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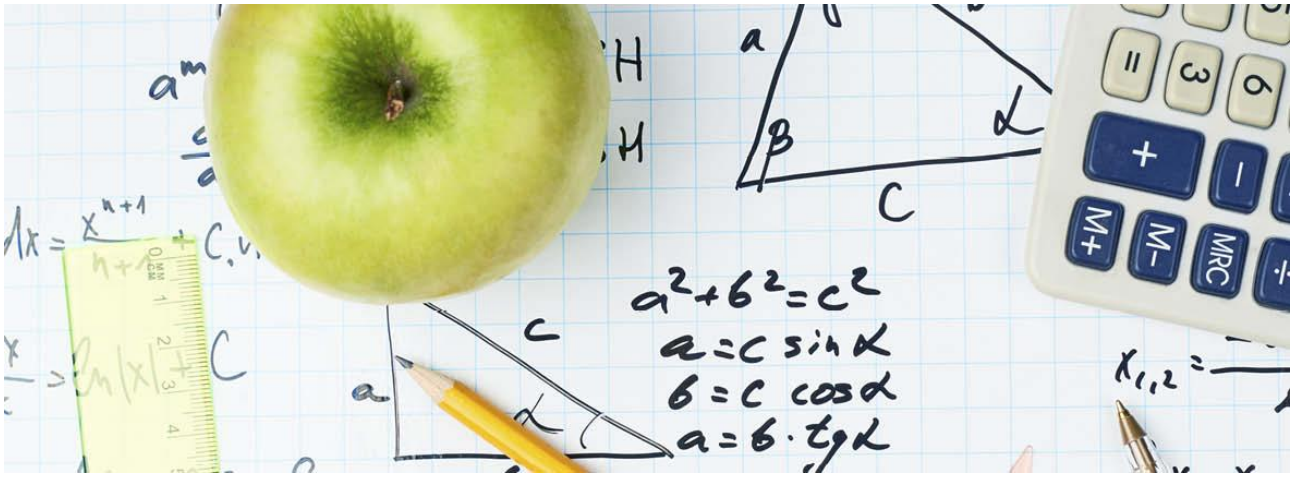

Investigating the U-Shaped Charitable Giving Profile Using Register-Based Data

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ABSTRACT

The present paper investigates the relationship between income and the proportion of income donated by use of register-based data merged with individual data on charitable giving, in a European setting. This paper contributes to the very scarce European literature concerning the U-shaped charitable giving profile. We find a strong, negative relationship between income and the proportion of income donated for the total donor population as well as for specific income groups. This contradicts some of the previous literature on the subject. With information on actual donations, we find evidence of a 'standard of giving' that is very likely to be an important explanation to the higher proportion of income donated amongst low-income individuals. Our findings suggest that researchers and policy makers should be careful when drawing conclusions regarding charitable giving from US-based studies to Europe and vice versa.

Key words: philanthropy, charitable giving, nonprofit, register data

JEL classifications: D12, D31, D64, I30

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INTRODUCTION

Charitable giving plays an increasingly important role of the economic landscape today, even though giving money to charitable causes has been puzzling economists for decades, and has developed into a major research field. Prior research in the economics of charitable giving has primarily been US-based where the number of non-profit organizations rises every year and the money given to charity corresponds to more than 2% of the gross domestic product in the United States (US) (List, 2011). Charitable giving is however not only a significant part of the US economy, 1.4 billion people in the world donated money to charity in 2014 (Charities Aid Foundation, 2014).

Giving to charity can be considered an unselfish act and therefore driven by an altruistic motivation. It is well-known that such actions contradict standard economic theory. Economists have therefore established models that explain charitable giving behavior, with the model of warm glow (Andreoni, 1989) being a popular explanation. Giving your money to charities being such a well-established part of human behavior, researchers have put their attention on actual giving behavior. One of the perhaps not surprising findings has been that availability of financial resources drive charitable giving.[1]

One question that has caused a lot of attention in the literature is the relationship between availability of financial resources and charitable giving. Researchers have found that individuals do not give a constant proportion of their income. Previous studies find a U-shaped relationship between income and the proportion of income donated to charity (e.g. Clotfelter & Steurle, 1981; James & Sharpe, 2007; Jencks, 1987; List, 2011), with low-income and high-income individuals giving a higher proportion of their income than middle-income individuals. However, the U-shaped charitable giving profile is not uncontested. Schervish & Havens (1995a, 1995b, 1998, 2001) have in a series of papers criticized this finding and others have found a negative relationship between income and the proportion of income donated (e.g. McClelland & Brooks, 2004; Wiepking, 2007). Overall, there seems to be a consensus in the literature that the left branch, the descending trend, of the U-shaped charitable giving profile is well established, lower-income individuals donate a higher proportion of their income than middle-income individuals, but the right branch is still disputed.

Most of the research on the relationship between income and the proportion of income donated rely on questionable data sources of small sample sizes that either are self-reported or systematically exclude

[1] Charitable giving can take different forms, e.g. giving in kind, volunteering or giving away your "time". In this paper, charitable giving is defined as monetary donations.

lower-income individuals. In addition, most studies do not carry out any meaningful multivariate analyses of the relationship, only reporting it bivariately. Lastly, with the exception of a paper from the Netherlands (Wiepking, 2007), all research have been based on data from the US with very few offering insights into European donation behavior on the matter.

The aim of this study is to explore the relationship between income and the proportion of income donated (forwardly referred to as 'the curve of giving'). The present paper extends the current literature providing a comprehensive analysis based on a rich dataset including detailed data on donation behavior as well as income and wealth at the individual level. To the best of our knowledge, this is the first study to apply individual register-based data merged with individual data on the curve of giving. With this data, we are able to overcome some of the shortcomings previously seen in this literature making robust multivariate analyses with a large sample size. We not only apply these analyses to the total donor population but also on different income groups to investigate whether donation behavior is driven by different factors for different income groups, an unanswered question thus far in the literature. In addition, the paper contributes to the scarce literature on the curve of giving in a European setting. Data includes around 70,000 donors in 2013 and their more than 500,000 actual donations and was obtained through a collaboration with a major Danish charitable organization. This data was merged with rich register-based data from Statistics Denmark, gaining real information on individuals' income and wealth, amongst others.

We find that there is a very clear and significant negative relationship between income and the proportion of income donated, for the total donor population as well as every 10^{th} income percentile. Similarly, we find a positive relationship between wealth and the proportion of income donated. With information on actual donations, we find evidence of a 'standard of giving', with more than 40% of the actual donations being exactly 50 DKK. Additionally, more than 20% of the donors donated exactly 600 DKK in 2013, corresponding to 50 DKK each month. This 'standard of giving' is very likely to be an important explanation to the higher proportion of income donated amongst low-income individuals.

With the negative relationship between income and the proportion of income donated, we confirm previous European findings (e.g. Wiepking, 2007). We find no support of the right branch of the U-shaped curve of giving previously found in studies from the US. This may be explained by differences in the Danish and the US tax systems (leading to crowding out in Denmark due to higher taxes on income), cultural differences concerning philanthropy across the Atlantic, insufficient or biased data in the US-based studies, or a combination thereof. Although this paper offers one of the most comprehensive investigations of the relationship between income and the proportion of income donated, several issues remain unresolved. We therefore urge researchers to keep exploring the phenomenon.

The paper is structured as follows. Part I. briefly outlines the theoretical foundation on charitable giving as well as the nature of charitable giving as a good. Part II. outlines some of the most important literature on the curve of giving as of yet. Part III. describes the data and the variables used. Part IV. presents our results and Part V. and VI. conclude with a discussion and conclusion.

THEORETICAL FOUNDATION

According to standard economic theory, giving to charity can be seen as a voluntary provision of a public good (defined as non-rival and non-excludable). Correspondingly, the optimal strategy and Nash equilibrium of an individual would be to give nothing (Andreoni, 1988). Nevertheless there are consistent evidence that individuals voluntarily give to public goods – in this case charity – and that this at least partly stems from the altruistic motivations, i.e. that an individual derives utility from the act of giving.

Public good games are essentially prisoner dilemma games with many players. The Pareto-optimal solution would be for all players to cooperate and donate but the strictly dominant strategy for each individual is to donate nothing (all in accordance with the standard model). However, the empirical evidence is inconsistent with findings varying from showing almost perfect cooperation, to showing no cooperation, with the majority of studies demonstrating cooperation greater than zero but less than perfect (Sally, 1995; Ledyard, 1995).

In order to understand donation behavior, an understanding of the underlying motivations for giving is crucial. An important – and perhaps the most important – motivation is altruistic behavior. Altruism is a willingness to act in the consideration of the interests of other persons, without an ulterior motive (Andreoni, Harbaugh & Vesterlund, 2008). Altruistic behavior comes in the form of pure altruism and paternalistic altruism. Pure altruism occurs when an individual experiences utility from a gain in someone else's net utility, even when the individual is not responsible for causing this gain. Pure altruism respects the other individual's preferences on the basis that if "you are happy, I am happy". Paternalistic altruism, on the other hand, reflects the utility derived from other people's well-being within specific domains (e.g. knowing they are safer, healthier or have a roof over their head).

Besides pure altruism, the notion of warm glow (Andreoni, 1989) is perhaps the most well-known theory explaining donation behavior but it in fact stems from the pure public goods model (Becker, 1961; Becker, 1974). In this formulation, donors donate to causes they care about and the increase in welfare of the recipients drive the utility increase for the donors. Although already hinted as far back as Becker (1961), the warm glow theory was first formalized by Andreoni (1989) and differs from the pure public goods model in that the utility increase in the warm glow theory stems from the act of giving in itself, not from the utility

increase of the recipients. The impact theory formalized by Duncan (2004) is a newer theory that captures both the public goods and the warm glow theory, relying on the notion that donors derive utility from the impact of their donation.

To formalize altruism, let $N = \{1, 2, \dots, n\}$ be a set of individuals and $X = (x_1, x_2, \dots, x_n)$ denote the monetary payoff of individual i for simplicity. The standard model of economics would predict that the utility of individual i only depends on her own monetary payoff, i.e. $U_i(x_1, x_2, \dots, x_n) = u_i(x_i)$. Hence, $\frac{\partial U_i(x_1, x_2, \dots, x_n)}{\partial_{x_j}} = 0 \; \forall \; j \in N \setminus \{i\}, i \in N$. As previously mentioned, experiments show that this derivative does not hold true for all individuals. Suppose that individual i's utility is given by $U_i(x_1, x_2, \dots, x_n) = u_i(x_i, x_j) \; \exists \; j \in N \setminus \{i\}, i \in N$. For individual i to constitute (pure) altruistic behavior, it must be that $\frac{\partial U_i(x_1, x_2, \dots, x_n)}{\partial_{x_j}} > 0 \; \exists \; j \in N \setminus \{i\}, i \in N$.

Another form of altruism likely to be present in charitable giving is impure altruism, also referred to as the warm-glow of giving (Andreoni, 1989, 1990). In this case, an individual receives a utility gain from the act of giving without any concern for the interest of others. Empirical evidence suggests that altruism and warm-glow are complements (Andreoni, 1993; Palfrey & Prisbrey, 1997; Eckel, Grossman & Johnston, 2005).

DellaVigna, List & Malmendier (2012) have proposed a model that – in addition to pure altruism – also captures impure altruism. As before, let $N = \{1, 2, \dots, n\}$ be a set of individuals but now suppose that $G = (g_1, g_2, \dots, g_n)$ denote the total contribution to a given charity and let $G_{-i} = (g_1, g_2, \dots, g_{i-1}, g_{i+1}, \dots, g_n)$ denote the contribution without individual i. Suppose that the utility of individual i is given by

$$U_i(g_i) = u_i(W_i - g_i) + \alpha v(g_i, G_{-i})$$

Where W is the wealth of individual i and $v(\cdot)$ is the utility of giving to the charity. Assume that utility satisfies the standard properties: $u'(\cdot) > 0$ and $u''(\cdot) \leq 0$. Furthermore, assume that $v'(\cdot) > 0, v''(\cdot) < 0$ and $\lim_{g \to \infty} v'(g,\cdot) = 0$.

The pure altruist cares about her own contribution, g_i, and the contribution of all others, G_{-i}. In this case, the overall utility she receives from giving is $\alpha v(g_i, G_{-i})$ where $\alpha \geq 0$ denotes the level of altruism (i.e. a purely self-interested individual would have $\alpha = 0$ and thereby $g = 0$).

