An Analysis of Charitable Expenditure in the UK

Student Number: 0133605

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1. Introduction

Analysis of charitable expenditure is an area that is generally neglected by researchers. Economists have provided an economic explanation for the decisions of individuals when deciding how much to donate, though little of this theory has been supported by empirical evidence

More recently, analysts have begun to realise the complexity of the decision involved in charitable donations. Extended surveys have been carried out on a subset of the population by charitable organisations in association with blue-chip companies and the government.[1] These results have allowed researchers to better understand the reasons for donations to charity. This analysis benefits both the government and charitable organisations when designing effective policies that encourage charitable donation.

In this paper I hope to look at reasons why households give to charity using economic theory. I hope to look at the effect of various variables on the level of donation and analyse the reliability of economic explanations.

2. Motivation

Bill Gates, the wealthiest individual in the world, recently donated a massive lump sum amount of £3.2 billion to charity. With donations of such a significant size becoming more commonplace, we could be forgiven for thinking that the problems they aim to eradicate are likely to disappear. The fact remains, however, that most middle-class earners contribute little or nothing to charity.

Various theories regarding what motivates people to give to charity appear in the public domain with regularity. Suggestions that giving is crowded out by taxation and the welfare state, are plausible. Critics have suggested that movement towards a more American style of giving should be implemented. In the USA, many institutions rely on charitable income to be successful and open philanthropy is welcome, unlike the case in the UK where open donations are often labelled as a way of buying acceptance. Also, the American system taxes neither donor of gift, and the donor may even receives tax credits.

The government has recently taken steps to address these issues, developing a new method of contribution, called Gift Aid. With this scheme, in effect since April 2000, all one-off donations to charity by individuals can be tax-effective, meaning that the tax paid on the amount donated is returned to the donor. However, less than 50% of donations to charity are currently tax free and there is little empirical evidence looking at whether these schemes are effective in increasing donations. By further understanding reasons for giving, it is likely that charities will be able to enjoy a more significant level of stable revenue.

3. Why give to charity?

The question of what motivates people to give money to charity can be answered from various theoretical viewpoints. Each has its merits and goes some way to explain the individual's decision to give. These various approaches illustrate how charitable giving is driven by both selfish and altruistic motivations. Different schools of thought suggesting motives for charitable contribution include sociologists, psychologists and economists. [2]

The economic approach focuses on the assumption that people are self-interested and building on this assumption, predicts the various reasons for giving. These explanations are outlined below, with a critique,[3]

[1] see CAF publications and Banks (1997)
[2] see Jas, P.(2001) for an analysis into these various theories
[3] see Sugden (1982) or Andreoni (2001) for further information

- A traditional method in explaining donations is through public good theory, where individuals give to a recipient who then shares the benefit among users of the good. This is in order to eradicate the "free rider effect" where, as the number of users increases, the donation decision of a single user is diluted and this individual will experience little return on his expenditure, so will choose not to donate. In the case of charity, the public may demand more of the service than is provided by the charity. In these cases the public must fund the charity and in the absence of other theories for giving, as the number of people approaches infinity, the free rider effect will dominate. However, public good theory does not explain the success of many large charities, and the fact that many charities do not provide their service to those that are making the donation.

- Another theory that attempts to explain charitable expenditure centres around the fact that some donors may receive direct tangible benefits through their donation, such as having a hospital wing named after them, or receiving special attention from an organisation, such as a restaurant or university. Most donors, however, do not receive anything in return for their donation.

- The fact that people spend on others without expecting economic returns, leads us to the assumption that the benefit they receive is intangible. People may feel empathy to those with difficulties, and so feel a 'warm glow' after contributing. This theory, developed by Andreoni (1989), implies that people have a taste for this "warm glow", enabling us to treat charitable giving like any other consumer good. It is suggested to be the main reason for giving.

There are other reasons for giving and these include pressure from the community, an instinct for group survival,[4] a desire to be seen as philanthropic, or through a religious duty. The reasons I have outlined, generally affect the decision to give as opposed to the amount of contribution.

Papers by Reece (1979) and Banks (1996) have looked at the variables affecting charitable expenditure, with empirical evidence. However, papers such as this have not looked at the fundamental reasons behind the significance of these variables, as outlined above and in the next section. In this paper, I hope to combine economic analysis with empirical evidence.

4. An Economic Rationale

By using simple tools of economic analysis, we can model the behaviour of an individual and evaluate their attitude toward charitable expenditure. I will begin by using a simple model, where there is one public good, one private good, and n consumers. This model is similar to the analysis by Warr (1982) and Bergstrom, Blume & Varian (1986)[5], with an added focus on variables affecting giving. Individuals are endowed with wealth w_i (non-charitable taxation deducted), which they allocate among consumption of the various goods. Each consumer, i, consumes x_i of the private good and donates an amount g_i to the supply of the public good. His budget constraint is,

$$x_i + g_i = w_i - t_i$$

Where t_i is the level of taxation used for charitable projects, per individual, and depends on the preferences of the government as well as the taxation level of the individual. The warm-glow effect and the tangible benefit effect come directly from the amount that the individual spends on charitable expenditure, g_i, and to a lesser extent, t_i[6]. The public good effect, however, comes from the total expenditure, by all individuals and the government, on the public good. This amount is the total the amount given by the public through donations and taxation, which we shall call Y,

$$Y = G + T = \sum_{i=1}^{n} g_i + \sum_{i=1}^{n} t_i$$

The variable g_i is a function of many different factors,

[4] This point is focussed on later in the analysis, when adding multiplicative variables, and when analysing the public good effect
[5] For earlier analysis of charitable expenditure, see Becker, G. (1974)
[6] Warm glow effect only

$$g_i = f(p_x, G, E^i, R_{-i})$$

In this equation, p_x is the price of good x, E^i represents education, experience as well as demographic and environmental variables, while the variable R_{-i} represents the characteristics of other persons that may affect the individual, such as their level of income or wellbeing. The variables that affect g_i are further analysed in the next section.

Given the two type of effects, we observe the following utility function,[7]

$$U = U(g_i, Y, x_i) \qquad i = 1,\ldots,n$$

The individual aims to maximise his utility, subject to his budget constraint,

$$\max_{x_i, Y, g_i} \quad U = U(g_i, Y, x_i) \qquad i = 1,\ldots,n$$

$$\text{s.t} \quad x_i + g_i = w_i - t_i$$

The utility function is assumed to be strictly quasi concave, and increasing with all arguments. We can continue the analysis by differentiating the function and separating the propensities to donate into egotistic and altruistic components, though this is not necessary for our analysis. The above function adequately shows how our individual is able to affect his utility through three effects; from a direct well-being and tangible benefit effects, through his donation, and through his contribution to the public good. The presence of other utility changing effects can also be hypothesised.

So far, we have assumed that an individual benefits positively from the utility of others, though on contrary, some may feel envy or hatred toward others in society; these are individuals who do not feel a "warm-glow" from donation. An individual with these characteristics will spend nothing on others in order to maximise his utility, unless other utility increasing effects are present.

5. Variables affecting charitable expenditure

We have already looked at the different reasons for individual giving. The importance that people place on these reasons is likely to be different depending on the individual. This importance is likely to be determined by various factors and characteristics, which I will look at now

Income & Wealth
The income variable I will be using in the regression is the income for the household, for the two-week period. If charitable expenditure is a normal good, as often hypothesised, I expect the relationship with income to be positive. I expect wealth to have a similar effect, though the data used does not measure this.

