Essays on Nonprofit Organizations, Donations, and Fund-raising

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Contents

Introduction

The public's willingness to help victims of major earthquakes and other natural catastrophes is huge. Individuals in Germany donated €670 million following the Tsunami in southern Asia in December 2004 and €350 million after the Elbe Flood in Germany in August 2002.[1] American individuals donated $3.9 billion after Hurricane Katrina in 2005 and $1.4 billion after an earthquake struck Haiti in 2010.[2] On the other hand, reports of bad conduct and scandals among organizations collecting donations are increasing. For instance, in 2007 Unicef Deutschland, one of the biggest and best known non-profit organizations (NPO) in Germany, was accused of nepotism, of having made dubious and expensive arrangements with private fund-raising agencies without written contracts, of paying suspiciously high consultant fees, which went partly to the former employees, and of the costly rebuilding of its headquarters in Cologne. The Charity Navigator provides another illustration.[3]

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[1]For more statistics on charitable giving in Germany, see Deutsches Zentralinstitut für soziale Fragen, www.dzi.de.

[2]For more statistics on charitable giving in US, see The Center on Philanthropy at Indiana University, http://www.philanthropy.iupui.edu.

[3]For more information, see http://www.charitynavigator.org/.

It occasionally publishes a "10 Charities Overpaying their For-Profit Fund-raisers" list. The top charities on this list pay almost 95 cents in fund-raising fees for each dollar solicited.

Joel Fleishman, whose main research is on the regulation of not-for-profit organizations characterizes the third sector in America in the following way:

> They have been the dynamo of social change since the beginning of the last century. Yet they are cloaked in secrecy - their decision-making and operations are inscrutable to the point of obscurity, leaving them substantially unaccountable (2007, back page).

Nowadays, the activities of the nonprofit sector go much beyond street fund-raising. Given the amount of money at stake and the special privileges this sector has been granted historically, there has been much political debate on this topic, especially in the UK and US.[4] In Germany, political interest increased after the Unicef Deutschland scandal. Especially in the US, there is a lot of research on charitable giving.[5] At the same time, however, the number of studies in continental Europe is negligible. Given that so many aspects of giving behavior and the nonprofit market remain puzzling, this dissertation addresses some underexplored questions. Four different problems from the field of charitable giving and nonprofit organizations are analyzed in four chapters.

[4]For more information, see for example The Economist, Sweetened charity, Jun 9th 2012.

[5]For the overviews of the literature, see Andreoni (2006b), Meier (2007), Vesterlund (2006) and Peloza and Steel (2005).

In the first chapter, I estimate the permanent and transitory tax-price and income elasticity of charitable giving in Germany using rich panel data of tax return for the years 2001–2006. To identify the effect of interest, I use the tax reform implemented gradually in 2004 and 2005. Further, the estimation method addresses omitted variable bias, the endogeneity of tax-price and after-tax income as well as possibly heterogeneous effects of nonprice and price variables. The results suggest that the permanent tax-price elasticity varies significantly by income class, ranging from -0.2 for low incomes to -1.6 for higher incomes. Permanent income elasticity does not vary much among income classes and is rather low, between 0.2–0.3. The donors adjust their donations gradually after changes in tax schedule and respond to future predictable changes in price. They respond mainly to changes in current and, to a smaller extent, in future income.

The second chapter presents a model in which the media helps to reduce the problem of asymmetric information in the market for nonprofit organizations (NPOs). NPOs solicit donations from individuals and offer in turn goods and services whose quality cannot be (easily) ascertained by the donors. This creates incentives for "bad" NPOs to enter the market and free ride on the donor's trust. In this environment of asymmetric information, the free press—acting as a watchdog—can enhance the trust of the donors, increase the level of donations, and increase the amount of public good produced.

Public contributions are somewhat puzzling. Assuming that NPOs produce a public good (e.g. scientific research) the standard public good theory predicts a high level of free riding leading to a low level of public contributions. The idea behind this is that the donors, who are assumed to be altruistic,—

i.e. they get the utility from the provision of the good—do not account for the positive externality of their donations (private cost) on other agents. The important implications of this theory are that public support and the contributions of others crowd out private contributions. However, the observations of donative behavior as well as a range of experiments do not support the traditional model. In reality, the amount of donations seems to be particularly high. In the US, 70–80 percent of the population donate at least once a year. In the year 2004, total contributions amounted for \$250 billion of which \$187.92 billion came from individuals.[6] Various experiments have shown that people choose their own contributions levels, electing to donate an amount between the individually rational and socially optimal value.[7] This insight gave an impulse for further research concerning donative behavior. In the third chapter, I empirically analyze a dynamic model of donations to nonprofit organizations. The econometric specification accounts for the effect of past donations. The data used is a 16-year-long panel from IRS Form 990 for U.S. nonprofit organizations operating in the fields of the higher education, museum, arts, hospital, international relief, disaster relief, and human services. Estimation results show that past donations and fund-raising expenses have positive effects on current donations.

The last chapter is motivated by the fact that, for many games describing human behavior game theory predictions and experimental results differ significantly. Public goods games are one such example. Here, game theory predicts high level of free riding, but in most experiments the contributions

[6]For more information, see Giving USA (2005).

[7]For more information, see for example Isaak and Walker (1988).

well exceed the predicted level. Also, in reality, the donative behavior departs from the Nash equilibria predictions. In general, those deviations can often be better explained by the prevalence of some social norm or tradition. Consequently, it is promising to supplement game theory approach by approaches that account for social norms in order to have both mathematical rigor and more accurate predictions. I propose a framework for normal form games in which the specification of a social norm can influence players behavior. In this extended game Nash equilibria remain the same but new norm equilibria with distinct outcomes emerge.

Chapter 1

Tax-price Elasticity of Charitable Donations - Evidence from Germany

1.1 Introduction

The tax system in many countries is designed to encourage private donations to charities. In some countries, including Germany, donations can be deducted from gross income and therefore reduce individual tax liability. At the same time, this imposes a cost on governments in the form of foregone tax revenue. For example, in 2001 in Germany the taxpayers declared a total of €3.7 billion of donations of which €2.9 billion has been recognized as deductible, thus reducing the tax revenue by approximately €0.9 billion.[1]

[1] The average marginal tax weighted by the income in 2001 was around 32 percent (own calculations). For more income tax statistics, see Buschle (2006).

Therefore, the policy makers are interested in assessing the effectiveness of allowing deductions to increase donations. The tax-price elasticity of donations is crucial for making this assessment and for evaluating potential policy changes. However, its value is unknown and has to be estimated. While there are numerous studies estimating tax-price elasticity of giving for the US, the evidence for other countries is rather sparse. At the same time, one should not believe that the estimates for the US are also valid for other countries. Specifically, Germany differs much from the US when it comes to the role of the government and the tradition of charitable giving. Total public social expenditures in Germany in 2001 amounted to 27.4% of GDP. By contrast, they were 14.7% of GDP in the US.[2] National giving levels are 1.67% of GDP in US and they are 0.22% of GDP, on average in Germany. Moreover, there are also strong regional differences in Germany. While in former East Germany the giving levels are 0.12% of GDP, they are 0.26% of GDP in West Germany.[3] The numbers for Germany exclude the church tax, which is between 8-9% (depending on the state) of the tax due. It is automatically deducted from the income of all members of the Catholic and Protestant church as well as of some Jewish and some free church congregations. The US and Germany also differ in the charitable goals that are primarily supported. While in 2010 35% of US donations went to support religious goals, 14% to educational goals and 9% to support human services,[4] the numbers for Germany were: 33% for emergency relief, 24% for child wel-

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[2]For more information, see Welfare Expenditure Report (2001).

[3]For more information, see International comparisons of charitable giving (2006).

[4]For more information, see Giving USA (2011).

fare and 24% for foreign aid.[5] Around two thirds of private donations in Germany are paid in form of membership fees for nonprofit associations and organizations.[6] Membership fees are usually of a fixed, prespecified value and are often automatically debited from members' bank accounts.[7] This could imply that German donors will be less responsive to small changes in price or any adjustments in contributions may occur after a time lag.

Given that donations have not been studied extensively in Germany, this chapter closes a gap in two ways: by providing tax-price and income elasticities based on panel data, and by accounting for the recent developments described in the literature. This longitudinal study allows me to solve many problems inherent to a cross-sectional study. First, it accounts for omitted variable bias coming from individual unobserved characteristics (like education, wealth or degree of altruism) that are potentially correlated with income and marginal tax, and are known to be important determinants of donations. Second, it accounts for the endogeneity of the tax-price and after-tax income variables by appropriate instruments. Third, it helps to overcome the identification problems while using the tax reform implemented gradually in 2004 and 2005. Moreover, it allows me to identify permanent and transitory tax-price and income elasticity and to understand whether donors adjust their charitable giving gradually in response to tax changes and possibly respond

[5]For more information, see Deutscher Spendenmonitor (2011).

[6]For more information, see Sommerfeld (2009).

[7]Most of the organizations offer the possibility of membership, examples include WWF and Greenpeace. The members usually receive a regular magazine informing about the program achievements etc.

in advance to known future changes. Finally, this study allows the tax-price and income elasticity to vary by income class.

The chapter is divided into following parts. The next section presents a review of the relevant literature. Section 1.3 explains the treatment of donations in the German tax law. Section 1.4 explains empirical methodology. Section 1.5 presents estimation results. In section 1.6 some robustness checks are presented.

1.2 Literature

There is a vast empirical literature investigating the tax-price and income elasticity of donations in the US. Initial research was conducted with cross-sectional data, using OLS or Tobit methods. Examples include Feldstein and Taylor (1996) and Feenberg (1988). The estimated price elasticity was large and on average -1.5 (US). Later, the availability of panel data allowed researchers to exploit panel data techniques accounting for individual heterogeneity of donors and found much lower price elasticities (for example Broman 1989). Recently, a new line of research has tried to distinguish permanent from transitory effects using the availability of long panels (see for example Randolph 1995, Barett et al. 1997, Bakija 2000 etc.). However, the discussion concerning the nature of the "true" tax-price elasticity is still ongoing.

Studies on tax-price elasticities from other countries are rather scarce, though tax deductions for donations are widely employed. Given different attitudes toward giving in different cultures as well as a different role governments play in the provision of public goods in different countries, the magnitude of the response to fiscal incentives in those countries might be very different from the US. For example, Fack and Landais (2009) using nonparametric method of quantile regression found rather low elasticities for France ranging from -0.6 to -0.2.

There are only a few empirical studies for Germany. The pioneering work was done by Paqué (1996). Using tax data aggregated on a state and income-group basis for 1961 to 1980 in 3-year intervals and using the OLS method he found an elasticity in the range of -1.8 to -1.4. Auer und Kalusche (2010) implemented a Tobit estimator on a cross section 1998 data with individual data and found an elasticity of -1.11 to -1.05. Borgloh (2008) used a Tobit and a two-step Heckman model applied to pooled 2001–2003 individual tax data and provided estimates in the range of -2.08 to -0.84. Bönke, Massarat-Mashhadi and Sielaff (2011) applied a censored quantile regression to (pooled) cross sections of the years 1998, 2001, and 2004 and obtained results ranging between -1.45 and -0.45.

This project differs from previous studies because it makes full use of the longitudinal characteristics of panel data. Although I use the same kind of tax return data as Borgloh (2008), she only covered the years 2001–2003, years when no significant change in tax schedule occurred. The lack of exogenous variation in price may lead to concerns that the coefficient estimates will not be correctly identified. In contrast to previous projects, the analysis in this project is based on a panel of data that includes the years 2001–2006. Changes in tax rates were implemented in the years 2004 and 2005 (see figure 1). The Borgloh (2008) study relied on only 1000 observations per year, resulting in large standard errors. Here, I analyze 5% of the tax-paying households in Germany, which gives me almost 1 million observations per year. Borgloh (2008) did not account for the panel data character and implemented a Tobit and a two-step Heckman on pooled data. The study by Bönke et. al (2011) allowed for heterogeneity for different points of the underlying distribution of charitable giving but not for individual heterogeneity. Here I use panel data aspects to control for unobserved individual characteristics.

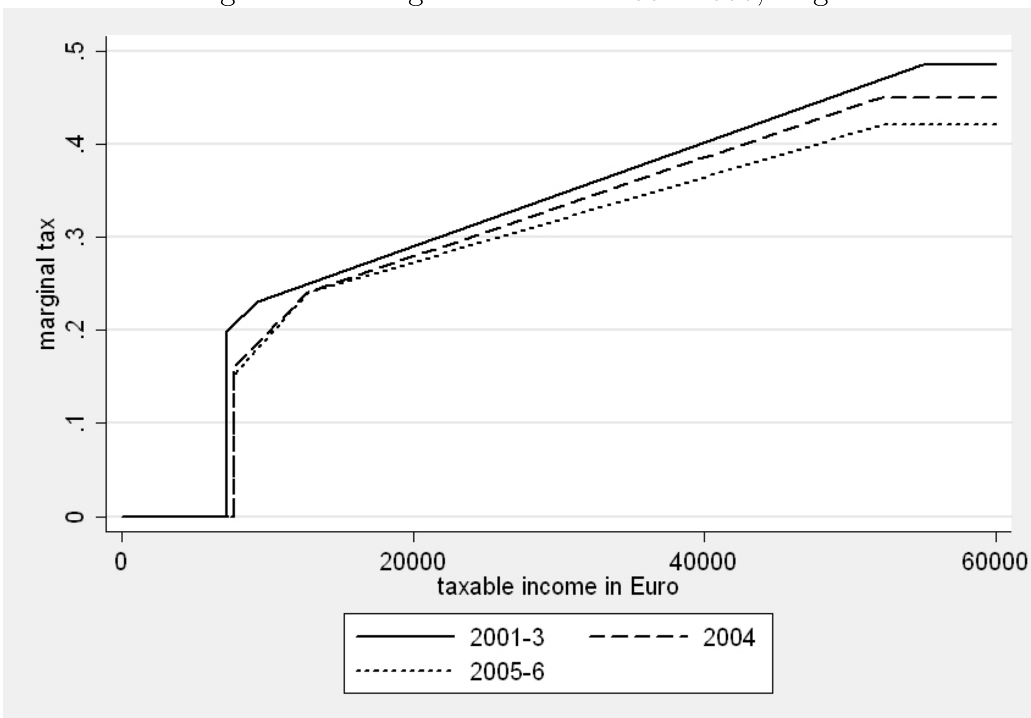
The methods used in this chapter are most similar to Bakija and Heim (2011). They worked with a very long panel of US tax returns from 1979–2006. Bakija and Heim, relied on both tax changes in the federal tax law and on the differences in tax evolution between different states. In Germany, there is only one uniform tax schedule. In this project, tax-price elasticity can be identified because individuals with different incomes were affected differently by tax schedule changes. Instead of using the so called first-dollar (first-euro) price as proxy for the actual price, I apply the instrumental variables approach using the first-dollar price as an instrument for the actual price. I take the same approach to after-tax income.

1.3 Donations and the Tax System in Germany

In Germany, both individual tax liability and the treatment of donations are regulated in the German Income Tax Act (ITA). The German fiscal year is equal to the calendar year. Roughly speaking, tax liability is determined in two steps. In the first step, all income from seven sources is added together and then different deductions are subtracted. These include allowances for the elderly and farmers, loss deduction, special expenses deduction (including donations), deduction for extraordinary expenses, and personal allowances. The remaining amount is the taxable income (TI). If a couple opts for joint filling, the taxable income for each spouse is determined as the average of the taxable incomes of both spouses. In the second step, the tax due is computed. The formula is $TAX = a_i TI^2 + b_i TI + c_i$ where $i = 0, 1, 2, 3$ defines different income thresholds such that this function is continuous but not smooth. Marginal tax is then given by $MT = 2a_i TI + b_i$. Figure 1.1 presents the marginal tax as a function of taxable income for a single household in 2001–2006. A tax reform was implemented gradually in 2004 and 2005 lowering the marginal tax for all incomes, however, to a different extent.

The deductibility of donations is regulated in §10b and §34g ITA. §10b addresses donations and membership fees to organizations that pursue scientific, charitable and cultural goals that are recognized as eligible. These are deductible up to an amount 5% of gross income. Furthermore, §10b allows deductions of donations and membership fees to organizations pursuing church-related, religious, and charitable goals that are recognized as eligible. These are deductible up to an additional 5% of gross income. Additionally, one can deduct donations to foundations up to €20,450 and grants to newly established foundations up to €307,000. Donations to political parties are governed by §34g and §10b ITA. 50% of the first €1650 (singles) or €3300 (married) given is directly deducted from due tax, having thus a fixed price of 0.5 for each €1 given. Each euro donated above this threshold up to

Figure 1.1: Marginal tax rates 2001–2006, single



€3300 (singles) or €6600 (married) reduces the taxable income in keeping with §10b. The price of those donations is given by one minus the marginal tax. In the following sections I will focus specifically on those donations which can be deducted from gross income, the price of which is given by one minus the marginal tax.

Among different and separate deductions, German law allows for the deduction of extraordinary expenses (§10,§10a ITA). These include childcare, tax advice, alimony, and other ongoing financial obligations, deductible church tax, education and training, expenses of a provident nature, school tuitions, donations, and other. Those who do not itemize any of those obtain a blanket allowance of €36 (€72 for couples filling jointly).

Sommerfeld (2009) provided a statistical overview of charitable giving in Germany. Her survey revealed that 83.5% of taxpayers are aware of the deductibility of donations. According to Sommerfeld, 70% of the population donates and 43% declare donations in tax fillings.

1.4 Empirical Methodology

1.4.1 Empirical Specification

I consider a model in which an individual utility is a function of consumption and one's own charitable donations. This corresponds to the treatment of charitable giving as a private consumption good similar to the warm glow of giving as considered in Andreoni (1990) or prestige as considered in Glazer and Konrad (1996). As a result, an individual maximizes the utility function $U(C, DON)$[8] where DON is the amount of donations and C is individual consumption. This individual faces a budget constraint $C + (1 - \tau)DON = Y$, where τ is the marginal tax rate and Y the after tax income. The demand function for donations is a solution to this optimization problem and is given by $DON^* = h((1 - \tau), Y)$, where h(.) is an unknown demand function.

Optimal tax treatment in this context has been investigated by Saez (2004) and Diamond (2006). Whereas initial empirical studies concluded that fiscal incentives are effective because the estimated elasticity was on average below -1, Saez analyzed cases in which incentives are also efficient for lower absolute average elasticity. He argues that the relevant number is the individual

[8] For a specification including regional governmental spending in the utility function, see for example Bönke et al. (2011).

elasticity weighted by the amount of individual donations. The weighted and unweighted average elasticity are likely to differ if the responsiveness to tax incentives is heterogeneous among income groups.

Usually, the literature assumes that the demand function stated above is linear in a natural logarithm, and imposes the following empirical specification:

$$lnDON_i = \mu + \delta ln(1 - \tau_i) + \beta lnY_i + X_i\gamma + u_i, \tag{1.1}$$

where for each individual i DON_i is the amount of the donations, τ_i is the marginal tax, Y_i is a measure of disposable income, X_i is a vector of other characteristics, μ is some constant, and u_i is an error term. Given the nonlinear dependence of the right-hand-side variables, i.e. tax price, income, marital status, and other characteristics leading to different deductions, there is the serious risk that if equation 1.1 is misspecified, the coefficients of interest might not be identified.[9] The issues that accompany attempts to determine the tax-price effect and the income effect separately are discussed in Triest (1998). Identification is only possible if there is a variation in tax rates (price) independent of individual characteristics that may affect charitable giving. Feenberg's (1987) solution is to exploit the variations in state income taxes in the US. For Germany, there is only one national income tax law. The effects of interest can be estimated because changes in national income tax occurred in 2004 and 2005 and they affected individuals with different incomes differently. Adopting the wide-spread approach from the previous literature on charitable giving, and in order to interpret the coefficients directly as elasticities, I estimate the above log-log specification with some

[9] There is no theoretical basis for this log-linear or any other specification.

modifications explained below.

One of the most important issues is the omitted variable bias in the specification above. The available data is missing characteristics such as education, wealth, and altruism which are known to be important determinants of charitable giving.[10] Likewise, these variables are known to be correlated with income.[11] Given that, a simple regression analysis will not identify the parameters of interest. Therefore, in the donations equation I account for the individual-specific fixed effects α_i. I assume that these individual-specific fixed effects α_i do not vary (significantly)[12] in time. At the same time, these fixed (time-invariant) individual-specific effect are potentially correlated with other explanatory variables, i.e. $E\{X_{it}\alpha_i\} \neq 0$. To account for factors influencing donations from year to year, the time effect δ_t is included in the specification. This might be especially important, as the Elbe flooding happened in 2002 and the Tsunami at the end of 2004, thus increasing donations shortly afterwards. The time-varying, individual-specific error term is accounted for by including u_{it}. At the same time I assume that $E\{X_{it}u_{it}\} = 0$ for each t. The donations' equation becomes:

$$lnDON_{it} = \delta lnPRICE_{it} + \beta lnY_{it} + X_{it}\gamma + \alpha_i + \delta_t + u_{it}. \tag{1.2}$$

[10] McClelland and Brooks (2004) find that more education is significantly correlated with donations. Brooks (2002) finds similar effects for wealth.

[11] Individuals can be more or less altruistic which may affect the choice of occupation and consequently the income.

[12] Most observations in my sample will have finished their education and, if not, education years will change linearly which does not pose a problem. Wealth changes will be captured to some extent by time effects.

The next important issue concerns endogeneity. Clearly, the tax price is determined by income, marital status, the amount donated, and other deductions. For most levels of income it holds true that the higher the amount of donations is, the lower the marginal tax rate is, and consequently the higher the tax price is. Similarly, after-tax income depends on taxes, which in turn depends on the amount donated. The simple OLS estimation of the equation of interest would yield biased estimates. Here, I address the endogeneity by using an instrumental variable estimator. For the variables of interest I propose instruments correlated with the endogenous variables but uncorrelated with unobserved characteristics which determine donations. For each individual I calculate a hypothetical marginal tax at zero donations which is clearly uncorrelated with the the dependent variable. Similarly, for after-tax income I calculate a hypothetical after-tax income at zero donations. There is a convention in the literature on charitable giving of regressing donations directly onto these hypothetical variables which are usually called first-dollar price and first-dollar income. This seems to be the second-best approach when the IV method is feasible. Not taking the IV approach leads to the estimation of what may be termed as "first-dollar price elasticity". But this will be different to the actual tax-price elasticity especially because first-dollar price elasticity is measured at a lower quantity and a lower price.

The literature suggests careful treatment of some special subgroups as non-itemizers and border itemizers.[13] Nonitemizers are those tax units who take the standard deduction rather than itemizing. The actual and first-dollar

[13]For more information, see for example Clotfelter (1980).

tax-price for such individuals is equal to one. Border itemizers are those whose first-dollar price is also equal to one. If they did not report donations, taking the standard deduction would be a better option for them. The actual price for those individuals is (usually) lower than one. The blanket allowance for extraordinary expenses in Germany is quite low. It amounts to €36 for single people and €72 for couples filling jointly. The deductions that fall into this category apart from donations include expenses for childcare, tax advice, alimony and other persistent obligations, the deductible church tax, education and training, expenses of a provident nature, and school tuition fees. The average donation in the sample is more than 10 times higher than the blanket allowance. This is very different from the US case, where, for example, in the year 2011 the standard deduction was an amount between $5,800 and $16,200 depending on the individual status. The US literature usually excludes both groups from the analysis. However, as discussed in Clotfelter (1980) the exclusion of any of those groups would induce a selection-induced nonzero correlation between the price and the error term. Additionally, excluding nonitemizers is analog to excluding lower half of the income distribution such that "extrapolation to the entire population might not be warranted" (Boskin and Feldstein 1977). For the US, Reece and Zieschang (1985) find that itemizers and non-itemizers behave differently. Duquette (1999) believes that nonitemizers are less educated than itemizers. In a metastudy, Peloza and Steel (2005) rejects a hypothesis that price elasticities among itemizers are higher (in absolute terms) than those among nonitemizers. In fact, in studies investigated by Peloza and Steel, the average elasticity for nonitemizers is higher than for itemizers. Given the nature of the German standard deduction, one would exclude individuals who have a combination of a number of characteristics: childless, not a member of an official church, not in training etc. Therefore, in the main analysis both groups are included.[14] Border itemizers will have unusually large donations given their first-dollar price being one (Clotfelter 1980). Given the low value of the blanket allowance, this price tends not to reflect fiscal incentives for those individuals. Therefore I instead follow Feldstein and Taylor (1976) by calculating a modified first-euro price as if the itemization was possible regardless of the actual value of donation. This first-euro price is used in IV approach as an instrument for the actual price, which is strictly lower than one for border itemizers and differs for each individual. I proceed accordingly for nonitemizers.

Many donors do not report donations in their tax fillings. It is difficult to account for censoring and fixed effects at the same time.[15] Because of the nonlinearity of the model, it is not possible to use simple transformations like demeaning or first differencing to get rid of the fixed effects. One can, of course, estimate the model by including the individual effects, which would in my case be equal to estimating over a million individual constants in addition to the parameters of interest. Even if one could get around the computational

[14] In section 1.6 I compare these results to the results from a regression excluding non-itemizers and border itemizers.