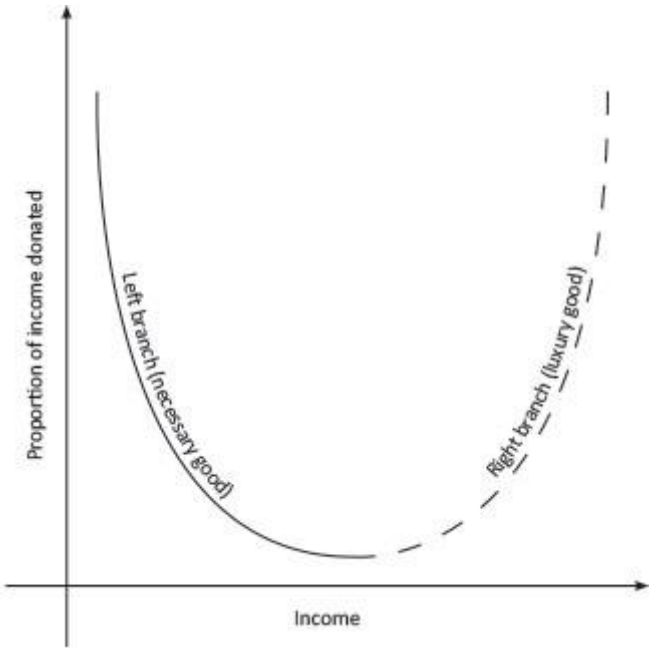
The impure altruist cares only about her own contribution, thus $\frac{\partial v(g_i, G_{-i})}{\partial G_{-i}} = 0$. The overall utility she receives from giving is $\alpha v(g_i)$ where $\alpha \geq 0$ captures the intensity of the warm glow.

CHARITABLE GIVING AS A GOOD

It is a well-established fact that individuals donate to charity, but what would we expect concerning the relationship between individuals' income and the proportion of income they give to charity? At least partly, the answer to this question lies in the nature of charitable giving as a *good*. To evaluate the aforementioned relationship, one needs to consider the income elasticities of charitable contributions. One issue that economists face when considering charitable contributions as a good is that it is not a tangible good that faces demand and supply as economic goods. Rather, charitable contributions are private contributions to public goods (Andreoni, 1988).

The notion of investigating income elasticities of charitable contributions is not a new one. Clotfelter (1985) estimated both price and income elasticities for different years and income classes. In most cases, he found the price elasticity to be below negative one, implying that it is possible to stimulate the charitable sector by enhancing the tax deductibility of individual charitable contributions (List, 2011). A finding that has been confirmed by other studies (e.g. Auten, Sieg & Clotfelter, 2002; Feenberg, 1987; Feldstein & Taylor, 1976; Tiehen, 2001). Similarly, Clotfelter (1985) found the income elasticities to be above zero for all income classes, but above one only for individuals in the highest income class. According to these findings, charity can be considered a luxury good for the highest income class and a necessary good for all other income classes. Kigma (1989) found an income elasticity of 0.99, indicating a flat curve of giving. Randolph (1995) proposed a model that considers the effect of both current and future income (and price) elasticities and he found that permanent income elasticities were above one whereas transitory income elasticities were below one but above zero. Using the same data as Randolph (1995), but spanning five more years and with a very different approach, Auten, Sieg & Clotfelter (2002) found both permanent and transitory income elasticities to be below one but above zero. The differences between the results from Randolph (1995) and Auten, Sieg & Clotfelter (2002), despite the similarities in the data used, drive two different conclusions. However as noted by Andreoni (2006), it is not possible to determine whether the differences stem from their estimation methods or the specification of the regression equation. Not only do the income and price elasticities differ because of differences in estimation methods and/or the specification of the regression equations, they also seem to differ by cause (see e.g. Bradley, Holden & McClelland, 2005; Feldstein, 1975; McClelland & Kokoski, 1994; Reece, 1979 and Yen, 2002). Income elasticities appear to be highest for health and educational purposes and lower for religious purposes but the literature on the subject is scarce.

Figure 1: The U-shaped curve of giving



Another branch of the literature has focused on the direct relationship between income and the proportion of income donated with previous findings suggesting a U-shaped curve of giving (e.g. Clotfelter & Steurle, 1981; James & Sharpe, 2007; Jencks, 1987; List, 2011). According to these findings, the descending nature of the left branch of the U-shaped curve of giving implies that charitable giving is a necessary good in this domain. Whereas the ascending nature of the right branch implies that charitable giving is a luxury good as represented in Figure 1. As the case is with the income elasticity, the U-shaped curve of giving is still a disputed area of economics. Whether the U-shape is really a U or merely a creation of insufficient data is yet to be seen. In the following section, we give a review of some of the most important literature concerning the curve of giving.

LITERATURE REVIEW

The first occurrence of a somewhat U-shaped curve of giving appears in Frank Emerson Andrews' (1950) book *Philanthropic Giving*. He considered the average contribution of five different income classes at four-year intervals from 1922 through 1946. With some fluctuations, Andrews (1950) found a positive relationship between income and the proportion of income donated for 1922-1942. These findings imply that charitable donations take on the form of a luxury good where higher income results in a higher proportion of income spent on charitable donations. It is not before 1946 that the downward sloping left branch begin to develop and with it, the interpretation of charity as not only a luxury good on the right branch, but also a necessary good on the left branch.

Andrews (1950) argued that the left branch developed because of the 1944 introduction of a standard deduction for the personal income tax. Andrews (1950) retrieved the data from tax records, thus information was only available for itemizers. However, in order for an individual to choose to itemize, the itemized deductions should at least be larger than the standard deductions or one would choose the latter. Andrews (1950) found that 61% of taxpayers in the lowest income classes chose the standard deduction in 1946, which was the highest amount of any of the brackets. Thus, itemizing may exaggerate the generosity of the lowest income group because it introduces a selection bias, low-income taxpayers may itemize because of large charitable donations, or because of high wealth. Additionally, the fact that low-income taxpayers more often chose the standard deduction implies that more small donations are excluded from the lowest income group as opposed to higher income groups.

Clotfelter & Steurle (1981) famously catalyzed the ongoing discussion of the U-shaped curve of giving by graphing contributions as a percent of income on the cumulative percent of all households or returns. They graphed two curves, one with data from the Consumer Expenditure Survey (CES), a self-reported survey, and one with data from the Statistics of Income (SOI). The latter only covers itemizers, while the former covers all households, alas self-reported. They found that lower-income individuals appear to be much more generous than middle- to high-income individuals, regardless of the source of data. They found a negative relationship between income and the proportion of income donated when using data from the CES and the U-shape was only evident using data from the SOI because the individuals in the top-1% of income donated a substantial part of their income. Both of the data sources arguably have flaws. For SOI, the flaws of using itemizers are as touched upon earlier that lower-income individuals choose the standard deduction, up to 90% in the first two income quantiles (James & Sharpe, 2007). The flaws for the CES are in the survey-design and the errors in using self-reported income and contributions are well known. As an example, Meyer & Sullivan (2003) show that low-income donors underreport their income in surveys, effectively increasing the proportion of income they donate. Nonetheless, their findings still started the discussion on the U-shaped curve of giving that has been ongoing throughout the 80's, 90's and 00's although Clotfelter & Steurle (1981) more or less included their figure as a parenthesis.

In 1987, Jencks (1987) concluded that the U-shaped curve of giving was evident for the general population as well as for itemizers. Using IRS data, Jencks (1987) shows the U-shaped curve. Itemizers with an adjusted gross income of below $10,000 deduct around six percent of their income as charitable deductions. From thereon deductions as a proportion of adjusted gross income declines and does not rise again until individuals have an income of $100,000 or more. He found the U-shape by using data on itemizers and as established, not many taxpayers with low income itemize. Indeed, only 3.1% of taxpayers in the lowest

income bracket itemized and it is only in the highest income brackets that 80% or more of the taxpayers chose to itemize. However, as Jencks states it, "it is striking that as income rises from $5,000 to $30,000, itemizers give a *declining* fraction of their income to philanthropic causes" (Jencks, 1987). For the general population, Jencks (1987) used a Gallup survey from 1981. In this event, the declining trend from the lowest to the middle income brackets is clear as well, however he does deem the Gallup figures for households over $50,000 as unreliable and the right branch of the U-shape in this case remains a question mark. To our knowledge, Jencks (1987) also offers the first explanation to the U-shape. He argues that philanthropy takes two distinctive forms, namely those of "paying your dues" and "giving away your surplus" and he believes that the U-shape is "a by-product of pooling these two kinds of philanthropy" (Jencks, 1987), which translates into explaining the left branch and the right branch of the U-shaped curve of giving.

To date, the most comprehensive study of the U-shaped curve of giving was made by James and Sharpe (2007). As others before them (e.g. Andreoni & Scholz, 1998; Brooks, 2002; Clotfelter & Steurle, 1981; Hrung, 2004), they use the CES (for the years 1998-2001) as the source of data when investigating charitable giving. Charitable giving is covered by five different questions in the CES, 1) contributions to church or other religious organizations; 2) contributions to charities such as United Way or Red Cross; 3) contributions to educational organizations; 4) political contributions; and 5) other contributions. James and Sharpe (2007) divide the answers into two groups, one group labeled 'religious gifting' and one labeled 'secular gifting'. The former consists of the answers to question 1, while the latter consists of the remaining answers to questions 2 through 5. The sum of the two groups is referred to as 'total gifting'.

James & Sharpe (2007) found that the U-shape is mostly evident for total giving. For religious giving, the left branch is very evident whereas the right branch is not apparent, for secular giving the U-shape returns. Their findings imply that lower-income individuals donate substantially more than higher-income individuals and as opposed to the findings of Andrews (1950), the left branch seems to be dominating the right branch at this point in time.

Schervish & Havens (1995a, 1995b, 1998, 2001) challenged the U-shape of charitable giving. Their main conclusions were that the U-shape is only apparent when considering donating households, not when considering the general population. They concluded that the relationship is not U-shaped but flat with a slight upturn as income increases (Schervish & Havens, 1995a). Their conclusions conflict directly with the findings of James & Sharpe (2007).

Some researchers have questioned the findings of Schervish & Havens (James & Sharpe, 2007). Firstly, Schervish & Havens use data from the Survey of Consumer Finances (SCF). However, the SCF omits data on

contributions less than $500. James & Sharpe (2007) explain how a full-time worker at a minimum wage that gives to charity 2.5 times the average national rate is omitted from the data, whereas an individual making $275,000 a year and gives less than one tenth of the national rate, is counted as a donor. Obviously, when arguing that lower-income individuals do not donate as much as previous literature reports, it is preferable that lower-income contributors are not omitted from the data. Secondly, Schervish & Havens use data from the 1996 General Social Survey (GSS), which includes fewer than 1,500 individuals who were asked about their charitable giving and furthermore their income levels were self-reported. James & Sharpe (2007) find that six out of seven of the income categories when using the GSS *do* follow the characteristic U-shape. Thirdly, the SCF only includes answers from the head of household, characterized as the husband in a mixed-sex couple and as the oldest individual in a same-sex couple. The fact that they omit answers from married women changes average giving by as much as 50% (James & Sharpe, 2007). Lastly, rather than using $3,500 as the midpoint in the lowest-income category as would be consistent with the other income categories, Schervish & Havens (1995a) use $5,000 as the midpoint in the lowest-income category. By using $3,500 as the midpoint, James & Sharpe (2007) confirm the U-shaped curve of giving.

Some of the findings from Schervish & Havens do however still echo. In particular, Schervish & Havens (2001) emphasized that not only income should be considered when examining generosity; another important factor is the individual's wealth. A U-shaped relationship as shown in Figure 1 implies that lower-income households are very generous and as Schervish & Havens (1995a) also note, popular articles often label lower-income households as generous and middle- to higher-income households as stingy. James & Sharpe (2007) investigate this interpretation and show that 30%-40% of lower-income households donate to charity whereas around 60-70% of middle- to higher-income households donate to charity, contradicting the notion of lower-income individuals being more generous. According to James & Sharpe (2007), the left branch of the U-shape stems from a certain group of individuals of which they label 'the committed few', defining a committed donor household as one that donates 10% or more of its after-tax income to charity. In their sample, committed donors represent about 5% of all households.