Price
When referring to the price level, I refer to the amount foregone by making a donation of a pound. This will often be less than unity, given that many contributions will be tax deductible. For tax deductible contributions, the price will be (1-t), where t is the proportion of tax returned on one pound of contribution. An indicator of tax effective contribution is whether the individual contributed to charity though deductions from pay, as these types of contributions are generally tax effective. Though not an accurate measurement of the level of tax effective contribution by a household, I will include payroll giving as a dummy variable.

[7] see Andreoni (1989)

Age[8]
Literature by the CAF suggests that younger members of society are less likely to make donations. This is because they are more inclined to feel that the government should provide for others. This could be said to mean that they interpret the value Y_{-i} as being larger than others do.

Children
The effect of the number of children on charitable expenditure is ambiguous.

Education
I will be using a variable that measures the age that the head of the household left education, to measure their education level. This should have a positive effect on the level of donation, because it could be said that the more educated are more likely to be aware of the wellbeing of the rest of the population. I will include dummy variables for the presence of O-levels (or GCSE's) and a college (or university) degree.

Employment Status
Occupational class could be interpreted as an indicator for wealth, given that it is likely that they are dependent upon one another. I expect that the better the occupational class of the household head, the more they will contribute and the more likely they will be to make a contribution. I also expect that if an individual is unemployed they will contribute less to charity.

Religion
Many religions, notably Judaism, Islam, and Christianity, request or expect their followers to contribute a significant proportion of their income, often 10%, to those who are less fortunate. This is a issue that I will focus on later.

Spending by others including governments
As analysed previously, an increase in spending by others is likely to have a crowding out effect on charitable expenditure. Given that I am only focussing on a single year, I am unable to see the effect of changes in these variables on levels of charitable spending.

Other variables that cannot be analysed using the dataset include psychological characteristics such as sympathy, pity, past experience and the need for self-esteem. The characteristics of the recipient, such as the cause or the use of appeals or branding, are also likely to affect the charitable giving decision.

6. Data: Family expenditure survey

The data source that I have chose to use is the Family Expenditure Survey 2000-2001. The FES, as used by Banks (1997), provides a large sample of data, measuring a diverse range of variables.

The FES consists of a two-week diary that is completed by all members of participant families over 16, recording their spending habits over this period. It also measures various characteristics such as age, income and demographics. As well as this diary, interviews are conducted to access the level of expenditure through direct debits or payment through salary, forms that are important in the case of charitable expenditure.

The FES measure of charitable expenditure consists of some of the following items,

animal charity, blind box, cancer league, candles (church), charity collection, donation to charity, Gold Heart (charity), Marie Curie memorial foundation, missionary box, poppy (charity), Red Cross donation, rugby life line, Salvation Army, school fund, Sunday school collection

[8] The head of the household is used when measuring age, education, employment status and ethnic background

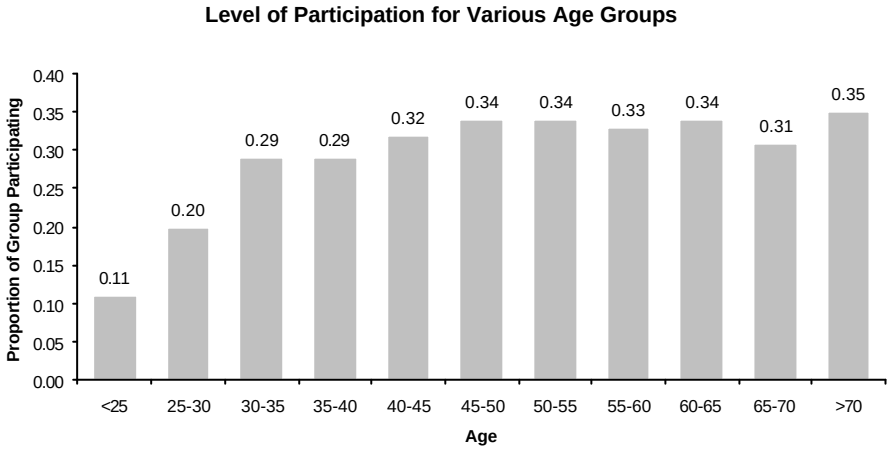
Donations where the donor may receive notable tangible benefits in return are not included. These include things such as charity shop purchases, donations in aid of relatives or purchases of raffle tickets. Though these types of expenditures account for a proportion of charitable giving, it is likely that the primary reason for spending is due to the goods or services received. It should be noted that the lack of the presence of these purchases does not detract from our analysis of the tangible benefit effect, where the benefit is not labelled as the main reason for donation.

7. Data analysis

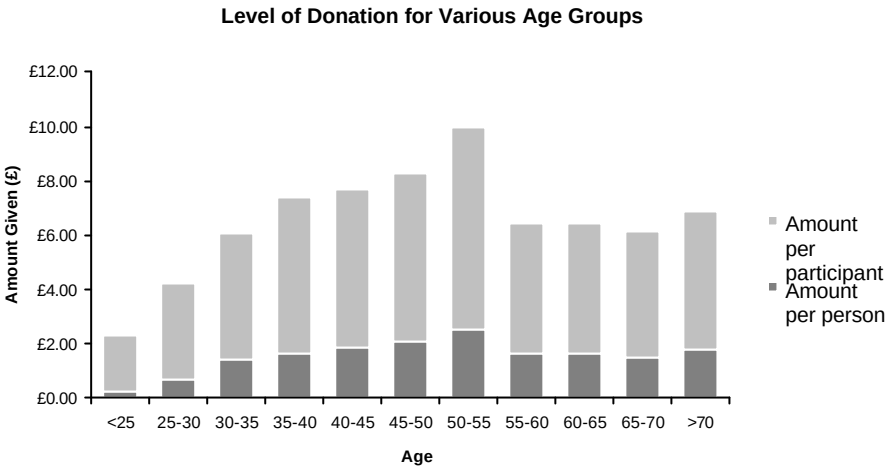
The average level of donation for households, in the UK, that are givers, samp led by the FES in the year 2000-2001 is £5.81, for a two-week period, or £2.91 per week. During this two-week period, 29.4% of the households sampled made a charitable contribution.

The level of participation and the average level of donation made generally increase with income, age, education and occupational class. In this section, I will further analyse the variables age and ethnic background.

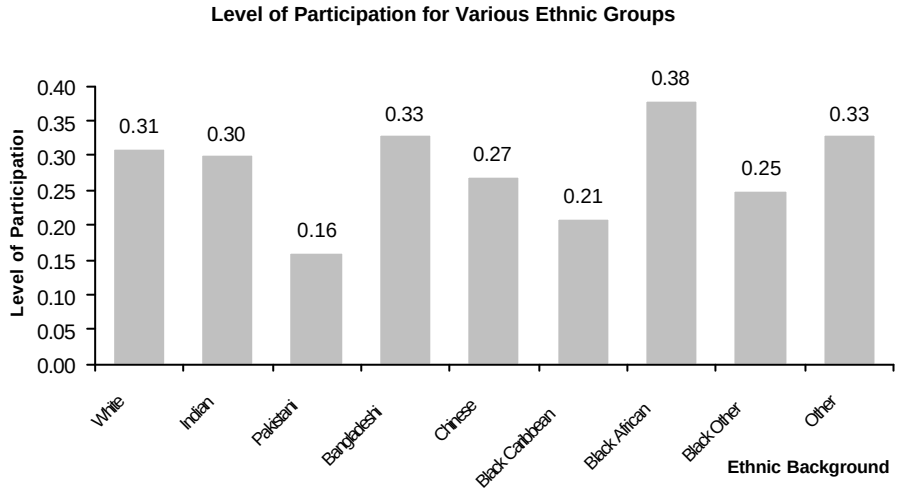
Looking firstly at the patterns of giving in relation to age, by splitting the data into several age groups, we observe that as the age of an individual increases, they become more likely to make a charitable contribution. The percentage of givers is low in the households where the head is aged under 25, with just 11% of households giving. This percentage increases rapidly to 20% for the 25-30, and up to 29% for the 30-35 group. It rises slightly, but generally remains the same, peaking at the oldest age group, those above 70.