[15] The following programs offer partly solutions: Pantob implements Honoré (1992) (For more information, see reference 133), LIMDEMP implements the fixed effects Tobit model with up to 50,000 individual effects (For more information, see reference 132).

issue, the incidental parameter problem[16] arises, as the number of nuisance parameters grows asymptotically with the number of observations. Moreover, Bradley, Holden and McLelland (2005) criticize applying such methods like Tobit or Heckman's two-stage method to address censoring in charitable donations. They observe that specification tests reject the assumptions about the form of the likelihood function in the selection equation, which is necessary for the consistency of these estimators. While they opt for semi- and nonparametric methods, they claim that their elasticities are similar to those obtained using panel data estimation methods. Panel studies from the US widely employ demeaning or first differencing, for example Bakija (2000) or Randolph (1995).[17] Because I believe that it is important to account for permanent unobserved heterogeneity across individuals, I treat the donations' function as if it were log-linear in price, income, and other variables. Then I can use demeaning to get rid of individual fixed effects. Nonetheless, I will carefully compare my results from the estimation of equation 1.2 with the results from an estimation that accounts for censoring.

The availability of a 6-year panel allows me to identify permanent and transitory effects. Therefore, the specification 1.2 is extended to:

$$\begin{aligned} lnDON_{it} &= \delta_1 lnPRICE_{it-1} + \delta_2 lnPRICE_{it} + \delta_3 lnPRICE_{it+1} + \\ &+ \beta_1 lnY_{it-1} + \beta_2 lnY_{it} + \beta_3 lnY_{it+1} + \\ &+ X_{it}\gamma + \alpha_i + \delta_t + u_{it}. \end{aligned} \quad (1.3)$$

[16]For more information on incidental parameter problem, see Neymann and Scott (1948).

[17]The number of observations with zero donations in those studies is usually small. For example there are 2% of observations with zero donations in Bakija (2000) and 4% in Randolph (1995).

The permanent price effect is given by $\delta_1 + \delta_2 + \delta_3$, the transitory effect by δ_2, and the effect of anticipated increase in price next year by δ_3.[18] Similarly, the permanent income effect is given by $\beta_1 + \beta_2 + \beta_3$ and the transitory income effect by β_2 respectively. When the actual values for the future tax price and income are included into equation, one assumes perfect foresight. However, future expectations are what matters for charitable giving and not realizations. To address this caveat I implement a similar solution to the one chosen by Bakija and Heim (2011). In one specification (perfect foresight) I treat future realizations of price and income as erroneous measurements of future expectations. In alternative specification (predictable tax change) I implement the IV approach in which I assume that the tax formula of the following year is known but the one's own income in the following year is not known. This means that in the first step I predict the following year's income using broad information available about the subjects, especially the income and price from the year in question and the year before as covariates. In the second step I use this predicted income to calculate the (predicted) future after-tax-income and the (predicted) future price using the appropriate tax formula.

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[18] Bakija and Heim (2011) include one more lag in their specification but their panel is much longer. They estimate an equation equivalent to 1.3. Their price coefficients enter as $\gamma_1(lnPRICE_{it} - lnPRICE_{it-1}) + \gamma_2 lnPRICE_{it} + \gamma_3(lnPRICE_{it+1} - lnPRICE_{it})$. Rearranging, this gives $(-\gamma_1)lnPRICE_{it-1} + (\gamma_1 + \gamma_2 - \gamma_3)lnPRICE_{it} + \gamma_3 lnPRICE_{it+1}$ such that $\delta_1 = -\gamma_1$, $\delta_2 = \gamma_1 + \gamma_2 - \gamma_3$ and $\delta_3 = \gamma_3$. Then the persistent price effect is given by $\gamma_2(= -\gamma_1 + \gamma_1 + \gamma_2 - \gamma_3 + \gamma_3)$, the transitory effect by $\gamma_1 + \gamma_2 - \gamma_3$, and the effect of an anticipated increase in price next year by γ_3. They treat their income coefficients analogously.

Finally, to allow for heterogeneous effects of price and nonprice variables, I multiply them by dummies for four different income classes (gross income in €: 1–29,999; 30,000–59,999; 60,000–89,999; and $\geq$ 90,000 for single households and twice the amount for married couples). If there is indeed heterogeneity, the last step is necessary due to the selectivity of the available sample in which high income taxpayers are strongly overrepresented (see below). Otherwise the conclusions cannot be carried over to the whole population. Therefore, the specification 1.3 is extended to:

$$
\begin{aligned}
lnDON_{it} &= \sum_{j=1}^{4} D_j * \\
&* [\delta_{j1} lnPRICE_{it-1} + \delta_{j2} lnPRICE_{it} + \delta_{j3} lnPRICE_{it+1} + \\
&+ \beta_{j1} lnY_{it-1} + \beta_{j2} lnY_{it} + \beta_{j3} lnY_{it+1} + X_{it}\gamma_j + \delta_{jt}] \\
&+ \alpha_i + u_{it}, \qquad (1.4)
\end{aligned}
$$

where D_j are dummies for the four income groups $j = \{1, 2, 3, 4\}$. This approach allows, moreover, for a more flexible relationship between income and charitable giving, thus relaxing the assumption imposed by equation 1.1.

1.4.2 Data

The analysis in this chapter is based on 5% sample from German Taxpayer Panel 2001–2006 made available by German Federal Statistical Office. It is a rich panel of individual income tax return data in which high income taxpayers are strongly overrepresented. It contains around a million of observations per year and detailed information on income and taxes, and some demographic characteristics such as age, state of residence, religion, and the number and age of children. The panel is available for distant computations with SAS. Tables 1.1 and 1.2 and figure 1.2 present some descriptive statistics. Figure 1.2 suggest that average donation in the sample (in 2001 prices) increased steadily with peaks in 2002 (Elbe flooding) and 2004–2005 (Tsunami).[19]

Figure 1.2: Average donation (in 2001 prices) and tax price

Because the panel contains only observations that filled in the tax form

[19]The Tsunami happened at the end of 2004, which meant that many donations were still being made at the beginning of 2005. There was a high jump in price in 2004 and 2005 very likely reflecting the change in taxes. Table 1.2 shows the average price for each of the four chosen income groups.

Table 1.1: Descriptive statistics

	2001	**2002**	**2003**	**2004**	**2005**	**2006**
avg. donation (€)	474.73	537.54	511.34	580.73	647.77	665.48
donors share (%)	45.55	47.64	46.75	48.77	50.34	47.71
avg. price (per 100 €)	71.03	71.32	71.36	72.20	72.93	72.85
avg. price (hypothetical)	70.98	71.25	71.30	72.15	72.88	72.81
avg. gross income (€)	80287	76677	76018	82302	92919	96941
avg. age	47.20	48.18	49.17	50.16	51.16	52.15
joint filling share (%)	60.30	60.53	60.71	60.86	61.12	61.06
west share (%)	84.77	84.79	84.80	84.83	84.85	84.87
religion share (%)	23.26	23.18	22.92	22.40	21.97	23.61
self-employed share (%)	18.13	18.26	18.50	18.77	18.86	18.77
number of children	0.82	0.81	0.80	0.79	0.78	0.76
N in million	0.93	0.93	0.93	0.93	0.93	0.93
Notes: high income households are overrepresented, current prices.						

Table 1.2: Descriptive statistics

single				
gross income (€)	1–29,999	30,000–59,999	60,000–89,999	$\geq$ 90,000
avg. price	99.59	76.13	62.03	55.45
N in million (total 6 years)	0.37	0.93	0.35	0.37
joint filling				
gross income (€)	1–59,999	60,000–119,999	120,000–179,999	$\geq$ 180,000
avg. price	99.66	73.21	61.12	54.80
N in million (total 6 years)	0.39	1.28	0.52	1.09

in all 6 years, young professional in their early 20', people who experience unemployment, and those that retired are excluded. Furthermore, I exclude observations with negative income. This leaves almost 1 million observations per year.

1.4.3 Variables

The dependent variable, $ln(DON_{it}+1)$, is the natural logarithm of donations declared after §10bEStG. Given that there are households that do not declare any donations and in order to assure that this variable takes values larger than zero, I add one euro to the amount of donations. The US literature usually adds the amount of $10. At the same time the average donation in those studies is 5 to more than 250 times higher than in the data used for this study.[20] This suggests that €1 is a better choice. However, the choice is still arbitrary. Later, I present robustness checks adding alternatively €5 and €10 to the amount of donations.

The first independent variable, $lnPRICE_{it}$, is the natural logarithm of the price which is 1 minus the marginal tax rate. The actual tax rate is endogenous, as it changes with the amount donated. Therefore, I calculate for each individual a hypothetical marginal tax at zero donations and use its natural logarithm, $ln\widetilde{PRIC}E_{it}$, as an instrument.

The second independent variable, lnY_{it}, is the natural logarithm of the after tax income. Respectively, I calculate a hypothetical after tax income at zero

[20]For example, in the sample used by Bakija and Heim (2011) the average donation is $125,000 (in 2007 dollars). At the same time the average after-tax income is greater than $1 million.

donations and use its natural logarithm, $ln\widetilde{Y}_{it}$, as an instrument.
Additionally, I include other control variables: dummies for each of the six income sources other than income earned as an employee (income from agriculture and forestry, from business, from self-employment, from dependent employment, capital income and income from rent and leasing properties), a dummy for joint filling, for living in West Germany, for the age squared, for religious affiliation and one control variable for the number of children.

1.5 Estimation Results

Table 1.3 presents the results from a regression when assuming that coefficients are uniform across income classes (equation 1.3) and using the IV approach to price and income. Column I presents the results from a regression that assumes perfect foresight and column II presents the results when using predictable-tax-change instruments. The coefficient estimates of permanent price elasticity (-0.33 and -0.37) are low in magnitude when compared to the estimates from cross-sectional studies for Germany. Similarly, the coefficient estimates for permanent income elasticity (0.31 and 0.43) are rather low.

Table 1.3: Permanent and transitory effects: assuming coefficients are uniform across income classes, using the IV approach to price and income. The dependent variable is $lnDON_{i,t}$.

	perfect foresight	predictable tax change instruments
$lnPRICE_{i,t}$	-0.03**	0.05**
	(0.01)	(0.02)
$lnPRICE_{i,t-1}$	-0.33***	-0.43***
	(0.01)	(0.02)
$lnPRICE_{i,t+1}$	0.02**	0.01
	(0.01)	(0.03)
$lnY_{i,t}$	0.21***	0.26***
	(0.00)	(0.01)
$lnY_{i,t-1}$	0.02***	0.02**
	(0.00)	(0.01)
$lnY_{i,t+1}$	0.07***	0.15***
	(0.00)	(0.02)
permanent price elasticity	-0.33***	-0.37***
permanent income elasticity	0.31***	0.43***
other controls	yes	yes
year effects	yes	yes
fixed individual effects	yes	yes
N in million	3.36	2.72

Notes:

[a]Source: taxpayerpanel 2001–2006, author's own calculations

[c] standard errors in parenthesis

[d] *** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 1.4 presents the results from the estimation which allows the coefficients for all nonprice variables to differ across income classes and uses the IV approach to price and income. As compared to estimates from previous table, the estimates for permanent price elasticity increase significantly (in absolute value) from -0.33 (Table 1.3, column I) to -0.57 (Table 1.4, column I) assuming perfect foresight and from -0.37 (Table 1.3, column II) to -0.82 (Table 1.4, column II) when relying on predictable changes of future income and price. The estimates for permanent income elasticity are around 0.2–0.3, slightly varying among different income classes. The change in the magnitude of the estimated elasticity suggests heterogeneity among different income groups and shows the importance of controlling for sample composition. Therefore the preferred specification is the equation 1.4. The estimation results from this specification are presented then in table 1.5.

Table 1.4: Permanent and transitory effects: the estimation allows coefficients on all nonprice variables to differ across income classes´, using the IV approach to price and income. The dependent variable is $lnDON_{i,t}$.

	Income class	perfect foresight	predictable tax change instruments
$lnPRICE_{i,t}$	All	-0.14*** (0.01)	-0.01 (0.01)

Table 1.4 – continued on next page

Table 1.4 – continued from previous page			
	Income class	perfect foresight	predictable tax change instruments
$lnPRICE_{i,t-1}$	All	-0.33***	-0.41***
		(0.01)	(0.02)
$lnPRICE_{i,t+1}$	All	-0.10**	-0.39***
		(0.01)	(0.04)
permanent price elasticity	All	-0.57***	-0.82***
$lnY_{i,t}$	1–29,999	0.19***	0.26***
		(0.00)	(0.01)
$lnY_{i,t-1}$	1–29,999	0.00	-0.01*
		(0.00)	(0.01)
$lnY_{i,t+1}$	1–29,999	0.04***	0.08**
		(0.00)	(0.02)
permanent income elasticity	1–29,999	0.23***	0.34***
$lnY_{i,t}$	30,000–59,999	0.16***	0.23***
		(0.00)	(0.01)
$lnY_{i,t-1}$	30,000–59,999	0.01*	-0.01
		(0.00)	(0.01)
$lnY_{i,t+1}$	30,000–59,999	0.03***	0.08**
		(0.00)	(0.02)
permanent income elasticity	30,000–59,999	0.20***	0.31***
$lnY_{i,t}$	60,000–89,999	0.16***	0.22***
Table 1.4 – continued on next page			

Table 1.4 – continued from previous page			
	Income class	perfect foresight	predictable tax change instruments
		(0.00)	(0.01)
$lnY_{i,t-1}$	60,000–89,999	0.01*	-0.01
		(0.00)	(0.01)
$lnY_{i,t+1}$	60,000–89,999	0.04***	0.08**
		(0.00)	(0.02)
permanent income elasticity	60,000–89,999	0.20***	0.30***
$lnY_{i,t}$	$\geq$ 90,000	0.15***	0.21***
		(0.00)	(0.01)
$lnY_{i,t-1}$	$\geq$ 90,000	0.01***	-0.00
		(0.00)	(0.01)
$lnY_{i,t+1}$	$\geq$ 90,000	0.04***	0.08**
		(0.00)	(0.02)
permanent income elasticity	$\geq$ 90,000	0.31***	0.28***
other controls x income class		yes	yes
year effects x income class		yes	yes
fixed individual effects		yes	yes
N in million		3.36	2.72

Notes:

[a]Source: taxpayerpanel 2001–2006, author's own calculations

[c] standard errors in parenthesis

Table 1.4 – continued on next page

Table 1.4 – continued from previous page			
	Income class	perfect foresight	predictable tax change instruments
[d] *** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level			

Table 1.5 presents the results from the estimation, which allows the coefficients on all variables to differ across income classes (equation 1.4) and uses the IV approach to price and income. It allows for the heterogeneity of tax responsiveness among different income groups and corrects for the sample composition in which high income groups are overrepresented. The results show that permanent tax-price elasticity varies significantly between income classes. It is as low as around -0.26 (perfect foresight) and -0.17 (predictable changes) for pretax incomes below €30,000 for singles and €60,000 for married couples, respectively. It is as high as -1.40 (perfect foresight) and -1.56 (predictable changes) for incomes €30,000–59,999 for singles and €60,000–119,999 for married couples. Higher incomes show elasticity of around -1 when assuming perfect foresight and around -1.35 when assuming predictable changes. Overall, there is evidence of heterogeneity among income classes. Consequently, this table presents results from the preferred specification (equation 1.4) and the results are referred to in conclusions from this chapter. Given that the distribution of the income classes in the whole population is approximately 50%, 30%, 10%, and 10% and their shares of

total giving are 23%, 26%, 14%, and 37%,[21] the average weighted permanet elasticity is slightly below -1. The conclusion is, that fiscal incentives in Germany are effective in stimulating charitable giving.

The comparability with other empirical studies for Germany is limited because they all estimate ”first-euro” elasticity. Regardless of the differences in the definition, my estimates predict rather lower responsiveness to tax incentives. This is especially true with respect to previous studies relying on OLS and Tobit methods.

The estimates for permanent income elasticity are around 0.2–0.3, slightly varying among different income classes.

I found evidence that donors adjust their charitable contributions gradually. They respond strongly to the former price. Moreover, I found evidence for all income classes, apart from the highest, that donors respond to predictable future changes in the price (see Table 1.5). The actual income and to some extend the future income drive the donations. The effects of past income are negligible.

[21] See Priller and Schupp (2011).

Table 1.5: Permanent and transitory effects. Estimates allowing coefficients on all variables including price to differ across income classes. IV approach to price and income. Dependent variable: $lnDON_{i,t}$

	Income class	perfect foresight	predictable tax change instruments
$lnPRICE_{i,t}$	1–29,999	-0.01	0.24***
		(0.01)	(0.02)
$lnPRICE_{i,t-1}$	1–29,999	-0.23***	-0.22***
		(0.01)	(0.02)
$lnPRICE_{i,t+1}$	1–29,999	-0.03**	-0.19***
		(0.01)	(0.05)
permanent price elasticity	1–29,999	-0.26***	-0.17***
$lnPRICE_{i,t}$	30,000–59,999	-0.54***	-0.41***
		(0.03)	(0.04)
$lnPRICE_{i,t-1}$	30,000–59,999	-0.47***	-0.57***
		(0.03)	(0.03)
$lnPRICE_{i,t+1}$	30,000–59,999	-0.38***	-0.58***
		(0.03)	(0.07)
permanent price elasticity	30,000–59,999	-1.40***	-1.56***
$lnPRICE_{i,t}$	60,000–89,999	-0.38***	-0.37***
		(0.04)	(0.07)

Table 1.5 – continued on next page

Table 1.5 – continued from previous page			
	Income class	perfect foresight	predictable tax change instruments
$lnPRICE_{i,t-1}$	60,000–89,999	-0.51***	-0.65***
		(0.04)	(0.05)
$lnPRICE_{i,t+1}$	60,000–89,999	-0.06	-0.32***
		(0.04)	(0.07)
permanent price elasticity	60,000–89,999	-0.96***	-1.33***
$lnPRICE_{i,t}$	$\geq$ 90,000	-0.37***	-0.48***
		(0.04)	(0.05)
$lnPRICE_{i,t-1}$	$\geq$ 90,000	-0.71***	-0.89***
		(0.03)	(0.04)
$lnPRICE_{i,t+1}$	$\geq$ 90,000	0.01	0.01
		(0.03)	(0.06)
permanent price elasticity	$\geq$ 90,000	-1.07***	-1.38***
$lnY_{i,t}$	1–29,999	0.21***	0.31***
		(0.00)	(0.01)
$lnY_{i,t-1}$	1–29,999	0.01***	0.01
		(0.00)	(0.01)
$lnY_{i,t+1}$	1–29,999	0.04***	0.07**
		(0.00)	(0.02)
permanent income elasticity	1–29,999	0.27***	0.39***
$lnY_{i,t}$	30,000–59,999	0.16***	0.25***
Table 1.5 – continued on next page			

Table 1.5 – continued from previous page			
	Income class	perfect foresight	predictable tax change instruments
		(0.00)	(0.01)
$lnY_{i,t-1}$	30,000–59,999	0.01**	-0.00
		(0.00)	(0.01)
$lnY_{i,t+1}$	30,000–59,999	0.03***	0.05**
		(0.00)	(0.02)
permanent income elasticity	30,000–59,999	0.19***	0.30***
$lnY_{i,t}$	60,000–89,999	0.16***	0.24***
		(0.00)	(0.01)
$lnY_{i,t-1}$	60,000–89,999	0.01	-0.01
		(0.00)	(0.01)
$lnY_{i,t+1}$	60,000–89,999	0.04***	0.06**
		(0.00)	(0.02)
permanent income elasticity	60,000–89,999	0.21***	0.30***
$lnY_{i,t}$	$\geq$ 90,000	0.15***	0.23***
		(0.00)	(0.01)
$lnY_{i,t-1}$	$\geq$ 90,000	-0.00	-0.02**
		(0.00)	(0.01)
$lnY_{i,t+1}$	$\geq$ 90,000	0.05***	0.08***
		(0.00)	(0.02)
permanent income elasticity	$\geq$ 90,000	0.20***	0.29***

Table 1.5 – continued on next page

Table 1.5 – continued from previous page			
	Income class	perfect foresight	predictable tax change instruments
other controls x income class		yes	yes
year effects x income class		yes	yes
fixed individual effects		yes	yes
N in million		3.36	2.72

Notes:

[a]Source: taxpayerpanel 2001–2006, author's own calculations

[c] standard errors in parenthesis

[d] *** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

1.6 Robustness Checks

This section presents a number of important robustness checks.

First-euro price and income instead of IV approach

Table 1.6 presents the results when estimating the basic specification (assuming coefficients are uniform across income classes) without the IV approach and using the the first-euro price and, similarly, hypothetical after-tax income at zero donations instead. The estimates of permanent tax-price elasticity are higher in absolute terms when compared to the basic specification with the IV approach (table 1.3). It changes from -0.33 to -0.59 when assuming perfect foresight and from -0.37 to -0.95 when assuming predictable tax change instruments. This might suggest that the estimates of tax-price elasticity from previous studies for Germany are overestimated. The estimates for permanent income elasticity are somewhat lower, changing from 0.31 to 0.25 when assuming perfect foresight and from 0.43 to 0.20 when assuming predictable tax change instruments.

Table 1.6: Permanent and transitory effects. Assuming coefficients are uniform across income classes. First-Dollar Price. Dependent variable: $lnDON_{i,t}$

	perfect foresight	predictable tax change instruments
$lnPRICE_{i,t}$	-0.22***	-0.30***
	(0.01)	(0.01)
$lnPRICE_{i,t-1}$	-0.38***	-0.55***
	(0.01)	(0.01)
$lnPRICE_{i,t+1}$	0.00	-0.10***
	(0.01)	(0.01)
$lnY_{i,t}$	0.17***	0.18***
	(0.00)	(0.00)
$lnY_{i,t-1}$	0.02***	-0.01***
	(0.00)	(0.00)
$lnY_{i,t+1}$	0.06***	0.03***
	(0.00)	(0.00)
permanent price elasticity	-0.59***	-0.95***
permanent income elasticity	0.25***	0.20***
other controls	yes	yes
year effects	yes	yes
fixed individual effects	yes	yes
N in million	3.36	2.73

Notes:

[a]Source: taxpayerpanel 2001–2006, author's own calculations

[c] standard errors in parenthesis

[d] *** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Adding quadratic and interaction terms

As pointed out above, there is no theoretical basis for excluding other polynomial and interaction terms on the right hand side of the equation. If included though, the tax price will approach perfect collinearity with income. To assure that this is not a problem and the model is not misspecified, I add the quadratic and interaction terms $lnPRICE^2$, lnY^2 and $lnPRICE * lnY$. The estimated permanent tax-price and income elasticity from the equation

$$\begin{aligned} lnDON_{it} &= \mu + \delta_1 lnPRICE_{it} + \delta_2 lnPRICE_{it}^2 + \beta_1 lnY_{it} + \beta_2 lnY_{it}^2 + \\ &+ \beta_3 lnY_{it} + lnPRICE_{it} + X_{it}\gamma + \alpha_i + \delta_t + u_{it}. \end{aligned} \tag{1.5}$$

(IV approach) is -0.34*** and 0.17*** as compared to -0.41*** and 0.16*** from the same specification without the interaction terms. Given the very large data set, the multicollinearity is considered to be negligible.

Censoring

Because for around 50% of observations I do not observe donations there is a serious concern that because of censoring my coeffients are biased. Can the comparably low coefficient estimates of price elasticity be explained by neglecting the censoring? I estimate a Tobit model[22] on pooled data regressing donations directly on the first-euro price and and other variables. I compare

[22]Due to the computational constraint of the statistical office, this estimation was only possible with an 0.05% sample. Consequently, the number of observations is 10 times lower than in the other estimations.

then the results with analogous OLS regression which do not account for censoring. The estimated coefficients as compared to simple OLS regression on pooled data are presented in table 1.7. The marginal effects from the Tobit regressions are similar to and not statistically different from those obtained from the OLS estimation. This does not support the hypothesis that the estimates of the elasticity obtained in previous section are biased.