James & Sharpe (2007) find that when excluding the committed few, the U-shape disappears and is replaced by an almost entirely flat curve of giving. James & Sharpe (2007) state that the source of their U-shape "is not the behavior of 95% of households but the substantial impact of the committed 5%". In relation to these findings, Auten, Clotfelter & Schmalbeck (2000) found that there is a very strong U-shaped curve of giving when including only the top-5% of itemizing charitable givers, complemented by Reed & Selbee (2001) who found that a committed core of 9% of Canadian adults account for 80% of volunteering.

James & Sharpe (2007) also mention how the lower-income committed donor households are substantially wealthier than non-committed donor households are. In fact, they find that lower-income committed donor households hold four to 17 times more liquid wealth than non-committed lower-income donor households do. In addition, they find that retirement-aged households are more likely to be committed donors. This leads to the conclusion that the U-shape is in fact true but that it is a factor of lower-income households, especially retirement-aged households, that are substantially wealthier than average in their income-bracket, donating a much larger proportion of their income than middle- and higher-income households. Thus, wealth may better describe donation behavior than income, at least in the lower-income households.

Wiepking (2007) is one of the very few examples of the curve of giving in a European setting. Wiepking (2007) describes the effect of income on religious as well as total giving. Wiepking (2007) bases her analyses on data from the Giving in The Netherlands Panel Study 2003 (GINPS03) where 1,316 individuals answered questions about their giving behavior. Wiepking (2007) includes the price of giving in her analyses. The price of giving refers to the fact that donations to charitable causes are tax deductible in The Netherlands. The higher income an individual has, the lower the cost of donating. Besides the price of giving, Wiepking (2007) controls for the gender of the individual, whether or not an individual was a homeowner, had a private health insurance, was a volunteer and whether an individual was aged below 35, between 35 and 65, or above 65, household size, and educational level. Of the 1,316 respondents, 95% made a donation in 2003 and 303 of those failed to specify a donation amount making the sample size dangerously low. Wiepking (2007) used multiple imputation to correct for these missing observations. However, this method violates the underlying assumption of multiple imputation that missing values are Missing at Random. 698 respondents did not make a religious donation in 2003, which is why Wiepking (2007) used Heckman Two-Stage regression analysis (Heckman, 1979).

Wiepking (2007) did not find a U-shaped curve of giving, rather a constant relationship for religious giving and a negative relationship for total giving. This negative effect was even more pronounced when including the price of giving as a control. Because of the small sample size, Wiepking (2007) has very few high-income donors, which can explain the lack of the nature of the right branch. By using Heckman Two-Stage regressions Wiepking shows that the negative effect of income on proportion of income donated is actually stronger for religious giving. In addition, Wiepking finds evidence that individuals think of absolute amounts when donating and not of relative amounts, thus explaining that the negative relationship stems from a ‘standard of giving’. Wiepking (2007) is not the only researcher to show a negative relationship between

income and proportion of income donated; Hoge & Yang (1994) showed it for religious giving and McClelland & Brooks (2004), who found it for total giving as well.

Most of the previous literature however fail to do any meaningful multivariate analyses on the phenomenon, leaving readers in the dark as to what drives the U-shape (or any other shape of the curve of giving). In the following sections, we briefly outline the most popular explanations of the left branch as well as the right branch of the U-shaped curve of giving.

CHARITABLE GIVING AS A NECESSARY GOOD (LEFT BRANCH)

As mentioned previously, Jencks (1987) offered the first explanation to the U-shaped curve of giving. He explained the higher proportion of income donated in the lower-income groups as "paying your dues" implying that there is a "giving standard" (Andreoni, 2004), a 'standard of giving' determined by the circumstances or a "reference group" (Harbaugh, 1998). Individuals have been found to donate more to public goods if they believe or have information that others donate as well (Fischbacher, Gachter & Fehr, 2001; Frey & Meier, 2004; Shang & Croson, 2009; Wiepking, 2007), perhaps driven by social pressure (DellaVigna, List & Malmendier, 2012) or warm glow. Edwards & List (2014) find that individuals are more likely to donate when facing a suggested donation amount. They contribute their findings to impure altruism, as individuals do not choose to change the suggested amount.

A 'standard of giving' explains the higher proportion of income donated amongst lower-income groups if the 'standard of giving' does not differ with income. Thus, individuals do not think of charitable donations as a relative amount of their income but as an absolute amount.

One of the most popular explanations of the downward sloping branch of the U-shaped curve of giving is that religious individuals donate more and that lower-income individuals tend to be more religious (Iannaccone, 1988; James & Sharpe, 2007; Jencks, 1987; List, 2011). List (2011) shows that religious giving is a larger part of total giving for lower-income households than it is for higher-income households. Another explanation mentioned is that younger individuals with low income, e.g. during education, might expect their income to increase in the future and therefore donate more today (Andreoni, 2004; List, 2011), however there is no clear evidence in the literature so far.

Others, such as Piff et al. (2010) through laboratory experiments and surveys, find that lower-income individuals have greater prosocial behavior and donate more, possibly due to a better understanding of the needs of others because of their own situation.

However, as established by James & Sharpe (2007) and discussed earlier, higher wealth among certain low-income households might in fact be the most important explanation as to why we observe the downward trend of the left branch of the U-shape.

CHARITABLE GIVING AS A LUXURY GOOD (RIGHT BRANCH)

Investigations of the increasing trend of the right branch of the U-shaped curve of giving are not as widespread as those of the decreasing trend, perhaps because of the fact that it is not as well-established and because of lack of data on the highest-income individuals. Most of the US-based studies have however shown the right branch of the U-shaped curve of giving (Clotfelter & Steurle, 1981; James & Sharpe, 2007; Jencks, 1987; List, 2011) and Ostrower (1995) explain these findings with an American culture for philanthropy. That is, in the US it is part of the culture to donate more to charity if you have a very high income. One can indeed argue that simply the differences in tax systems between countries such as Denmark and the US can slow donations for the highest income groups in Denmark due to a higher tax on income. This might give higher-income individuals a feeling of partly donating through taxes, practically crowding-out donations. As mentioned, Jencks (1987) referred to this as "giving away your surplus", that surplus would simply be higher in the US than in Denmark.

Prestige is another explanation to the right branch of the U-shaped curve of giving. Large anonymous donations are very rare, but for instance, many universities have buildings named after very generous donors (Harbaugh, 1998). That is, the more public recognition a donation offers, the more likely large donations will be.

Lastly, it is worth noting that most of the prior literature on the U-shaped curve of giving rely on small sample sizes, especially in the highest-income group, making them vulnerable to extreme outliers. To our knowledge, no researchers have had sufficiently large datasets to describe the highest-income donors. Van Slyke & Brooks (2005) found differences between 'low' and 'not-low' income groups but were not able to divide groups further because of a small sample size. We are able to run regressions on the 10^{th} income percentiles with more than double the total sample size from Van Slyke & Brooks (2005) in each regression, offering new insights into what drives donations in the different income groups.

DATA AND VARIABLES

In three comprehensive studies, Bekkers & Wiepking (Bekkers & Wiepking 2010, 2011; Wiepking & Bekkers, 2012) identify mechanisms that drive charitable giving as well as variables correlated with the amount of charitable giving. As it is evident in Bekkers & Wiepking (Bekkers & Wiepking, 2011; Wiepking & Bekkers, 2012), the literature aiming to explain or describe donors and donations is vast. However, the lack of rich data sources makes the description of donors a tough puzzle to compile. With our data, we aim to give a more comprehensive understanding of the factors that drive charitable giving via access to 70,000 actual donors and their donations for 2013 as well as rich register-based data on the donors.

DATA

The data was extracted from two sources. The actual giving behavior of the individuals was established through collaboration with a major Danish charitable organization, DanChurchAid (DCA, in Danish: Folkekirkens Nødhjælp). Although the name of DCA includes "church", it is not a religious organization. DCA split their income from donations almost evenly between disaster relief and general development aid to the world's poorest people. We obtained data from 70,414 donors who donated at least once in 2013 and provided DCA with their social security number. The data included information on all their donations in 2013 on amount donated, date donated, campaign donated to (e.g. disaster relief, "give a goat", fixed payment agreement), and the means of donation (e.g. bank transfer, mobile payment). Through register data from Statistics Denmark, it was possible to obtain all other information presented in this paper including information on actual income and wealth. In addition, we include a sample of 651,160 randomly drawn members of the Danish population *not* in the population from DCA. The sample was drawn from the 2014 population and includes individuals from the year they turn 18.[2]

The exchange rate of January 2nd 2013[3] was used to divide the individuals into 12 income groups in line with those made by James & Sharpe (2007). Table 1 summarizes the income and wealth statistics for both the donors and the sample from 2013. The composition of the donors is different than that observed by James & Sharpe (2007) with less having very low or high income and more having low to medium income. This finding is not unexpected due to differences in tax systems as well as distributional differences between Denmark and the US. Table 2 summarizes descriptive statistics on the other independent variables used. Because of the large sample size, the share of individuals is very accurate and thus the donor population *is* significantly different from the sample population in almost all of the variables. That is, the

[2] The number of donors as well as individuals in the sample population might differ from these figures because of missing values and/or outliers.
[3] 562.52 DKK to 100 USD.

donor population has a higher income and wealth than the sample population, is younger but with slightly more elders as well, there are more females in the donor population, and more single households. Likewise, the donor population is employed in higher skill-level jobs, have higher education and tend to live more in the cities, more donors are members of the Danish National Church, and of Danish origin.

Table 1: Personal income statistics of donor and sample population 2013

Disposable Income	Donors	% of donors	Sample	% of sample
Below 56,252 DKK	3,677	5.29	35,616	5.72
56,252 DKK - 122,498 DKK	10,117	14.54	81,011	13.00
112,499 DKK - 168,750 DKK	11,342	16.31	139,911	22.45
168,751 DKK - 225,002 DKK	12,608	18.13	123,441	19.81
225,003 DKK - 281,254 DKK	11,755	16.90	104,003	16.69
281,255 DKK - 337,506 DKK	8,447	12.14	62,312	10.00
337,507 DKK - 393,758 DKK	4,882	7.02	32,131	5.16
393,759 DKK - 450,010 DKK	2,584	3.71	16,804	2.70
450,011 DKK - 506,262 DKK	1,464	2.10	8,994	1.44
506,263 DKK - 562,514 DKK	830	1.19	5,266	0.85
562,515 DKK - 843,774 DKK	1,307	1.88	8,898	1.43
More than 843,774 DKK	548	0.79	4,804	0.77
	Mean disposable income: Donors	**Standard deviation**	**Mean disposable income: Sample**	**Standard deviation**
Below 56,252 DKK	36,675	14,001	30,479	15,540
56,252 DKK - 122,498 DKK	83,473	16,709	87,786	15,818
112,499 DKK - 168,750 DKK	142,418	16,231	142,454	15,921
168,751 DKK - 225,002 DKK	197,286	16,010	196,184	16,307
225,003 DKK - 281,254 DKK	252,634	16,215	251,307	16,072
281,255 DKK - 337,506 DKK	307,009	16,090	306,470	16,059
337,507 DKK - 393,758 DKK	362,694	15,861	362,555	16,077
393,759 DKK - 450,010 DKK	418,730	16,132	418,861	16,072
450,011 DKK - 506,262 DKK	475,640	16,339	475,647	16,396
506,263 DKK - 562,514 DKK	531,962	15,716	532,530	15,868
562,515 DKK - 843,774 DKK	662,266	76,902	665,315	76,400
More than 843,774 DKK	1,891,174	3,834,476	1,798,116	6,017,665