We can also look at the level of contribution made by these various age bands, in terms of both the average amount contributed per person and the average amount per participant. As we see, the amount given per participant increases from a low of £2.07 for the below 25 age group, peaking at a level of £7.48 for the 50-55 age group. Interestingly, it drops to a level of £4.81 for the 55-60 age group and remains at a similar figure for age groups above this. This could be due to a reduction in disposable income, as retirement becomes more probable.

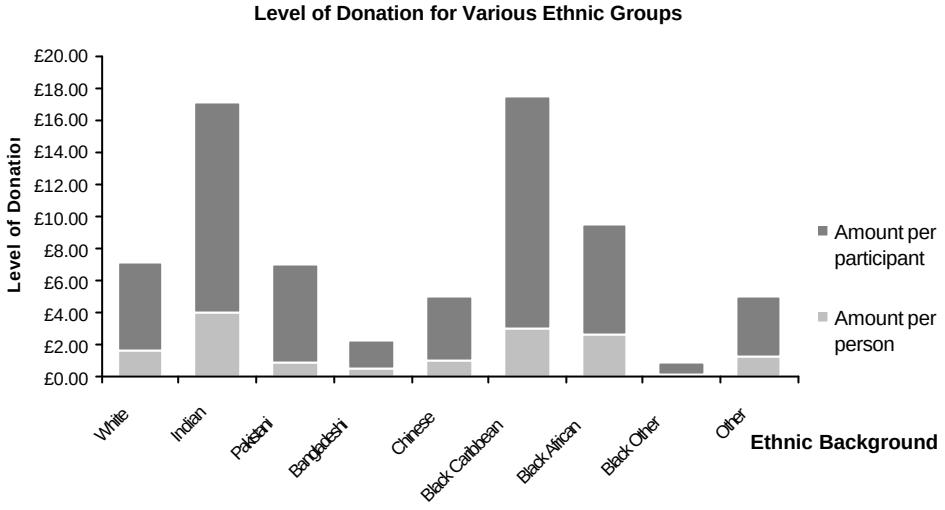


Looking now at effect of ethnic background of the distribution of charitable giving. The graph below shows how the proportion donating to charity varies, with those from Black African backgrounds, being the most likely to make a donation, with 38% donating. Those from a Pakistani background are least likely to donate, with 16% making a donation.



The level of donation is greatest for Indians and Black Caribbean's, in the sample, with participants in these two groups giving more than £17.00, during the two-week period. Those from other Black backgrounds and from Bangladeshi backgrounds give the least per participant. It should be noted that some of the ethnic groups sampled contained a small number of households, so error may be significant.[9]

[9] see Appendix 5



8. Zero observations

In the FES, a significant number of households contribute nothing during the period recorded. The treatment of these zero observations is fundamental in our analysis. There are two explanations for their existence. First, it could be the case that these households are non-givers. Given their measured characteristics and beliefs, it may be that they feel that the work charities are involved in should be left to the government, or that they do not include the utility of others into their own utility calculation and do not benefit significantly from the other effects mentioned. Another possibility is related to the infrequency of giving. Some groups may only donate on an occasional basis, and have made no such donations during the two-week period of the diary, so the data neglects their real effect as donors.

Given the cluster of zero observations, the data is not continuous; this can have various implications. If our zero observations are composed solely of infrequent givers, it is reasonable to leave them from the sample, given that they represent a random sample of the entire population measured. However, if the observations are non-givers, their characteristics are likely to be significantly different to that of our donating population. Ignoring this population is likely to produce bias in our model.

It is likely that these zero variables are a combination of both types of household, non-giver and occasional giver. I will test whether this is the case in my regression analysis

9. Method of analysis

In this section, I will look to find the components of charitable giving, using regression techniques.

Initially, an OLS regression was performed (see Appendix 1). This directly regresses the independent variables against the dependent variables

$$Y_t = \beta_0 + \beta_1 X_{1i} + \beta_1 X_{2i} + \beta_1 X_{3i} + \ldots + \beta_k X_{ki} + \varepsilon_t$$

The use of OLS will lead to biased estimators of the parameters involved in the regression, given the effect of zero variables on the regression, so an alternative regression is likely to be more accurate.

The Tobit regression is a maximum likelihood procedure and has been used by Reece (1979) in his analysis of charitable expenditure. A Tobit model uses an additional constraint that determines

whether a particular observation makes it into a sample. This produces more reliable results than OLS, given the reduction of the bias arising from zero values.

The Tobit model makes use of a latent variable, we shall call it Y*

$$Y_t = Y_t^* \quad = \beta_0 + \beta_1 X_{1i} + \beta_1 X_{2i} + \beta_1 X_{3i} + \ldots + \beta_k X_{ki} + \varepsilon_t \text{ if } Y_t^* > 0$$
$$= 0 \text{ otherwise}$$

A latent variable is a continuous function and better reflects an individual's desire to contribute to charity. Use of this model avoids bias from the zero valued observations

The above Tobit regression makes the critical assumption that the decision not to donate is determined by the same factors as the decision on how much to donate.[10] A further improvement on this model would be the use of a Heckman 2-step, as used by Banks(1997).

The Heckman model[11] works by treating the two types of household, contributor and non-contributor, differently. It introduces a selection constraint that separates the types, taking on the value of 1 if the individual is a contributor and zero otherwise.

$C_i = 1(Z_i? + \varepsilon_{0i} > 0)$

The function Z in the above constraint consists of variables that predict whether a household donates to charity or not. The functions Z and X_I may be similar, though if identical, the Heckman two-step fails. The Heckman procedure is sensitive to several other constraints, and I will look to ensure that these are satisfied in my regression.

With a disparity between the parameters affecting the two types of household, a function ? is found to be missing, often referred to as the *Inverse Mills ratio*. It is defined as,

$$? = \frac{f(\beta X_i)}{F(\beta X_i)}$$

Where f is the normal density function, and F the cumulative density function. Including this ratio into the regression, we have the following equation,

$E(Y_i / Y_i > 0) = \beta X_i + s?$

Where s is the covariance between the selection and regression equations. The Heckman procedure estimates the function ? by running a Probit model, using the selection equation, to obtain an estimate for β, and using this estimate to construct ?. Following this, it runs an OLS on X and ?. This produces consistent estimates for β. The t-values produced from this model must be corrected to allow for heteroskedasticity

The Heckman routine is sensitive to various factors, as mentioned previously. Most importantly, the correlation between errors in the regression and selection equations must be high, and the degree of collinearity between the explanatory variables in the regression and selection equations must be small.

In creating a selection equation, variables must be used that effect the decision to contribute, but not the amount of contribution. Theory suggests that the multiplicative variables AGE*INCOME and AGE*EDUCATION are effective. By using these, we are saying that an individual's level of income or education, relative to others of their age, affects their decision to contribute, but not their level of contribution. This reflects an individual's desire to increase the utility of others who belong to the same population subset, in this case age.