Table 1.7: Accounting versus not accounting for censoring: Tobit versus OLS. First-Euro Price. Dependent variable: $lnDON_{i,t}$

	Tobit marginal effects	OLS	Tobit marginal effects	OLS
$lnPRICE_{i,t}$	-1.16***	-1.11***	-0.60***	-0.68***
	(0.24)	(0.03)	(0.11)	(0.08)
$lnPRICE_{i,t-1}$			-0.41***	-0.58***
			(0.07)	(0.06)
$lnPRICE_{i,t+1}$			-0.14***	-0.18***
			(0.02)	(0.07)
$lnY_{i,t}$	0.51***	0.51***	0.08***	0.13***
	(0.11)	(0.01)	(0.01)	(0.02)
$lnY_{i,t-1}$			0.15***	0.13***
			(0.03)	(0.01)
$lnY_{i,t+1}$			0.39***	0.36***
			(0.07)	(0.02)
permanent price elasticity			-1.14***	-1.43***
permanent income elasticity			0.61***	0.61***
Other controls	yes	yes	yes	yes
year dummies	yes	yes	yes	yes
N in tausend	366.5	366.5	306	252

Notes:

[a]Source: taxpayerpanel 2001–2006, author's own calculations

[c] standard errors in parenthesis

[d] *** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Adding different amounts to donations

Because of the numerous observations with zero donations and because the logarithmic function is not defined at zero, I have added an additional euro to the individual contribution. Given the steepness of the log function at low levels of donations I conduct a robustness check by adding €5 or €10 alternatively. This results in slightly lower absolute coefficient estimates of price elasticity due to the shift towards a less steep part of a logarithmic curve (see table 1.8).

Table 1.8: Permanent and transitory effects. Assuming coefficients are uniform across income classes. Adding different constants to donations. IV approach to price and income. Dependent variable: $lnDON_{i,t}$

	+1		+5		+10	
	perfect foresight	predictable tax change instruments	perfect foresight	predictable tax change instruments	perfect foresight	predictable tax change instruments
$lnPRICE_{i,t}$	-0.03**	0.05**	0.00	0.07***	0.01**	0.07***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
$lnPRICE_{i,t-1}$	-0.33***	-0.43***	-0.23***	-0.31***	-0.19***	-0.26***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
$lnPRICE_{i,t+1}$	0.02**	0.01	0.05***	0.05**	0.05***	0.06**
	(0.01)	(0.03)	(0.01)	(0.02)	(0.01)	(0.02)
$lnY_{i,t}$	0.21***	0.26***	0.17***	0.21***	0.15***	0.19***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
$lnY_{i,t-1}$	0.02***	0.02**	0.02***	0.02**	0.02***	0.01***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
$lnY_{i,t+1}$	0.07***	0.15***	0.05***	0.11***	0.05***	0.10***
	(0.00)	(0.02)	(0.00)	(0.01)	(0.00)	(0.01)
permanent price elasticity	-0.33***	-0.37***	-0.17***	-0.19***	-0.12***	-0.12***
permanent income elasticity	0.31***	0.43***	0.24***	0.33***	0.21***	0.30***
other controls	yes	yes	yes	yes	yes	yes
year effects	yes	yes	yes	yes	yes	yes
fixed individual effects	yes	yes	yes	yes	yes	yes
N in million	3.36	2.72	3.36	2.72	3.36	2.72

Notes:

[a]Source: taxpayerpanel 2001–2006, author's own calculations

[c] standard errors in parenthesis

[d] *** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Excluding non-itemizers and border itemizers

Finally, I present the results from a regression in which I exclude non-itemizers and border itemizers (see table 1.9). On average, 30% of the tax units take the standard deduction and less than 1% are classified as border itemizers. As some individuals switch between itemizing and non-itemizing in subsequent years, I lose around 42% of my sample. The estimates of tax-price elasticity are slightly lower and those of income elasticity slightly higher than those in table 1.3.

Table 1.9: Permanent and transitory effects. Assuming coefficients are uniform across income classes. IV approach to price and income. Excluding non-itemizers and border itemizers. Dependent variable: $lnDON_{i,t}$

	perfect foresight
$lnPRICE_{i,t}$	0.06**
	(0.02)
$lnPRICE_{i,t-1}$	-0.29***
	(0.02)
$lnPRICE_{i,t+1}$	-0.02
	(0.02)
permanent price elasticity	-0.25***
$lnY_{i,t}$	0.27***
	(0.01)
$lnY_{i,t-1}$	0.02***
	(0.01)
$lnY_{i,t+1}$	0.10***
	(0.00)
permanent income elasticity	0.39***
other controls	yes
year effects	yes
fixed individual effects	yes
N in million	1.97

Notes:

[a]Source: taxpayerpanel 2001–2006, author's own calculations

[c] standard errors in parenthesis

[d] *** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

1.7 Conclusions

In this chapter I have estimated the permanent and the transitory tax-price and income elasticity of donations in Germany. My results suggest heterogenous effects of the tax price among different income groups. They range between -0.2 for lower incomes and -1.6 for higher incomes. The average permanent price elasticity weighted with the amount of giving by different income groups is around -1 meaning that fiscal incentives for donations in Germany are effective. I found evidence that donors adjust their donations gradually after changes in tax schedule and respond to future predictable changes in price. They respond mainly to changes in current and, to a smaller extent, in future income. The estimates for permanent income elasticity are around 0.2–0.3, slightly varying among different income classes. The actual income and to some extend the future income drive the donations. The effects of past income are negligible.

Chapter 2

Nonprofit Organizations, Free Media and Donor's Trust

2.1 Introduction

In 2007, Unicef Deutschland, one of the biggest and most well-known nonprofit organization (NPO) in Germany, was accused of nepotism, of having made dubious and expensive arrangements with private fund-raising agencies without written contracts, of paying suspiciously high consultant fees, which went partly to the former employees and of the costly rebuilding of its headquarters in Cologne. Shortly afterward, the German certifying agency, the Deutsches Zentralinstitut für soziale Fragen (DZI) was criticized for not sufficiently examining Unicef Deutschland. The story was uncovered by the German newspaper, the "Frankfurter Rundschau". Between December 2007 and April 2008, Unicef Deutschland lost the trust of 38,000 of its individual members, worth roughly €22 million in yearly donations. Many corporate donors also revoked their donation agreements.[1] A story involving a smaller organization, Hatun & Can, which aims to help Muslim women in danger, was uncovered by Alice Schwarzer, the publisher of the German feminist journal EMMA.[2] The chairman of Hatun & Can was accused of the misuse of around €0.7 million for private enjoyments. In fact, the very few activities directed at Muslim woman were financed with other organizations' money. Treberhilfe, a small nonprofit organization situated in Berlin, Germany is another example of this. As the name suggests, the organization offered help and shelter to Trebergänger - runaway home young people and other disadvantaged persons. It was not principally funded by donations, but rather by government grants and direct social assistance payments. Already at the end of 2008 Berlin newspaper "Der Tagesspiegel" wondered why the managing director had a Maserati car with a chauffeur for his private enjoyment and lived in an expensive villa belonging to the organization.[3] Later, information about the managing director's exorbitant salary and perks, and other dubi-

[1] "Unicef verliert 38.000 Fördermitglieder", *Frankfurter Rundschau*, 24.06.2008, accessed October 4, 2012. http://www.fr-online.de/unicef/geschaeftsberichts-2007-unicef-verliert-38-000-foerdermitglieder,1477342,2727340.html and Thieme, Matthias, "Paradies für Berater", *Frankfurter Rundschau*, 20.12.2007, accessed October 4, 2012. http://www.fr-online.de/unicef/unicef-paradies-fuer-berater,1477342,2680618.html.

[2] Schwarzer, Alice, "Hatun & Can, Die bittere Wahrheit", *EMMA* 3/2010 (summer 2010), accessed October 4, 2012. http://www.emma.de/hefte/ausgaben-2010/sommer-2010/hatun-can/.

[3] Thomas Loy, "Hol schon mal den Maserati", *Der Tagesspiegel*, 22.12.2008, accessed October 4th, 2012, http://www.tagesspiegel.de/berlin/stadtleben/berliner-treberhilfe-hol-schon-mal-den-maserati/1402336.html.

ous occurrences were uncovered by the press. As a result some governmental agencies withdraw their support for Treberhilfe. Even then, it was only three years later that a legal case could be made against the managing director. This and other recent scandals show that there is a serious problem in the nonprofit sector. Because the donors are distinct from the beneficiaries, they cannot estimate how much of their donation reaches the needy and how much trickles away as fund-raising and administrative costs or even as agency fees and private expenses. Although many of the nonprofit organizations seem to be devoted to achieving the charitable goal they have chosen to the best of their abilities, some of them, however, rather maximize the amount of money in their own pocket. In his book "Fund raising in the United States," Cutlip (1990) describes the situation in the following way:

> Cruel exploitation of man's urge to help his less fortunate fellow man is an ancient evil. [...] In the early centuries of philanthropy the charity frauds were perpetrated mostly by the itinerant beggars, making false claims in their tearful appeal for alms, or of local fund appeals of questionable merit. [W]ith the advent of America's twentieth-century surefire methods of fund raising and multibillion-dollar philanthropy, dishonest and wasteful fund raising has become a serious social problem (Cutlip 1990, p. 441).

The solutions to the problem of asymmetric information proposed and implemented for typical consumer goods might not work for the nonprofit sector.[4]

[4] The solutions are, among others: quality signaling (see for example Spence, 1973), reputation (see for example Klein and Leffler, 1981) and certifying (see for example Biglaiser, 1993).

The reason is that the notion of quality is a very subjective one and there are few legal rules for how the money collected has to be spent. This is intentional, as the governments aim at more private involvement, believing that such nonprofit organizations better understand the needs of the needy. The governments do not want to restrain nonprofit activities by too much regulation. This allows the "bad" nonprofit organizations to abuse the trust they are granted by the donors. Therefore, in the absence of any other mechanism revealing the true quality, donors' decisions about the amount of charitable giving must be based on the expected quality. The consequences are at hand. If the level of trust is low, such that a good organization cannot cover its cost, then a complete market collapse is probable. Nevertheless, the size of the third sector is, at least in some countries, large. For example, in the US it amounts to $300 billion annually,[5] in the Netherlands it makes up 4.95% of GDP, whereas in Mexico it is only 0.12%.[6] It is probable that the citizens of those countries have different preferences with regard to charity, but it is also the available information that makes the difference. The relevant information is provided by certifying and watchdog agencies, and by the media. Media can spread the information about (subjective) misconduct very quickly, and therefore severely punish an organization that relies on private contributions. In words of Brunetti and Weder (2005) "[A]ny independent journalist has a strong incentive to investigate and uncover stories on wrongdoing." Investigative journalism increases the probability of revealing a "bad" NPO and reduces its incentives to enter the market. What are the incentives for the

[5] For more information, see reference 129.

[6] For more information, see Salamon and Sokolowski (2004).

media per se? The main product that they sell is news. Qualitatively good, interesting, scandalous and timely news bring new readers and encourages loyalty among the current readers. This in turn increases circulation and revenue from advertising. Furthermore, the career concerns and private motives of the watchdog ethos may play an important role as well. Big organizations might get more attention from national and international media. Above examples show that small, regional nonprofit organizations are of interest at least to the regional media. Figure 2.1 suggests positive relationship between private philanthropy and the freedom of the press in different countries.

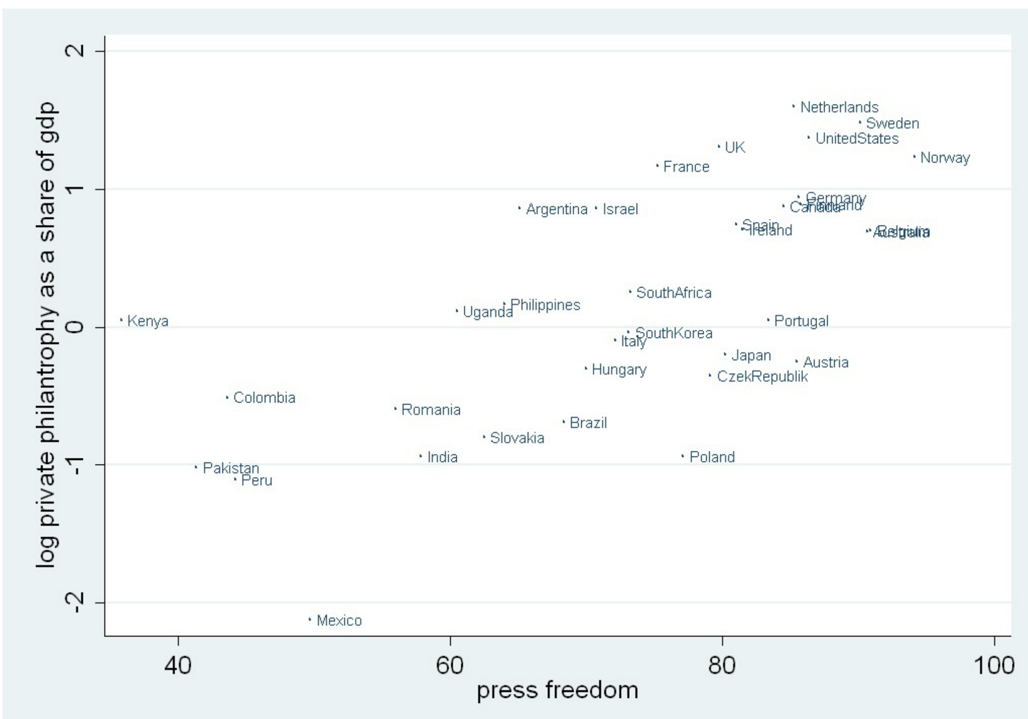


Figure 2.1: Charitable Giving and Volunteering and free press (FH)[7]

This chapter shows how media competition contributes to more transparency in the nonprofit sector. It shows that more competition among media outlets reduces the incentives of "bad" organizations to enter the market, thus increasing donors' trust and the level of public good. However, the media is never able to completely deter the "bad" type from entering the market. The explanation for this is the following: if the probability of "bad" type entering the market is zero, the investigation of that market does not pay out. Without the probability of being detected, "bad" types of organizations, expect positive profits and certainly enter the market. In broader sense, this project contributes to the less examined research field that investigates incentives and behavior of nonprofit organizations.

In the next section I will discuss the relevant literature. In section 2.3 I present the theoretical model. The effects of media on the amount of public good are explained in section 2.3.6. Conclusions from the model follow in section 2.4. Second part of the chapter, section 2.5 presents insights based on real world data on giving and press freedom. Appendix A presents a numerical example, an overview of results and some proofs.

2.2 Literature Review

The literature addressing the problem of asymmetric information in the nonprofit market is scarce. Vesterlund (2003) proposes a theoretical model, in which the sequentiality of fund-raising can lead to a revelation of the char-

[7] Data source: private philanthropy - Salamon and Sokolowski 2004, and index of press freedom - Freedom House, 1995-2002.

ity's quality. She assumes that there are some donors, who can find out the quality of a NPO on costly inspection and reveal it to the subsequent donors by choosing a high and publicly announced donation.

Svítková and Ortmann (2006) propose costly and perfect certification as the solution to the adverse selection problem of the nonprofit market. Unfortunately, there is some evidence that such certifying agencies might not perform well. As Strausz (2005) points out, they may be tempted to accept bribes. Furthermore, if the quality of the certificate depends on efforts or costs incurred by a certifying agency and if those are not verifiable, such an agency can avoid investing effort. Moreover, it is not clear how to address the subjectivity of the NPOs quality. An empirical study by Bekkers (2003) shows that the effect of the introduction of an accreditation system in the Netherlands on the trust of the donors toward the nonprofit organizations was ambiguous.

The role of the press as a watchdog is dealt in an empirical paper by Brunetti and Weder (2003), who find that a functioning free press significantly reduces corruption. Petrova (2007) proposes a theoretical model in which the media can shape public opinion. Other contributions that concern the performance-enhancing role of the media in politics or economy include works by Strömberg (2001 and 2004), Besley and Burgess (2002), and Reinikka and Svensson (2005). The determinants of general trust in economic exchange between countries were analyzed econometrically by Guiso et al. (2009), who also examined the effects of press coverage. They conclude that the more often a particular country is mentioned in the national press, the more trustworthy that country seems. This chapter extends those findings to the nonprofit market.

Media can be compared to the imperfect certification. Then my model is most similar to the model of imperfect quality certification by De and Nabar (1991). The analogy concerns the efficiency of the certification process in a following sense: the high quality product (here: the NPO) has a higher probability of getting a better ranking (here this is the absence of a negative ranking) than the low quality product. However, due to the nature of the media, the assumptions in this chapter are different. Whereas in De and Nabar (1991) the firms decides whether to undergo costly certification process, in this model the nonprofits have no choice but also no costs. On the other side, in this model the quality of the surveillance is endogenously determined, whereas in De and Nabar (1991) it is exogenous.

2.3 Model

In this section I present the theoretical model. First the players are introduced, then the timing is explained. The next two subsections introduce benchmark cases: full information and asymmetric information without media. The core analysis follows in the subsection 2.3.5 and the significance of those results is translated into the amount of public good produced in subsection 2.3.6.

2.3.1 Players

The Nonprofit Organization

In the first period, one potential risk-neutral nonprofit entrepreneur (NPO) emerges. She can be of two types: $T \in H, L$. With a probability of one half[8] she is a good type (H) and with the remaining probability she is a bad type (L). The entrepreneur knows her type. In the second period she can start up a nonprofit organization. If so, she incurs some fixed costs $0 < c < 1$ organizing a fund-raising campaign and developing the project. If she has decided to enter the market, she solicits donations g. In the last period the good type produces the public good out of the surplus and the bad type consumes the surplus herself. Both types maximize $g - c$.

The Donor

There is one representative and risk-neutral donor. She donates according to the (expected) quality of the NPO.[9] In the case of full information, she would give 1 if a good NPO has entered the market and 0 respectively if bad NPO

[8]One could introduce a variable to describe the probability of the good type. This would unnecessarily complicate th e calculations and would not change the conclusions from the model.

[9]The assumption that the donor gives according to the expected quality simplifies the following analysis. With a concave utility function, the demand function would be a convex function of the H-type probability and one would have to deal additionally with risk aversion. The simplification allows to concentrate on the effects of asymmetric information.

has entered the market[10]. With asymmetric information the donor cannot observe the type of the NPO and forms beliefs $\mu(H)$ about the expected quality using Bayes rule. Out of equilibrium and without entry she can have any beliefs $\mu(H) \in [0,1]$. In the equilibrium with entry the beliefs must equal the true distribution of the types.

Media

There are n identical risk neutral media $i = 2, 3, .., n$. The media do not observe the quality of the NPO directly but can invest some effort x_i and with positive probability p_i will get the correct information. The media who (first) gets and publishes the information that the NPO which has entered the market is of L-type gets some prize (high selling numbers, career prospects for the journalists etc.). Only true information can be published.[11] Therefore the media engage into a contest. Given that L-type has entered the market, there is positive probability of winning the contest. This probability increases

[10]The explanations for utility from charitable giving in the literature include altruism (see for example Samuelson 1954) and private good hypothesis (for example warm glow, prestige etc., see Olson 1965). The assumption concerning giving behavior is also in line with public good theory given that in my model there is only one donor and consequently there is no possibility of free riding on others' contributions.

[11]One can assume that in the case of a lie the competitors will be happy to uncover the falsehood and eliminate the rival media outlet.

in effort and is given by the following contest success function:[12]

$$p_i(x_i, x_{j\neq i}) := \begin{cases} \dfrac{x_i}{\sum x_i + k} & \text{if } \sum x_i > 0 \\ 0 & \text{otherwise} \end{cases}$$

There is at most one winner of the contest. I assume $k > 0$ for which follows that the winning probabilities do not sum to one. This is one of the key variables in the model. It describes the intransparency of the market. High levels of k reflect the fact that media can be hindered in their investigative activities, their freedom of speech can be limited or they can be hassled in another way. However, the probability of detection increases in the sum of efforts and is given by

$$\alpha := \sum p_i(x_i) = \frac{\sum x_i}{\sum x_i + k}. \tag{2.1}$$

The probability that a "bad" NPO which enters the market will not be detected is therefore given by

$$(1-\alpha) = 1 - \sum p_i(x_i) = \frac{k}{\sum x_i + k}$$

and increases in k. The media outlet i which exerts effort $x_i \geq 0$ incurs effort costs being x_i.

2.3.2 Timing

The timing is as follows:

[12] This is a slightly modified Tullock contest success function (see Tullock 1980).

1. A potential nonprofit entrepreneur is born. With probability of 1/2 it is of H-type and with probability of 1/2 of L-type.

2. NPO decides about entry: $e_T \in \{0, 1\}$ are pure strategies and correspond to "no entry" and "entry" respectively. I allow for mixed strategies as well. In this case $\sigma_T \in [0, 1]$ denotes the probability of entry. In the case of entry the costs c are sunk. (Without entry the game ends)

3. Media observe entry, form beliefs $\mu(H)$ and decide about efforts.

4. The contest takes place. With a probability α a bad NPO (if it has entered the market) is detected. (If detected the game ends)

5. Conditional on entry and no detection the donor updates her beliefs about the NPO's quality in the market $\mu_\alpha(H)$ and donates $g = \mu_\alpha(H)$.

6. NPO collects donations. Good NPO produces the good, bad NPO consumes the surplus.

2.3.3 Case 1: Full Information, no Media (FI)

First I consider the benchmark case with full information and no media. In this situation the donor can distinguish the good NPO from the bad one and she will only donate to the good one. Thus the bad NPO does not enter the market. The good NPO enters and receives $g_H = 1 > c$.

2.3.4 Case 2: Asymmetric Information, no Media (AI)

Before I proceed with the analysis of the full model with media, I present as the opposite benchmark the case of asymmetric information and no media. The appropriate solution concept is Perfect Bayesian Nash Equilibrium (PBNE). Given two pure strategies and and the possibility of randomization for both NPO types, I have nine strategy-type combinations as candidates for an equilibrium $\{\sigma_H, \sigma_L\} = \{0; (0,1); 1\} \times \{0; (0,1); 1\}$.[13] In the following I will explain which of those candidates and why can indeed be or not an equilibrium.

In the absence of any institution which eliminates the uncertainty about the quality, a NPO cannot credibly claim its type. With identical entry costs the NPOs must be pooled and receive donation based on expectations and not on the real quality. Consequently a separating equilibrium with only H-type entering ($e_H = 1, e_L = 0$) or only L-type entering ($e_H = 0, e_L = 1$) can not exist. NPOs of both types enter the market if they expect to make a surplus, i.e. when donor's expectations are sufficiently high. The donor has a belief $\mu(H)$ about the quality of the NPO which, in equilibrium, must match the true expected quality ($E[e_H/(e_H + e_L)]$).

If both types enter with probability 1, the average quality will be 1/2 and the beliefs in equilibrium must be also be 1/2. Consequently for low costs $c \leq 1/2$ both types make surplus and enter for sure. This is summarized by following

Proposition 1 ***(entry pooling PBNE)*** *For $c \leq 1/2$ a PBNE is given by $\mu^*(H) = 1/2, e_H^* = 1, e_L^* = 1, g^* = 1/2$. Both types enter the market. Donor beliefs are given by the average quality and the level of donations correspondingly. Both types earn a surplus.*

[13] All candidates and findings are summarized in the Appendix A, table 2.1.

Clearly for these beliefs ($\mu(H) = 1/2$) and high costs ($c > 1/2$) the NPO will not enter. Moreover, without entry the beliefs are not restricted. Consequently, there will be an equilibrium without entry as long as the beliefs are lower than the costs ($\mu(H) < c$). This reasoning also applies to low costs ($c \leq 1/2$) as well. Consider the case in which the donor is very skeptical: she believes that if entry occurs it is much more likely that a bad NPO enters. As long as the beliefs and respectively the expected donations do not cover the costs ($\mu(H) < c$), the NPOs do not enter the market. And in this situation the donor is allowed to hold these beliefs. The reasoning reduces to the following

Proposition 2 ***(no-entry pooling PBNE)*** *A PBNE is given by* $\mu^*(H) = [0, c), e_H^* = 0, e_L^* = 0, g^* = 0$. *There is no entry and no donations.*

One can also identify another case. Given the beliefs $\mu(H) = c$, any NPO which enters makes zero surplus. Consequently NPOs are indifferent between entry and abstaining. For this to be an equilibrium they must behave such that the beliefs correspond to the true expected quality $\mu(H) = E[\sigma_H/(\sigma_H + \sigma_L)] = c$, where σ_H and σ_L are entry probabilities of H-type and L-type respectively. This is summarized by the following

Proposition 3 ***(break-even PBNE)*** *A PBNE is given by* $\sigma_H^* = \sigma_L^* c/(1 - c)$ *together with* $\mu^*(H) = c$ *and* $g^* = c$. *Expected quality, beliefs and donations are determined by the costs. Both types earn no surplus.*

Note that for $c \leq 1/2$ the entry probability of L-type can be of any range $\sigma_L^* \in [0, 1]$ and σ_H^* is strictly lower than one. For $c > 1/2$ the opposite holds.

All equilibrium candidates and results are summarized in the Appendix A, table 2.1. The mixed strategies given above suggest a randomization on the side of the NPOs. The idea that a NPO will toss a coin in order to decide about entry and that she will do this only to keep the other players from deviating as for her alone it does not make any difference might be difficult to accept. Aumann (1987) argues that it is sufficient to think of mixed strategies as if they would reflect the beliefs about the behavior of the opponent. And the NPO itself chooses in fact deterministic strategy whether to enter or not. Harsanyi (1973) provides another interpretation. Imagine small uncertainty concerning the real costs of both NPO types. In this case the decision of each player depends on the true realization of their costs and is deterministic. But the opponent is uncertain about the choice of player's pure strategy.