Table 1 (continued): Personal income statistics of donor and sample population 2013

weight_inc	**Donors**	**% of donors**	**Sample**	**% of sample**
Below 56,252 DKK	1,178	1.72	10,868	1.70
56,252 DKK - 122,498 DKK	6,271	9.17	39,041	6.12
112,499 DKK - 168,750 DKK	10,275	15.03	130,970	20.52
168,751 DKK - 225,002 DKK	13,283	19.43	149,663	23.45
225,003 DKK - 281,254 DKK	12,830	18.77	122,152	19.14
281,255 DKK - 337,506 DKK	9,537	13.95	80,601	12.63
337,507 DKK - 393,758 DKK	6,026	8.82	45,048	7.06
393,759 DKK - 450,010 DKK	3,527	5.16	23,858	3.74
450,011 DKK - 506,262 DKK	1,954	2.86	12,746	2.00
506,263 DKK - 562,514 DKK	1,137	1.66	7,176	1.12
562,515 DKK - 843,774 DKK	1,730	2.53	11,155	1.75
More than 843,774 DKK	609	0.89	4,958	0.78
Mean *weight_inc*:	**Donors**	**Standard deviation**	**Mean *weight_inc*c: Sample**	**Standard deviation**
Below 56,252 DKK	41,132.57	13,315.86	31,160.36	18,388.20
56,252 DKK - 122,498 DKK	83,729.65	17,021.11	87,949.68	16,642.77
112,499 DKK - 168,750 DKK	143,981.40	15,864.85	145,471.60	15,173.58
168,751 DKK - 225,002 DKK	197,539.60	16,107.56	196,219.50	16,311.62
225,003 DKK - 281,254 DKK	252,474.60	16,181.16	251,592.80	16,132.06
281,255 DKK - 337,506 DKK	307,422.80	15,978.07	306,932.70	16,070.36
337,507 DKK - 393,758 DKK	362,929.60	15,999.64	362,761.10	16,053.64
393,759 DKK - 450,010 DKK	419,527.20	15,955.06	418,728.20	16,064.02
450,011 DKK - 506,262 DKK	475,419.40	16,179.45	475,143.20	16,084.08
506,263 DKK - 562,514 DKK	531,714.70	16,121.18	531,575.30	16,098.98
562,515 DKK - 843,774 DKK	657,233.10	75,386.00	660,011.80	75,734.12
More than 843,774 DKK	1,742,374.00	3,242,404.00	1,623,151.00	4,374,934.00
Disposable income	**Mean wealth: Donors**	**Standard deviation**	**Mean wealth: Sample**	**Standard deviation**
Below 56,252 DKK	31,031.78	363,722.50	23,511.34	1,189,748.00
56,252 DKK - 122,498 DKK	35,101.10	493,732.10	39,116.15	727,232.60
112,499 DKK - 168,750 DKK	181,487.80	761,763.00	162,137.60	743,626.30
168,751 DKK - 225,002 DKK	298,865.70	807,476.50	232,790.60	974,409.80
225,003 DKK - 281,254 DKK	416,401.10	982,569.50	292,391.40	1,143,219.00
281,255 DKK - 337,506 DKK	634,886.30	1,281,988.00	473,600.70	2,067,811.00
337,507 DKK - 393,758 DKK	938,541.30	1,504,689.00	712,923.30	1,566,030.00
393,759 DKK - 450,010 DKK	1,382,285.00	2,167,406.00	1,012,759.00	2,137,810.00
450,011 DKK - 506,262 DKK	1,766,010.00	2,664,224.00	1,315,801.00	2,676,078.00
506,263 DKK - 562,514 DKK	2,432,150.00	4,684,096.00	1,571,673.00	2,765,607.00
562,515 DKK - 843,774 DKK	2,990,911.00	4,095,240.00	2,004,157.00	4,604,631.00
More than 843,774 DKK	15,629,566.00	73,772,201.00	8,653,212.00	169,095,423.00

Table 2: Descriptive statistics of donor and sample population

Age	**Donors**	**% of donors**	**Sample**	**% of sample**
Below 20 years old	4,426	6.33	40,684	6.34
20 - 29 years old	14,342	20.52	92,857	14.47
30 - 39 years old	10,331	14.78	99,328	15.48
40 - 49 years old	9,482	13.56	117,719	18.34
50 - 59 years old	9,985	14.28	104,884	16.34
60 - 69 years old	9,811	14.03	99,489	15.50
70 - 79 years old	6,521	9.33	58,176	9.07
80 - 89 years old	4,057	5.80	25,089	3.91
90 years or older	951	1.36	3,520	0.55
Number of children in family				
0 children	46,710	66.87	398,013	62.91
1 child	9,214	13.19	92,150	14.56
2 children	9,720	13.92	102,016	16.12
3 children	3,499	5.01	33,079	5.23
4 children	583	0.83	5,947	0.94
5 children	89	0.13	1,111	0.18
6 children	26	0.04	283	0.04
7 children or more	7	0.01	105	0.02
Gender				
Female	39,720	56.82	324,961	50.55
Male	30,186	43.18	317,884	49.45
Household				
Single (with or without children)	30,664	43.86	223,640	34.79
Not single (with or without children)	39,242	56.14	419,205	65.21
Member of the Danish National Church				
Yes	57,343	83.91	518,647	80.69
No	10,994	16.09	124,136	19.31
Danish origin				
Yes	65,817	94.15	576,208	89.64
No	4,089	5.85	66,630	10.36
Self-employed				
Yes	2,174	3.11	23,975	3.73
No	67,732	96.89	618,863	96.27
Level of employment				
Topleader in firms, organizations or the public sector	1,361	1.95	14,385	2.24
Employed in high skill-level jobs	13,072	18.70	56,463	8.78
Employed in medium skill-level jobs	8,108	11.60	69,642	10.83
Employed in low skill-level jobs	9,819	14.05	130,647	20.32
Not employed in any of the above	37,546	53.71	371,701	57.82

Table 2 (continued): Descriptive statistics of donor and sample population

Unemployed (at least one half of the year)				
Yes	847	1.21	10,644	1.66
No	69,056	98.79	632,194	98.34
On maternity leave, income maintenance/jobseekers allowance, other benefits				
Yes	664	0.95	7,878	1.23
No	69,242	99.05	634,960	98.77
During education				
Yes	6,749	9.65	44,757	6.96
No	63,157	90.35	598,081	93.04
Receiving social secutiry benefits (kontanthjælp)				
Yes	1,336	1.91	17,327	2.70
No	68,570	98.09	625,511	97.30
Retired status				
Not retired	50,477	72.21	461,836	71.84
Retied	19,429	27.79	181,002	28.16
Region				
The Capital Region (Used as base group)	19,613	28.69	198,819	30.93
Region of Zealand	5,575	8.16	95,421	14.84
Region of Southern Denmark	15,661	22.91	137,181	21.34
Region of Central Jutland	19,110	27.96	144,495	22.48
Region of Northern Jutland	8,396	12.28	66,922	10.41
Education (highest completed)				
Primary school	3,181	4.65	27,535	4.28
High school	1,854	2.71	16,389	2.55
Vocational education	12,307	18.00	209,271	32.55
Further educated skilled worker (not at higher education)	17,650	25.82	201,366	31.32
Higher education (2-4 years)	19,889	29.10	118,056	18.36
Highest education (5+ years)	13,474	19.71	70,221	10.92

DANISH SYSTEM FOR TAX DEDUCTIONS

In Denmark, charitable donations are tax deductible. In 2013, the maximum deductible amount was 14,500 DKK, equivalent to 2,580 USD. This amount is the total sum of all donations in a year. Since 2012, all donations have been tax deductible as long as the yearly sum is below the aforementioned maximum amount. Before 2012, the minimum deductible amount was 500 DKK. At present, donations to 1,239 approved associations are tax deductible. It is not possible for an individual to deduct the donations manually; the association instead reports the deductions if the donor applies her social security number. Thus, deductions are “automatic” or at least only vulnerable to errors from the association.

The fact that there is a maximum deductible amount unfortunately leaves a flaw in the data. Although associations file the full amount that an individual gives, donors that know they will exceed the maximum deductible amount might be more reluctant to apply their social security number for further donations or they might donate through other channels. This flaw may lead to a downward bias of the donations for donors that donated at least 14,500 DKK in 2013. In our data, 138 donors donated at least 14,500 DKK.

VARIABLES

As the dependent variable, the proportion of income donated is used. We aim to explain the effect of disposable income as well as wealth on the dependent variable. The variables on disposable income and wealth are provided through register data from Statistics Denmark. Disposable income accounts for all income, all tax deductions and all paid taxes.

Previous literature view donations as a household decision and therefore take the perspective of the household when determining the curve of giving. Unfortunately, the necessary data on household income is not available for 2013 as of right now and we do not have data on personal income on each member of each household. However, one variable, $weight\_inc$, in the data for the personal income is a measure of household income made by summing all measures of individual disposable income in the household and dividing with the weighted number of persons in the household. As an example, consider a family of four with two adults (above 14 years old) and two children (below 15 years old). The weighted number of persons in the household is 1 (first adult) + 0.5 (each subsequent adult) + 0.3 (child below 15) + 0.3 (child below 15) = 2.1 weighted persons in the household. Imagine that the sum of disposable personal income in this household is 420,000 DKK, each individual in the household would have $weight\_inc = \frac{420{,}000\ DKK}{2.1} = 200{,}000\ DKK$. Below, I use this variable as a proxy for household income, the biggest difference being that this variable should be interpreted as each member of the household's share of the household income. Thus, the income variable is not based on each individual household but each member of the household's share of the household income.

The wealth variable is the sum of cash at bank(s), stocks and bonds estimated at yearly market value and value of real estates subtracted debts. The value of pensions, cars, boats/yachts and private debts are not accounted for in the variable. In later analyses, we use an ordered variable for wealth that groups individuals in wealth groups based in which wealth percentile they belong. The reason is that wealth is negative for around 32% of donors, which eliminates the possibility of using log-transformation of the variable unless negative values are excluded or all values are transformed, neither solution being optimal. Table 3 outlines all variables used in the paper.

Table 3: Dependent and independent variables

Dependent variable	**Label**	**Classification**	**Levels**	**Notes**
Proportion of income donated	*prop*	Ratio	Above 0, below or equal to 1	This variable is multiplied by 100 and log transformed
Independent variables				
Personal disposable income	*disp_inc*	Ratio	Above 0	This variable is log transformed
Weighted share of household income	*weight_inc*	Ratio	Above 0	
Wealth	*wealth_pct*	Ordered	From 0 to 9	Individuals were grouped into groups according to 10th wealth percentiles
Gender	*female*	Binary	0 or 1	
Age	*age*	Interval	At least 17	Age is also included as a squared term.
Number of children	*children*	Ratio	At least 0	Equal to the number of children in the household
Danish origin	*danish*	Binary	0 or 1	Equal to zero if none of the parents are born in Denmark and has Danish citizenship
Member of the Danish National Church	*chur_mem*	Binary	0 or 1	Equal to 1 if the individual is a member of the Danish National Church
Living status	*single*	Binary	0 or 1	Equal to 1 if the individual does not live with a partner
Level of work	*job_level*	Ordered	From 0 to 4	4 is topleader, 3 is employment that needs high-level skills, 2 is employment that needs medium-level skills, 1 is employment that needs low-level skill, 0 is neither
Employment status	*no_job*	Binary	0 or 1	Equal to 1 if the individual was unemployed for at least half the year
Social security benefits	*rec_ben*	Binary	0 or 1	Equal to 1 if the individual received social security benefits
Income maintenance/jobseekers allowance	*rec_allo*	Binary	0 or 1	Equal to 1 if the individual received income maintenance/jobseekers allowance
Retirement status	*retired*	Binary	0 or 1	Equal to 1 if the individual is retired (of old-age or incapacity)
Self-employed	*self_emp*	Binary	0 or 1	Equal to 1 if the individual is self-employed
During education	*study*	Binary	0 or 1	Equal to 1 if the individual is studying an education
Region	*region*	Categorical	From 0 to 4	Variable corresponds to the five Danish regions
Highest completed education	*educ*	Ordered	From 0 to 5	Primary school is 0 and highest education is 5 (see Table 2)

The variable *church_mem* indicates whether an individual is a member of the Danish National Church or not. It is important to note that being a member of the church is something that most Danes are born in to and that being member means that one pays church taxes, on average church taxes are 0.88% of income before taxes. In 2008, 7% of people living in Denmark went to church at least once a month and 0.9% went to church at least once a week (Andersen & Lüchau, 2011).

RESULTS

Table 4 (below) shows the giving profile for the donors to DCA in 2013. 69,561 donors did not have negative donations, zero donations, or negative disposable income. The mean donated amount is increasing with income, a finding that is well-documented in the literature (e.g. Andrews, 1950; Clotfelter & Steurle, 1981; Schervish & Havens, 2001; Wiepking, 2007). The two different estimates of income give slightly different total amounts donated which is due to more missing values for the *weight_inc* variable. The mean donated amount is 1,029.88 DKK and the mean disposable income is 237,741.5 DKK. That is, on average a donor donates 0.43% of her personal disposable income to DCA, lower than in other studies (e.g. James & Sharpe, 2007; Wiepking, 2007). We do not have information on whether donors donate to other charitable organizations as well but assume that the donation behavior of donors to DCA is representative for their overall donation behavior and for donation behavior in Denmark in general. As opposed to James & Sharpe (2007) but in line with Wiepking (2007), the output in Table 1 does not show more than a very slight tendency that high-income individuals are more likely to donate than low-income individuals.