[10] see Appendix 2 for Tobit analysis
[11] see Heckman, J (1979)

Aside from the theoretical standpoint of using these variables, they also reduce the level of collinearity between selection and regression equations. Though collinearity is increased among variables in the selection equation, it is unlikely to be crippling.

10. The Public Good Effect

So far the analysis has relied mainly the theory that people derive a "warm glow" from their donation. The presence of ethnic groups and their greater contribution to charity relative to the (majority) white population, may help us consider other reasons for giving.

It could be the case that those belonging to these communities are obliged to contribute a set amount to charity, given religious obligations. This is likely to account for part of the donation though does not provide a full explanation.

To extend our analysis, we must make the realistic assumption that some members of these groups feel, or genuinely are, segmented from the rest of society. Their greater level of participation and level of donation can then be explained by the relatively low density of their population subset, using the alternative economic theories outlined at the start of the paper.

The theory that individuals donate so that others may see them as philanthropic can partly explain this effect. If a group of individuals belongs to a minority, it is plausible that their community is more tightly knit and so any charitable donation receives greater appraisal than otherwise. It is also likely that they receive greater tangible benefits from donation, or that there is a greater pressure to donate.

Public good theory suggests that as the number of users of a good increases to infinity, the free rider effect will dominate till the good is no longer provided. This helps to explain donations to niche sector charities by individuals belonging to minorities, such as those donating to local charitable organisations or organisations catering for the disabled. Charities that target ethnic minority groups may be more popular as the benefit is shared among this minority, especially if the charity is local. Given public good theory, benefit from a similar charity that targets the majority white population has to be shared among a greater number of people, and so is drowned out, leading to reduced donations.[12]

To measure the above effects, I shall add a variable to indicate the respective density of the population subset that a household belongs to, given their area. To form this indicator of population density, I will use the National Statistics Database. Firstly, I assign each household a percentage value, which is the percentage of local population that their ethnic group represents. I will then calculate (100/percentage) to find a value that increases with isolation level. Taking a few households as examples,

Household	**Population Percentage**	**Density Indicator**
Indian household in the West Midlands	3.39	29.50
Black Caribbean household living in the North East	0.04	2500
White household in Scotland	97.99	1.02

If I choose to include this density variable into my regression, I will also need to include dummy variables for the ethnic background of the household, and the region of residence. This will account for the religious, cultural and regional obligations of households.

[12] Though the public good effect implies the supply of a good or service, it could also apply to the supply of well-being. This does not detract from our analysis.

11. Results

Both OLS and Tobit regressions were performed and are given in the appendix. However, given their neglect of certain fundamentals, such as the treatment of zero-observations and the differences in factors affecting participation and level of giving, a Heckman two-step regression was tried.[13]

The presence of a significant Mills ratio leads us to the conclusion that the participation and level of giving decisions are not affected by exactly the same factors. Though most variables were identical, the selection equation incorporated additional variables, as discussed previously.

A wide selection of variables were tested with the Heckman model, though many of these were found to be insignificant. Those that have been used in the final regression(s), are generally of economic significance. Three outlier observations were identified using residual analysis, and subsequently removed.

Analysis of Selection Equation

Log Income was found to have a positive coefficient, and was highly significant. It was included in the selection equation only, and results show that an increase in income by 10% increases the level of participation by 2.18%.[14]

The age of the head of the household was also found to have a highly significant positive coefficient. It was found that an increase in age of 1 year, from the mean age of 51, increases the probability of participation by 0.256%.

The presence of O-levels (or GCSE's) or a college education, each increase the probability of giving by around 5.0%.

The occupational background of the head of the household was found to have a significant effect on the probability of giving. Those who were in professional, managerial or skilled roles, were found to be around 10% more likely to give than those in non-skilled manual jobs. This could be due to the greater level of wealth, the stronger understanding of the needs of others, or due to the greater exposure to charitable organisations.

It was found that gambling has a positive effect on the probability of participation, increasing the probability of giving by 0.16% for an increase of £1[15]. The presence of children had a negative effect, though this was also insignificant. It was also found that the presence of males in the household decreases the probability of giving, while the presence of females has the opposite effect, with the presence of a single female increasing the probability of giving by around 3%, relative to al other households. This is to be expected, as females are generally found to be more philanthropic, as detailed by other authors, such as Banks (1997) and the CAF.

It was found that the region that a household comes from also affects their probability of giving, with those from the North[16], being the most likely to give. Reasons for this are diverse and include economic and social prosperity, exposure to charitable organisations, and ethnic distribution. The ethnic distribution across regions will be analysed in the next section.

In order to differentiate between the selection and regression equations, the multiplicative variables AGE*INCOME and AGE*O-LEVELS were added. The coefficient of AGE*O-LEVELS shows that if

[13] see Appendix 3

[14] As a Probit model is used to model the selection equation, marginal effects and elasticities must be calculated incorporating expected values for independent and dependent variables. Given the presence of continuous variables such as age and income, the change given is for an initial value at mean level. Dummy variables are automatically treated as discrete, with the initial value taken as zero. A breakdown of the results is given in the appendices.

[15] significant at 10%

[16] North: North East & North West & Yorkshire, Midlands: West Midlands & East Midlands & East, South: South East & South West

an individual has a higher level of education than someone in the same age group, they will be 0.1% more likely to give, though this coefficient is insignificant at the 10% level. The coefficient on AGE*INCOME was negative, though highly insignificant.

Analysis of Regression Equation

Looking now at the results from the regression equation. In this equation, the log of expenditure was used, as this is a strong indicator of the willingness to spend. Income was not incorporated into this equation, due to the level of collinearity between income and expenditure, and also in order to further distinguish between selection and regression equations. The coefficient on log expenditure tells us that a 1% increase in general spending, increases the level of charitable spending by 0.225%.

The presence of o-levels or similar, increases charitable expenditure by 2.14%,[17] while the addition of further education increases charitable spending by 9.0%.[18] Adding a year to the age of the head of the household increases charitable donations by 0.52%.[19]

An increase in the level of gambling was found to decrease charitable spending negatively, with a one unit increase in spending on gambling, decreasing the level of charitable spending by 0.0049%.[20]

It was found that the use of tax-effective expenditure, measured as the presence of a charitable deduction through pay, had a positive effect on the overall level of charitable spending, with its presence increasing spending by 25.5%. This indicates the effectiveness of tax reduction schemes in increasing charitable donation.

The occupational background of the head was found to have an unexpected effect on the level of charitable expenditure. It was found that the more prosperous the background, the lower the level of spending, with those from professional or managerial backgrounds spending 17% less than unskilled manual workers.[21] The presence of children was found to have a negative effect on the level of donation, though this was again found to be insignificant.

The level of charitable expenditure for participants was found to decrease by 0.04% with an increase of £1 in the level of gambling.[22] This could be due to the fact that most individuals were gambling through the National Lottery, which donates to charity. However, the coefficient was found not to be highly insignificant, and a non-zero value is rejected at any significance level below and including 20%.

An increase in the number of individuals in the household has a negative effect of the level of giving, unlike the effects of these variables on the decision to give. This is probably due to fact that the utility from charitable spending is shared among a greater number of people. An increase in the number of males and females, reduces charitable spending by 1.4% and 3.0%, respectively.[23]

A similar study, using data from the FES, conducted by Banks (1997), used data from a number of years. Though the variables used differ slightly, the results from his analysis generally agree with my own. Some of his coefficients were found to be more significant, though this could be due to his use of a larger dataset.