2.3.5 Case 3: Asymmetric Information, Media (AIM)

In this subsection I analyze the effect of media on the market for NPOs. Because the media do not eliminate but only reduce the uncertainty on the donor's side, the appropriate solution concept is, again, Perfect Bayesian Nash Equilibrium. First I will specify the beliefs, then the effort of media and finally I will take a look at the equilibria of this game. Similarly to the case 2 I have nine-type strategy combinations which are candidates for the equilibrium. All candidates and findings are summarized in the Appendix A, table 2.2.

Beliefs

Media and donor have the same information about the distribution of NPO types and their entry costs. Thus, conditional on entry, they have the same prior beliefs about the quality of the NPO: $\mu(H) = \sigma^e_H/(\sigma^e_H + \sigma^e_L)$, where σ^e_T is the belief concerning the entry probability of the NPO type $T \in \{L, H\}$. The donor updates her beliefs after the stage 4: a bad NPO is detected with probability

$$\alpha = \frac{\sum x_i}{\sum x_i + k}$$

such that her beliefs are now given by:

$$\mu_\alpha(H) = \frac{\sigma^e_H}{\sigma^e_H + (1-\alpha)\sigma^e_L}.$$

Consequently the posterior beliefs are weakly higher than the prior: $\mu(H) \leq \mu_\alpha(H)$. In equilibrium the expectations must match the true distribution of types.

Media

The optimization problem of each journalist is given by:

$$\max_{x_i} \frac{x_i}{\sum x_i + k} P(1-\mu(H)) - x_i,$$

where the first term is the probability of winning, P is the prize, $(1-\mu(H))$ are the beliefs about the probability of a bad type entering the market and x_i are effort costs. Define $P_\mu \equiv P(1-\mu(H))$. Then for given beliefs and in symmetric equilibrium the efforts are given by:[14]

[14]Results from simple maximization of the objective function.

$$x_i^*(n, P_\mu) = \begin{cases} \frac{-2kn+P_\mu(n-1)+\sqrt{4P_\mu kn+P_\mu^2(n-1)^2}}{2n^2} & \text{if } P_\mu > k \\ 0 & \text{otherwise.} \end{cases} \tag{2.2}$$

The condition for *positive efforts* is given by

$$P(1-\mu(H)) > k.$$

It requires that the prize P and the expected probability of bad type $(1-\mu(H))$ are sufficiently high, and, on the other side, the negative transparency of the market k is sufficiently low. If both types enter with equal probability, beliefs are 1/2 and for efforts to be positive following must hold: $P > 2k$. To assure that at least in some cases the media exerts effort and therefore to make the problem interesting, I assume from now on that $P > 2k$.

Assumption 1 $P > 2k$.

If the *positive efforts* condition does not hold, one is back in the no media case (AI).

NPO

NPO enters the market if the expected donations are higher than the costs. Thus a good NPO enters the market if $\mu_\alpha(H) \geq c$ and a bad NPO enters if $(1-\alpha)\mu_\alpha(H) \geq c$. Then it must necessarily hold that the entry probability of L-type is weakly lower than that of H-type,

$$\sigma_L \leq \sigma_H. \tag{2.3}$$

Equilibrium

Because the media do not eliminate but only reduce the uncertainty, a separating equilibrium where only H-type enters ($e_L = 0$, $e_H = 1$ and $\mu(H) = 1$) cannot exist. Formally, this is the case because $e_L = 0$ and $e_H = 1$ must imply $\mu(H) = 1$. With $\mu(H) = 1$ there is no prize to win for the media and consequently the effort of any media i must be zero $x_i = 0$. But this cannot be an equilibrium because then for all c bad NPO can make strictly positive surplus by deviating from $e_L = 0$.

The converse case with $e_L = 1$ and $e_H = 0$ cannot be an equilibrium as well because of the equation 2.3).

There will be a PBNE where both types enter for sure ($e_L^* = 1, e_H^* = 1$) only if the low type makes surplus, i.e. $\mu_\alpha(H)(1-\alpha) \geq c$ holds. In an equilibrium where both types enter for sure, the *positive efforts* condition reduces to $P > 2k$ (what I have assumed to hold). Consequently, media exerts effort and the probability of detection is $\alpha > 0$. Thus, this equilibrium can be only sustained with low costs where the upper bound is given by

$$\bar{c} = \frac{4kn + P(n-1) - \sqrt{8knP + P^2(n-1)^2}}{4kn + 2P(n-2)}, \tag{2.4}$$

which is smaller than 1/2 (see Appendix A). This findings are summarized in the following

Proposition 4 ***(entry pooling PBNE)*** *For $c \leq \bar{c}$ there is a PBNE with $e_L^* = 1, e_H^* = 1$, $x^* = (-4kn + P(n-1) + \sqrt{8knP + P^2(n-1)^2})/(4n^2)$ and beliefs $\mu(H)^* = 1/2$, $\mu_\alpha^*(H) = 1/(2-\alpha^*)$, $g^* = 1/(2-\alpha^*)$. Both types enter for sure and make surplus.*

The cost range for which this equilibrium is sustainable falls in n and P (both increase the probability of detection) and rises with k (decreasing probability of detection). Donor's beliefs and the level of donations are higher in comparison to the *entry pooling PBNE* without media. Beliefs and consequently donations increase both in n and P.

There is also an equilibrium without entry. It exists even for low costs if the donors are sufficiently skeptical. The reasoning is the same as in case 2: asymmetric information, no media. It is summarized in

Proposition 5 ***(no-entry pooling PBNE)*** *There is a PBNE for* $\mu^*(H) = \mu^*_\alpha(H) = [0, c), e^*_H = 0, e^*_L = 0, x^* = 0, g^* = 0.$

If *positive efforts* condition holds, in contrast to the no media case, there will be no equilibrium with $\mu_\alpha(H) = c$. With positive efforts of media the expected receipts for the bad type are given by $(1-\alpha)\mu_\alpha(H)$ which is then strictly lower than c. Then it cannot be that the low type enters with positive probability. Unless the good type does not enter (which leads to *no-entry pooling PBNE*), such beliefs are inconsistent.

But if $(1-\alpha)\mu_\alpha(H) = c$ (zero surplus for low type) holds, the good type makes surplus and enters for sure. Recall that α and $\mu_\alpha(H)$ depend on the investigation efforts of the media which in turn depend on the beliefs concerning the entry probability of the low type. The entry probability and efforts must solve the zero surplus condition and the equation 2.2. In this equilibrium $\sigma_L > \frac{k}{P-k}$ which follows directly from *positive efforts* condition. This leads to the following

Proposition 6 ***(partially separating PBNE)*** *There is a PBNE with* $\sigma_H = 1$*,* $\sigma^*_L \in (k/(P-k), 1)$*,* $\mu^*_\alpha(H) = (1-\alpha^*)/c$*,* $x^* > 0$*,* $g = \mu^*_\alpha(H) \in$

$[1/2, 1]$ *where L-type randomizes between entry and no entry with* $\sigma_L^* \in (k/(P-k), 1)$ *and* $c = (1-\alpha^*)\mu_\alpha^*(H)$ *(zero surplus) holds. Then H-type enters for sure* $\sigma_H = 1$ *and makes surplus. The media exerts positive efforts* $x^* > 0$. *Donations are given by* $g = \mu_\alpha^*(H) \in [1/2, 1]$.

For a given costs c, number of contestants n, prize P and transparency k one can solve for σ_L^* (see Appendix A). Beliefs and consequently donations increase both in n and P. A numerical example is presented in Appendix A.

If *positive efforts* condition does not hold, then the situation is analogous to the no media case. Then the *break-even PBNE* exists.

Proposition 7 ***(break-even PBNE)*** *For* $P < \frac{k}{1-c}$ *a PBNE is given by* $\sigma_H^* = \sigma_L^* c/(1-c)$, $\sigma_L < \frac{k}{P-k}$ *together with* $x^* = 0$, $\mu^*(H) = c$ *and* $g^* = c$. *Both types earn no surplus.*

When comparing case 2 with case 3, the effect of the introduction of the media is that the equilibrium where both types enter for sure is now only sustainable for lower costs. Beliefs are now higher in this equilibrium. In the *partially separating PBNE* (in contrast to *break-even PBNE*) now the good type makes surplus.

2.3.6 The Effect of Media onto the Amount of Public Good

Only H-type NPO produces public good. The expected amount of the public good is given by:

$$EG = (g - c)\frac{1}{2}\sigma_H. \tag{2.5}$$

I want to compare the level of public good in different regimes. To make the comparison possible, I confine the attention to the Pareto superior equilibria which sustain the highest level of the public good. Indeed with some financial support from the government, one can eliminate the no-entry equilibrium. In what follows, for case 2 (AI) and low costs I consider *entry pooling PBNE.* In case 2 and high costs the amount of public good produced equals zero in all equilibria. For case 3 (AIM) and low costs I consider *entry pooling PBNE* and for high costs *partially separating PBNE.*
For low costs ($c < \bar{c}$) the amount of public good is following:

- case 1: full information: $EG^{FI} = (1 - c)/2$
- case 2: asymmetric information, no media: $EG^{AI} = (1/2 - c)/2$ (the respective equilibrium is *entry pooling PBNE* as $\bar{c} < 1/2$,see Appendix A)
- case 3: asymmetric information, media: $EG^{AIM} = (1/(2 - \alpha) - c)/2$ where α is qiven in equation 2.1

Comparing those numbers lead to the following

Proposition 8 *For $c \leq \bar{c}$ the expected amount of public good is higher with media than without but lower than with full information: $EG^{AI} < EG^{AIM} < EG^{FI}$. Moreover the amount of public good increases in the number of media.*

Proof in the Appendix A.
For the medium range of costs $\bar{c} < c < 1/2$ the expected amount of the public good in the case of full information and asymmetric information without

media is the same as above. In the case with media and in *partially separating PBNE* it is given by

$$EG^{AIM} = \frac{\frac{1}{1+\sigma_L^*(1-\alpha^*)} - c}{2}. \tag{2.6}$$

It is apparent that for $\sigma_L^*(1-\alpha^*) \in (0,1)$ the amount of public good lies in between the full information case and asymmetric information without media case. This is true if media efforts are positive. By assumption 1 it holds for $c < 1/2$.

Proposition 9 *For $\bar{c} < c < 1/2$ the expected amount of public good is higher with media than without but lower than with full information: $EG^{AI} < EG^{AIM} < EG^{FI}$. Moreover the amount of public good increases in the number of media.*

For high costs $c > 1/2$ in the case of asymmetric information and without media no public good is produced $EG^{AI} = 0$ in any equilibrium. For the case with media the amount is given as by

$$max\left\{0, \frac{\frac{1}{1+\sigma_L^*(1-\alpha^*)} - c}{2}\right\}.$$

Proposition 10 *For $c > 1/2$ the expected amount of public good is weakly higher with media than without but lower than with full information: $EG^{AI} \leq EG^{AIM} < EG^{FI}$.*

Propositions 8, 9 and 10 together show that the amount of public good produced under the presence of media is (weakly) higher than this amount in no media case.

2.4 Conclusions

This chapter analyzes the influence of media on the market for nonprofit organizations. Assuming that there are good and bad potential NPO entrants, it turns out that (higher) media competition and consequently (higher) threat of being revealed as bad type changes the incentives on the NPOs. There is less entry of bad type. Furthermore, donors trust more and charitable giving is higher. Eventually, the amount of public good provided is higher.

For a given number of media similar results can be achieved by reducing the intransparency of the market, enhancing press freedom and watchdog ethos. The results might, for example, carry over to markets for consumer goods, services and governmental activities.

Appendix A

Summary of results

Table 2.1: Asymmetric information, no media

entry probability:	$\sigma_H = 0$	$\sigma_H \in (0,1)$	$\sigma_H = 1$
$\sigma_L = 0$	*no-entry pooling PBNE* for $c \in (0,1)$	no PBNE	no (separating) PBNE
$\sigma_L \in (0,1)$	no PBNE	*break-even PBNE* $\sigma_H^* = \frac{c}{1-c}\sigma_L^*$ for $c \in (0,1)$ zero surplus	*break-even PBNE* $\sigma_L^* = \frac{1-c}{c}$ for $c > \frac{1}{2}$ zero surplus
$\sigma_L = 1$	no (separating) PBNE	*break-even PBNE* $\sigma_H^* = \frac{c}{1-c}$ for $c < \frac{1}{2}$ zero surplus	*entry pooling PBNE* for $c \leq \frac{1}{2}$ positive surplus

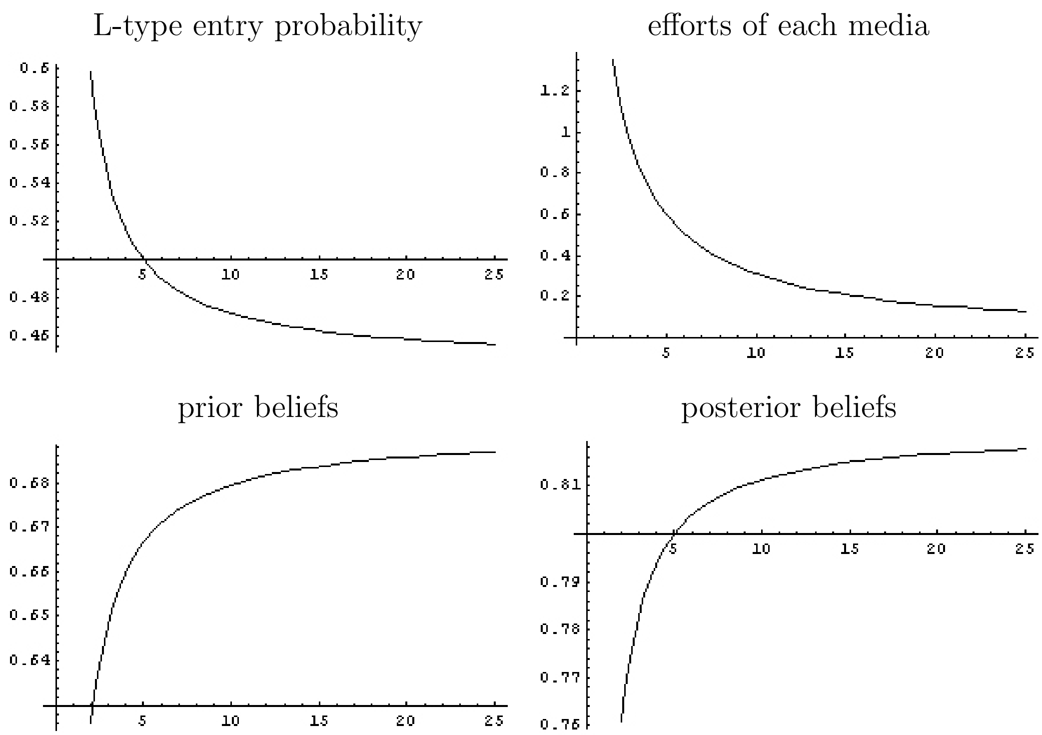
Table 2.2: Asymmetric information with media

entry probability:	$\sigma_H = 0$	$\sigma_H \in (0,1)$	$\sigma_H = 1$
$\sigma_L = 0$	*no-entry pooling PBNE* for $c \in (0,1)$ $x^* = 0$	no PBNE	no (separating) PBNE
$\sigma_L \in (0, \frac{k}{P-k})$	no PBNE	*break-even PBNE* $\sigma_H^* = \frac{c}{1-c}\sigma_L^*$ for $c > \frac{P-k}{P}$ zero surplus $x^* = 0$	*break-even PBNE* $\sigma_L^* = \frac{1-c}{c}$ for $c > \frac{P-k}{P}$ zero surplus $x^* = 0$
$\sigma_L \in (\frac{k}{P-k}, 1)$	no PBNE	no PBNE	*partially separating PBNE* H-type makes surplus $x^* > 0$
$\sigma_L = 1$	no (separating) PBNE	no PBNE	*entry pooling PBNE* for $c < \bar{c} < \frac{1}{2}$ positive surplus $x^* > 0$

Numerical Example

This example presents partially separating equilibrium in the case of asymmetric information with media. L-type entry probability, efforts of each media outlet, prior and posterior beliefs are calculated for following parameters $c = 0.4$, $p = 20$, $k = 3$. Figures in table 2.4 show how this values depend on the number of media outlets $n = 1, 2, ..., 25$.

Table 2.3: Numerical example



L-type Probability of Entry

To solve for σ_L^* note that following must hold:

$$c = (1-\alpha^*)\mu_\alpha^*(H). \tag{2.7}$$

Inserting

$$(1-\alpha^*) = 1 - \frac{k}{\sum_1^n x_i + k}$$

and

$$\mu_\alpha^*(H) = \frac{1}{1+(1-\alpha^*)\sigma_L^*}$$

into (2.7)

reduces to

$$k = c(\sum_1^n x_i + k + k\sigma_L^*).$$

Note that in symmetric Nash equilibrium all media invest the same amount of efforts which is given by

$$x^* = \frac{-2kn + P\frac{\sigma_L^*}{1+\sigma_L^*}(n-1) + \sqrt{4P\frac{\sigma_L^*}{1+\sigma_L^*}kn + P^2(\frac{\sigma_L^*}{1+\sigma_L^*})^2(n-1)^2}}{2n^2}. \tag{2.8}$$

Using (2.8) and

$$k = c(nx^* + k + k\sigma_L^*)$$

σ_L^* is given as the (economically reasonable) solution to the following cubic equation:

$$nk + \sigma_L(nk(1-2c) - pc(n-1+c)) + \sigma_L^2 c(nk(c-2) + p(n-1)c) + \sigma_L^3 nkc^2 = 0.$$

The Upper Bound of Costs

To show is that $\bar{c} < 1/2$. With $\bar{c}$ given in equation 2.4 it is equivalent to:

$$\frac{4kn + P(n-1) - \sqrt{8knP + P^2(n-1)^2}}{4kn + 2P(n-2)} < 1/2$$

Rearranging, taking both sides to the power of two (the term under the square root is strictly positive for $k > 0$, $P > 0$ and $n > 2$) and rearranging once more leads to:

$$4k^2n^2 - 4knP < P^2n^2 - 2P^2n$$

which holds for $P > 2k$ (assumption 1).

Proof of Proposition 8

To show: $EG^{AI} < EG^{AIM} < EG^{FI}$, where $EG^{FI} = (1-c)/2$, $EG^{AI} = (1/2 - c)/2$ and $EG^{AIM} = (1/(2-\alpha) - c)/2$.
This gives

$$\frac{\frac{1}{2} - c}{2} < \frac{\frac{1}{2-\alpha^*} - c}{2} < \frac{1-c}{2}.$$

This is true for $0 > \alpha^* > 1$. α is given in the equation 2.1 which in symmetric Nash equilibrium reduces to $\alpha = nx/(nx+k)$. Therefore for $k > 0$ and in the equilibrium with positive effort $\alpha \in (0,1)$.
Additionally I want to show that α increases in the number of media n. It is sufficient to show that the first derivative of nx in n is positive. The derivative is given by:

$$\frac{P^2(n-1) - 4Pkn + P\sqrt{8Pkn + P^2(n-1)^2}}{4n^2\sqrt{8Pkn + P^2(n-1)^2}}$$

The denominator is positive for $P > 0, k > 0, n > 2$ and it is sufficient to show that the numerator is positive. After rearranging, taking to the power of two (the term under the square root is positive), rearranging once more, one gets $P > 2k$ which holds by assumption 1.

2.5 Cross-Country Evidence

In this part of the chapter I want to test the predictions of my theoretical model with real world data. Cross-country data on third sector are scarce. I use the data on giving and volunteering for 36 countries delivered by Johns Hopkins Comparative Nonprofit Sector Project. All 36 countries report positive amount of giving and volunteering. The size of third sector ranges from 0.12% of the GDP for Mexico[15] to 4.95% of the GDP for the Netherlands. The numbers suggest that all countries are in nonzero equilibrium which allows me to test for the effect of media competition.

2.5.1 Econometric Specification

The predictions of the model are that the level of donations depends on the beliefs which in turn depend on, the number of media, the constant k which reflects the low transparency of the market, the prize to win and the costs of running the nonprofit organization: $g = g(n, k, P, c)$. The relation given in the theoretical model is nonlinear. I assume that it can be approximated by a linear function. The independent variable of interest is n, the number of media.

I argue that I can exclude the case that the causality between donations and media is the other way round. Although there might be some nonprofit newspapers, usually the funding comes from advertising and from selling. It

[15]This number does not include data on volunteering and giving to religious worship organizations.

is less clear whether there is another variable influencing both donations and media competition. In this sense using media I would proxy for this another variable which could be i.e. the general quality of the state. In this sense the relationship suggested by the figures 2.2, 2.3 and 2.4 would be misleading. If I suspect the general quality of the state to be the driver of the effect seen in the regression, I should find appropriate controls to extract the pure effect of media competition.

I want to estimate the following econometric specification: $DONATIONS_i = \alpha + \beta MEDIA_i + X_i\gamma + \epsilon_i$, where the parameter β is the estimate of the influence of an additional media outlet onto the level of donations. The explanatory variables in X should capture k, P, c of the theoretical model. Then I assume that the error term ϵ_i is i.i.d and uncorrelated with other explanatory variables. I cannot rule out the case that there are country fixed effects. Because I have no panel data I cannot control for those. Also with 36 observations I cannot include to many control variables. Still I hope that the control variables I have chosen will catch sufficiently the differences between countries and that this specification does not suffer from the problem of omitted variable bias.