Table 4: Income giving profile for donors to DCA. N=69,951 for disposable income and N=68,357 for weight_inc

Disposable income	**Amount donated to DCA**	**% of total amont**	**Mean yearly amount donated to DCA**	**Standard deviation**
Below 56,252 DKK	1,676,489.17	2.53	455.94	966.96
56,252 DKK - 122,498 DKK	5,580,721.33	8.43	551.62	742.84
112,499 DKK - 168,750 DKK	8,763,277.21	13.24	772.64	992.48
168,751 DKK - 225,002 DKK	11,724,970.98	17.72	929.96	1,193.01
225,003 DKK - 281,254 DKK	11,909,014.01	17.99	1,013.10	1,312.15
281,255 DKK - 337,506 DKK	9,374,016.02	14.16	1,109.74	1,624.39
337,507 DKK - 393,758 DKK	6,121,588.62	9.25	1,253.91	1,833.96
393,759 DKK - 450,010 DKK	3,450,854.48	5.21	1,335.47	1,862.04
450,011 DKK - 506,262 DKK	2,123,899.46	3.21	1,450.75	2,013.94
506,263 DKK - 562,514 DKK	1,349,869.70	2.04	1,626.35	2,255.65
562,515 DKK - 843,774 DKK	2,405,413.26	3.63	1,840.41	4,628.38
More than 843,774 DKK	1,701,978.95	2.57	3,105.80	12,080.75
weight_inc	**Amount donated to DCA**	**% of total amount**	**Mean amount donated to DCA**	**Standard deviation**
Below 56,252 DKK	537,650.98	0.82	456.41	407.93
56,252 DKK - 122,498 DKK	3,032,781.02	4.65	483.62	468.68
112,499 DKK - 168,750 DKK	7,353,920.25	11.28	715.71	967.92
168,751 DKK - 225,002 DKK	11,661,677.02	17.88	877.94	1,192.65
225,003 DKK - 281,254 DKK	12,042,366.30	18.47	938.61	1,193.13
281,255 DKK - 337,506 DKK	9,710,478.03	14.89	1,018.19	1,312.19
337,507 DKK - 393,758 DKK	7,042,345.16	10.80	1,168.66	1,751.99
393,759 DKK - 450,010 DKK	4,522,531.02	6.94	1,282.26	2,092.67
450,011 DKK - 506,262 DKK	2,803,560.12	4.30	1,434.78	1,978.23
506,263 DKK - 562,514 DKK	1,661,782.35	2.55	1,461.55	1,999.31
562,515 DKK - 843,774 DKK	3,138,254.60	4.81	1,814.02	3,962.78
More than 843,774 DKK	1,700,961.36	2.61	2,793.04	11,515.15

The proportion of income donated to DCA is shown in Table 5 (below). Bivariately, the curve of giving is plotted in Figure 2 and shows a decreasing trend somewhat similar to Wiepking (2007), for both disposable income and *weight_inc*. As in Wiepking (2007), the U is not evident, at least not the right branch of the U. Those in the lowest income group donate a substantially higher proportion of their income, no matter what income variable we use. For disposable income, the lowest income group donates 1.24% of their income to DCA, the second-lowest income group donates 0.66%. For the rest of the income groups, there is a negative trend that seems to flatten for donors with a disposable income of 393,759 DKK - 843,774 DKK, who donate around 0.30% of their income. The curve drops again for the highest income group, donating 0.16% of their income. As mentioned earlier, James & Sharpe (2007) explain their U-shape with the committed few. When they exclude highly committed donors, the U-shape vanishes and the curve of giving is flat. In our data,

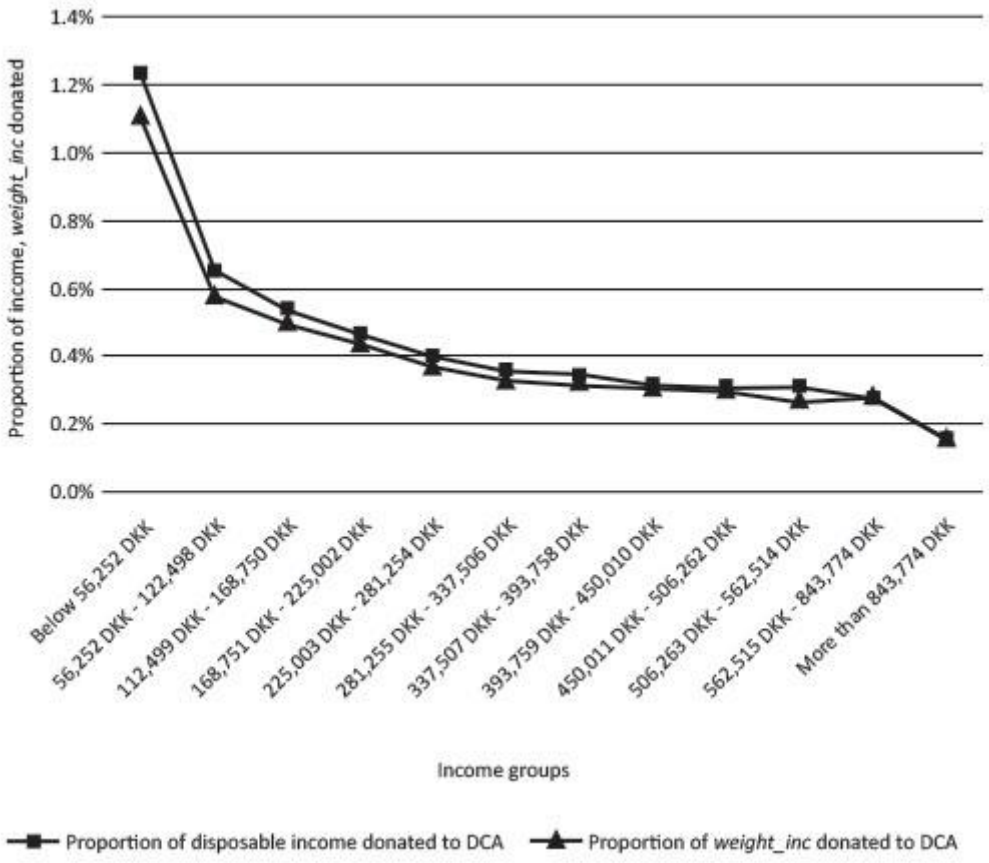
there is no effect of excluding committed donors.[4] Similarly, there is no clear evidence that lower-income donors are more wealthy than they "should be", as seen in Table 1.

Table 5: Proportion of income donated to DCA, N=69,951 for disposable income and N=68,357 for weight_inc

Disposable income	**% of disposable income donated to DCA**	**% of donors**	**% of total donations**
Below 56,252 DKK	1.24	5.29	2.53
56,252 DKK - 122,498 DKK	0.66	14.54	8.43
112,499 DKK - 168,750 DKK	0.54	16.31	13.24
168,751 DKK - 225,002 DKK	0.47	18.13	17.72
225,003 DKK - 281,254 DKK	0.40	16.9	17.99
281,255 DKK - 337,506 DKK	0.36	12.14	14.16
337,507 DKK - 393,758 DKK	0.35	7.02	9.25
393,759 DKK - 450,010 DKK	0.32	3.71	5.21
450,011 DKK - 506,262 DKK	0.31	2.1	3.21
506,263 DKK - 562,514 DKK	0.31	1.19	2.04
562,515 DKK - 843,774 DKK	0.28	1.88	3.63
More than 843,774 DKK	0.16	0.79	2.57
weight_inc	**% of *weight_inc* donated**	**% of donors**	**% of total donations**
Below 56,252 DKK	1.11	1.72	0.82
56,252 DKK - 122,498 DKK	0.58	9.17	4.65
112,499 DKK - 168,750 DKK	0.50	15.03	11.28
168,751 DKK - 225,002 DKK	0.44	19.43	17.88
225,003 DKK - 281,254 DKK	0.37	18.77	18.47
281,255 DKK - 337,506 DKK	0.33	13.95	14.89
337,507 DKK - 393,758 DKK	0.32	8.82	10.8
393,759 DKK - 450,010 DKK	0.31	5.16	6.94
450,011 DKK - 506,262 DKK	0.30	2.86	4.3
506,263 DKK - 562,514 DKK	0.27	1.66	2.55
562,515 DKK - 843,774 DKK	0.28	2.53	4.81
More than 843,774 DKK	0.16	0.89	2.61

[4] Similar statistics were made when excluding donors that contributed at least 10%, 5% and 2% of their income to DCA, all showing the same negative trend as seen in Figure 2.

Figure 2: Curve of giving for donors to DCA



WEALTH

Although wealth do not directly explain why low-income individuals donate a higher proportion of their income than higher-income individuals, dividing individuals into wealth groups as opposed to income groups show some intriguing findings. By taking the 10^{th} percentiles of the wealth variable, we divide donors into wealth groups instead of income groups. Table 6 (below) shows the income statistics for the wealth groups.

Table 6: Income statistics for donors with 10th percentile wealth groups

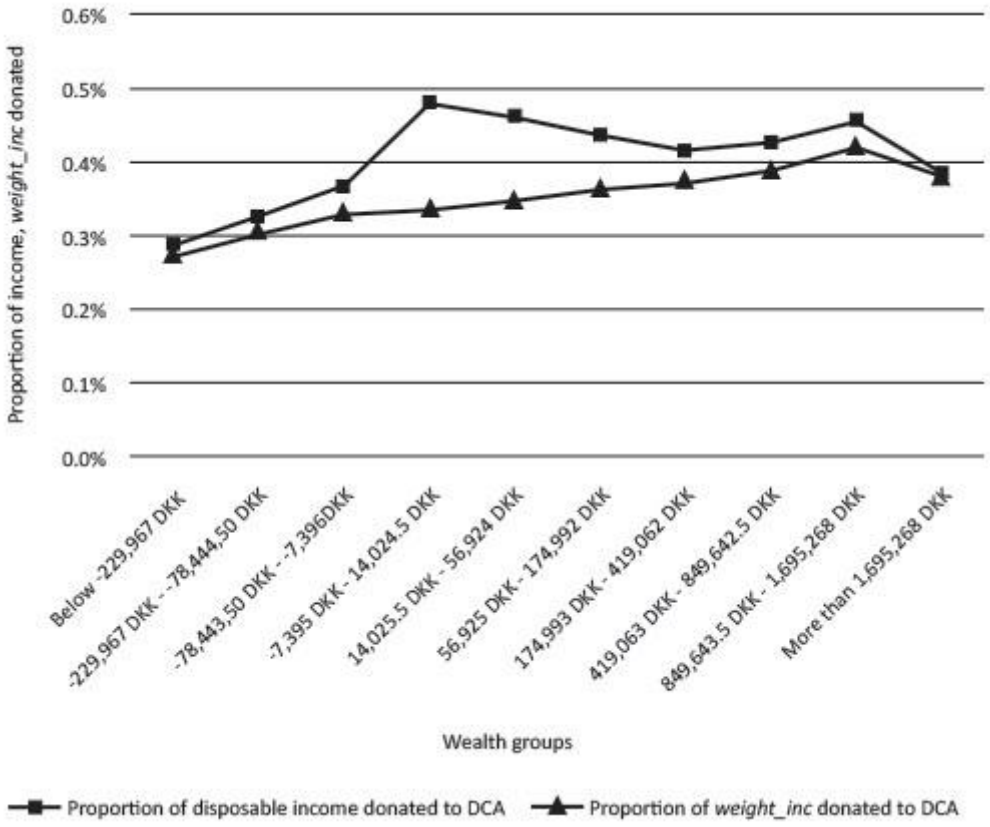
Wealth	Mean disposable income	Standard deviation	Mean *weight_inc*	Standard deviation
Below -229,967 DKK	263,326.00	216,984.30	277,172.50	192,742.00
-229,967 DKK - -78,444.5 DKK	205,311.40	109,239.40	220,654.70	148,517.60
-78,443.5 DKK - -7,396 DKK	165,168.50	96,781.88	184,592.20	102,654.00
-7,395 DKK - 14,024.5 DKK	118,437.30	77,651.89	169,839.10	108,914.60
14,025.5 DKK - 56,924 DKK	154,408.80	92,478.97	205,407.70	106,114.20
56,925 DKK - 174,992 DKK	201,692.50	104,660.70	242,462.70	132,249.00
174,993 DKK - 419,062 DKK	250,826.40	122,432.90	279,198.70	149,790.90
419,063 DKK - 849,642.5 DKK	273,814.30	123,761.50	302,241.10	142,917.00
849,643.5 DKK - 1,695,268 DKK	300,297.60	155,927.70	325,023.60	151,058.80
More than 1,695,268 DKK	458,513.20	1,144,068.00	462,802.30	1,023,896.00

The income statistics are not surprisingly U-shaped in this case since both extremes of wealth usually need high disposable income to obtain whereas individuals with low income have wealth closer to zero. Table 7 and Figure 3 show the proportion of income donated for each wealth group. Figure 3 bivariately shows a slightly increasing trend. Donors that have negative wealth donate a lower proportion of their income than donors that have positive wealth. For donors with a wealth around zero, there is a slight difference between the two income variables, where the curve for disposable income jumps for individuals with a wealth of
-7,395 DKK to 14,024.5 DKK. For both curves however there is a positive relationship between wealth and the proportion of income donated.

