0.082]	-0.306***	[0.095]	-0.208**	[0.087]
-"-: University	-0.007	[0.086]	-0.124	[0.082]	-0.284***	[0.091]	-0.145*	[0.085]
-"-: Graduate	-0.127	[0.103]	-0.022	[0.103]	-0.222**	[0.099]	-0.074	[0.098]
Age: 15-25	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: 26-35	0.082	[0.108]	0.161	[0.108]	-0.098	[0.110]	0.024	[0.112]
-"-: 36-45	0.222**	[0.108]	0.267**	[0.111]	-0.057	[0.114]	0.153	[0.115]
-"-: 46-55	0.131	[0.109]	0.270**	[0.109]	0.041	[0.115]	0.309***	[0.116]
-"-: 56-65	0.153	[0.114]	0.422***	[0.111]	-0.037	[0.119]	0.366***	[0.123]
-"-: 66-75	0.024	[0.126]	0.373***	[0.123]	0.161	[0.136]	0.323**	[0.140]
-"-: >76	0.239	[0.164]	0.424***	[0.152]	0.066	[0.190]	0.245	[0.171]
Male	0.040	[0.042]	0.223***	[0.046]	0.135***	[0.045]	0.302***	[0.044]
Marital status: Single	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: Married/Cohabiting/Civil partnership	-0.048	[0.059]	-0.095	[0.065]	-0.009	[0.060]	0.003	[0.061]
-"-: Widowed/Divorced/Separated	-0.008	[0.078]	0.034	[0.085]	0.031	[0.080]	-0.001	[0.077]
Log(Household size)	-0.002	[0.049]	0.09	[0.055]	0.026	[0.050]	-0.023	[0.040]

Table A3 continued in next page

Table A3 continued from last page

	RD_1^{GB}		RD_2^{GB}		$RD_1^{Scotland}$		$RD_2^{Scotland}$	
Children at preschool and school age	-0.040	[0.058]	0.009	[0.060]	-0.069	[0.060]	0.069	[0.058]
Occupation: Student	-0.288**	[0.130]	-0.153	[0.141]	-0.203*	[0.111]	0.051	[0.117]
-"-: Employed	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: Inactive	-0.069	[0.073]	0.100	[0.072]	-0.015	[0.076]	0.219***	[0.072]
-"-: Unemployed	-0.015	[0.142]	0.116	[0.140]	0.399***	[0.131]	0.281**	[0.125]
-"-: Retired	-0.131**	[0.066]	-0.09	[0.059]	-0.154**	[0.067]	-0.054	[0.072]
Last work: Self-employed	-0.115*	[0.066]	-0.088	[0.065]	0.402***	[0.140]	0.263	[0.177]
-"-: Private sector	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: Public sector	-0.008	[0.047]	0.039	[0.048]	0.172	[0.130]	0.204	[0.127]
-"-: Third sector	0.063	[0.090]	0.092	[0.084]	0.424	[0.465]	-0.065	[0.451]
-"-: Other	-0.113	[0.103]	0.207**	[0.102]	0.162	[0.134]	0.095	[0.114]
-"-: Never worked	-0.109	[0.125]	0.045	[0.130]	0.141	[0.174]	0.187	[0.146]
Trade union member (current or past)	0.131***	[0.044]	0.142***	[0.047]	0.103	[0.109]	0.047	[0.112]
Ethnicity: White	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: Black	-0.208	[0.165]	0.071	[0.239]	0.491	[0.750]	0.663*	[0.384]
-"-: Mixed	0.125	[0.207]	0.308	[0.228]	-0.244	[0.256]	-0.112	[0.317]
-"-: Asian	0.122	[0.137]	0.061	[0.169]	0.351	[0.229]	0.388	[0.250]
-"-: Other	-0.111	[0.168]	-0.001	[0.128]	-0.048	[0.121]	0.015	[0.137]
Country of birth: England	{*Ref.*}		{*Ref.*}		{*Ref.*}		{*Ref.*}	
-"-: Scotland	-0.186*	[0.100]	-0.056	[0.101]	0.111*	[0.060]	0.083	[0.057]
-"-: Wales	-0.130	[0.109]	0.307*	[0.176]	0.021	[0.162]	-0.245	[0.168]
-"-: Northern Ireland	0.116	[0.180]	-0.079	[0.258]	-0.392**	[0.193]	-0.710***	[0.244]
-"-: Republic of Ireland	0.018	[0.198]	0.036	[0.167]	-0.172	[0.272]	-0.271	[0.481]
-"-: Commonwealth	0.234	[0.186]	0.037	[0.175]	-0.024	[0.144]	-0.184	[0.203]
-"-: European Union	0.098	[0.137]	0.010	[0.125]	-0.018	[0.148]	-0.396**	[0.189]
-"-: Rest of World	-0.100	[0.179]	-0.298*	[0.160]	-0.014	[0.128]	0.014	[0.162]
Home owner: Own the leasehold/freehold outright	-0.060	[0.053]	-0.154***	[0.056]	-0.121*	[0.063]	-0.105*	[0.062]
Mortgage: Buying leasehold/freehold on a mortgage	-0.049	[0.052]	-0.216***	[0.062]	-0.08	[0.059]	-0.078	[0.057]
Has experienced income shock in last year	0.170***	[0.062]	0.414***	[0.074]	0.529***	[0.081]	0.559***	[0.082]
Risk-taker: 1 (Low) - 4 (High)	-0.035	[0.033]	-0.016	[0.036]	-0.051	[0.036]	-0.056	[0.035]
Political orientation: 0 (left) - 10 (Right)	-0.186***	[0.011]	-0.195***	[0.011]	-0.220***	[0.012]	-0.238***	[0.012]
Social desirability: 0 (Low) - 4 (High)	0.005	[0.018]	-0.008	[0.019]	0.059***	[0.019]	0.037**	[0.018]
Religiousness	-0.026	[0.041]	0.025	[0.043]	0.013	[0.042]	0.057	[0.043]
BIG5: Agreeableness	0.034***	[0.012]	0.014	[0.013]	0.027**	[0.014]	0.022	[0.014]
-"-: Conscientiousness	-0.010	[0.012]	-0.008	[0.013]	-0.019	[0.013]	-0.010	[0.013]
-"-: Extraversion	-0.022**	[0.010]	0.003	[0.009]	0.008	[0.010]	-0.004	[0.010]
-"-: Neuroticism	0.005	[0.010]	0.022**	[0.010]	0.020*	[0.011]	0.032***	[0.011]
-"-: Openness	0.001	[0.013]	0.005	[0.013]	0.045***	[0.014]	0.038***	[0.014]
Urban region	-0.051	[0.043]	-0.006	[0.047]	0.063	[0.048]	0.131***	[0.048]