Figure 2.2: Charitable Giving and Volunteering and Newspaper Circulation

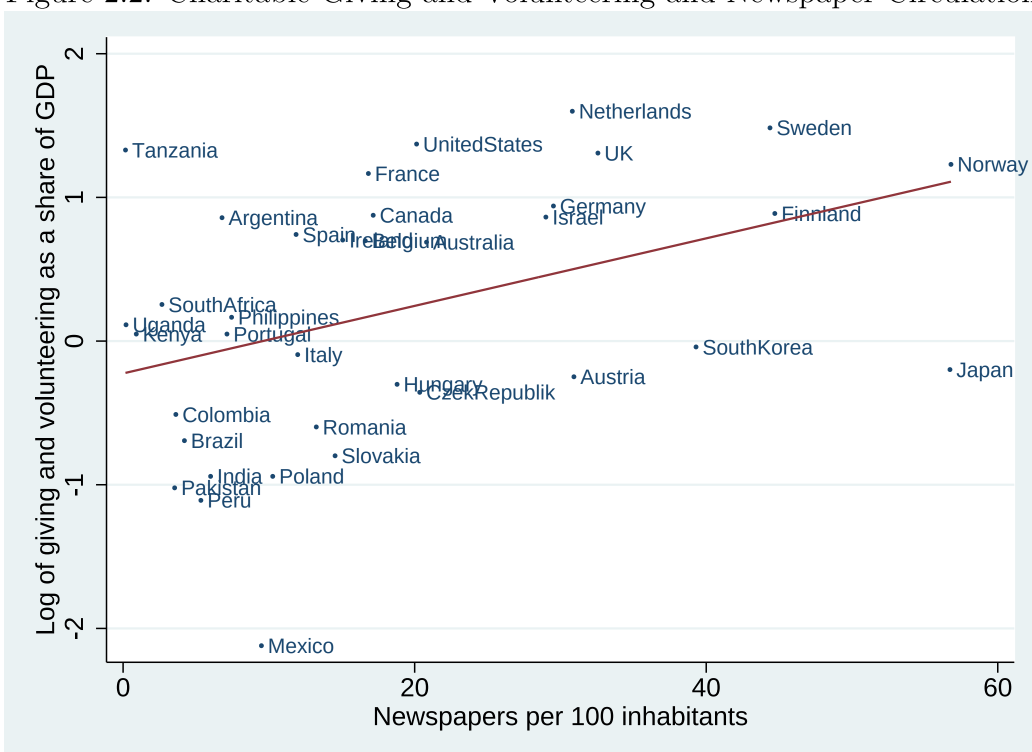


Figure 2.3: Charitable Giving and Volunteering and free press (FH)

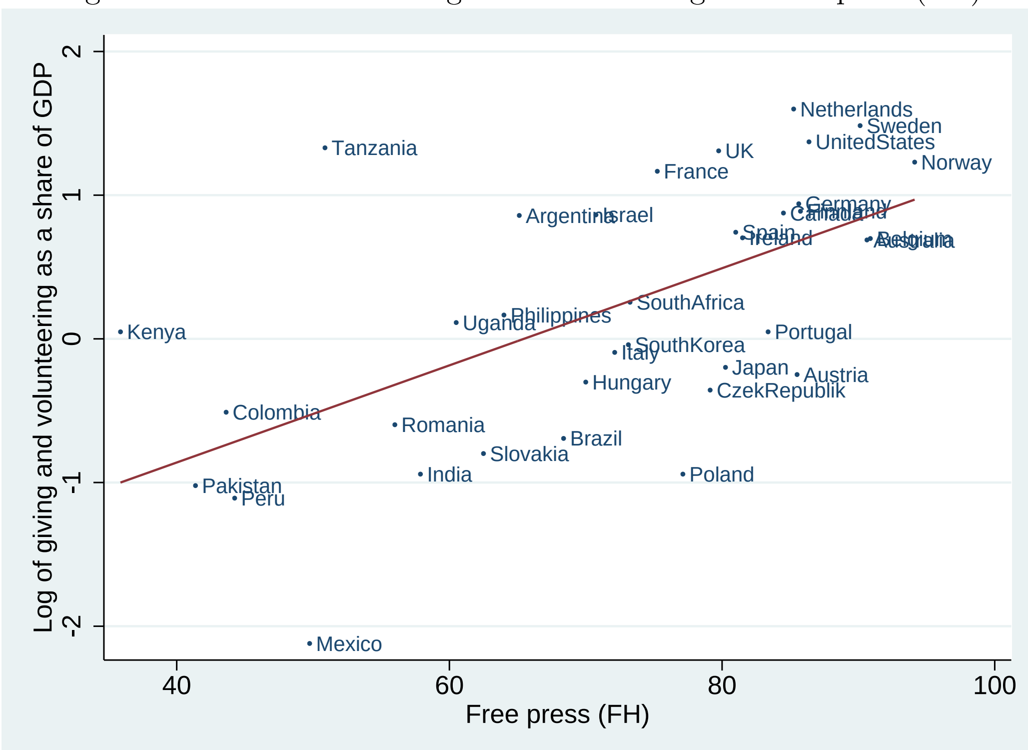
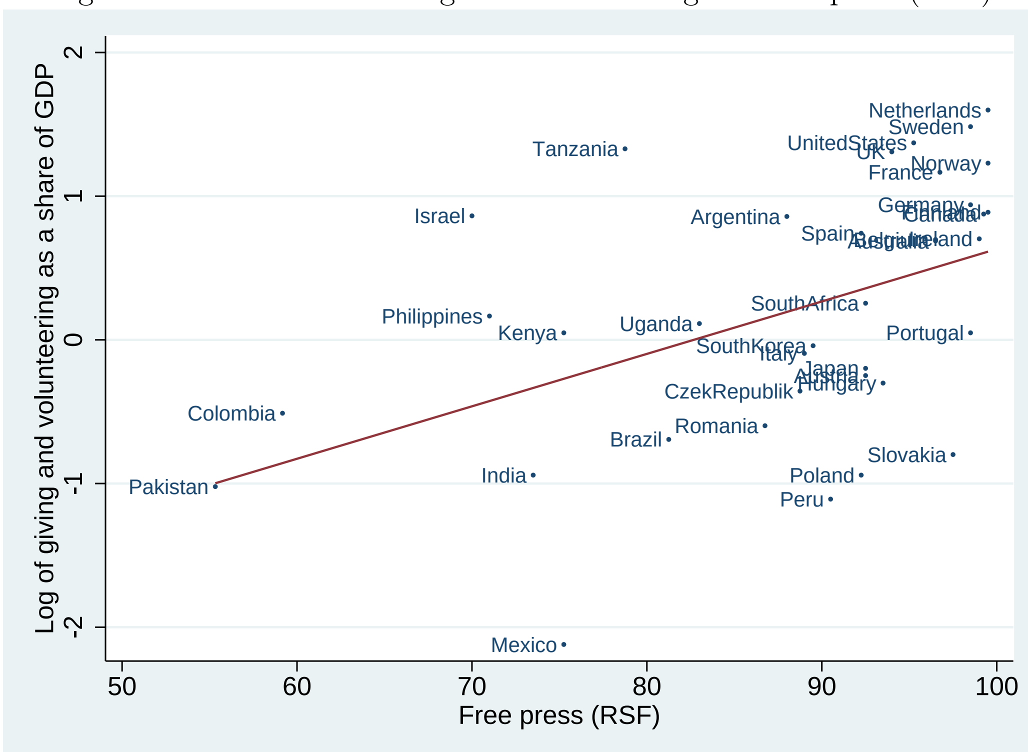


Figure 2.4: Charitable Giving and Volunteering and free press (RSF)



2.5.2 Data and Variables

The variable $DONATIONS$ is defined as giving and volunteering as percent of GDP. Those are estimates from Johns Hopkins Comparative Nonprofit Sector Project for a period of 1995-2002. Because the definitions of third sector differ in different countries and project-responsible researchers could not obtain all information necessary,[16] those data must be treated with care. Because the data on the dependent variable span the period of 1995-2002, I use for all the independent variables, if available, the averages over that period.

To measure the competitiveness of the media market I use three different sources. The first measure is the number of newspapers circulating per 100 inhabitants obtained from World Bank. As the second measure I use the inverted index from Freedom House describing press freedom in a particular country. The index can take values between 0 and 100 and (here) the higher the number is the more press freedom is assumed in a given country. Third measure is the inverted press freedom index from Reporters Sans Frontières. The scale is alike. The other variables are log of GDP, population, a dummy for legal British origin and a democracy score. Table 2.4 gives summary statistics. Detailed description of all variables can be found in the Appendix B.

Figures 2.2 - 2.4 show the correlation between the charitable giving and volunteering with newspaper circulation and press freedom. The fitted lines

[16] According to Johns Hopkins Comparative Nonprofit Sector Project the data does not include gifts to religious worship organizations for some countries because their estimates were not available.

Table 2.4: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
giving and volunteering as % of GDP	36	1.721	1.321	.12	4.95
free press (FH)	36	71.542	15.762	35.875	94.125
free press (RSF)	36	88.313	11.604	55.33	99.5
papers per 100	36	18.329	15.455	.164	56.789
British legal origin	36	.333	.478	0	1
log of GDP	36	5.313	1.643	1.8003	9.113
population	36	74.354	171.399	3.736	1020.254
democracy	36	8.611	2.522	0	10

included suggest positive correlation between those variables.

2.5.3 Results

For the given small number of cross-country observations I use simple OLS and LAD[17] regression. The results are given in Table 2.5 (OLS) and Table 2.6. The results indicate that increasing press freedom as measured by 10 points on the index scala leads to about 0,4% of GDP in additional collected donations and value of the volunteering. 10 additional newspapers circulating by 100 inhabitants increase collected donations and volunteering by additional 0,3% of GDP. Furthermore, on average, in the countries of British legal origin, the level of donations is, on average, higher by 1% of GDP.

I conclude that increasing media competition as measured by press freedom

[17]Least Absolute Deviations Estimation is a reasonable alternative to OLS given that in small sample OLS is very sensitive to atypical data points. The LAD estimator estimates the median regression (Greene 2008).

Table 2.5: Estimation results, dependent variable DONATIONS, OLS

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
free press (FH)	.043***	.038***	.042***						
	(.012)	(.013)	(.014)						
free press (RSF)				.049***	.042***	.047**			
				(.014)	(.015)	(.019)			
papers per 100							.036**	.032*	.032*
							(.016)	(.016)	(.018)
legal British origin		.905**	.838**		1.000**	.943**		1.061***	1.078***
		(.389)	(.387)		(.386)	(.393)		(.336)	(.328)
log of GDP		.119	.136		.226*	.251**		.199	.189
		(.137)	(.136)		(.123)	(.118)		(.130)	(.139)
population		-.002***	-.002***		-.002***	-0.002***		-.002***	-.002***
		(.000)	(.000)		(.000)	(.001)		(.001)	(.000)
democracy			-.051			-.054			.016
			(.087)			(.094)			(.097)
Intercept	-1.362***	-1.840**	-1.748*	-2.585**	-3.347***	-3.512**	1.065***	-.127	-.210
	(.839)	(.790)	(.978)	(.896)	(1.221)	(1.203)	(0.301)	(.673)	(.892)
n	36	36	36	36	36	36	36	36	36
R^2	.2645	.3676	.3725	.1835	.3349	.3398	.1750	.3676	.3378

Notes: *** 1% ** 5% * 10%, robust errors in parenthesis

Table 2.6: Estimation results, dependent variable DONATIONS, LAD

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
free press (FH)	.045***	.025	.023						
	(.013)	(.020)	(.024)						
free press (RSF)				.038*	.014	.016			
				(.021)	(.025)	(.041)			
papers per 100							.045*	.045*	.047*
							(.023)	(.024)	(.024)
legal British origin		1.117*	1.127*		1.213*	1.233*		1.044*	1.097*
		(.509)	(.598)		(.583)	(.665)		(.470)	(.443)
log of GDP		.330	.370		.488*	.493*		.336*	.347
		(.235)	(.278)		(.216)	(.264)		(.194)	(.256)
population		-.002	-.002		-.002	-.002		-.002	-.002
		(.005)	(.008)		(.005)	(.008)		(.005)	(.009)
democracy			-.011			-.038			-.078
			.226			(.231)			(.216)
Intercept	-1.678*	-2.031*	-2.044	-1.743	-2.378	-2.245	.842*	-1.217	-.571
	(.845)	(1.001)	(1.464)	(1.775)	(2.025)	(2.737)	(.381)	(.758)	(1.658)
hline n	36	36	36	36	36	36	36	36	36
Pseudo-R^2	.1972	.2763	.2768	.1200	.2499	.2551	.1282	.2956	.3069

Notes: *** 1% ** 5% * 10%, standard errors basen on 500 bootstrapped replications in parenthesis or by the number of newspaper per 100 inhabitants increases significantly the amount of giving and volunteering.

Table 2.7: Estimation results (without Tanzania), dependent variable DONATIONS, OLS

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
free press (FH)	.051***	.041***	.040***						
	(.011)	(.014)	(.016)						
free press (RSF)				.054***	.042**	.041*			
				(.017)	(.018)	(.021)			
papers per 100							.042**	.033**	.031**
							(.013)	(.014)	(.014)
legal British origin		.685*	.691		.793*	.804*		.854**	.918**
		(.390)	(.412)		(.419)	(.427)		(.410)	(.421)
log of GDP		.196	.195		.310**	.305**		.282**	.246*
		(.138)	(.143)		(.130)	(.139)		(.133)	(.142)
population		-.002	-.001		-.002	-.002		-.002*	-.001
		(.001)	(.001)		(.001)	(.001)		(.001)	.001
democracy			.005			.012			.070
			(.098)			(.010)			(.093)
Intercept	3.074***	1.632	-2.446	-3.133**	-3.847**	-3.816**	.869***	-.605	-.995
	(.363)	(1.001)	(.929)	(1.503)	(1.514)	(1.565)	(.306)	(.678)	(.857)
n	35	35	35	35	35	35	35	35	35
R^2	.3743	.4574	.4574	.2388	.4076	.4078	.2503	.4156	.4268

Notes: *** 1% ** 5% * 10%

2.5.4 Robustness Checks

Figure 2.2 - 2.4 suggest that Tanzania might be an outlier. The very high share of private philanthropy is suspicious. In fact it reflects rather outside

funding and external dependence of the state than the inside NPO activity. Treating Tanzania as an outlier and repeating the estimation for the 35 countries delivers similar estimates (see Table 2.7). The effect of press freedom is more significant for the specification 2 and 3. The value of R square increases for all specifications.

Appendix B

List of Countries

Argentina	Ireland	Romania
Australia	Israel	Slovakia
Austria	Italy	South Africa
Belgium	Japan	South Korea
Brazil	Kenya	Spain
Canada	Mexico	Sweden
Colombia	Netherlands	Tanzania
Czek Republik	Norway	Uganda
Finnland	Pakistan	UK
France	Peru	United States
Germany	Philippines	
Hungary	Poland	
India	Portugal	

Correlations

List of Variables

	donations	free press (FH)	free press (RSF)	papers per 100	British origin	log of GDP	population	democracy
donations	1.0000							
free press (FH)	0.5143	1.0000						
free press (RSF)	0.4284	0.7794	1.0000					
papers per 100	0.4183	0.6480	0.4839	1.0000				
British origin	0.1703	-0.1716	-0.2442	-0.2774	1.0000			
log of GDP	0.2849	0.5179	0.3128	0.4262	-0.1411	1.0000		
population	-0.1605	-0.1680	-0.2789	-0.1553	0.2735	0.2569	1.0000	
democracy	0.2014	0.6157	0.6118	0.4756	-0.3397	0.5145	-0.0221	1.0000

donations	giving and volunteering as % of GDP source: John Hopkins Comparative Nonprofit Sector Project estimates for the period 1995-2002
free press (FH)	reversed index: ranges from 0 (no press freedom) to 100 (total press freedom). source: Freedom House, www.freedomhouse.org average over 1995-2002 computed by adding four component ratings: laws and regulations, political pressures and controls, economic influences and repressive actions.
free press (RSF)	reversed index: ranges from 0 (no press freedom) to 100 (total press freedom). source: Reporters Sans Frontières, www.rsf.org, year 2002 (Slovenia 2003). based on interviews with journalists, reaserchers and legal experts about press freedom violations (murders or arrests of journalists, censorship, pressure, state monopolies, regulation of the media etc.).
papers per 100	number of newspapers circulating per 100 inhabitants. Source: World Bank World Development Indicators and UNESCO, STM103 Global Indicators Shared Dataset. average over 1996, 1998, 2000, 2001 and 2002 the original data has been rescaled by 10
log of GDP	source: World Bank average over 1995-2002
legal British origin	dummy equal 1 if legal British origin source: Shared Global Indicators (Pippa Norris' website)
population	source: World Bank average over 1995-2002
democracy	index: 0 least democratic and 10 most democratic average of two indices from Freedom House and Polity2 source: Quality of Government Dataset, University of Gothenburg

Chapter 3

Econometric Evidence for Sequential Donations to US Nonprofit Organizations

3.1 Introduction

The nonprofit sector constitutes an important part of the economy in many countries. Nonprofit organizations (NPO) cover a wide field of activities ranging from aid to the poor, higher education, culture, scientific research and others. Typically, the goods and services provided by the nonprofit sector have collective good characteristics and the beneficiaries are distinct from payers. Consequently, the scope for direct sales is limited. Contributions from the public are an important source of financing and nonprofit organizations are interested in understanding how to elicit and increase those donations.

There is a number of factors potentially influencing the propensity to give and the size of donations. Obviously, donors have preferences for particular charitable goals. Besides that, a number of studies reviewed in this chapter, has confirmed the role of the price and quality in charitable giving. Lately, some interest has been directed towards sequential fund-raising. Indeed, it is a common practice among fund-raisers to announce past donations. Examples include lead donor announcement, a visible list of all big donors or a running count of donations to date. In the US, donors can easily learn about last year contributions to any charitable organization. US nonprofit organizations are obliged to submit an annual informational tax form, IRS Form 990. They are also obliged to make last three years' declarations publicly available. Additionally, watchdog agencies like GuideStar and Charity Navigator collect this data and present it online in a user-friendly way. Their websites offer both the original lengthy IRS Form 990 and simple indicators like fund-raising efficiency (i.e. the amount spent to raise $1 in charitable contributions) and other efficiency measures. According to those agencies a substantial number of potential donors search in their data bases. GuideStar, which started its online presence in 1996, reported the daily number of users to be 20,000[1] in 2004. Charity Navigator, which started its online presence in 2001, reported over 4.7 million visitors in the year 2010.[2]

[1] "GuideStar: A Brief History", *GuideStar.org*, accessed September 21, 2012, http://www.guidestar.org/rxg/about-us/history.aspx.

[2] "President & CEO's 2010 Year-End Report", CharityNavigator.org, 22.12.2010, accessed September 21, 2012, http://www.charitynavigator.org/index.cfm?bay=content.view&cpid=1184.

The purpose of financial disclosures is to make nonprofit organizations more accountable and to increase donor's trust. This project is concerned with the question whether donors take into account the information contained in financial disclosures when deciding about their contributions. Special focus is devoted towards the information about past donations. To answer this question, I explore a long panel of data from the IRS Form 990 in the US from 1989 to 2004. Similar data, which spans a shorter period of time, has often been used in previous research. I present both results for the overall sample and separate results for the following industry samples: higher education, museums, arts, hospitals, international relief, disaster relief and human services. Given that I want to estimate the effect of lagged dependent variable, dynamic panel data models are used. Because the effect of financial disclosures is expected to be stronger after watchdog agencies started their online operations, I test whether the magnitude of the coefficients of interest has changed in the "after" period relatively to the "before" period.

Estimation results show a positive effect of past donations and current fund-raising. They show negative effect of price and past fund-raising. However, I do not find evidence that the effect of past donations was stronger in later years, when watchdog agencies made the information contained in financial disclosures easily accessible on the Internet.

The chapter is divided into following parts. The next section presents relevant literature. Section 3.3 explains the empirical methodology and data. After a discussion of the results in section 3.4, section 3.5 presents concluding remarks.

3.2 Literature

According to the standard public good theory developed by Varian (1994), sequential fund-raising is no better than simultaneous fund-raising. Given perfect information, continuous public good and substitability of donations, the theory predicts that the initial donors will free ride on subsequent ones. A different line of research assumes complementarities between donations. Vesterlund (2003) shows that sequential fund-raising might increase donations in an environment of asymmetric information. In her model, she assumes that the quality of the projects is not known publicly, however, a donor can acquire this information at a cost. The potential donor can, for example, invest time in studying the business plan of the organization, talking to the managers, or pay an independent expert to evaluate the project. Unless the costs are not prohibitively high, in Vesterlund's model the first donor will exert effort and will find out about the quality of the NPO. Then the donor decides on the size of her contribution, which might be publicly announced by the NPO. In the following stage the other donors decide on their contributions. Because this is a sequential game, the subsequent donors try to elicit the quality of the NPO from the size of the first donation. Since this is known to the leading donor, she behaves strategically and chooses her contribution accordingly. Given the announcement of the first donation, in the Bayes-Nash-equilibrium the high quality organization obtains more donations than it would obtain in the case its quality were publicly known. Andreoni (2006) builds on and refines the model developed by Vesterlund (2003). According to Andreoni (2006) the government can also act as a leader.

Informational cascades theory offers another explanation for why donors might be guided by the level of past donations.[3] A number of nonprofit organizations, whose exact quality is not known, solicit donations. The underlying assumption is that donors receive a binary signal about the quality of each organization, that this signal is true with a probability higher than 0.5 and that it is independent of the signals of others. If enough donors make donation in the first period, rational donors in the second and subsequent periods of time should logically disregard their private signals and donate to the organization that received most donations in the first period (by law of large numbers, this organization is good with the largest probability). In cases when there are different types of NPOs and that donors have different preferences, subsequent donors should logically choose an organization with most donations among the organizations of the most preferred type.

In two laboratory experiments, Potters, Sefton and Vesterlund (2007) and Bracha, Menietti and Vesterlund (2011) confirm the positive informational effect of sequential play described by Vesterlund (2003). In a field experiment, Karlan and List (2007), find out that the existence of a lead donor increases contributions significantly. Huck and Rasul (2011) obtain similar results in a field experiment conducted among regular visitors to the Bavarian State Opera House in Munich, Germany. List and Lucking-Reiley (2002) study the effect of seed money and conclude that increasing it significantly augments contributions.[4] In a field experiment by Shang and Croson (2009),

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[3]For more information, see for example Bikhchandani, Hirshleifer and Welch (1998).

[4]In their experiment design, there is a fixed fund-raising target. Seed money acts similarly as lead gift but also reduces the amount of charitable contributions needed to complete the project.

radio listeners who decided to donate are or are not provided with the information about the size of the last contribution. Shang and Croson find positive significant correlation between the size of own contribution and the size of past announced donation.

There are a number of empirical studies on organizational level aiming at explaining donation's function.[5] Posnett and Sandler (1989) test a model in which donations are a function of price (defined as total expenses/program expenses), fund-raising expenses, government support, age, bequest and autonomous income. The coefficient estimates from an OLS estimation suggest large negative and significant effect of price, and positive effect of remaining above named factors. Greenlee and Brown (1999) introduce administrative inefficiency into the model and find it to have a significant negative effect on donations. Marudas (2004) adds 'years of available assets' (net assets/total expenses - fund-raising expenses) to the model. This measure is similar to a measure provided by watchdog agencies. It shows potential donors how invulnerable the organization is, i.e. how long it is able to sustain its operations without public support. Tinkelman and Mankaney (2007) provide some sensitivity tests, in which they exclude certain organizations: reporting low donations, zero fund-raising expenses or zero administrative costs.

However, the above literature has thus far neglected the potential effect of past donations. This project closes this gap because it extends the range of potential factors by adding past contributions. Motivated by Vesterlund (2003) and Andreoni (2006) theory, and in line with experimental evidence, the hypothesis is:

[5] For an extensive review of this literature, see for example Jacobs and Marudas (2009).

H1: Donations to a given NPO are positively related to past donations.

Because the rise of watchdog agencies at end of 90's made it so easy to access financial disclosures, my second hypothesis is:

H2: The effect of past donations in later years is stronger that this effect in prior periods of time.

3.3 Empirical Model

3.3.1 Data

The data for this project has been provided by National Center for Charitable Statistics (NCCS). NCCS collects data from the IRS Form 990. All US organizations that are exempt from federal income taxes under section 501(c)(3) of the Internal Revenue Code and whose annual receipts are "normally" more than $25,000 a year have to fill in this form. Churches and private foundations are excluded. Information from the IRS Form is open to the public and is increasingly accessible via the Internet or by directly contacting an organization. The panel data available for this project is core trend file covering the period from 1989 to 2004. Unfortunately, it contains only a reduced number of variables as compared with the information in the IRS Form 990. The number of organizations in the file exceeds 400,000. Therefore, in the main estimation I use a random sample of 10%. Prior studies found significant differences in coefficient estimates for different fields. Therefore, I present the results from separate regressions on following industry types (100% sample): higher education (National Taxonomy of Exempt Entities- Core Codes: B40), museums (A50), arts (A20), hospitals (E20), international relief (Q33), disaster relief (M20) and human services (P20). The choice reflects different characteristics and purposes of the nonprofit sector. In the sample, higher education NPOs are very large in terms of assets, program revenue, and donations received and they operate continuously over long time. By contrast, hospital NPOs have very high program revenues and receive comparatively few donations. International relief NPOs receive, on average, high levels of donations and have low program revenues. Disaster relief NPOs are small in terms of assets, program revenue and donations received, and their number varies significantly over time.

Observations with negative values for donations, fund-raising expenditures and program revenue are excluded. I also exclude observations with zero or negative assets. Descriptive statistics can be consulted in table 3.1.

The samples used in the subsequent analysis are left unbalanced in order to limit the effect of self-selection of nonprofit organizations.

There exist some critical voices about the reliability of the data used for the analysis. No strict financial regulation and transparency is required from NPOs. While the IRS Forms 990 are becoming more easily available via the Internet, nonprofit organizations have incentives to misreport their financial status and to improve their apparent efficiency. The US General Accounting Office (GAO) in their 2002 report, points out some wide-spread tactics, for example, netting out professional fund raising fees against raised donations or booking fund-raising fees as "other" expenses. From 1994 through 1998, on average 64% of charities reported zero fund-raising expenses or left this line item blank. Krishnan, Yetman and Yetman (2006) provide evidence that reporting zero fund-raising is (at least partly) due to deliberate misreporting and that it can be explained by wrong managerial incentives. On the other hand, Jacobs and Marudas 2012 find evidence that donors do not perceive the financial disclosures of organizations which report zero fund-raising expenses to be less reliable. Still, it poses a question whether the true effect of current fund-raising can be estimated. To address this issue, I present results from regressions in which I exclude NPOs reporting zero fund-raising expenses. Financial disclosures of such organizations might be perceived to be less reliable.

3.3.2 Choice of Variables

I want to estimate the donations' function and hence the variable of interest is the amount of donations received by organization i during year t. The measure of donations provided in the data combines direct[6] and indirect[7] public support, membership dues and assessments as well as government contribu-

[6]Direct public support are contributions, gifts, grants, and bequests received directly from the public. It includes amounts received from individuals, trusts, corporations, estates, foundations, public charities, or raised by an outside professional fund-raiser.

[7]Indirect public support are contributions received indirectly from the public: (1) through solicitation campaigns conducted by federated fund-raising agencies or organizations such as the United Way; (2) from a parent organization or another organization with the same parent; or (3) from a subordinate organization.

tions and grants.[8] The available data does not allow to separate government contributions and grants from other donations. However, Andreoni (2006) shows that the government can play the role of lead giver as well. This justifies the inclusion of government grants into the variable donations. Since I want to find the elasticity of donations with respect to different factors, I take, for the purpose of estimation, the natural logarithm of the dollar amount, i.e. $lnDON_{i,t}$. To cope with the cases with zero reported donations, I add \$1 to the amount of donations. Consequently $lnDON_{i,t} \in [0, \infty)$. The same is done for all other variables included in this estimation when zero-value observations are not excluded.

Since the main interest of this study is to estimate the effect of past donations on the current ones, the main independent variable will be lagged donations $lnDON_{i,t-1}$.