Table 7: Donation statistics with 10th percentile wealth groups

Wealth	Mean donated	Standard deviation	% disposable income donated	% *weight_inc* donated
Below -229,967 DKK	752.32	859.22	0.29	0.27
-229,967 DKK - -78,444.5 DKK	668.68	716.86	0.33	0.30
-78,443.5 DKK - -7,396 DKK	607.49	617.79	0.37	0.33
-7,395 DKK - 14,024.5 DKK	569.79	795.59	0.48	0.34
14,025.5 DKK - 56,924 DKK	712.87	1,082.93	0.46	0.35
56,925 DKK - 174,992 DKK	881.23	1,228.62	0.44	0.36
174,993 DKK - 419,062 DKK	1,040.77	1,250.68	0.41	0.37
419,063 DKK - 849,642.5 DKK	1,169.44	1,456.43	0.43	0.39
849,643.5 DKK - 1,695,268 DKK	1,369.97	2,979.99	0.46	0.42
More than 1,695,268 DKK	1,766.53	3,756.85	0.39	0.38

Figure 3: Curve of giving with 10th percentile wealth groups



Is wealth a better measure of overall economic ability? As the U-shaped statistics of mean disposable income in Table 6 shows, negative wealth usually needs some level of disposable income to be obtained due to negative wealth by our measurements often being a case of decreasing real estate values. Individuals in the lower wealth groups are younger, have more children in the household and higher skill-level jobs than other individuals. Individuals in higher wealth groups tend to be older and have fewer children in the household than other individuals. Thus, there might be some underlying factors that explain the relationship, but as it is evident in our regression results in Tables 10 and 11 (in a later section), we find that there is a significant positive relationship between wealth and the proportion of income donated.

STANDARD OF GIVING

The data from DCA offers information on every single donation they received in 2013 where the donors applied their social security number. After excluding donations by will and regulating for negative donations, there were 571,599 unique donations. Table 8 shows the statistics of those donations. Looking at Table 8 (below), 50 DKK is clearly a "magic" number. Only 3.13% of the donations were below 50 DKK and 40.93% of the donations were exactly 50 DKK, in fact 50 DKK is by far the most common donation, 100

DKK being second with 23.40% of the donations. An indication that many donors believe donations below 50 DKK to be too small but donations of 50 DKK to be acceptable.

Table 8: Single donations to DCA in 2013

Donation	Number of donations	% of donations
Below 50 DKK	17,902	3.13
50 DKK - 99.99 DKK	310,415	54.31
50 DKK	233,942	40.93
75 DKK	70,215	12.28
100 DKK - 149.99 DKK	144,223	25.23
100 DKK	133,730	23.40
150 DKK - 299.99 DKK	73,490	12.86
150 DKK	33,595	5.88
200 DKK	27,912	4.88
300 DKK or more	25,569	4.47

Panel I. of Table 9 (below) shows the income profile for the donors that donated 50 DKK at least twice during the year of 2013. There was a total of 21,804 donors donating 50 DKK at least twice during the year of 2013, 15,601 of those donors donated *exactly* 600 DKK to DCA in 2013, 50 DKK each month. Panel II. of Table 9 shows the income profile for the donors that donated 100 DKK at least twice during the year of 2013. There was a total of 13,630 donors donating 100 DKK at least twice during the year of 2013, 7,820 of those donors donated *exactly* 1,200 DKK to DCA in 2013, 100 DKK each month.

Fifty DKK is clearly a popular amount to donate for all income groups. The share of donors donating 50 DKK is higher for the lower-income groups but even with an income of 450,011 DKK - 506,262 DKK, 24.69% of donors have donated 50 DKK at least twice, more than in the lowest income group, despite having a substantially higher disposable income. Similarly, almost 20% of the highest-income individuals choose to donate 50 DKK. In panel II., it is clear that the two lowest income groups are less likely to donate 100 DKK than the other groups. However, individuals with a disposable income in the range of 112,499 DKK - 168,750 DKK are almost as likely to donate 100 DKK as individuals in the highest income group, excluding the two lowest income groups this yield an almost entirely flat curve.

Table 9: Income profile for donors that donated 50 DKK (panel I.) or 100 DKK (panel II.) at least twice to DCA in 2013

	I. Donors donating 50 DKK at least twice during 2013		*II. Donors donating 100 DKK at least twice during 2013*	
Disposable income	**Number of donors**	**% of income group**	**Number of donors**	**% of income group**
Below 56,252 DKK	839	24.20	223	6.43
56,252 DKK - 122,498 DKK	3785	38.19	1016	10.25
112,499 DKK - 168,750 DKK	3958	35.41	2035	18.21
168,751 DKK - 225,002 DKK	4163	33.30	2812	22.49
225,003 DKK - 281,254 DKK	3711	31.72	2711	23.17
281,255 DKK - 337,506 DKK	2467	29.32	1970	23.42
337,507 DKK - 393,758 DKK	1271	26.12	1131	23.24
393,759 DKK - 450,010 DKK	619	24.02	615	23.86
450,011 DKK - 506,262 DKK	359	24.69	289	19.88
506,263 DKK - 562,514 DKK	152	18.45	165	20.02
562,515 DKK - 843,774 DKK	263	20.29	282	21.76
More than 843,774 DKK	101	18.57	113	20.77

With both Tables 8 and 9 in mind and the fact that 15,601 donors donate *exactly* 600 DKK in 2013, corresponding to 50 DKK each month, it is very likely that 50 DKK indeed is an established 'standard of giving' for all income groups. The simple fact that 50 DKK is 0.1% of 50,000 DKK and 0.01% of 500,000 DKK and that 40.93% of all donations were 50 DKK makes it likely that the negative trend found in Table 5 can be due to this 'standard of giving', at least in part.

REGRESSION RESULTS

A vast variety of literature aims to describe charitable behavior and donations (Bekkers & Wiepking, 2011; Wiepking & Bekkers, 2012). However, the results have varied which may both be due to the data sources available and methodological differences. Ordinary Least Squares (OLS) regression have been commonly used (e.g. Wiepking & Breeze, 2012) with some researchers applying tobit regressions (e.g. Van Slyke & Brooks, 2005) because of censoring of donations around zero (in datasets including both donors and non-donors), and others using a Heckman procedure (e.g. Wiepking, 2007). Using OLS regressions in charitable giving data has been questioned since it produces biased results because of truncation, however this is only a problem when the proportion of non-donors is large (Wiepking, 2008). Drawing conclusions to the general population from our results will likely result in inconsistent parameter estimates (Bradley, Holden & McClelland, 2005). Since we only have available information on the donor population from DCA, we do not aim to draw conclusions to the general population and do not face a large number of zero observations. Thus, tobit regressions or Heckman procedures are not relevant for the present data. In practice, many

researchers analyzing charitable giving use OLS regressions, and the results appear to be both valid and reliable as long as the fraction of non-donors remain small (Wiepking, 2008).

We use OLS regressions to investigate the predictors of donor behavior by using the proportion of income donated as the dependent variable. The variables outlined in Table 3 are used and the results are reported with both *disp_inc* and *weight_inc* as the independent income variable. Many donors donated a small proportion of their income, making the distribution right-skewed. Therefore, we use the natural logarithm of the proportion of income donated as the dependent variable. Before log-transformation, the variable was multiplied by 100 for interpretation purposes. Similarly, the natural logarithms of the variables *disp_inc* and *weight_inc* are used. Table 10 sums the results from OLS regressions on the total donor population.

Table 10: OLS regression analysis on the natural logarithm of proportion of income donated

	I. Ln(*prop100)**		**II. Ln(*prop**100)**	
	Coefficient	Rob. Standard error	Coefficient	Rob. Standard error
Ln(*disp_inc*)	-0.833***	0.009		
Ln(*weight_inc*)			-0.870***	0.009
wealth_pct	0.029***	0.001	0.030***	0.002
female	-0.141***	0.007	-0.159***	0.007
age	0.023***	0.001	0.028***	0.001
age²	-0.0001***	0.000	-0.0001***	0.000
children	-0.023***	0.004	-0.016***	0.004
danish	0.014	0.017	0.010	0.017
chur_mem	0.068***	0.011	0.068***	0.010
single	-0.020**	0.008	0.025***	0.008
job_level	0.021***	0.005	0.033***	0.005
no_job	-0.158***	0.033	-0.158***	0.033
rec_ben	-0.097***	0.025	-0.079***	0.025
rec_allo	-0.068*	0.036	-0.066*	0.036
retired	-0.030*	0.016	-0.034**	0.016
self_emp	0.027	0.023	0.040*	0.023
study	0.043***	0.016	-0.016	0.015
educ	0.047***	0.003	0.054***	0.003
region [a]				
Region of Zealand	-0.002	0.015	-0.006	0.015
Region of Southern Denmark	0.069***	0.010	0.060***	0.010
Region of Central Jutland	0.103***	0.010	0.101***	0.010
Region of Northern Jutland	0.046***	0.012	0.042***	0.012
Constant	7.823***	0.098	8.039***	0.104
n	68,300		68,309	
R-squared	0.21		0.19	

[a] base level is "the Capital Region", *** is significant at p < 0.01, ** is significant at p < 0.05, * is significant at p < 0.10

Controlling for a large number of factors, the output from Table 10 undeniably confirms that the relationship between income and proportion of income donated is negative. The size of the coefficient does not differ much between panel I. and II. in Table 10 and it implies that a 10% increase in income results in more than an 8% decrease in the proportion of income donated. Similarly, higher wealth indicates an increase in the proportion of income donated, consolidating the curve of giving found in Figure 3.

Referring to panel I. of Table 10, it shows that females donate a smaller proportion of their income; on average, they donate 14.1% less of their proportion of income than males. Additionally, proportion of income donated increases with age but at a decreasing rate. The proportion of income donated decreases with 2.3% on average for each additional child in the household. Being a member of the Danish National Church increases the proportion of income donated with 6.8%, as well as being employed in a high skill-level job increases the proportion of income donated. Being out of job, receiving social security benefits or other benefits decreases the proportion of income donated. Perhaps surprisingly, the results show that retired individuals donate a slightly lower proportion of their income, although the coefficient is only significant at a 10%-level. Additionally, individuals currently engaged in an education donate a higher proportion, and also higher education increasing the proportion of income donated. Lastly, and perhaps curiously, donors from the Capital Region as well as the Region of Zealand donate a smaller proportion of their income compared to other regions. The results do not differ much in panel II. where the most noteworthy difference is that self-employed individuals donate a larger proportion of income as well as the sign of *single* changing.

Because of the large dataset, it is possible to consider the relationship between the proportion of income donated and disposable income, wealth and other control variables, on different income groups. Table 11 (below) shows the output of regressions for the 10^{th} income percentiles. Because of the small differences between panel I. and II. in Table 10, only the findings using personal disposable income are reported.[5] To our knowledge, no researchers have been able to make such detailed analyses on different income groups, which is of interest for researchers (Wiepking, 2007).

[5] Consequently, standard errors are not reported because of the many different splits. Results do not differ substantially when using *weight_inc* instead.