Results of analysis into the public good effect

I chose to extend my analysis by including variables that account for the population density of the household, calculated from their ethnic background and the percentage of individuals originating from this background, living in their region. I added dummy variables reflecting their background and a variable indicating their population density. I also added multiplicative variables for DENSITY*O-

[17] Highly insignificant
[18], [19], [20], [21], [22], [23] Insignificant at 20% significance level

LEVELS and DENSITY*INCOME to measure the effects of having a greater level of education and income, respectively, than other people who are members of a population of a similar density.[24]

Looking at my selection equation, a negative coefficient of –0.000858 on the Density variable was found, perhaps due to the increasing lack of opportunities to donate. From the DENSITY*INCOME variable, it was found that increasing income by £100, relative to others in a similar area of ethnic density, increases the probability of giving by around 0.65%.[25] The presence of o-levels relative to someone without, living in a similar area of density, increases the probability of donation by 0.03%,[26] though this coefficient was insignificant.[27]

Coefficients on Density and DENSITY*INCOME in my regression equation were found to be positive. I found that an increase in income of £100, relative to others from a similar ethnic density background, increases charitable spending by around 5.06%.[28] The coefficient on DENSITY*O-LEVELS suggests that the presence of o-levels, relative to someone in the same area without decreases charitable spending by 0.05%.[29]

After including additional variables accounting for background and geography, all other variables in the regression maintained similar coefficients.

12. Critique

The variables used to account for the wealth level of the household included the occupational class, the region, and the level of education, though these variables do not provide a reliable indicator. The inclusion of a more realistic wealth indicator, such as the level of investment by households, would have proved useful.

Variables neglected from the analysis include psychological characteristics and processing determinants, such as guilt, sympathy, past-experience and the need for self-esteem. These factors are bound to play a fundamental part in charitable decisions, though are difficult to measure. Other factors important in charitable decision making involve recipient characteristics such as the cause, or existence of strong branding. In addition, a time-series analysis would allow us to look at factors such as changes in economic wellbeing, the effect of war, and the effect of tax changes. These additional variables would significantly increase the reliability of the results. They would also allow us to focus on the magnitude by which the various reasons for giving affect charitable decision making.

[24] see Appendix 4
[25, 28] Insignificant at 20%
[26] Insignificant at 10%
[27] see Marginal Effect analysis in Appendix 4
[29] Highly insignificant

13. Conclusion

In this paper I have laid an economic foundation for charitable giving, incorporating the most popular motives suggested by theorists. I have then looked at the variables that may affect the decision to give, and how much to give. Following this, various regressions have been carried out, with focus on results from the Heckman 2-step.

The variables that affect the decision to give and the level of giving are complex. Results show that these two decisions are not affected by exactly the same factors and it is likely that additional factors, not measured by the FES, have a greater role to play.

Results show that those belonging to a background that accounts for a small percentage of their local population, are more likely to give and give more, ceteris paribus. The greater level of giving by those in isolated regions can be explained by their donation to charities that target their own group, and the expectation of greater returns, as explained by the public good theory and other theories. The significance of these variables in the regression has signalled the presence of factors other than the dominant "feel-good" effect. It has helped to explain the reasons why those from minority populations give more to charitable organisations. The results show that it may be wise for charities to indicate that they are dedicated to a subset of the population. It also helps to explain the existence of the significant number of small charities in the UK.

Although this paper is limited by the lack of certain variables, it has indicated the complexity of charitable decision making. Factors that increase the level of giving and the likelihood of participation include age, income, education and occupational class. The most significant determinants of charitable giving, along with reasons behind the significance of these variables, have been addressed.

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Appendix 1: OLS Regression

Source	SS	df	MS	Number of obs =	6593
Model	20863.4209	19	1098.07478	F(19, 6573) =	26.37
Residual	273691.741	6573	41.6387861	Prob > F =	0.0000
Total	294555.162	6592	44.6837321	R-squared =	0.0708
				Adj R-squared =	0.0681
				Root MSE =	6.4528

charitable~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
[30] log_inc	.4072965	.1184809	3.44	0.001	.1750354	.6395576
log_expend	.7787384	.1624396	4.79	0.000	.460304	1.097173
age	.0429167	.0065	6.60	0.000	.0301745	.0556588
children	.1237635	.2782269	0.44	0.656	-.4216516	.6691785
gambling	-.0163283	.0129194	-1.26	0.206	-.0416546	.0089979
olevels	.9590279	.229978	4.17	0.000	.5081962	1.40986
college	.8262519	.2835432	2.91	0.004	.2704151	1.382089
taxeff	6.614862	.4634832	14.27	0.000	5.706284	7.523439
proff_manag	-.3481207	.3075244	-1.13	0.258	-.9509683	.254727
nonman_ski~n	-.3050587	.2622321	-1.16	0.245	-.8191188	.2090014
semiorunsk~l	-.616472	.3112417	-1.98	0.048	-1.226607	-.0063373
selfemployed	.4854736	.3110739	1.56	0.119	-.1243323	1.095279
[31] unemployed	.6143004	.498191	1.23	0.218	-.3623158	1.590917
males_total	-.0075795	.1190208	-0.06	0.949	-.240899	.2257401
females_to~l	.1307832	.125943	1.04	0.299	-.1161059	.3776724
[32] North	.125496	.0289676	4.33	0.000	.0687101	.182282
South	-.2235048	.1990837	-1.12	0.262	-.6137735	.166764
Midlands	.3141628	.2553602	1.23	0.219	-.1864262	.8147519
London	.4571487	.2891107	1.58	0.114	-.1096021	1.0239
_cons	-8.78281	.8871727	-9.90	0.000	-10.52196	-7.043663

[30] log refers to natural log
[31] Other occupational types include unskilled manual workers
[32] Other regions not included, are Wales, Northern Ireland, each with similar coefficients

Appendix 2: Tobit Regression

```
Tobit estimates                                   Number of obs   =       6593
                                                  LR chi2(19)     =     942.24
                                                  Prob > chi2     =     0.0000
Log likelihood = -9874.5498                       Pseudo R2       =     0.0455

------------------------------------------------------------------------------
charitable~e |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     log_inc |   1.210987    .341274     3.55   0.000     .5419796    1.879995
  log_expend |    3.88905   .4472358     8.70   0.000     3.012323    4.765778
         age |    .232867   .0187978    12.39   0.000     .1960172    .2697168
    children |   .5860615   .7332471     0.80   0.424     -.851341    2.023464
    gambling |  -.0102583   .0301939    -0.34   0.734    -.0694482    .0489316
     olevels |   3.631785   .5846212     6.21   0.000     2.485738    4.777833
     college |   2.146568   .6899126     3.11   0.002     .7941154    3.499021
      taxeff |   17.10541   .9818955    17.42   0.000     15.18057    19.03024
 proff_manag |   .5215505   .7995864     0.65   0.514    -1.045899       2.089
nonman_ski~n |   .7659725   .7103578     1.08   0.281    -.6265595    2.158505
semiorunsk~l |  -1.403876   .8925477    -1.57   0.116     -3.15356    .3458071
selfemployed |   .3797141   .7911245     0.48   0.631    -1.171147    1.930575
  unemployed |   1.097888   1.497406     0.73   0.463    -1.837514     4.03329
 males_total |  -.6150553   .3153002    -1.95   0.051    -1.233146    .0030354
females_to~l |   .6413206   .3285157     1.95   0.051    -.0026769    1.285318
       North |   .5331293   .0756834     7.04   0.000     .3847652    .6814933
       South |  -1.888802   .5144758    -3.67   0.000    -2.897342   -.8802622
    Midlands |   .8730431   .6871978     1.27   0.204    -.4740879    2.220174
      London |  -.7228999    .753509    -0.96   0.337    -2.200022    .7542224
       _cons |  -55.83751   2.677585   -20.85   0.000    -61.08645   -50.58857
-------------+----------------------------------------------------------------
         _se |   13.06396    .218379           (Ancillary parameter)
------------------------------------------------------------------------------

  Obs. summary:       4560  left-censored observations at charit~e<=0
                      2033     uncensored observations
```