A large number of empirical studies at the organizational have analyzed the effects price, fund-raising expenses, age, wealth and other efficiency measures.[9] The general view is that the donors respond to price in the same way as they do in the case of private goods. Donations are spent not only to produce charitable goods and services but also on fund-raising fees and administrative expenses. Since Posnett and Sandler (1989), following definition of price is widely employed: (program expenses + fund-raising expenses + administrative expenses)/program expenses = total expenses/(total expenses - fund-raising expenses - administrative expenses). In fact, this is reciprocal

[8]Government grants are payments from the government to a nonprofit organization to further the organization's public programs.

[9]For a review of literature and main findings, see for example Marudas et al. (2012).

to the program expenses ratio being one of the efficiency measures published by Charity Navigator and other watchdog agencies. Many studies (for example Posnett and Sandler 1989, Marudas 2004) find positive and significant effect of price for at least some NPO sectors. Therefore, I include a measure of price in my specification. However, due to data constraints (trend file), my measure lacks administrative expenses. It is given by: total expenses/ (total expenses - fund-raising expenses). Because I want to estimate a log-log model, I take natural logarithm of price: $lnPRICE_{i,t}$.

Donors should respond to quality. However, because the beneficiaries are usually third parties, donors will be uncertain about the quality of the final output, while it could be assumed that the nonprofit organizations have full information about their product. For this reason the nonprofit organizations are interested in providing information to potential donors. To some extend this happens through fund-raising but this information is noisy as fund-raising has two countervailing effects. On the one side, it plays a similar role as advertising, on the other side, it increases the price of giving. The effect of current fund-raising should be similar to the advertising effect, i.e. encouraging donations. Previous studies have usually found positive and significant effect of fund-raising (Marudas, Hahn and Jacobs 2012, Tinkelman and Mankaney 2007 and other). Following previous studies I include a variable which is defined as total expenses incurred in soliciting contributions, gifts, grants, etc. For the same reasons as above I take the natural logarithm of the dollar amount ($lnFUND_{i,t}$). On the other hand, donors who study the information contained in financial disclosures should prefer organizations with lower fund-rising expenses because those expenses lower the amount of charitable goods and services produced by the organization. Because watchdog agencies provide information about past values, I expect the effect of past fund-raising expenses to be negative. For this reason I also include past fund-raising expenses ($lnFUND_{i,t-1}$). I expect the long-term effect of fund-raising expenses given by the sum of those two coefficients to be positive.

Other variables included in the analysis are: the natural logarithm of compensations and salaries ($lnCOM_{i,t}$), the natural logarithm of assets ($lnASS_{i,t}$) and the natural logarithm of program revenues ($lnPREV_{i,t}$). Compensations and salaries are related to fund-raising and public good production efforts both resulting in higher donations. Assets can be seen as a proxy for the size of the organization. Program revenues might explain different needs of financing from public contributions. There is a number of studies concerned with the question whether managerial compensations in the nonprofit sector depend on performance.[10] However, the introduction of compensation and salaries into donations function is novel. Because the payments are meant to incentivize staff, I expect the effects of compensations and salaries to be positive. The possible endogeneity problem is addressed in the GMM estimation method.

Another measures for quality similar to those provided by watchdog agencies have been tested and shown to be significant. The measure of administrative efficiency (administrative expenses as a share of all expenses) is not included in my specification due to data constraints. Fund-raising efficiency (fund-raising expenses as a share of all expenses) is excluded in favor of testing

[10]See for example Baber, Daniel and Roberts (2002).

the the effect of fund-raising expenses directly. Donors might have more trust towards charities which exist for long time. Weisbrod and Dominiguez (1986) and Marudas and Jacobs (2004) propose age of the NPO as a proxy for quality. Age variable is omitted from the specification because its impact cannot be estimated when relying on demeaning and differencing. It will be omitted from the OLS estimation as well for comparability reasons.

Table 3.1: Summary statistics

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
		10 % sample			
donations	682124.087	7649077.836	0	1138238976	342772
fund-raising expenses	37548.659	892981.476	0	291278720	342773
compensations	1139700.689	41229903.142	0	17336954880	190133
assets	6841988.271	367980039.101	1	96254631936	329742
program revenue	2188306.882	35381774.544	0	6842990080	342573
price	1.437	80.161	1	38590.199	339996
		Higher education			
donations	11420417.307	58179693.52	0	1276135552	25992
fund-raising expenses	775215.099	2598387.175	0	169071008	25990
compensations	19548209.368	76998949.900	0	1244123008	11874
assets	153379431.654	1524660342.306	1	96254631936	25617
program revenue	29693796.231	133298832.368	0	6842990080	25979
price	1.057	2.039	1	209.891	25911

Continued on next page...

... table 3.1 continued

Variable	Mean	Std. Dev.	Min.	Max.	N
		Hospital			
donations	739011.572	5746123.98	0	259776256	8891
fund-raising expenses	35226.339	380041.241	0	13997002	8895
compensations	12126799.523	141775377.019	0	7422142464	2956
assets	31192034.361	99235106.107	1	1691400192	8742
program revenue	25582671.314	84672437.408	0	1585442688	8878
price	1.072	2.023	1	152.596	8826
		International relief			
donations	5074806.794	36251759.14	0	962287232	9473
fund-raising expenses	254499.327	2379539.208	0	63279000	9472
compensations	499122.093	7846203.639	0	338449984	6438
assets	1982202.492	13417310.147	1	356343584	8793
program revenue	72127.197	912259.944	0	55687948	9460
price	1.064	0.967	1	59.742	9418
		the Arts			
donations	311721.971	2467382.062	0	178330304	50028
fund-raising expenses	17745.018	102623.32	0	5923440	50027
compensations	119539.7	728647.989	0	33680644	27888
assets	976771.955	8897644.138	1	608653504	48210
program revenue	128990.882	871489.375	0	56141848	49991
price	1.211	12.808	1	1342.28	49752
		Museum			

Continued on next page...

... table 3.1 continued

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
donations	1138709.175	6611169.312	0	537306048	35164
fund-raising expenses	83520.255	391635.657	0	24518894	35164
compensations	505866.456	2951055.608	0	118987896	19367
assets	7534460.222	47199968.724	1	2308963072	34128
program revenue	275490.564	1474065.488	0	65798024	35151
price	1.215	10.275	1	1552.182	34965
		Disaster			
donations	112674.883	1026654.624	0	161471696	34624
fund-raising expenses	6124.854	94285.793	0	9228613	34613
compensations	25539.906	196096.674	0	10438018	22011
assets	550311.742	1192066.545	1	47117812	33950
program revenue	46595.252	252308.993	0	12529514	34609
price	1.121	1.928	1	179.92	34370

3.3.3 Econometric Specification

I propose the following empirical model of donations to organization i in year t:

$$lnDON_{it} = \delta lnDON_{i,t-1} + X_{it}\beta + \alpha_i + u_{it}, \text{ for all } i = 1, \ldots, N \text{ and } t = 1, \ldots, T. \tag{3.1}$$

The dependent variable, $lnDON_{i,t}$, the natural logarithm of total public support for each nonprofit organization i in period t is expressed as a function of its lagged realization, $lnDON_{i,t-1}$, a row vector of explanatory variables $X_{i,t}$, an unobserved organization-specific time-invariant effect α_i and an error term varying across organizations and time, $u_{i,t}$. The vector of explanatory variables in the main specification consists of $lnFUND_{i,t}$, $lnCOM_{i,t}$, $lnASS_{i,t}$ and $lnPREV_{i,t}$ and time dummies. Extended specification includes past fund-raising expenses $lnFUND_{i,t-1}$ and price $lnPRICE_{i,t}$ additionally. The organization-specific effect in this regression accounts for an unobserved heterogeneity of each NPO, as they will have different organizational structures, cost structures and production functions. Concerning the error terms $u_{i,t}$ I assume the following:

$$\begin{gathered} E\left[\alpha_i\right] = E\left[u_{it}\right] = E\left[\alpha_i u_{it}\right] = 0, \\ E\left[u_{it} u_{js}\right] = 0 \text{ for each } i, j, t, s, i \neq j. \end{gathered} \tag{3.2}$$

The number of individuals is N and the number of time periods is T. The parameter δ and the column vector beta have to be estimated.

Obviously, an ordinary OLS estimation will give an inconsistent δ since $lnDON_{i,t-1}$ is positively correlated with the error term $(\alpha_i + u_{it})$ due to the presence of individual effects. To eliminate the organization-specific effect one could use the WITHIN estimator. This estimator transforms the equations in such a way that the original observations are expressed as deviations from its individual means. But given a small T, this transformation implies a non negligible correlation between the transformed variable and the error term. Thus, the estimation of δ is biased as well.

Further, I cannot assure the strict exogeneity of my explanatory variables. Probably not only do more fund-raising expenses lead to more donations, but as the level of contributions rises the fund-raising budget and the budget for compensations rises as well. To address those problems I use the Generalised Method of Moments (GMM), which is widely applied for this type of dynamic micro panel data model. Following Arellano and Bond (1991), I take first differences of the equation (1) to eliminate the organizational-specific effect α_i:

$$\begin{gathered}\Delta lnDON_{it} = \delta \Delta lnDON_{i,t-1} + \Delta X_{it}\beta + \Delta u_{it}, \\ \text{for all } i = 1, \ldots, N \text{ and } t = 1, \ldots, T.\end{gathered} \tag{3.3}$$

This transformed equation leads to a correlation between $\Delta lnDON_{i,t-1}$ and Δu_{it} and thus cannot be estimated by a simple OLS regression. Nevertheless, it is possible to obtain consistent estimates by instrumenting $\Delta lnDON_{i,t-1}$ with a set of suitably lagged levels of $lnDON_{i,t}$ as well as a set of additional (suitably) lagged explanatory variables. The necessary assumption for $lnDON_{i,1}$ is to be predetermined. This means that $lnDON_{i,1}$ has to be uncorrelated with all subsequent disturbances $u_{i,t}$ for $t = 2, \ldots, T$. Further, I assume that $X_{i,t}$ is endogenous which means that it can be correlated with $u_{i,t}$ and earlier shocks but it is uncorrelated with the subsequent shocks. Therefore, the vector of moment conditions becomes $(lnDON_{i,1}, \ldots, lnDON_{i,t-2}, X_{i,1}, \ldots, X_{i,t-2})$. Since my T is up to 16 I have a large number of instruments.

There is an alternative to the difference GMM. If the true δ is big, then it will not be identified using the moment conditions for the first differenced equations. The system GMM estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998) has a much smaller finite simple bias and much greater precision when estimating AR parameters using a persistent series. It exploits an assumption about the initial conditions to obtain moment conditions that remain informative even for persistent series. The system GMM combines the standard set of equations in the first differences and suitably lagged levels as instruments (difference GMM) with an additional set of equations in levels and suitably lagged first differences as instruments.

3.4 Results

3.4.1 Main specification

In the main specification I include lagged donations, current fund-raising, compensations, program revenue and assets as right-hand-side variables. From those variables only lagged donations is the measure which can be found in financial disclosures containing information about last year finances. The regression results for different fields can be seen in tables 3.2-3.9. The first two columns of each table show the estimation results for OLS and WITHIN estimations. Both give biased coefficients on $lnDON_{i,t-1}$ for reasons explained above. However, I show them both for comparison. Because I expect the OLS coefficient on past donations to be biased upwards and the WITHIN coefficient to be biased downwards, the true coefficient should lie in between these two.

Third and fourth columns of each table report the estimation results for GMM Difference and System specifications. Those have been obtained with the command xtabond2 (Roodman 2006) in Stata. The coefficients of past donations lie, as expected, in between of those obtained from the OLS and WITHIN estimations.

Given the Arrelano-Bond test for AR1 and AR2 in first differences the null hypothesis of no first-order autocorrelation is rejected and respectively null hypothesis of no second-order autocorrelation cannot be rejected in both GMM specification for all fields.

Because $T > 3$ for most organizations in the panel and the model is overidentified and one can implement the Hansen test of overidentifying restrictions. This test does not reject the validity of the moment conditions used for all difference GMM specifications. However, the p-value is low for system GMM in the case of following industries: hospitals, arts, museums, human services and disaster relief. Additionally, I conduct the Difference-in-Hansen test of the additional moment conditions against the Difference specification. It accepts the validity of additional instruments in the case of the overall sample, hospitals, higher education and international relief. Consequently, the preferred specification is System GMM for the overall sample, hospitals and higher education and difference GMM for the other fields.

The elasticity of donations with respect to the past donations is positive and significant. It is 0.745*** for the overall sample and lies between 0.29 and 0.47 for particular industries analyzed. It seems to be higher for higher education, hospitals and human services, i.e. organizations which are larger and more stable over time. Those findings confirm the hypothesis that donations are positively related to past donations. The specification, however, does not allow to distinguish whether it happens because the donors regard past donations as a signal of quality or because of other motives like the persistence in the donative behavior of the individuals.

The estimates of fund-raising elasticity are positive and significant in all cases. These findings are in general in line with previous studies.[11] Program revenues have negative significant effects on donations, except for hospitals (insignificant) and higher education (positive significant). The pattern for assets is mixed.

[11]Significant positive elasticities of fund-raising has been found by, among others, Frumkin & Kim (2001), Khanna & Sandler (2000), Tinkelman (1998 and 1999).

Table 3.2: 10% sample: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.871***	0.262***	0.471***	0.745***
	(0.002)	(0.007)	(0.030)	(0.020)
lnFUNDit	0.046***	0.040***	-0.033***	0.031***
	(0.001)	(0.003)	(0.009)	(0.007)
lnCOMit	0.031***	0.052***	-0.045**	0.036***
	(0.001)	(0.004)	(0.016)	(0.009)
lnASSit	-0.023***	-0.018	-0.146***	0.023**
	(0.003)	(0.012)	(0.018)	(0.009)
lnPREVit	-0.024***	-0.129***	-0.165***	-0.034***
	(0.001)	(0.006)	(0.008)	(0.004)
year effects	yes	yes	yes	yes
AR1, p-value	0.000		0.000	0.000
AR2, p-value	0.2472		0.521	0.130
P-Hansen			0.709	0.157
P-Diff-Hansen				0.476
No. of obs.	40028	40028	32561	40028
No. of groups		7274	6772	7274
No. of instruments			198	222

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 3.3: Higher education: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
$lnDON_{i,t-1}$	0.879***	0.229***	0.251***	0.385***
	(0.011)	(0.037)	(0.067)	(0.061)
$lnFUND_{i,t}$	0.046***	0.038***	-0.003	0.071***
	(0.005)	(0.008)	(0.023)	(0.021)
$lnCOM_{i,t}$	0.013***	0.040***	0.026	0.075***
	(0.005)	(0.012)	(0.034)	(0.025)
$lnASS_{i,t}$	0.029**	0.174**	0.224**	0.299***
	(0.012)	(0.075)	(0.105)	(0.058)
$lnPREV_{i,t}$	0.008	-0.001	-0.030	0.076***
	(0.009)	(0.061)	(0.113)	(0.028)
year effects	yes	yes	yes	yes
AR1, p-value	0.000		0.000	0.000
AR2, p-value	0.650		0.506	0.994
P-Hansen			0.584	0.176
P-Diff-Hansen				0.007
No. of obs.	11382	11382	9432	11382
No. of groups	1917	1917	1823	1917
No. of instruments			217	242

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 3.4: Hospitals: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
$lnDON_{i,t-1}$	0.902***	0.284***	0.323***	0.469***
	(0.011)	(0.044)	(0.064)	(0.048)
$lnFUND_{i,t}$	0.064***	0.041	0.006	0.117***
	(0.009)	(0.027)	(0.045)	(0.044)
$lnCOM_{i,t}$	0.032***	0.047	-0.023	0.133**
	(0.009)	(0.030)	(0.078)	(0.065)
$lnASS_{i,t}$	-0.046**	-0.089	-0.043	-0.099
	(0.021)	(0.125)	(0.141)	(0.075)
$lnPREV_{i,t}$	0.002	-0.057	-0.028	0.047
	(0.008)	(0.074)	(0.112)	(0.034)
year effects	yes	yes	yes	yes
AR1, p-value	0.004		0.000	0.000
AR2, p-value	0.134		0.093	0.994
P-Hansen			0.126	0.069
P-Diff-Hansen				0.041
No. of obs.	2768	2768	2134	2768
No. of groups	619	619	561	619
No. of instruments			216	243

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 3.5: International Relief: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
$lnDON_{i,t-1}$	0.794***	0.230***	0.302***	0.355***
	(0.028)	(0.047)	(0.070)	(0.069)
$lnFUND_{i,t}$	0.042***	0.040***	0.016	0.058***
	(0.006)	(0.008)	(0.018)	(0.014)
$lnCOM_{i,t}$	0.025***	0.026*	0.004	0.029
	(0.005)	(0.014)	(0.023)	(0.020)
$lnASS_{i,t}$	0.030***	0.040**	0.007	0.177***
	(0.010)	(0.017)	(0.019)	(0.036)
$lnPREV_{i,t}$	-0.041	-0.142***	-0.187***	-0.068***
	(0.009)	(0.035)	(0.050)	(0.019)
year effects	yes	yes	yes	yes
AR1, p-value	0.017		0.000	0.000
AR2, p-value	0.081		0.306	0.245
P-Hansen			0.645	0.486
P-Diff-Hansen				0.296
No. of obs.	5514	5514	4252	5514
No. of groups	1235	1235	1081	1235
No. of instruments			211	236

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 3.6: The Arts: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
$lnDON_{i,t-1}$	0.842***	0.250***	0.328***	0.470***
	(0.009)	(0.021)	(0.039)	(0.033)
$lnFUND_{i,t}$	0.031***	0.032***	0.039***	0.059***
	(0.002)	(0.004)	(0.010)	(0.008)
$lnCOM_{i,t}$	0.026***	0.032***	0.016	0.069***
	(0.002)	(0.005)	(0.016)	(0.012)
$lnASS_{i,t}$	0.010**	0.023*	-0.002	0.096***
	(0.005)	(0.012)	(0.020)	(0.018)
$lnPREV_{i,t}$	-0.017***	-0.051***	-0.078***	-0.034***
	(0.002)	(0.008)	(0.013)	(0.005)
year effects	yes	yes	yes	yes
AR1, p-value	0.000		0.000	0.000
AR2, p-value	0.424		0.976	0.393
P-Hansen			0.238	0.012
P-Diff-Hansen				0.476
No. of obs.	25168	25168	20080	25168
No. of groups	4921	4921	4480	4921
No. of instruments			222	247

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 3.7: Museums: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
$lnDON_{i,t-1}$	0.816***	0.245***	0.289***	0.476***
	(0.014)	(0.028)	(0.047)	(0.035)
$lnFUND_{i,t}$	0.042***	0.049***	0.050***	0.088***
	(0.003)	(0.006)	(0.012)	(0.009)
$lnCOM_{i,t}$	0.025***	0.044***	0.038**	0.073***
	(0.003)	(0.006)	(0.014)	(0.015)
$lnASS_{i,t}$	0.002	-0.020	-0.064**	0.064**
	(0.006)	(0.020)	(0.022)	(0.022)
$lnPREV_{i,t}$	-0.001	-0.028**	-0.027**	-0.002
	(0.002)	(0.010)	(0.010)	(0.007)
year effects	yes	yes	yes	yes
AR1, p-value	0.000		0.000	0.000
AR2, p-value	0.615		0.313	0.713
P-Hansen			0.427	0.000
P-Diff-Hansen				0.215
No. of obs.	17703	17703	14233	17703
No. of groups	3366	3366	3063	3366
No. of instruments			222	247

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 3.8: Disaster Relief: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
$lnDON_{i,t-1}$	0.819***	0.226***	0.293***	0.393***
	(0.011)	(0.022)	(0.038)	(0.037)
$lnFUND_{i,t}$	0.017***	0.018**	0.014	0.045***
	(0.003)	(0.006)	(0.011)	(0.010)
$lnCOM_{i,t}$	0.011***	0.025*	0.035	0.053
	(0.003)	(0.012)	(0.035)	(0.019)
$lnASS_{i,t}$	0.047***	-0.047	-0.105**	0.176***
	(0.008)	(0.028)	(0.037)	(0.023)
$lnPREV_{i,t}$	-0.043***	-0.133***	-0.167***	-0.113***
	(0.004)	(0.012)	(0.018)	(0.009)
year effects	yes	yes	yes	yes
AR1, p-value	0.000		0.000	0.000
AR2, p-value	0.5821		0.497	0.822
P-Hansen			0.750	0.002
P-Diff-Hansen				0.215
No. of obs.	19545	19545	15472	19545
No. of groups	3931	3931	3542	3931
No. of instruments			220	245

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

Table 3.9: Human Services: coefficient estimates of donations' function (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
$lnDON_{i,t-1}$	0.885***	0.264***	0.359***	0.502***
	(0.005)	(0.017)	(0.032)	(0.025)
$lnFUND_{i,t}$	0.027***	0.028***	0.022**	0.068***
	(0.002)	(0.003)	(0.007)	(0.006)
$lnCOM_{i,t}$	0.038***	0.065***	0.040*	0.117***
	(0.002)	(0.008)	(0.019)	(0.016)
$lnASS_{i,t}$	0.017***	0.025	0.011	0.116***
	(0.005)	(0.017)	(0.025)	(0.019)
$lnPREV_{i,t}$	-0.018***	-0.113***	-0.164***	-0.026***
	(0.002)	(0.011)	(0.016)	(0.007)
year effects	yes	yes	yes	yes
AR1, p-value	0.000		0.000	0.000
AR2, p-value	0.273		0.566	0.134
P-Hansen			0.147	0.000
P-Diff-Hansen				0.000
No. of obs.	40532	40532	32903	40532
No. of groups	7450	7450	6879	7450
No. of instruments			222	247

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]*** significant at 0.01 level, ** significant at 0.05 level, * significant at 0.1 level

3.4.2 Extended Specification

The extended specification includes additional variables being price and past fund-raising expenditures. Previous studies has confirmed price as important determinant of individual contributions. However, my measure of price is missing the information about administrative expenses. Therefore, I exclude it from the main specification. Past fund-raising expenditures is another measure which can be found in financial disclosures and is of substantial interest to potential donors.

The regression results for different fields can be consulted in tables 3.10-3.17. The left part of the table (columns I-) presents the results when organizations with zero fund-raising costs are included whereas the second part of the table (columns II-) presents the results when organizations with zero fund-raising costs are excluded. Columns Ia, Ib, IIa and IIb of each table show the estimation results for OLS and WITHIN estimations. Both give biased coefficient estimates of $lnDON_{i,t-1}$ for reasons explained above. However, I show them both for comparison. Because I expect the OLS coefficient estimate on past donations to be biased upwards and the WITHIN coefficient estimate to be biased downwards, the true coefficient estimate should lie in between these two.

The columns Ic and IIc of each table report the estimation results for difference GMM specification. The columns Id and IId of each table report the estimation results for system GMM specification. Those have been obtained with the command xtabond2 in Stata.[12] The coefficients of past donations

[12] For more information, see Roodman (2006).

lie, as expected, in between of those obtained from the OLS and WITHIN estimations (or at least are not significantly different from).

Table 3.10, part I presents estimation results for the 10 % sample, all industry types and including organizations with zero fund-raising costs. The p-value of the AR2 test in column Ic and Id suggest that the hypothesis of second-order autocorrelation cannot be rejected. Therefore in table 3.11 I present the results when also second lag of $lnDON$ is included. In this specification, however, the hypothesis of second-order autocorrelation for GMM Difference (column Ic) is rejected. Because $T > 3$ in the panel and because the model is overidentified and one can implement the Hansen test of overidentifying restrictions. This test does not reject the validity of the moment conditions used for this difference GMM specification. Because the Difference-in-Hansen test of the additional moment conditions used in the GMM system against the difference specification rejects additional moment conditions, difference GMM is the preferred specification in this case. This suggests the overall elasticity of past donations to be 0.347***. It means that organization receiving 1% more donations in given year, can expect a spillover effect of 0.35% more donations in the next year.

Table 3.10 and 3.11, part II presents estimation results for the 10 % sample, all industry types and excluding organizations with zero fund-raising costs. While in the first table the coeficcient estimate for past donations from both GMM specifications is not statistically significant, it is significant when also second lag is included. The test statistics suggest the includion of second lag and GMM difference being the preffered specification. This suggests the long term elasticity of 0.263. The coefficients on price and fund-raising are not significant in the preferred specifications.

In the higher education sample, table 3.12, based on test statistics, the preferred specification is difference GMM. This suggests, the elasticity of past donations of 0.222*** for all organizations. When excluding organizations reporting zero fund-raising expenses, this coefficient is not significant.

In the hospital sample, table 3.13, based on test statistics, the preferred specification is system GMM. Because the number of organizations when excluding zero-fund-raising organizations drops to 56 for difference GMM and 78 for system GMM, the number of instruments should be reduced. Therefore I use only second and third lags as instruments. The results suggest the elasticity with respect to past donations to be 0.432*** in the overall sample and 0.673*** in the sample of organizations with positive fund-raising expenses.

In the international relief sample, table 3.14, based on test statistics, the preferred specification is system GMM. The coefficient estimate of elasticity with respect to past donations is 0.329***. When excluding organizations with zero fund-raising expenses, this coefficient becomes insignificant.