Table 11: OLS regression analysis on the natural logarithm of proportion of income donated for every 10th income percentile

	I. Ln(*prop**100) Coefficient	II. Ln(*prop**100) Coefficient	III. Ln(*prop**100) Coefficient	IV. Ln(*prop**100) Coefficient	V. Ln(*prop**100) Coefficient	VI. Ln(*prop**100) Coefficient	VII. Ln(*prop**100) Coefficient	VIII. Ln(*prop**100) Coefficient	IX. Ln(*prop**100) Coefficient	X. Ln(*prop**100) Coefficient
Ln(*disp_inc*)	**-0.940*****	**-0.857*****	**-0.678*****	**-0.858*****	**-0.848*****	**-0.826*****	-0.391	**-0.605****	**-1.283*****	**-0.725*****
wealth_pct	**0.033*****	**0.030*****	**0.037*****	**0.054*****	**0.033*****	**0.020*****	**0.023*****	**0.025*****	**0.022*****	**0.022*****
female	**-0.168*****	**-0.135*****	**-0.110***	**-0.098*****	**-0.104*****	**-0.127*****	**-0.122*****	**-0.125*****	**-0.173*****	**-0.166*****
age	**0.091*****	**0.022*****	**0.027*****	**0.019*****	**0.015*****	**0.021*****	**0.025*****	**0.015*****	**0.021*****	**0.029*****
age²	**-0.0009*****	**-0.0001****	**-0.0001*****	**-0.0001*****	-0.0000	**-0.0001*****	**-0.0001*****	-0.0000	**-0.0001***	**-0.0002*****
children	**-0.019***	-0.022	-0.012	-0.007	-0.011	-0.005	-0.019	-0.018	**-0.042*****	**-0.060*****
danish	**0.077***	**0.093***	-0.025	0.004	0.056	-0.025	0.024	-0.076	0.045	-0.016
chur_mem	0.010	0.021	**0.084****	**0.082****	0.020	**0.064***	**0.094*****	0.054	**0.160*****	**0.091*****
single	-0.011	-0.006	-0.026	**-0.070*****	**-0.047***	0.023	0.027	-0.044	-0.007	0.018
job_level	**0.125*****	0.010	0.000	0.020	-0.016	0.016	0.020	0.022	**0.034****	**0.027***
no_job	**-0.439*****	**-0.139***	**-0.123****	**-0.313*****	0.051	**-0.307****	-0.283	**-0.736*****	0.294	-0.121
rec_ben	**-0.170****	-0.018	**-0.222*****	-0.081	**-0.207****	0.038	0.185	-0.158	omitted	-0.873
rec_allo	-0.045	0.024	**-0.134****	-0.060	-0.150	-0.096	**-1.065*****	0.008	-0.147	**0.435*****
retired	**0.423***	0.015	**-0.130*****	-0.061	-0.037	0.038	-0.007	0.073	0.018	0.054
self_emp	0.006	0.032	-0.050	-0.031	-0.099	0.125	**-0.163***	-0.029	0.043	0.046
study	0.042	0.023	-0.052	0.177*	-0.082	-0.346	0.094	0.087	**0.929*****	**0.539*****
educ	-0.006	**0.036*****	**0.033*****	**0.031*****	**0.050*****	**0.040*****	**0.060*****	**0.063*****	**0.071*****	**0.071*****
region [a]										
Region of Zealand	**-0.146****	**-0.106***	-0.067	-0.022	-0.005	0.058	0.017	0.013	0.005	**0.121*****
Region of Southern Denmark	**0.141*****	0.030	**0.090*****	**0.096*****	0.035	**0.071****	**0.060***	**0.078****	0.036	**0.072***
Region of Central Jutland	**0.146*****	**0.092*****	**0.155*****	**0.154*****	**0.089*****	**0.112*****	**0.131*****	0.049	**0.067****	**0.074****
Region of Northern Jutland	0.022	**-0.064***	0.048	0.036	**0.149*****	**0.086****	**0.110*****	**0.111*****	**0.075***	0.068
Constant	**7.968*****	**8.127*****	**5.921*****	**8.193*****	**8.191*****	**7.865****	2.196	5.180	**13.497*****	**6.243*****
n	6,831	6,828	6,831	6,830	6,831	6,831	6,828	6,831	6,829	6,830
R-squared	0.26	0.10	0.11	0.09	0.10	0.08	0.08	0.07	0.06	0.11

[a] base level is "the Capital Region", *** is significant at p < 0.01, ** is significant at p < 0.05, * is significant at p < 0.10

As shown in Table 11, the coefficient for income is significant and has a negative sign for all income percentiles but the 7th. The 7th income percentile includes individuals with a disposable income between 244,901 DKK and 278,419.5 DKK, and the lack of significance is perhaps due to the small range in income. All regressions show that the coefficient on wealth is significant and has a positive sign but it is strongest in the low to medium income percentiles.

All regressions show that females donate a smaller proportion of their income as well as the fact that proportion of income donated increases with age. The coefficient on number of children in the household is only significant in the lowest and the two highest income groups. For the highest income group, having an additional child lowers proportion of income donated by 6% on average. Being of Danish Origin has a positive impact on the proportion of income donated for the two lowest income percentiles while being a member of the Danish National Church has a positive impact on the proportion of income donated in most income percentiles, besides the two lowest. Individuals in the lowest and the two highest income percentiles employed in higher skill-level jobs donate a higher proportion of their income. Being unemployed especially has an impact on the low to medium income percentiles. Being retired has no impact on the proportion of income donated, save two income percentiles. Individuals in the two highest income percentiles currently undergoing an education donate a higher proportion of their income. The level of education obtained is strongly significant for all income percentiles, save the lowest. As was the case in the output from Table 10, individuals outside the Capital Region tend to donate a higher proportion of their income, especially those living in the Region of Central Jutland.

DISCUSSION

To our knowledge, this study is one of the first studies to investigate the curve of giving in a European setting (with the exception of Wiepking, 2007), and the first to use individual register-based data in combination with individual data on charitable giving. As Wiepking (2007), we find a negative relationship between income and the proportion of income donated. If one accepts the notion of generosity being measured as the relative amount of income spent on charity, low-income individuals are more generous than high-income individuals. Interpreting charity as a good, our findings contribute the characteristics of a necessary good to charity.[6] Notably and in contrast with previous US-based studies (e.g. Clotfelter & Steurle, 1981; James & Sharpe, 2007; Jencks, 1987; List, 2011) we find that the highest income group is the group that donates the smallest proportion of their income. Thus, we find no support of the right branch of the U-shaped curve of giving. With rich register-based data using actual donations from 2013 to a Danish

[6] It is possible to extend the analyses to offer a view of the income elasticity as well but this is out of the scope of the present paper.

charitable organization, it is possible to investigate 10 different income splits to determine whether there is a difference in donation behavior in different income groups.[7] These regressions confirm the findings for the total donor population. That is, an increase in income has a negative effect on the proportion of income donated. Similarly, we find that there is a positive relationship between wealth and the proportion of income donated, for the general population as well as for the different income splits, with the effect being strongest in the lower income groups. Donors were divided into 10th percentile wealth groups because of a large amount of donors having negative wealth. This is a sub-optimal solution but better than alternatives such as using the actual amount of wealth or adding a constant and log-transforming the wealth variable. However, analyses using other solutions for the wealth variable show the same general conclusions as using wealth percentiles. Our analyses focus on donations in 2013 and initial analyses for 2012 and 2014, not included in this paper, verify our findings. Initial analyses when correcting for the price of giving imply a stronger negative relationship between income and the proportion of income donated, in line with Wiepking (2007). We find the methods applied to be very robust, especially given the large sample sizes, but future versions of the paper aim to investigate different methods, e.g. using longitudinal data analysis. Previous literature has also applied tobit regressions or Heckman procedures but since our data do not include zero observations, these methods are not warranted.

We find a strong, negative relationship between income and the proportion of income donated. These results suggest that lower-income individuals are more "generous" than higher-income individuals donating a higher proportion of their income. One explanation for this decreasing trend can be the presence of a 'standard of giving' where we find that more than 40% of the actual donations are 50 DKK and only around 3% are below 50 DKK. Additionally, more than 15,000 of the donors donate exactly 600 DKK in 2013, corresponding to 50 DKK each month. The nature of the 'standard of giving' in our data may be partly driven by the fact that almost 95% of donations are automatic fixed payment agreements (e.g. payments every fortnight or every month). This giving standard applies for higher income groups as well as lower income groups implying that donors think of an absolute amount rather than a relative amount. The presence of a 'standard of giving' has been found previously (e.g. Andreoni, 2004; Harbaugh, 1998) and our findings contribute to the notion that individuals do not want to give less than this standard (Edwards & List, 2014). Fundraisers able to effectively getting donors to think of relative rather than absolute amounts will be able to increase the donations from higher-income donors. We do not find evidence that lower-income individuals are substantially wealthier than other income groups, nor is there a large group of

[7] Donors could have been divided into different income groups than the 10th percentile as used in Table 11 (e.g. into the income groups used in Table 5 and Figure 2). However, this does not change the findings from Table 11 but in some cases lower the sample size to dangerously low proportions (results available from author).

committed donors that explain the larger proportion of income donated. However, we find that using wealth groups instead of income groups show a positive relationship between wealth and the proportion of income donated as depicted in Figure 3. One question that remains to be answered is whether wealth better explains overall economic ability than income and whether generosity should be measured using wealth instead of income, or a combination of the two. Another way of understanding generosity might be to look at the proportion of expenditures donated since low-income high-wealth individuals might donate a higher proportion of their income but have higher expenditures in other areas as well. In a US-setting, James & Sharpe (2007) found a U-shaped curve of giving when using expenditures instead of income, but no European study of the kind exists as of date. The mixed US findings on the curve of giving are likely due to differences in data sources. Some of the previous literature shows the relationship bivariately but fails to do any multivariate analyses, thus we cannot know for sure whether the U-shape is actually driven by income or if some other variables explain the relationship better. In our multivariate analyses, we show a significant negative relationship between income and the proportion of income donated, controlling for a wide range of factors. However, we are not able to include more value-based explanators or information on whether individuals are charitable through other means (e.g. volunteering). Researchers able to combine register-based data as ours with detailed survey-based data on opinions, values and charitable giving behavior will be able to explain individual donation behavior even further. Such studies are warranted.

We find no support of the right branch of the U-shaped curve of giving. The lack of support may be due to the construction of the Danish tax system with a maximum limit of deductible donations (14,500 DKK in 2013), effectively increasing the price of giving to 100% on donations that exceed the limit. However, the data from DCA as well as a survey conducted in 2013 (Jensen & Jacobsen, 2013) show that very large donations are very rare. Another question one could ask is whether the U-shaped curve in a US-setting is only evident because of very rich Americans donating a high proportion of their income as in Clotfelter & Steurle (1981). In Denmark a much smaller proportion of the population has an income comparable to the richest Americans. Another explanation could be that there simply is cultural differences between the US and Europe, making the nature of philanthropy different across the Atlantic. In Denmark, as in many other European countries, the tax system is progressive. The differences in tax systems, and especially the higher taxes on income amongst higher-income individuals in Denmark, might lower their contributions to charity if individuals consider taxes as substitutions for charitable contributions. Previous studies have found indication of such a substitution effect by showing that taxpayers would cut their donations by the increase in their tax bill (List, 2011). Further studies in a European setting can offer insights into the differences in donation behavior across the Atlantic. Furthermore, getting access to richer datasets in the US should be a

priority. Our findings suggest that researchers and policy makers need to be careful when drawing conclusions regarding charitable giving from US-based studies to Europe and vice versa.

The data suffers from some shortcomings that need to be addressed. Although the data includes the entire donor population from DCA in 2013, it does not offer insights into donations to other charitable organizations. We do not know whether donors in the DCA population donate to other charitable organizations (some likely do) and how much. In addition, the DCA donor population differs from the general population on several sociodemographics, which is why conclusions should not be drawn from the donor population to the general population. However, with such rich data and the fact that DCA is one of the largest charitable organizations in Denmark, it is a sound assumption that the donor behavior in the DCA population translates to other donor populations as well as donations to other organizations and causes.[8] Joined data from different charitable organizations will be able to offer further insights into donation behavior.[9] Alternatively, it is possible to investigate information on tax deductions from the register (as these include all causes). Unfortunately, we lack sufficient information on tax deductions from donors as well as the sample population. The data at hand on tax deductions is "noisy" and especially overestimate donations among medium- to high-income donors. Initial analyses using tax deductions conclude the negative trend but further studies able to eliminate the noise in the data (or when better data becomes available) will be able to offer further insights into donation behavior.[10]

CONCLUSION

To the best of our knowledge, this is the first study to investigate the U-shaped charitable giving profile using register-based data merged with individual data on donated amounts to a charity.