Appendix 3: Heckman 2-Step Regression

```
Heckman selection model -- two-step estimates   Number of obs      =      6593
(regression model with sample selection)        Censored obs       =      4560
                                                Uncensored obs     =      2033

                                                Wald chi2(34)      =    285.62
                                                Prob > chi2        =    0.0000
```

	Coef.	Std. Err.	z[33]	P>|z|	[95% Conf.	Interval]
logcharity						
log_expend	.2250023	.0627441	3.59	0.000	.1020261	.3479784
age	.0051855	.0051575	1.01	0.315	-.004923	.0152941
children	-.0034712	.10756	-0.03	0.974	-.214285	.2073426
gambling	-.0049167	.0039454	-1.25	0.213	-.0126495	.0028161
olevels	.0214341	.1115895	0.19	0.848	-.1972772	.2401454
college	.0902942	.1022199	0.88	0.377	-.1100532	.2906416
taxeff	.2547912	.0993844	2.56	0.010	.0600014	.449581
proff_manag	-.1775904	.1445062	-1.23	0.219	-.4608174	.1056366
nonman_ski~n	-.2045921	.1369205	-1.49	0.135	-.4729514	.0637671
semiorunsk~l	-.2180538	.1392297	-1.57	0.117	-.490939	.0548313
selfemployed	.3386635	.1238927	2.73	0.006	.0958382	.5814887
unemployed	.2384603	.2391372	1.00	0.319	-.2302399	.7071605
males_total	-.0142816	.0455041	-0.31	0.754	-.103468	.0749049
females_to~l	-.0297907	.0548237	-0.54	0.587	-.1372432	.0776617
North	.0566699	.0137984	4.11	0.000	.0296256	.0837142
South	.0083044	.0853435	0.10	0.922	-.1589658	.1755747
Midlands	.2480561	.1014629	2.44	0.014	.0491924	.4469198
London	.2746309	.1230323	2.23	0.026	.033492	.5157698
_cons	-.1337468	.9634922	-0.14	0.890	-2.022157	1.754663
select						
log_inc	.2081195	.0345302	6.03	0.000	.1404415	.2757975
age	.01667	.0016838	9.90	0.000	.0133698	.0199702
children	-.0007014	.058163	-0.01	0.990	-.1146987	.113296
gambling	.0046809	.0027033	1.73	0.083	-.0006175	.0099792
olevels	.1428538	.1218559	1.17	0.241	-.0959793	.381687
college	.1413741	.0572264	2.47	0.013	.0292124	.2535358
proff_manag	.27608	.0640978	4.31	0.000	.1504506	.4017094
nonman_ski~n	.3030447	.0556584	5.44	0.000	.1939563	.4121332
semiorunsk~l	.0806864	.068541	1.18	0.239	-.0536515	.2150242
selfemployed	-.1653761	.064038	-2.58	0.010	-.2908882	-.039864
unemployed	-.1134197	.1147803	-0.99	0.323	-.3383849	.1115455
males_total	-.016211	.0242663	-0.67	0.504	-.0637721	.03135
females_to~l	.0985996	.0255907	3.85	0.000	.0484428	.1487565
North	.0409553	.0060413	6.78	0.000	.0291146	.0527961
South	-.2128383	.0412875	-5.16	0.000	-.2937603	-.1319163
Midlands	.0127366	.054215	0.23	0.814	-.0935228	.1189961
London	-.2196563	.0610729	-3.60	0.000	-.3393569	-.0999557
age_m_olev	.0030483	.002258	1.35	0.177	-.0013774	.007474
age_m_income	-7.44e-08	1.30e-06	-0.06	0.954	-2.61e-06	2.46e-06
_cons	-3.154375	.2194087	-14.38	0.000	-3.584408	-2.724342
mills						
lambda	-.9560951	.3151397	-3.03	0.002	-1.573758	-.3384325
rho	-0.64093					
sigma	1.4917236					
lambda	-.9560951	.3151397				

[33] Values corrected to allow for heteroskedasticity

Marginal effects after heckman[34]

y = Pr(select) (predict, psel)

= .29438796

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
log_ex~d*	(no effect)						5.65316
age*	.0025521	.00011	23.98	0.000	.002343	.002761	51.0944
children*	-.0002417	.02005	-0.01	0.990	-.039531	.039048	.302820
gambling*	.0016104	.00093	1.74	0.083	-.000208	.003429	1.24888
olevels*	.0498568	.043	1.16	0.246	-.034414	.134128	.327402
college*	.049906	.02064	2.42	0.016	.009459	.090353	.165737
taxeff*	(no effect)						.031669
proff_~g*	.0991311	.02383	4.16	0.000	.05242	.145842	.184135
nonman~n*	.1074357	.02019	5.32	0.000	.06787	.147002	.299352
semior~l*	.0282663	.02439	1.16	0.246	-.019528	.07606	.113558
selfem~d*	-.0547372	.02027	-2.70	0.007	-.094474	-.015	.080669
unempl~d*	-.0379186	.03715	-1.02	0.307	-.110726	.034889	.030006
males_~l*	-.0056194	.00843	-0.67	0.505	-.022146	.010907	1.14613
female~l*	.0325532	.00827	3.94	0.000	.016341	.048765	1.25260
North*	.0118612	.00137	8.63	0.000	.009167	.014556	6.84105
South*	-.0712655	.01346	-5.30	0.000	-.097637	-.044894	.268738
Midlands*	.0044012	.01878	0.23	0.815	-.032408	.041211	.140552
London*	-.0717802	.01887	-3.80	0.000	-.108762	-.034799	.094103
log_inc*	.0218308	.00307	7.10	0.000	.015805	.027856	5.76509
age_m_~v*	.0010254	.00074	1.38	0.166	-.000427	.002478	14.7578
age_m_~e*	-2.57e-08	.00000	-0.06	0.954	-9.0e-07	8.5e-07	21861.1