In the case of arts, table 3.15, the chosen specification is difference GMM for the overall sample and system GMM if zero-fund-raising organizations are excluded. The coefficient estimate of elasticity with respect to past donations is 0.299*** and 0.316***.

In the case of museum, table 3.16, the chosen specification is difference GMM for the overall sample and system GMM if zero-fund-raising organizations are excluded. The coefficient estimate of elasticity with respect to past donations is 0.280*** and 0.422***.

In the case of disaster, table 3.17, the chosen specification is difference GMM for the overall sample and system GMM if zero-fund-raising organizations are excluded. The coefficient estimate of elasticity with respect to past donations is 0.264*** and 0.394***.

In all specifications, the coefficient estimates of fund-raising elasticity are higher after exclusion of organizations reporting zero fund-raising expenses.

Table 3.10: Coefficient estimates of donations' function: 10% sample, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.870***	0.259***	0.227**	0.327***	0.836***	0.194***	0.043	0.199
	(0.002)	(0.007)	(0.074)	(0.077)	(0.010)	(0.028)	(0.073)	(0.118)
lnPRICEit	-0.297***	-0.063	0.234	-0.267	-0.365***	-0.228***	-0.010	-0.007
	(0.030)	(0.052)	(0.190)	(0.203)	(0.041)	(0.054)	(0.195)	(0.184)
lnFUNDit	0.068***	0.042***	-0.009	0.104***	0.169***	0.145***	0.134	0.147*
	(0.002)	(0.003)	(0.024)	(0.024)	(0.010)	(0.010)	(0.085)	(0.062)
lnFUNDit-1	-0.021***	-0.002	-0.004	-0.005	-0.094***	-0.003	0.021	0.038
	(0.002)	(0.002)	(0.010)	(0.012)	(0.010)	(0.008)	(0.027)	(0.034)
lnCOMit	0.030***	0.052***	-0.015	0.100***	0.023***	0.031***	0.001	0.051**
	(0.001)	(0.004)	(0.017)	(0.017)	(0.002)	(0.006)	(0.031)	(0.016)
lnASSit	-0.020***	-0.013	-0.097***	0.070***	0.042***	0.002	-0.078*	0.357***
	(0.003)	(0.012)	(0.022)	(0.015)	(0.005)	(0.019)	(0.037)	(0.057)
lnPREVit	-0.025***	-0.131***	-0.161***	-0.088***	-0.017***	-0.060***	-0.064***	-0.044***
	(0.001)	(0.006)	(0.008)	(0.011)	(0.001)	(0.009)	(0.011)	(0.008)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0425		0.000	0.000	0.0000		0.002	0.000
AR2, p-value	0.9831		0.006	0.000	0.1893		0.344	0.075
P-Hansen			0.000	0.000			0.278	0.015
P-Diff-Hansen				0.000				0.082
N	168232	168232	134416	168232	39607	39607	29675	39607
No. of organizations		32582	29914	32582		9401	7565	9401
No. of instruments			299	333			298	331

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]* p<0.05, ** p<0.01, *** p<0.001

Table 3.11: Coefficient estimates of donations' function: 10 % sample, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-3	GMM SYS t-3	OLS LEVELS	WITHIN GROUPS	GMM DIF t-3	GMM SYS t-3
lnDONit-1	0.709***	0.271***	0.347***	0.433***	0.700***	0.195***	0.129*	0.333***
	(0.005)	(0.007)	(0.048)	(0.050)	(0.016)	(0.028)	(0.064)	(0.064)
lnDONit-2	0.197***	-0.031***	0.052*	0.156***	0.173***	-0.024	0.134***	0.175***
	(0.005)	(0.006)	(0.022)	(0.027)	(0.015)	(0.016)	(0.029)	(0.029)
lnPRICEit	-0.261***	-0.100	0.462*	0.010	-0.319***	-0.228***	0.171	-0.012
	(0.031)	(0.056)	(0.197)	(0.219)	(0.037)	(0.058)	(0.193)	(0.171)
lnFUNDit	0.059***	0.042***	-0.039	0.060**	0.151***	0.142***	0.079	0.108
	(0.003)	(0.003)	(0.021)	(0.022)	(0.010)	(0.011)	(0.070)	(0.059)
lnFUNDit-1	-0.022***	-0.002	0.004	0.007	-0.087***	-0.001	0.043	0.050
	(0.002)	(0.002)	(0.010)	(0.012)	(0.010)	(0.008)	(0.025)	(0.029)
lnCOMit	0.026***	0.052***	-0.054**	0.076***	0.019***	0.033***	-0.021	0.061***
	(0.001)	(0.004)	(0.019)	(0.011)	(0.002)	(0.006)	(0.029)	(0.015)
lnASSit	-0.019***	0.007	-0.126***	0.028**	0.028***	0.009	-0.113**	0.178***
	(0.003)	(0.013)	(0.020)	(0.011)	(0.005)	(0.022)	(0.039)	(0.031)
lnPREVit	-0.022***	-0.129***	-0.161***	-0.059***	-0.015***	-0.059***	-0.066***	-0.036***
	(0.001)	(0.006)	(0.009)	(0.005)	(0.001)	(0.009)	(0.012)	(0.005)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0255		0.000	0.000	0.0001		0.000	0.000
AR2, p-value	0.0000		0.573	0.002	0.0006		0.000	0.003
AR3, p-value	0.1279		0.969	0.039	0.6454		0.917	0.867
P-Hansen			0.388	0.000			0.533	0.002
P-Diff-Hansen				0.000				0.000
N	153605	153605	122667	153605	38001	38001	28566	38001
No. of groups		30169	26837	30169		8940	7204	8940
No. of instruments			291	324			290	323

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]* p<0.05, ** p<0.01, *** p<0.001

Table 3.12: Coefficient estimates of donations' function: higher education, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.877***	0.223***	0.222***	0.377***	0.657***	0.148	0.018	0.121
	(0.012)	(0.038)	(0.064)	(0.061)	(0.067)	(0.094)	(0.075)	(0.073)
lnPRICEit	-0.401	0.266	-0.127	-0.686*	-1.133***	-0.493	-0.624	-1.251**
	(0.242)	(0.398)	(0.280)	(0.294)	(0.149)	(0.310)	(0.392)	(0.480)
lnFUNDit	0.060***	0.031***	0.048	0.161***	0.394***	0.269***	0.500*	0.479
	(0.011)	(0.009)	(0.030)	(0.044)	(0.056)	(0.053)	(0.207)	(0.280)
lnFUNDit-1	-0.017	0.008	-0.065**	-0.036	-0.279***	-0.100*	-0.055	-0.120
	(0.011)	(0.010)	(0.021)	(0.023)	(0.061)	(0.042)	(0.046)	(0.073)
lnCOMit	0.011*	0.036**	-0.056	0.009	-0.002	0.001	-0.055	-0.062
	(0.005)	(0.012)	(0.066)	(0.042)	(0.004)	(0.004)	(0.065)	(0.035)
lnASSit	0.047***	0.259*	0.350*	0.361***	0.152***	0.204	-0.011	0.408*
	(0.014)	(0.103)	(0.158)	(0.071)	(0.024)	(0.135)	(0.293)	(0.185)
lnPREVit	0.005	-0.006	-0.034	0.062*	0.006	0.152	0.283	-0.002
	(0.010)	(0.063)	(0.118)	(0.029)	(0.029)	(0.159)	(0.228)	(0.053)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0000		0.000	0.000	0.1120		0.000	0.031
AR2, p-value	0.6151		0.428	0.926	0.1190		0.298	0.694
P-Hansen			0.768	0.020			0.402	0.084
P-Diff-Hansen				0.015				0.002
N	11288	11288	9355	11288	7062	7062	5827	7062
No. of groups		1886	1802	1886		1188	1121	1188
No. of instruments			286	319			276	307

Notes:
[a]Source: authors own calculations
[b]robust clustered standard errors in parenthesis
[c]* p<0.05, ** p<0.01, *** p<0.001

Table 3.13: Coefficient estimates of donations' function: hospitals, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.901***	0.275***	0.289***	0.432***	0.876***	0.289***	0.048	0.673***
	(0.012)	(0.045)	(0.070)	(0.050)	(0.057)	(0.083)	(0.087)	(0.135)
lnPRICEit	-0.492*	-0.341	-0.108	-0.142	-0.587*	0.083	0.792	0.595
	(0.204)	(0.411)	(0.318)	(0.220)	(0.272)	(0.211)	(0.621)	(0.827)
lnFUNDit	0.078**	0.044	0.007	0.082*	0.286	-0.076	-0.467	0.142
	(0.025)	(0.028)	(0.041)	(0.041)	(0.156)	(0.082)	(0.433)	(0.194)
lnFUNDit-1	-0.005	0.028	0.008	0.034	-0.177	-0.045	-0.161	-0.033
	(0.026)	(0.025)	(0.034)	(0.043)	(0.141)	(0.067)	(0.168)	(0.145)
lnCOMit	0.033**	0.034	0.020	0.171*	0.007	0.009	0.235	0.140*
	(0.010)	(0.032)	(0.087)	(0.071)	(0.014)	(0.014)	(0.230)	(0.068)
lnASSit	-0.055*	0.166	0.062	-0.187	0.013	0.035	-0.377	-0.061
	(0.025)	(0.183)	(0.227)	(0.103)	(0.038)	(0.112)	(0.273)	(0.114)
lnPREVit	0.003	-0.054	-0.022	0.049	-0.008	-0.279	-0.377	-0.061
	(0.009)	(0.080)	(0.113)	(0.035)	(0.014)	(0.279)	(0.305)	(0.035)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0036		0.000	0.000	0.4333		0.022	0.003
AR2, p-value	0.1365		0.089	0.182	0.4513		0.943	0.963
P-Hansen			0.670	0.896			0.763	0.757
P-Diff-Hansen				0.339				0.677
N	2719	2719	2098	2719	267	267	184	267
No. of groups		604	553	604		78	56	78
No. of instruments			286	321			50	73

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]* p<0.05, ** p<0.01, *** p<0.001

Table 3.14: Coefficient estimates of donations' function: international relief, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.787***	0.221***	0.275***	0.329***	0.790***	-0.005	0.097	0.161
	(0.031)	(0.048)	(0.061)	(0.073)	(0.065)	(0.114)	(0.090)	(0.101)
lnPRICEit	-0.460**	-0.147	-0.177	-0.124	-0.810*	-0.924*	-1.349**	-0.449
	(0.158)	(0.113)	(0.310)	(0.210)	(0.342)	(0.445)	(0.485)	(0.293)
lnFUNDit	0.061***	0.037***	-0.002	0.049	0.250***	0.239***	0.342***	0.272***
	(0.009)	(0.009)	(0.041)	(0.031)	(0.034)	(0.038)	(0.077)	(0.068)
lnFUNDit-1	-0.019*	0.011	-0.015	0.025	-0.122***	0.046	0.028	0.053
	(0.008)	(0.006)	(0.022)	(0.021)	(0.028)	(0.029)	(0.034)	(0.041)
lnCOMit	0.024***	0.027	0.039	0.053	0.010*	0.023*	0.019	0.085***
	(0.005)	(0.014)	(0.032)	(0.027)	(0.005)	(0.010)	(0.024)	(0.024)
lnASSit	0.052**	0.030	-0.058	0.237***	0.044	0.057	-0.099*	0.263***
	(0.017)	(0.037)	(0.046)	(0.047)	(0.023)	(0.047)	(0.045)	(0.053)
lnPREVit	-0.043***	-0.142***	-0.186***	-0.086***	-0.018	-0.046	-0.087	-0.048**
	(0.010)	(0.036)	(0.052)	(0.019)	(0.010)	(0.030)	(0.054)	(0.018)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0285		0.000	0.000	0.0323		0.006	0.006
AR2, p-value	0.1086		0.498	0.460	0.0138		0.209	0.165
P-Hansen			0.085	0.127			0.490	0.345
P-Diff-Hansen				0.014				0.207
N	5341	5341	4126	5341	1797	1797	1309	1797
No. of groups		1181	1040	1181		461	375	461
No. of instruments			280	313			271	304

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]* p<0.05, ** p<0.01, *** p<0.001

Table 3.15: Coefficient estimates of donations' function: arts, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.841***	0.248***	0.299***	0.477***	0.821***	0.076	-0.027	0.316***
	(0.010)	(0.023)	(0.039)	(0.035)	(0.034)	(0.080)	(0.049)	(0.080)
lnPRICEit	-0.144	0.054	0.312	-0.038	-0.128	-0.099	-0.077	-0.474
	(0.092)	(0.171)	(0.245)	(0.361)	(0.094)	(0.122)	(0.174)	(0.271)
lnFUNDit	0.046***	0.032***	0.002	0.069**	0.156***	0.150***	0.155**	0.390***
	(0.004)	(0.005)	(0.020)	(0.022)	(0.022)	(0.019)	(0.053)	(0.078)
lnFUNDit-1	-0.015***	-0.006	-0.005	-0.012	-0.076***	0.031	0.010	-0.017
	(0.004)	(0.004)	(0.009)	(0.011)	(0.023)	(0.019)	(0.027)	(0.067)
lnCOMit	0.025***	0.032***	-0.060*	0.033*	0.018***	-0.001	-0.030	0.002
	(0.002)	(0.006)	(0.025)	(0.017)	(0.004)	(0.011)	(0.033)	(0.031)
lnASSit	0.016*	0.009	-0.081**	0.178***	0.027*	0.006	-0.103*	0.160**
	(0.006)	(0.020)	(0.029)	(0.026)	(0.012)	(0.037)	(0.044)	(0.061)
lnPREVit	-0.018***	-0.051***	-0.075***	-0.030***	-0.006	-0.017	-0.036	-0.017*
	(0.002)	(0.009)	(0.013)	(0.006)	(0.003)	(0.010)	(0.018)	(0.008)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0000		0.000	0.000	0.0000		0.000	0.000
AR2, p-value	0.5474		0.782	0.468	0.0479		0.741	0.095
P-Hansen			0.889	0.052			0.500	0.264
P-Diff-Hansen				0.019				0.935
N	24668	24668	19673	24668	6955	6955	5212	6955
No. of groups		4793	4380	4793		1638	1334	1638
No. of instruments			295	328			278	311

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]* p<0.05, ** p<0.01, *** p<0.001

Table 3.16: Coefficient estimates of donations' function: museum, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.813***	0.241***	0.280***	0.500***	0.683***	0.196***	0.249***	0.422***
	(0.015)	(0.028)	(0.045)	(0.038)	(0.023)	(0.025)	(0.047)	(0.034)
lnPRICEit	0.118	0.260	0.236	0.447	-0.236**	0.070	-0.478	-0.612*
	(0.072)	(0.138)	(0.270)	(0.290)	(0.076)	(0.168)	(0.290)	(0.263)
lnFUNDit	0.063***	0.045***	0.026	0.057*	0.246***	0.166***	0.191**	0.391***
	(0.005)	(0.007)	(0.025)	(0.027)	(0.017)	(0.020)	(0.071)	(0.072)
lnFUNDit-1	-0.029***	-0.003	0.001	-0.016	-0.071***	0.013	-0.002	-0.015
	(0.005)	(0.005)	(0.011)	(0.014)	(0.016)	(0.012)	(0.030)	(0.038)
lnCOMit	0.025***	0.044***	0.029	0.052***	0.011*	0.015*	0.029	0.024
	(0.003)	(0.006)	(0.018)	(0.015)	(0.004)	(0.007)	(0.022)	(0.020)
lnASSit	0.018*	-0.028	-0.191***	0.165***	0.058***	-0.064*	-0.367***	0.089*
	(0.008)	(0.038)	(0.045)	(0.029)	(0.011)	(0.029)	(0.051)	(0.043)
lnPREVit	0.000	-0.027**	-0.021*	0.008	-0.000	-0.013	-0.013	-0.009
	(0.002)	(0.010)	(0.010)	(0.007)	(0.003)	(0.009)	(0.012)	(0.007)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0000		0.000	0.000	0.1266		0.000	0.000
AR2, p-value	0.5500		0.370	0.912	0.3890		0.984	0.446
P-Hansen			0.238	0.032			0.613	0.591
P-Diff-Hansen				0.014				0.053
N	17444	17444	14058	17444	7783	7783	6094	7783
No. of groups		3272	2992	3272		1616	1413	1616
No. of instruments			297	330			284	318

Notes:
[a]Source: authors own calculations
[b]robust clustered standard errors in parenthesis
[c]* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 3.17: Coefficient estimates of donations' function: disaster, all periods (the dependent variable is $lnDON_{i,t}$).

	all organizations				organizations reporting non-zero fund-raising expenses			
	Ia	Ib	Ic	Id	IIa	IIb	IIc	IId
	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
lnDONit-1	0.813***	0.214***	0.264***	0.383***	0.878***	0.039	0.096	0.394***
	(0.012)	(0.023)	(0.037)	(0.037)	(0.026)	(0.044)	(0.066)	(0.062)
lnPRICEit	-0.315***	-0.108	-0.029	-0.324	-0.326***	-0.154	0.159	-0.255
	(0.076)	(0.107)	(0.181)	(0.232)	(0.082)	(0.206)	(0.169)	(0.264)
lnFUNDit	0.038***	0.023***	-0.016	0.047	0.074*	0.032	-0.010	-0.024
	(0.006)	(0.006)	(0.026)	(0.030)	(0.032)	(0.027)	(0.103)	(0.127)
lnFUNDit-1	-0.017**	-0.008	-0.007	-0.021	-0.037	0.015	0.066*	-0.065
	(0.006)	(0.005)	(0.013)	(0.014)	(0.031)	(0.018)	(0.033)	(0.063)
lnCOMit	0.010**	0.022*	0.074	0.042	0.002	0.025*	0.090	0.022
	(0.003)	(0.011)	(0.046)	(0.022)	(0.003)	(0.012)	(0.060)	(0.031)
lnASSit	0.078***	-0.071	-0.234***	0.287***	0.049**	-0.111*	-0.200***	0.389***
	(0.010)	(0.047)	(0.069)	(0.033)	(0.017)	(0.056)	(0.056)	(0.064)
lnPREVit	-0.045***	-0.135***	-0.167***	-0.116***	-0.019***	-0.066**	-0.078**	-0.065***
	(0.004)	(0.012)	(0.018)	(0.010)	(0.005)	(0.021)	(0.030)	(0.013)
year effects	yes	yes	yes	yes	yes	yes	yes	yes
AR1, p-value	0.0000		0.000	0.000	0.0424		0.000	0.000
AR2, p-value	0.2260		0.808	0.222	0.0146		0.539	0.711
P-Hansen			0.414	0.002			0.543	0.090
P-Diff-Hansen				0.001				0.619
N	19277	19277	15238	19277	4457	4457	3147	4457
No. of groups		7250	6746	7250		2878	2405	2878
No. of instruments			298	331			285	319

Notes:

[a]Source: authors own calculations

[b]robust clustered standard errors in parenthesis

[c]* p<0.05, ** p<0.01, *** p<0.001

3.4.3 Comparing before and after periods

To test whether the effect of past donations was different since the watchdog agencies started their operations and offered easy online access to financial disclosures I add to the main specification a interaction term: $lnDON_{i,t-1}$ x dummy1996-2004. The variable dummy1996-2004 equals to one for years 1996,...,2004 and zero otherwise. Similarly I run a regression with with following interaction term: $lnDON_{i,t-1}$ x dummy2001-2004. Third regression includes two interaction terms: $lnDON_{i,t-1}$ x dummy1996-2000 and dummy2001-2004. The results for the overall sample are presented in table 3.18.The preferred specification is difference GMM for all three regressions. The coefficient estimates for the interaction terms are 0.038 (dummy1996-2004) in the first specification, -0.019*** (dummy2001-2004) in the second specification and 0.036 (dummy1996-2001) and 0.017 (dummy2001-2004) in the third specification. Whereas the effect of past donations after 1996 has increased, this effect is not significant. The effect after 2001 is significantly negative. The last could be explained with different donative behavior in and after the crisis. Overall, the results do not support the hypothesis that the effect of past donations is stringer in later years.

Table 3.18: Coefficient estimates of donations' function: 10% sample, comparing early with late years (the dependent variable is $lnDON_{i,t}$).

	OLS LEVELS	WITHIN GROUPS	GMM DIF t-2	GMM SYS t-2
	dummy 1996-2004			
lnDONit-1	0.834***	0.248***	0.442***	0.912***
	(0.038)	(0.026)	(0.035)	(0.087)
lnDONit-1*dummy1996-2004	0.037	0.024	0.038	-0.020
	(0.038)	(0.025)	(0.023)	(0.086)
P-Hansen			0.154	0.000
P-Diff-Hansen				0.000
N	169725	169725	135811	169725
No. of groups			30053	32752
No. of instruments			205	232
	dummy 2001-2004			
lnDONit-1	0.869***	0.277***	0.445***	0.855***
	(0.003)	(0.007)	(0.030)	(0.015)
lnDONit-1*dummy2001-2004	0.004	-0.010**	-0.019***	0.044***
	(0.003)	(0.003)	(0.005)	(0.011)
P-Hansen			0.322	0.000
P-Diff-Hansen				0.000
N	169725	169725	135811	169725
No. of groups			30053	32752
No. of instruments			205	232
	dummy 1996-2000 and dummy 2001-2004			
lnDONit-1	0.834***	0.251***	0.410***	0.926***
	(0.038)	(0.026)	(0.034)	(0.087)
lnDONit-1*dummy1996-2001	0.035	0.026	0.036	-0.005
	(0.038)	(0.025)	(0.021)	(0.087)
lnDONit-1*dummy2001-2004	0.039	0.015	0.017	-0.009
	(0.038)	(0.025)	(0.022)	(0.087)
P-Hansen			0.339	0.000
P-Diff-Hansen				0.000
N	169725	169725	135811	169725
No. of groups			30053	32752
No. of instruments			205	233

Notes:
[a]Source: authors own calculations
[b]other controls: lnPRICEi,t, lnFUNDi,t, lnFUNDi,t-1, lnCOMi,t, lnASSi,t, lnPREVi,t, year dummies
[c]robust clustered standard errors in parenthesis
[d]* p<0.05, ** p<0.01, *** p<0.001

3.5 Conclusions

The evidence in this chapter suggests that the level of past donations have a positive impact on current ones. This confirms the theoretical model of Vesterlund (2003) and Andreoni (2006). Consequently, the practical recommendation for nonprofit organizations is to openly publish the numbers concerning past donations.

The evidence has been established by using data from the IRS Form 990 on nonprofit organizations from seven different fields: higher education, museums, arts, hospital, international relief, disaster relief and human services. For the dynamic context appropriate estimation methods (difference and system GMM) have been implemented. Additional findings confirm the hypothesis that fund-raising expenses have a positive impact on the level of donations. Compensations are positively correlated with donations and program revenues are, in most cases, negatively correlated with donations.

However, the US seems to be a very special case due to the very high activity of the nonprofit sector. Whereas charitable giving accounts for 1.67% of the GDP in the US, it reaches 0.73% in UK and only 0.22% in Germany followed by France with 0.14%.[13] Therefore, donative behavior might also be different with respect to different countries and cultures and one should be cautious in interpreting various results.

[13] For more information concerning the international comparisons of charitable giving, see for example CAF briefing paper (2006)

Chapter 4

Social Norms and Charitable Giving

> "They [norms] constitute constraints on individual behavior beyond the legal, information and budget constraints usually considered by economists."
>
> Fehr and Gächter 1999.

4.1 Introduction

In economics, there is no clear consensus on what a social norm is and whether it plays any role in influencing individual behavior. In contrast, in sociology it is widely recognized that social norms influence the behavior of individuals. In this literature, in general, norms are assumed to be exogenous and to work through sanctions imposed by other individuals.[1] In economic literature, a number of authors describe social norms as emerging from the repeated inter-

[1] For more information, see for example Bicchieri and Muldoon (2011).

actions of individuals who maximize their own (material) utility.[2] However, one often encounters situations that arise on a once-off or infrequent basis in which the individuals do not pursue their materialistic goals but rather some known norm is reflected in their behavior. Those situations frequently arise in the context of charitable giving, collective action, family matters, or crime.

For example, for the private provision of a public good one expects a high level of free riding, i.e one expects individual contributions to be very small. However, neither experiments[3] nor the observations of reality (for example giving in the US amounts to over $300 billion a year) confirm this hypothesis. Jackson, Bachmeier, Wood and Craft (1995) find that religious associations, by encouraging norms of charitable giving, promote the amount of volunteering and giving to nonsecular causes among their members.

Another example provides a study by Hong and Kacperczyk (2009). The authors empirically analyzed a norm that influenced investor's choices when buying stocks. They found out that some investors (for example pension plans) are biased against investing in companies involved in producing alcohol, tobacco, and gaming despite higher expected returns. But otherwise they seek to maximize expected returns.

Traditional game theory approaches perform poorly when explaining such phenomena as elderly care by relatives, the care of disabled, or honor killing. More examples of such puzzles include the fact that citizens go to polls even if the probability that their votes are pivotal is infinitely small. People (usually)

[2]For more information, see for example Kandori (1992).