In keeping with previous European findings, we find a very clear and significant negative relationship between income and the proportion of income donated both for the total donor population as well as for every 10th income percentile. Similarly, we find a positive relationship between wealth and the proportion of income donated. Our results thus seem to demonstrate a decline in the charitable giving relative to

[8] Although DCA is not a religious organization today, it has its roots in the Danish National Church and there might be a slight overrepresentation of believers (with 83.91% of donors being members of the Danish National Church as opposed to 80.69% of the sample population).

[9] Another noteworthy addition might be to include data on religious donations as well since donation behavior to religious causes differs from general donation behavior (e.g. James & Sharpe, 2007; Wiepking, 2007). However, in Denmark religious donations are likely to be a much smaller proportion of total donations than in the US, due to cultural differences.

[10] Initial analyses imply that higher-income donors donate a smaller proportion of their total donations to DCA than lower-income donors, suggesting that higher-income donors spread their donations out to more charitable organizations than lower-income donors. However, because data on tax deductions overestimate donations for higher-income donors, this finding should be taken lightly.

income suggesting that lower income groups are relatively more generous than higher income groups. Looking further at the actual donations, we find evidence of a 'standard of giving' that might explain this finding. This 'standard of giving' is likely to be an important explanation to the higher proportion of income donated amongst low-income individuals.

We find no support of the right branch of the U-shaped curve of giving as previously found in studies from the US. This may be explained by differences in the Danish and the US tax systems, cultural differences concerning philanthropy across the Atlantic, insufficient or biased data in the US-based studies or a combination thereof. Our findings suggest that researchers and policy makers need to be careful when drawing conclusions regarding charitable giving from US-based studies to Europe and vice versa. Although this paper offers one of the most comprehensive investigations of the relationship between income and the proportion of income donated, several issues remain unresolved. We therefore urge researchers to keep exploring the phenomenon.

REFERENCES

Andersen, P. B. & Lüchau, P. (2011). Individualisering og aftraditionalisering af danskernes religiøse værdier, s. 76-96. In Gundelach, P. (Ed.) (2011). *Små og store forandringer: danskernes værdier siden 1981*. Hans Reitzels forlag.

Andreoni, J. (1988). Privately provided public goods in a large economy: the limits of altruism. *Journal of Public Economics*, *35*(1), 57-73.

Andreoni, J. (1989). Giving with impure altruism: Applications to charity and Ricardian equivalence. *The Journal of Political Economy*, *97*(6), 1447.

Andreoni, J. (1990). Impure altruism and donations to public-goods – A theory of warm-glow giving. *Economic Journal*, *100*(401), 464-477.

Andreoni, J. (1993). An experimental test of the public-goods crowding-out hypothesis. *American Economic Review*, 1317-1327.

Andreoni, J. (2004). Economics of philanthropy. In Gerard-Varet, L. A., Kolm, S. C., & Ythier, J. M. (Eds.). *Handbook of giving, reciprocity and altruism* (pp. 11369–11376). North-Holland: Elsevier.

Andreoni, J. (2006). Philanthropy. *Handbook of the economics of giving, altruism and reciprocity*, *2*, 1201-1269.

Andreoni, J., Harbaugh, W. T., & Vesterlund, L. (2008). Altruism in experiments. Durlauf, S. N. & Blume, L. E. *The New Palgrave* (Second Edition). Palgrave Macmillan.

Andreoni, J., & Miller, J. H. (1993). Rational cooperation in the finitely repeated prisoner's dilemma: Experimental evidence. *Economic Journal*, *103*(418), 570-85.

Andreoni, J., & Scholz, J. K. (1998). An econometric analysis of charitable giving with interdependent preferences. *Economic inquiry*, *36*(3), 410-428.

Andrews, F. E. (1950). *Philanthropic giving*. New York: Russell Sage Foundation.

Auten, G. E., Clotfelter, C. T., & Schmalbeck, R. L. (2000). Taxes and philanthropy among the wealthy. In: Slemrod, J. B. (2000). *Does atlas shrug*, p. 392-424.

Auten, G. E., Seig, H. & Clotfelter, C. T. (2002). Charitable Giving, Income, and Taxes: An Analysis of Panel Data. *American Economic Review, 92*(1): 371–82.

Becker, G. (1961). Notes on an Economic Analysis of Philanthropy, Working Paper, National Bureau of Economic Research.

Becker, G. S. (1974). A theory of social interactions. *Journal of Political Economy*, *82*(6).

Bekkers, R., & Wiepking, P. (2010). A literature review of empirical studies of philanthropy: Eight mechanisms that drive charitable giving. *Nonprofit and Voluntary Sector Quarterly*.

Bekkers, R., & Wiepking, P. (2011). Who gives? A literature review of predictors of charitable giving part one: religion, education, age and socialisation. *Voluntary Sector Review*, *2*(3), 337-365.

Bradley, R., Holden, S. & McClelland, R. (2005). A robust estimation of the effects of taxation on charitable contributions. *Contemporary Economic Policy*, *23*(4), 545–554.

Brooks, A. C. (2002). Welfare receipt and private charity. *Public budgeting & finance*, *22*(3), 101-114.

Charities Aid Foundation, (2014). *World Giving Index 2014: A global view of giving trends*. [online] Charities Aid Foundation. Available at: https://www.cafonline.org/docs/default-source/about-us-publications/caf_wgi2014_report_1555awebfinal.pdf [Accessed 10 Aug. 2015].

Clotfelter, Charles T. (I985). *Federal Tax Policy and Charitable Giving*. Chicago: University of Chicago Press.

Clotfelter, C. T., & Steurle, C. E. (1981). Charitable contributions. In Aaron, H. J. & Pechman, J. A. (Eds.), *How Taxes Affect Economic Behaviour*, Washington D.C.: The Brookings Institution, 404-437.

DellaVigna, S., List, J. A., & Malmendier, U. (2012). Testing for altruism and social pressure in charitable giving. *The Quarterly Journal of Economics*,*127*(1), 1-56.

Duncan, B. (2004). A theory of impact philanthropy. *Journal of Public Economics*, *88*(9-10), 2159–2180.

Eckel, C. C., Grossman, P. J., & Johnston, R. M. (2005). An experimental test of the crowding out hypothesis. *Journal of Public Economics*, *89*(8), 1543-1560.

Feenberg, Daniel. 1987. Are Tax Price Models Really Identifi ed: The Case of Charitable Giving. *National Tax Journal, 42*(4): 629–33.

Fehr, E. & Gächter, S. (2000). Cooperation and punishment in public goods experiments. *American Economic Review*, *90*(4), 980-94.

Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The quarterly journal of economics*, *114*(3), 817-868.

Feldstein, M. S. (1975). The Income Tax and Charitable Contributions Part II-The Impact on Religious, Educational and Other Organizations. *National Tax Journal*, *28*(2).

Feldstein, M. S., & Taylor, A. (1976). The Income Tax and Charitable Contributions. *Econometrica, 44*(6), 1201–22.

Fischbacher, U., Gachter, S., & Fehr, E. (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters*, *71*, 397–404.

Frey, Bruno S., Meier, Stephan, 2004. Social comparisons and pro-social behavior: testing "conditional cooperation" in a field experiment. *American Economic Review*, *94*(5), 1717–1722.

Harbaugh, W. T. (1998). What do donations buy? A model of philanthropy based on prestige and warm glow. *Journal of Public Economics*, *67*, 269–284.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the econometric society*, 153-161.

Hoge, D. R., & Yang, F. (1994). Determinants of religious giving in American denominations: Data from two nationwide surveys. *Review of Religious Research*, *36*(2), 123–148.

Hrung, W. B. (2004). After-Life Consumption and Charitable Giving. *American Journal of Economics and Sociology*, *63*(3), 731-745.

Iannaccone, L. (1988). A formal model of church and sect. *American Journal of Sociology, 94*(Suppl.), 241-268.

James, R. N., & Sharpe, D. L. (2007). The nature and causes of the U-shaped charitable giving profile. *Nonprofit and Voluntary Sector Quarterly*, *36*(2), 218-238.

Jencks, C. (1987). Who gives to what? In W.W. Powell, *The Nonprofit Sector: A Research Handbook* (1st ed.). New Haven: Yale University Press, 321-339.

Jensen, J. B. & Jacobsen, P. Ø. (2013). *Danskerne og velgørenhed anno 2013*. Copenhagen Business School.

Kingma, B. R. (1989). An accurate measurement of the crowd-out effect, income effect, and price effect for charitable contributions. *The journal of political economy*, 1197-1207.

Ledyard, J. (1995). Public goods: A survey of experimental research. In J. Kagel, and A. Roth (Eds), *Handbook of Experimental Economics*. Princeton: Princeton University Press.

List, J. A. (2011). The market for charitable giving. *The Journal of Economic Perspectives*, 157-180.

McClelland, R., & Kokoski, M. F. (1994). Econometric Issues in the Analysis of Charitable Giving. *Public Finance Review*, *22*(4), 498 –517.

McClelland, R., & Brooks, A. C. (2004). What is the real relationship between income and charitable giving? *Public Finance Review*, *32*(5), 483–497.

Meyer, B. D., & Sullivan, J. X. (2003). *Measuring the well-being of the poor using income and consumption* (No. w9760). National Bureau of Economic Research.

Ostrower, F. (1995). *Why the wealthy give: The culture of elite philanthropy*. Princeton, NJ: Princeton University Press.

Palfrey, T. R., & Prisbrey, J. E. (1997). Anomalous behavior in public goods experiments: How much and why? *American Economic Review*, *87*(5), 829-846.

Piff, P. K., Kraus, M. W., Côté, S., Cheng, B. H., & Keltner, D. (2010). Having less, giving more: the influence of social class on prosocial behavior. *Journal of Personality and Social Psychology, 99*(5), 771.

Reece, W. (1979). Charitable contributions: New evidence on household behavior. *The American Economic Review*, *69*(1), 142–151.

Reed, P. B., & Selbee, L. K. (2001). The civic core in Canada: Disproportionality in charitable giving, volunteering, and civic participation. *Nonprofit and voluntary sector quarterly*, *30*(4), 761-780.

Sally, D. (1995). Conversation and Cooperation in Social Dilemmas A Meta-Analysis of Experiments from 1958 to 1992. *Rationality and society*, *7*(1), 58-92.

Schervish, P. G., & Havens, J. J. (1995a). Do the poor pay more: is the U-shaped curve correct? *Nonprofit and Voluntary Sector Quarterly, 24*(1), 79-90.

Schervish, P. G., & Havens, J. J. (1995b). Explaining the curve in the U-shaped curve. *Voluntas: International Journal of Voluntary and Nonprofit Organizations, 6*(2), 202-225.

Schervish, P. G., & Havens, J. J. (1998). Money and magnanimity: New findings on the distribution of income, wealth, and philanthropy. *Nonprofit Management and Leadership, 8*(4), 421-434.

Schervish, P. G., & Havens, J. J. (2001). Wealth and the commonwealth: New findings on wherewithal and philanthropy. *Nonprofit and Voluntary Sector Quarterly, 30*(1), 5-25.

Shang, Jen, Croson, Rachel (2009). A field experiment in charitable contribution: the impact of social information on the voluntary provision of public goods. *Economic Journal*, *119*(540), 1422–1439.

Tiehen, Laura (2001). Tax Policy and Charitable Contributions of Money. *National Tax Journal, 54*(4), 707–23.

Van Slyke, D. M. & Brooks, A. C. (2005). Why do People Give? New Evidence and Strategies for Nonprofit Managers. *The American Review of Public Administration*, *35*(3), 199-222.

Wiepking, P. (2007). The philanthropic poor: In search of explanations for the relative generosity of lower income households. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *18*(4), 339-358.

Wiepking P. 2008. For the love of mankind. A sociological study on charitable giving. Department of Philanthropic Studies, Dissertation VU University Amsterdam, Amsterdam.

Wiepking, P., & Bekkers, R. (2012). Who gives? A literature review of predictors of charitable giving. Part Two: Gender, family composition and income. *Voluntary Sector Review*, *3*(2), 217-245.

Wiepking, P. & Breeze, B. (2012). Feeling Poor, Acting Stingy: The Effect of Money Perceptions on Charitable Giving. *International Journal of Nonprofit and Voluntary Sector Marketing*, *17*(1), 13-24.

Yen, S. T. (2002). An Econometric Analysis of Household Donations in the USA. *Applied Economics Letters*, *9*(13), 837–41.