(*) dy/dx is for discrete change of dummy variable from 0 to 1

[34] Note: Marginal effects applicable to selection equation only

Appendix 4: Heckman 2-Step Regression Incorporating Ethnic Density

```
Heckman selection model -- two-step estimates   Number of obs      =      6593
(regression model with sample selection)        Censored obs       =      4560
                                                Uncensored obs     =      2033

                                                Wald chi2(56)      =    314.47
                                                Prob > chi2        =    0.0000

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logcharity   |
  log_expend |   .2186372    .063111     3.46   0.001     .0949419    .3423325
         age |   .0076982   .0054131     1.42   0.155    -.0029114    .0183077
    children |   .0156228   .1054393     0.15   0.882    -.1910345    .2222801
    gambling |  -.0042026   .0037931    -1.11   0.268    -.0116369    .0032317
     olevels |   .0691808   .1125262     0.61   0.539    -.1513665    .2897281
     college |   .1022396   .0997479     1.02   0.305    -.0932627    .2977418
      taxeff |   .2432525   .0992415     2.45   0.014     .0487428    .4377622
 proff_manag |  -.1674005   .1425263    -1.17   0.240    -.4467469     .111946
nonman_ski~n |  -.1605911   .1375555    -1.17   0.243    -.4301948    .1090127
semiorunsk~l |  -.1984668   .1364718    -1.45   0.146    -.4659467    .0690131
selfemployed |   .3204641   .1211585     2.64   0.008     .0829979    .5579303
  unemployed |   .2351417    .240132     0.98   0.327    -.2355084    .7057918
 males_total |  -.0233568   .0447584    -0.52   0.602    -.1110816     .064368
females_to~l |  -.0199603   .0557351    -0.36   0.720    -.1291991    .0892784
       North |   .0764624   .0178194     4.29   0.000      .041537    .1113878
       South |   .0080209   .0836316     0.10   0.924     -.155894    .1719358
    Midlands |   .2964029   .1016493     2.92   0.004      .097174    .4956319
      London |   .2478479   .1277668     1.94   0.052    -.0025704    .4982662
      indian |   .4265141   .2915231     1.46   0.143    -.1448606    .9978888
   pakistani |   .1139422   .5492693     0.21   0.836    -.9626058     1.19049
 bangladeshi |  -.4417803    .682873    -0.65   0.518    -1.780187    .8966262
     chinese |   .1686124   .7806706     0.22   0.829    -1.361474    1.698699
  blackcarib |    .563143   .4015396     1.40   0.161    -.2238601    1.350146
 blackafrica |   -.069858   .3955667    -0.18   0.860    -.8451545    .7054386
  blackother |  -1.337635   1.265477    -1.06   0.291    -3.817924    1.142655
       other |  -.2276414    .368591    -0.62   0.537    -.9500665    .4947837
     density |   .0005121   .0014742     0.35   0.728    -.0023773    .0034014
density_in~e |   .0005643   .0003216     1.75   0.079    -.0000661    .0011947
density_olev |  -.0005367   .0015919    -0.34   0.736    -.0036567    .0025833
       _cons |  -.7215381   1.040184    -0.69   0.488    -2.760262    1.317186
```

```
-------------+----------------------------------------------------------------
select       |
     log_inc |   .2038073   .0347568     5.86   0.000     .1356852    .2719293
         age |   .0167411   .0017017     9.84   0.000     .0134058    .0200764
    children |  -.0121494   .0584889    -0.21   0.835    -.1267856    .1024868
    gambling |   .0045648   .0027011     1.69   0.091    -.0007293    .0098588
     olevels |   .1139635   .1225683     0.93   0.352     -.126266    .3541931
     college |   .1412733   .0574303     2.46   0.014      .028712    .2538347
 proff_manag |   .2765981   .0642012     4.31   0.000      .150766    .4024302
nonman_ski~n |   .3014362   .0557336     5.41   0.000     .1922005     .410672
semiorunsk~l |   .0766072   .0687159     1.11   0.265    -.0580735    .2112879
selfemployed |  -.1606226   .0641847    -2.50   0.012    -.2864223   -.0348228
  unemployed |  -.1299742   .1158644    -1.12   0.262    -.3570642    .0971158
 males_total |  -.0119461   .0246075    -0.49   0.627     -.060176    .0362837
females_to~l |   .1051332   .0259457     4.05   0.000     .0542806    .1559858
       North |   .0448793   .0074682     6.01   0.000      .030242    .0595167
       South |  -.2053353   .0425294    -4.83   0.000    -.2886913   -.1219793
    Midlands |   .0258812   .0558833     0.46   0.643     -.083648    .1354104
      London |  -.2316413     .06585    -3.52   0.000    -.3607049   -.1025778
      indian |   -.139601    .163271    -0.86   0.393    -.4596062    .1804042
   pakistani |  -.3619356   .2598615    -1.39   0.164    -.8712548    .1473837
 bangladeshi |   .3218937   .3519299     0.91   0.360    -.3678762    1.011664
     chinese |   .0932673   .4402084     0.21   0.832    -.7695253      .95606
  blackcarib |   .0356787   .2117958     0.17   0.866    -.3794334    .4507908
 blackafrica |   .5530756   .2296454     2.41   0.016     .1029788    1.003172
  blackother |  -.0313393   .6003812    -0.05   0.958    -1.208065    1.145386
       other |   .1492779   .2238984     0.67   0.505    -.2895549    .5881106
     density |   -.000858   .0005831    -1.47   0.141    -.0020009     .000285
density_in~e |   .0001894   .0002009     0.94   0.346    -.0002044    .0005831
density_olev |   .0011404   .0007217     1.58   0.114     -.000274    .0025549
  age_m_olev |    .003479   .0022657     1.54   0.125    -.0009617    .0079197
age_m_income |  -6.15e-07   1.42e-06    -0.43   0.665    -3.40e-06    2.17e-06
       _cons |  -3.175571   .2221118   -14.30   0.000    -3.610902    -2.74024
-------------+----------------------------------------------------------------
mills        |
      lambda |   -.741919   .3462339    -2.14   0.032    -1.420525   -.0633129
-------------+----------------------------------------------------------------
         rho |   -0.52992
       sigma |  1.4000698
      lambda | -.74191897   .3462339
------------------------------------------------------------------------------
```

Marginal effects after heckman
      y = Pr(select) (predict, psel)
         =   .2938979