Table A3 continued in next page

Table A3 continued from last page

	RD_1^{GB}		RD_2^{GB}		$RD_1^{Scotland}$		$RD_2^{Scotland}$	
Region: Northeast	-0.029	[0.095]	-0.001	[0.112]	–		–	
-"-: Northwest	0.025	[0.075]	0.009	[0.078]	–		–	
-"-: Yorkshire & Humber	0.170**	[0.082]	0.030	[0.085]	–		–	
-"-: East Midlands	-0.091	[0.089]	0.012	[0.090]	–		–	
-"-: West Midlands	-0.024	[0.082]	-0.127	[0.086]	–		–	
-"-: East England	-0.036	[0.081]	-0.160*	[0.084]	–		–	
-"-: Greater London	{*Ref.*}		{*Ref.*}		–		–	
-"-: South East	-0.043	[0.075]	-0.034	[0.075]	–		–	
-"-: South West	0.091	[0.084]	-0.106	[0.102]	–		–	
-"-: Wales	-0.504***	[0.162]	-0.157	[0.136]	–		–	
-"-: Scotland	-0.193	[0.153]	-0.140	[0.135]	–		–	
Region: Borders	–		–		0.249	[0.286]	0.356	[0.338]
-"-: Central	–		–		0.300	[0.266]	0.174	[0.322]
-"-: Dumfries and Galloway	–		–		0.334	[0.293]	0.263	[0.340]
-"-: Fife	–		–		0.293	[0.268]	0.272	[0.322]
-"-: Grampian	–		–		0.160	[0.265]	0.075	[0.322]
-"-: Highland	–		–		0.344	[0.270]	0.350	[0.325]
-"-: Lothian	–		–		0.294	[0.259]	0.297	[0.317]
-"-: Orkney	–		–		0.289	[0.401]	0.399	[0.342]
-"-: Strathclyde	–		–		0.422	[0.259]	0.326	[0.316]
-"-: Tayside	–		–		0.298	[0.269]	0.304	[0.322]
-"-: Western Isles	–		–		0.696*	[0.419]	-0.048	[0.433]
-"-: Rest of Great Britain	–		–		{*Ref.*}		{*Ref.*}	
Cut-off point 1	-2.934***	[0.234]	-2.875***	[0.256]	-2.443***	[0.336]	-2.338***	[0.408]
-"-: 2	-2.731***	[0.235]	-1.827***	[0.250]	-2.297***	[0.335]	-1.376***	[0.407]
-"-: 3	-2.437***	[0.235]	-1.047***	[0.248]	-1.971***	[0.337]	-0.630	[0.406]
-"-: 4	-2.027***	[0.234]	0.039	[0.247]	-1.566***	[0.335]	0.402	[0.405]
-"-: 5	-1.792***	[0.234]	–		-1.331***	[0.336]	–	
-"-: 6	-1.281***	[0.232]	–		-0.892***	[0.336]	–	
-"-: 7	-1.041***	[0.232]	–		-0.639*	[0.336]	–	
-"-: 8	-0.702***	[0.231]	–		-0.302	[0.336]	–	
-"-: 9	-0.437*	[0.231]	–		-0.030	[0.336]	–	
-"-: 10	-0.234	[0.232]	–		0.170	[0.336]	–	
No. of Observations	4,895		5,101		4,989		4,986	
Pseudo R^2	0.056		0.094		0.067		0.097	
Log-likelihood	-12,448.5		-7,989.9		-5,143.2		-3,000.4	
LR $\chi 2$	685.61***		812.19***		886.08***		852.13***	

Notes: * p<0.10, ** p<0.05, *** p<0.01