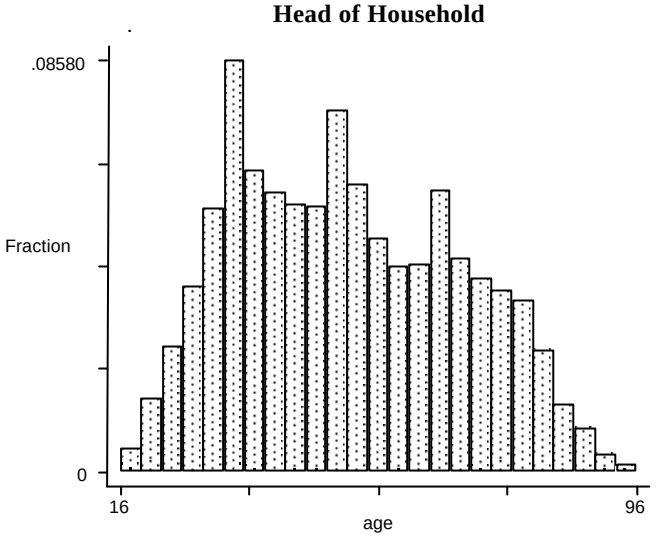
variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
log_ex~d*	(no effect)						5.65316
age*	.0025452	.00008	31.80	0.000	.002388	.002702	51.0944
children*	-.0041793	.02009	-0.21	0.835	-.043562	.035204	.302820
gambling*	.0015694	.00093	1.69	0.090	-.000247	.003386	1.24888
olevels*	.039651	.04304	0.92	0.357	-.044715	.124016	.327402
college*	.0498347	.0207	2.41	0.016	.009254	.090415	.165737
taxeff*	(no effect)						.031669
proff_~g*	.0992597	.02386	4.16	0.000	.052497	.146022	.184135
nonman~n*	.1067799	.0202	5.29	0.000	.067196	.146364	.299352
semior~l*	.0267968	.02439	1.10	0.272	-.021006	.074599	.113558
selfem~d*	-.0531845	.02035	-2.61	0.009	-.093077	-.013292	.080669
unempl~d*	-.04321	.03706	-1.17	0.244	-.115847	.029427	.030006
males_~l*	-.0041318	.00855	-0.48	0.629	-.02088	.012616	1.14613
female~l*	.0345736	.00811	4.26	0.000	.018669	.050478	1.25260
North*	.0127224	.00162	7.85	0.000	.009548	.015897	6.84105
South*	-.0687718	.01382	-4.98	0.000	-.09585	-.041694	.268738
Midlands*	.008959	.01944	0.46	0.645	-.02914	.047058	.140552
London*	-.0753872	.02005	-3.76	0.000	-.114679	-.036095	.094103
indian*	-.046206	.05175	-0.89	0.372	-.147631	.055219	.011009
pakist~i*	-.1110562	.06917	-1.61	0.108	-.24663	.024518	.005731
bangla~i*	.1189507	.13695	0.87	0.385	-.149469	.38737	.002262
chinese*	.0328999	.15875	0.21	0.836	-.278251	.344051	.001659
blackc~b*	.0124041	.0743	0.17	0.867	-.133228	.158036	.008445
blacka~a*	.2103291	.09153	2.30	0.022	.030939	.389719	.005881
blacko~r*	-.0107018	.20323	-0.05	0.958	-.409017	.387613	.001206
other*	.0533248	.08261	0.65	0.519	-.108583	.215233	.007390
density*	-.0002964	.0002	-1.47	0.142	-.000692	.000099	7.29652
densi~me*	.0000646	.00007	0.95	0.340	-.000068	.000197	99.1067
densit~v*	.0003922	.00025	1.58	0.113	-.000093	.000878	3.03232
log_inc*	.0221257	.00284	7.80	0.000	.016563	.027688	5.76509
age_m_~v*	.0011651	.00074	1.58	0.114	-.000279	.002609	14.7578
age_m_~e*	-2.13e-07	.00000	-0.43	0.666	-1.2e-06	7.6e-07	21861.1

(*) dy/dx is for discrete change of dummy variable from 0 to 1

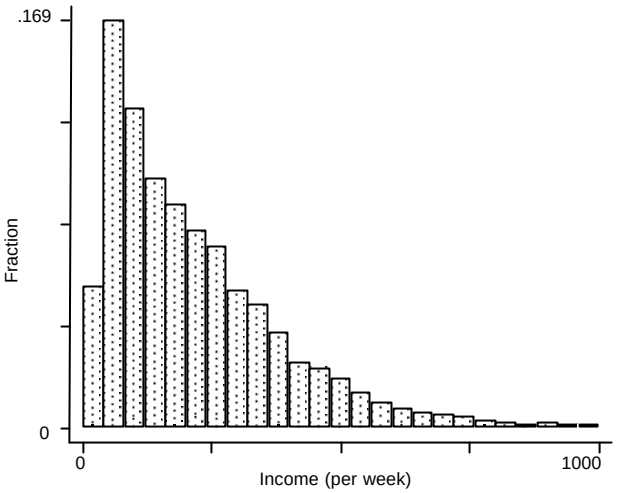
Appendix 5: Analysis of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
charitable~e	6631	1.708652	6.666959	0	149.26
gross_curr~e	6631	457.1298	436.1994	0	8421.29
total_expe~e	6631	374.7183	296.3433	5.34	3798.422
gambling	6631	1.248885	6.209933	0	240.34
age	6631	51.09441	17.27963	16	96
children	6631	.3028201	.4595127	0	1
olevels	6631	.3274016	.4693005	0	1
college	6631	.1657367	.3718721	0	1
foodspending	6631	60.67002	39.28171	0	336.965
alcohol	6631	13.8763	21.90937	0	602.725
tobacco	6631	6.042454	12.50833	0	128.91
clothing_f~r	6631	21.37377	35.60138	0	498.98
household_~s	6631	32.3749	67.66158	0	1721.845
taxeff	6631	.0316694	.1751317	0	1
proff_manag	6631	.1841351	.3876236	0	1
nonman_ski~n	6631	.2993515	.4580085	0	1
semiorunsk~l	6631	.1135575	.317297	0	1
selfemployed	6632	.0806695	.2723474	0	1
unemployed	6632	.030006	.1706167	0	1
males_total	6631	1.146132	.8881148	0	8
females_to~l	6631	1.252601	.861257	0	7
North	6631	.0481074	.2140093	0	1
South	6631	.2687377	.4433367	0	1
Midlands	6631	.140552	.347585	0	1
London	6631	.0941035	.2919946	0	1
white	6631	.9558136	.2055245	0	1
indian	6631	.0110089	.104352	0	1
pakistani	6631	.0057307	.0754896	0	1
bangladeshi	6631	.0022621	.0475113	0	1
chinese	6631	.0016589	.0406986	0	1
blackcarib	6631	.0084452	.0915157	0	1
blackafrica	6631	.0058815	.0764706	0	1
blackother	6631	.0012065	.0347157	0	1
children	6631	.3028201	.4595127	0	1
other	6631	.0073895	.0856507	0	1
density	6631	7.296518	56.14722	1.007557	2000

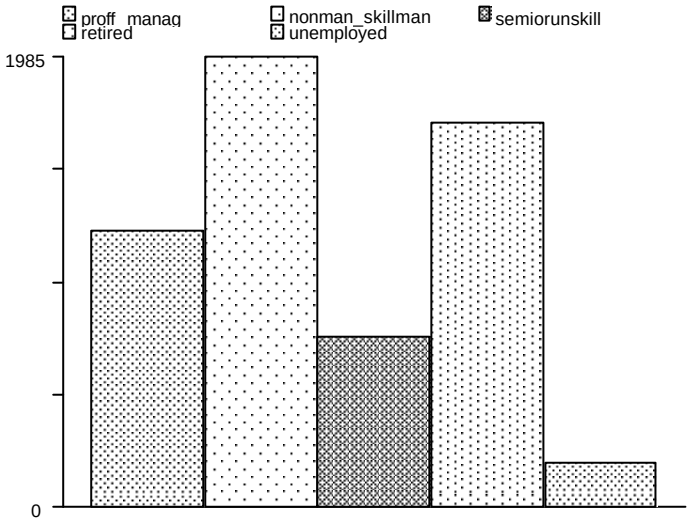
Histogram illustrating Distribution of Age for Head of Household



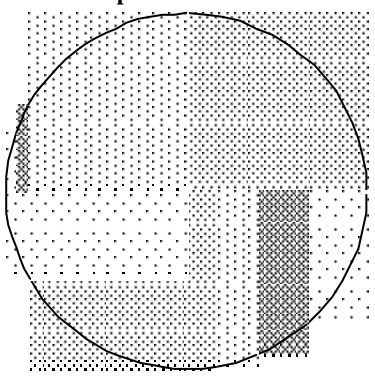
Histogram illustrating Household Income Distribution for Incomes <£1000 per week

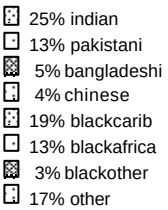


Bar Chart for Occupational Backgrounds



Pie Chart for non-white Groups





Total white: 6638 (95.6%)
Total non-white: 289 (4.4%)