[3]For more information, see for example Isaac et al. (1984).

do not steal even if they can be sure to remain undiscovered. Groups impose standards on their members, for example dress, slang, and career choices. Those deviations from Nash equilibrium play can be better explained by the prevalence of some norm or tradition. Consequently, it is promising to supplement game theory approach by approaches that account for social norms in order to have both mathematical rigor and more accurate predictions. I propose a framework for normal form games in which the specification of a social norm can influence players behavior. In this extended game Nash equilibria remain the same but there arise new *norm equilibria* with distinct outcomes.

This chapter addresses this issue and introduces social norms into onetime simultaneous games. The next section presents a review of the relevant literature. Section 4.3 introduces social norms into normal form games and proposes an approach to solve them. Section 4.4 presents several examples.

4.2 Literature

The discord between game theoretical predictions of onetime strategic interactions and experimental evidence or real-world observations has been addressed in different ways. The specification of payoffs draws often the attention of the researchers. In order to address this problem, the wide spread approach is to account for mental utility, internal sanctions or other-regarding preferences in the utility function.[4] Andreoni (1989) assumes that

[4]For more information, see for example Ostrom (1998), Bicchieri (2010) and Winter (2009).

people feel a "warm glow" when donating to charitable causes, others assume that individuals feel guilt when committing a crime etc. Rabin (1993) extends the material payoffs of a player by some payoffs reflecting their kindness towards the other players and reflecting the player's beliefs concerning the kindness of the other players towards himself. Bacharach (2006) assumes that a considerable portion of individuals plays the games from an utilitaristic perspective, maximizing the aggregated utility. Alternatively, if the game might be better described as a repeated game, the Folk Theorem might apply. In a subgame perfect Nash equilibrium of an infinitely repeated game, in which agents weight future payoffs sufficiently high, any mutually beneficial outcome can be achieved. Similarly, Kandori 1992 shows that the same result holds even when the agents play the same game with changing partners (but the size of the population is bounded).

One of the possible generalizations of the Nash equilibrium concept provides Aumann's correlated equilibrium.[5] In this concept there is a probability distribution over the strategy space rather than over individual strategies. Given a recommendation of a third party or given that the decisions of how to play are conditioned on some publicly available signal, the equilibrium will be reached if the individuals cannot make themselves better off by deviating. For example, in a game of chicken such a recommendation might lead to higher payoffs than those predicted by a mixed Nash equilibrium. Other solution concepts include K-level thinking, heuristics, etc.

Authors who explicitly introduced social norms and conventions into game theory are, among others, Schelling (1960), Lewis (1969), Ullmann-Margalit

[5]For more information, see for example Aumann (1987).

(1977), Sudgen (1986), Young (1993), Vandrshraaf (1995) and Bicchieri (1993) and (2006). Schelling looks at coordination games and suggests that there are some details of the game (be it mathematical, aesthetic, historical, legal, moral, cultural or other suggestive and connotative details) which capture the attention of a player and direct her expectations in a certain direction. This focal point helps then to arrive at an equilibrium. Bicchieri's approach is to adjust payoffs in such a way such that for example a prisoners dilemma game becomes a coordination game with the only Nash equlibrium with both players choosing coordinate instead of defect. Akerlof (1976) describes social customs as a self-fulfilling equilibrium given sufficiently severe punishments and his motivating example is the caste system in India. Young (1998) describes conventions as an equilibrium of a game. According to him a 50-50 division of one dollar between two parties "is a convention because it is a usual and customary equilibrium in games of this kind". He points out that "conventions reduce transaction costs by coordinating expectations and reducing uncertainty" and gives the example of differing right- and left-hand-side traffic conventions in 1920s Italy.

This project takes a diffrent approach to social norms. It introduces them directly into a normal form game and proposes a new approach to solve those extended games.

4.3 Norms

The following definition of social norm is based on Bicchieri (2006). Social norms are unwritten rules which prescribe and proscribe behavior in certain situations. For a norm to influence the behavior it is important that the particular individual knows the norm and knows that it applies to a particular situation. Morover, she must believe that the others behave according to this norm and that the others expect her to behave according to this norm, too. Gächter and Herrmann (2009) conclude from their vast experimental research on public goods problems that around 50% of the subjects are conditional cooperators. They decide the size of their contribution conditional on the beliefs of how much the others contribute. Moreover, "if cooperators know that they are among other 'like-minded' cooperators, they are able to maintain very high levels of cooperation [...] because conditional cooperators will adjust their cooperative behaviour to those observed around them and to what they believe others will do [...] (Gächter and Herrmann 2009)." In other experiments Bicchieri and Xiao (2009) and Bicchieri and Chavez (2010) find that individuals follow a shared norm when (a) they expect the others to follow the norm and (b) they believe that the others expect them to follow the norm. Moreover, they observe that if either (a) or (b) does not hold, individuals' actions deviate from the norm.

My approach is to introduce those expectations towards the other and towards oneself explicitly into the model and assume that the state is in equilibrium only if those expectations are matched with the true actions. I assume that the norms are exogenously given and I am not concerned with the the evolution of those. Furthermore, I analyze the behavior of individuals in one-shot games.

Consider a normal form game G (described by the number of players N, the strategies of players S and the payoffs U) extended by an established and announced norm. A norm has to specify actions to be taken conditional on the validity of the norm. The validity in this context concerns only the one-shot relationship between a set of agents when playing the game G. 4.1 gives the operationalization of a norm:

$$N = \left\{ \; (s_1^\circ, \ldots, s_n^\circ) \qquad \text{if } \mu_i(s_{-i} = s_{-i}^\circ) = 1 \text{ for all } i \in I \; \right\}, \tag{4.1}$$

where s_i° is the strategy of player i for given beliefs $\mu_i(s_{-i})$ concerning the other players' strategies.[6]

Then the norm equilibrium is defined as follows:

Definition: A *norm equilibrium* of the game $G = (N, S, U, Norm)$ is a strategy profile $s \in S$ and the beliefs μ such that:

i) each player's strategy is rational given the norm, his beliefs about the validity of the norm and the strategies of the other players.

ii) the beliefs of player i are consistent with the players' equilibrium strategies.

In this sense, the norm is a restriction on actions, such that if the norm is activated (and only then) the players do not consider deviations as possibilities. One-sided deviations destroy the norm because the believes must be adjusted such that it does not apply anymore. Consequently, either the norm is valid, and all individuals behave according to the norm, or the norm is not valid and the usual Nash equilibrium applies.

The norm can be seen as a (conditional) commitment device. It is more probable that social norms will arise in common interest games like coordination games than in zero-sum games. However, their existence in zero-sum games is not excluded and the concept applies as well. Next section presents several examples.

[6]For the more explicit modeling of the norm see the appendix to this chapter.

4.4 Examples

4.4.1 The Prisoner's Dilemma and a Welfare Enhancing Norm

Consider the standard prisoner's dilemma with one row player and one column player:[7]

	cooperate	defect
cooperate	4,4	0,6
defect	6,0	1,1

In an infinitely repeated game (cooperate, cooperate) can be supported as a subgame perfect Nash equilibrium given a discount factor sufficiently close to one. But, if the the game is played only one time, the only Nash equilibrium is (defect, defect). However, the superior allocation is clearly (cooperate, cooperate). Even if players would form a coalition, without punishment, the deviation is still each player's best response. Cheap talk does not extend the set of equlibria, either. Still, from the examples at the beginning of this chapter, one can imagine situations in which also in the one-shot game (cooperate, cooperate) might be played but that this matrix either insufficiently describes the reality or that the assumptions concerning the behavior are wrong. Especially, consider the following norm:

$$\left\{ \begin{array}{ll} (\mathit{cooperate}, \mathit{cooperate}) & \text{if } \mu_i(s_j = \mathit{cooperate}) = \mu_j(s_i = \mathit{cooperate}) = 1 \end{array} \right\}. \tag{4.2}$$

[7]The exact value of payoffs is not relevant for the analysis.

In this norm player i will play (cooperate) if he beliefs that the other player j behaves according to the (same) norm.

I claim that (cooperate, cooperate) together with $(\mu_i(s_j = cooperate), \mu_j(s_i = cooperate)) = (1, 1)$ is a norm equilibrium of the prisoner's dilemma game for a given norm (4.2):

i) Given that player i's beliefs are $\mu_i(s_j = cooperate) = 1$, her only action is to cooperate.

ii) Since both players cooperate, the norm is valid and the beliefs are consistent.

Because the norm imposes a restriction on actions, no deviation is possible. The players are better of with the norm than without, so there is no incentive to (bilateraly) abolish the norm.

Obviously, (defect, defect) together with $(\mu_i(s_j = cooperate), \mu_j(s_i = cooperate)) = (0, 0)$ is another equilibrium, since:

i) Given that player i's beliefs are $\mu_i(s_j = cooperate) = 0$, her best response is to defect.

ii) Since both players choose to defect, the beliefs are consistent.

In this game the set of possible equilibria is extended from $\{(defect, defect)\}$ (Nash equlibrium of a standard game) to $\{(defect, defect), (cooperate, cooperate)\}$.

4.4.2 Public Goods

At the beginning of her book "Rationality and coordination", Bicchieri (1993) presents a real-life example of a midnight seminar and a professor who promised his students a certain grade if and only if at least eleven students show up for each session. Apparently each week twelve students appeared. Analogously, consider the following public goods game with 3 players:

- each of the 3 players can give one unit of currency to the public good
- for each unit given to the public good each of the players receives half unit back
- norm:

$$\left\{ \begin{array}{ll} (give, give, give) & \text{if } \mu_i(s_j = give, s_h = abstain) = 1 \text{ for } j \neq h \neq i \end{array} \right\}.$$

The norm of charitable giving prevails as long as (at least) a particular portion of the population donates. However, within the norm, people behave selfish i.e. assuming that a sufficient number of other players give, 'I' can abstain.
If not accounting for the norm, the solution to the above game is given by the strategies (abstain) for all players. The socially optimal solution is given by the strategies (give) played by all the players. The payoffs are summarized in the following tables, where player 1 is the row player, player 2 is the column player and player 3 chooses between the left and the right table.

give			abstain		
	give	abstain		give	abstain
give	$\frac{3}{2};\frac{3}{2};\frac{3}{2}$	1;2;1	give	1;1;2	$\frac{1}{2};\frac{3}{2};\ \frac{3}{2}$
abstain	2;1;1;	$\frac{3}{2};\frac{3}{2};\frac{1}{2}$	abstain	$\frac{3}{2};\frac{1}{2};\ \frac{3}{2}$	1;1;1

Given this particular specification of the norm, the set of equilibria is extended from $\{(a, a, a)\}$ (Nash equilibrium of a standard game) to $\{(a, g, g), (g, a, g), (g, g, a), (a, a, a)\}$.

4.4.3 Norms as Coordination Devices

Norms seem to be especially useful in coordination games. Consider the following game:

	A	B
A	4,4	0,0
B	0,0	1,1

Although this game has two pure Nash equilibria (and one mixed) it is somehow natural to think that players will rather play (A,A), i.e. the following norm naturally arises:

$$\left\{ \begin{array}{ll} (A, A) & \text{if } \mu_i(s_j = A) = \mu_j(s_i = A) = 1 \end{array} \right\}. \tag{4.3}$$

This norm does not change the set of equilibria. It acts solely as a coordination device. There are many norms like this: "first people leave the bus/train, than new passenger enter". But even in new situations structured as in the game above, the individuals usually coordinate on the Pareto superior equilibrium.

In general, a norm does not necessarily lead to a Pareto superior allocation. In the game above, a norm leading to (B,B) is also thinkable. Still, in this equilibrium payoffs are higher than in a mixed Nash equilibrium, where each player plays strategy A with the probability of 0.2 and gets an expected payoff of 0.8. For example, there are different inheritance rules in different societies. Societies which depended on the use of land preferred the (oldest) son to inherit over dividing the land up to small pieces. Pastoral societies preferred to divide the wealth between many descendant. Even after the basic conditions have changed, the (Pareto inferior) norm still prevails.

Bacharach (2006) presents similar concept to which he refers as framing. He cites the experiments in which subjects are expected to coordinate and they choose some focal point (first object in a row, number one, heads, higher payoff).

4.4.4 Prisoner's Dilemma Reversed: Juvenile Behavior

Kahan (1997), in his study on juvenile criminality, explains that juveniles think that they are expected to join gang activities and by joining themselves strengthen the perception of criminality as a norm. This "shared misunderstanding" results in a a high-criminality neighborhood. Similar case might concern smoking. In generall, young people are expected not to smoke and they are widely informed about the negative consequences of smoking. The beginners are not instantenously addicted and there is supposedly nobody who liked her first cigarette. Though there are groups in which smoking is the norm. In those groups young people think that their friends expect them to smoke and they themselves expect the others to behave accordingly.

4.5 Discussion

The opinion that people behave according to norms because of external sanctions or external rewards is widespread. But sanctions and rewards are not necessarily inherent to norms. There are many norms which work without sanctions or even without the supervision.

The external sanctions hypothesis can be easily tested in experiments. In fact, in (e.g. dictator, ultimatum game) experiments without monitoring, subjects do not maximize their material rewards but rather behave according to the "fairness" norm (for a meta study on dictator games see Engel 2011). Although sanctions seem to play an important role in norm creation, once the norm is established their significance fades. The second hypothesis concerning emotions cannot be tested that easily. However, neuroscientists have identified parts of the brain responsible for emotions and cognitive thinking. To some extend it allows them to open the black box of the human mind. The experiment of Rustichini et. al. (2005) involving brain imaging aims explicitly at distinguishing between learning and decision taking. The experimenters conclude that emotions might be important in learning and processing information but the process of decision making seems to be a cognitive process alone. Another experiment by Leland and Grafman (2005) applies different methodology. In their experiment normal individuals as well as individuals with damages in the parts of brain responsible for emotions are instructed to play, among other, dictator and ultimatum games. In both games the decisions taken by both normal and ventromedial (brain damaged) types do not differ significantly but are very different from game theoretical predictions. In other words, people unable to experience emotions and without external sanctions still stick to norms.

4.6 Conclusions

In experiments and real life situations one often observes deviations from Nash equilibrium predictions. Those deviations can often be better explained by the prevalence of some social norm or tradition. Consequently, it is promising to supplement game theory approach by approaches that account for social norms in order to have both mathematical rigor and more accurate predictions. I propose a framework for normal form games in which the specification of a social norm can influence players behavior. In this extended game Nash equilibria remain the same but there arise new *norm equilibria* with distinct outcomes.

This framework allows to better explain and predict the behavior in, for example, situations of charitable giving.

Appendix A

Alternatively, behavior according to social norms can be modeled explicitly. Social norms are then considered to be coordination games which overlap with the games of interest. It is assumed that individuals like to be accepted by the group with which they interact and dislike to be identified as rule-breakers. This is represented by following payoffs:

$$\text{payoffs to player i } = \left\{ \begin{array}{ll} 0 & \text{if behaving according to the norm} \\ & \text{ and given that the others do as well} \\ -B & \text{if } \textbf{not} \text{ behaving according to the norm} \\ & \text{and given that the the others doas well} \\ 0 & \text{otherwise} \end{array} \right| .$$

For only two players this corresponds to the following matrix:

	behavior acc. to the norm	behavior not acc. to the norm
behavior acc. to the norm	0,0	0,$-B$
behavior not acc. to the norm	$-B$,0	0,0

where B is some big number, possibly ∞.

Any onetime simultaneous game of interest can be overlapped with this game and leads to the conclusions presented in the examples above.

Chapter 5

Summary

This dissertation addresses issues in the domain of charitable giving, non-profit organizations and fund-raising.

In the first chapter, I estimated the permanent and transitory tax-price and income elasticity of charitable giving in Germany using rich panel data of tax return for the years 2001-2006. To identify the effect of interest, I use the tax reform implemented gradually in 2004 and 2005. Further, the estimation method addresses omitted variable bias, the endogeneity of tax-price and after-tax income as well as possibly heterogeneous effects of non-price and price variables. The results suggest that the permanent tax-price elasticity varies significantly by income class, ranging from -0.2 for low incomes to -1.6 for higher incomes. Overall, weighted permanent price elasticity is slightly below -1 implying the effectiveness of fiscal incentives to stimulate donations in Germany. Permanent income elasticity does not vary much among income classes and is rather low, between 0.2-0.3. I found evidence that the donors adjust their donations gradually after changes in tax schedule and respond to future predictable changes in price. They respond mainly to changes in current and, to a smaller extent, in future income.

This is the first analysis of giving behavior in Germany which exploits panel data. Based on panel estimation techniques this chapter brings new insights. It provides evidence that taxpayers are heterogeneous with respect to their responsiveness to fiscal incentives. In the context of optimal tax design my work suggests that different taxpayers should be addressed differently. In particular it means that any measures aimed at increasing donative behavior might only be efficient for high income groups.

However, more research is still needed. A possible future research project would be based on a longer panel of data and would also consider the major changes in tax schedule. This would provide more support for the identification strategy. Unfortunately, this kind of data not available as far.

The second chapter presents a model in which the media helps to reduce the problem of asymmetric information in the market for nonprofit organizations (NPOs). NPOs solicit donations from individuals and offer in turn goods and services whose quality cannot be (easily) ascertained by the donors. This creates incentives for "bad" NPOs to enter the market and free ride on the donor's trust. In this environment of asymmetric information, the free press—acting as a watchdog—can enhance the trust of the donors, increase the level of donations, and increase the amount of public good produced.

The contribution of the second chapter is to provide a better understanding of the incentives of the NPOs on the one side and the potential of the media on the other side. The first insight calls for more transparency in and rules governing the NPO market, the second makes an argument for more media freedom and competition.

There are potential extensions of the model presented in this chapter. One could, for example, change the sequence in which players move or about designing a repeated game. However, this should not change the conclusions made in this chapter. Furthermore, more empirical investigation is needed. Unfortunately, to my best knowledge, no better cross-country comparative data on the third sector is available than the data set used in this chapter.

In the third chapter, I empirically analyze a dynamic model of donations to nonprofit organizations on an organizational level. Apart from the widely studied effects of price, fund-raising expenses and other factors I identify the effect of past donations. Previous contributions may offer potential donors a signal of quality. The data used is a 16-year-long panel from IRS Form 990 for U.S. nonprofit organizations operating in the fields of the higher education, museum, arts, hospital, international relief, disaster relief and human services. Estimation results show that past donations positive effects on current donations.

This chapter has an important implication for NPOs and policy makers interested in increasing donative behavior of individuals. Germany and other countries should follow the US example and oblige NPOs to greater disclosure of financial activities easily accessible for potential donors.

There is need for further research on the effect of past donations. In particular, a well-designed field experiment could provide better evidence.

The last chapter is motivated by the fact that, for many games describing human behavior game theory predictions and experimental results differ significantly. An example are public goods games, for which game theory predicts high level of free riding but in most experiments the contributions well exceed the predicted level. Also in reality the donative behavior departs from the Nash equilibria predictions. In general, those deviations can often be better explained by the prevalence of some social norm or tradition. Consequently, it is promising to supplement game theory approach by approaches that account for social norms in order to have both mathematical rigor and more accurate predictions. I propose a framework for normal form games in which the specification of a social norm can influence players' behavior. In this extended game Nash equilibria remain the same but there arise new *norm equilibria* with distinct outcomes.

The policy implication from this chapter is to pay greater attention towards social norms when making recommendations based on theoretical models in economics. However, the framework could be extended to games of imperfect information etc. This implies that further research is needed.

German Summary / Deutsche Zusammenfassung

Die Hilfsbereitschaft und die Großzügigkeit gegenüber den Opfern von Katastrophen sind groß. Alleine in Deutschland, Spenden von Individuen erreichten 670 Millionen Euro nach dem Tsunami in Südasien in Dezember 2004 sowie 350 Millionen Euro nach der Elbe Flut in 2002[1]. Individuen in Amerika spendeten 3,9 Milliarden Dollar nach dem Hurrikan Katrina in 2005 und 1,4 Milliarden Dollar nach dem Erdbeben in Haiti in 2010[2]. Unter spendensammelnden Organisationen werden andererseits immer wieder Skandale aufgedeckt. In 2007, zum Beispiel, erschütterte eine Spendenaffäre Unicef Deutschland. Die Organisation hat fragwürdige Beraterverträge und teure Fund-Raising Verträge mit profitorientierten Agenturen abgeschlossen. Als Resultat dieser Affäre verlor Unicef Deutschland zahlreiche Mitglieder und Spendenzusagen. Andere der jüngsten Skandale galten der Organisa-

[1] Für mehr Spendenstatistiken, siehe Deutsches Zentralinstitut für soziale Fragen, www.dzi.de

[2] Für mehr Spendenstatistiken, siehe The Center on Philanthropy at Indiana University, http://www.philanthropy.iupui.edu

tion Hatun & Can und Treberhilfe. Charity Navigator[3] veröffentlicht eine Liste mit 10 Spendenorganisationen, die ihre profitorientierten Fund-Raiser übermäßig entlohnen. So zahlt die erste Organisation auf dieser Liste, im Durchschnitt, pro einem Dollar gewonnener Spenden 95 Cents als Gebühren. Heutzutage geht das Spendensammeln weit über Straßenkollekten hinaus. Da es sich um sehr hohe Geldsummen im Spiel handelt sowie um Privilegien des Dritten Sektors, wird auf der politischen Szene viel darüber debattiert. Die Diskussion ist besonders aktuell in Groß Britannien und den USA[4] aber auch in Deutschland gibt es einen intensiven politischen Austausch. In 1999 wurde eine Enquete-Kommission "Zukunft des Bürgerschaftlichen Engagement" einberufen. In 2007 startete das Bundesamt für Familie, Senioren, Frauen und Jugend eine Initiative "Miteinander-Füreinander" um das Zivilengagement zu stärken.

Zu dem Thema Spenden und Non-Profit-Organisationen sowie Fund-Raising gibt es zahlreiche Aufsätze, die mehrheitlich in den USA verfasst wurden[5]. Gleichzeitig ist die Anzahl der Studien auf dem kontinentalen Europa eher unbedeutend. Viele Themen, die das Spendenverhalten und den Markt für Non-Profit-Organisationen betreffen, sind noch ein Rätsel und müssten erforscht werden. Diese Dissertation behandelt einige dieser unerforschten Fragestellungen. In vier Kapiteln kombiniert sie unterschiedliche Themen aus dem Bereich der Spenden, Non-Profit-Organisationen sowie Fund-Raising. In

[3] http://www.charitynavigator.org/

[4] Für mehr Information zum Thema, siehe zum Beispiel Referenz 121

[5] Für einige Übersichten, siehe Andreoni (2006), Meier (2007), Vesterlund (2006) and Peloza and Steel (2005).

dem ersten Kapitel wird die permanente und transitorische Steuerpreiselastizität der Spenden für Deutschland geschätzt. Das deutsche Steuersystem begünstigt das Spenden, indem es deren Absetzung als Sonderausgabe in bestimmten Grenzen erlaubt. Dieses bedeutet für den Steuerzahler, dass der faktische (Steuer-) Preis pro Euro-Spende um den individuellen Grenzsteuersatz gemindert wird. Die Absetzbarkeit soll Anreize setzen, um das Spendenniveau anzuheben. Es gibt für Deutschland allerdings nur wenige Studien, welche die Wirksamkeit dieses Instruments zu beurteilen versuchen. Sie alle basieren auf Querschnittsdaten und können das zentrale methodische Problem der separaten Identifikation der Steuerpreiselastizität und der Einkommenselastizität nicht angemessen adressieren. Diese Studie profitiert von der einzigartigen Möglichkeit, welche die Steuerstatistik 2001-2006 dank des Panelaufbaus sowie ihres Umfangs bietet. Dadurch wird es möglich für unbeobachtete zeitinvariante individuelle Charakteristika zu kontrollieren, welche gleichzeitig das Spendenverhalten, das Einkommen und dadurch den Steuerpreis beeinflussen. Des Weiteren gibt es aufgrund der Steuerreform der Einkommensteuer unabhängige Variation im Preis. Darüber hinaus wird eine Instrumentenvariablenschätzung angewandt, welche die Verzerrung im geschätzten Steuerpreiskoeffizienten aufgrund der Progression der Einkommensteuer aufhebt. Die verwendete Spezifikation berücksichtigt die Endogenität des Steuerpreises und des Einkommens nach Steuer. Sie lässt heterogene Effekte des Steuerpreises und anderer Variablen in verschiedenen Einkommensgruppen zu und erlaubt temporäre von permanenten Effekten zu trennen. Die Ergebnisse suggerieren, dass die absolute permanente Steuerpreiselastizität in der Gruppe der niedrigen Einkommen kleiner als Eins ist.

Sie ist allerdings in der Gruppe der mittleren und hohen Einkommen größer als Eins. Der Effekt des Vorjahrespreises ist stärker als der aktuelle Preis. Der zukünftige Preis erweist sich oft als insignifikant. Die Einkommenselastizität ist relativ gering und bewegt sich im Rahmen 0,2-0,3 für alle Einkommensgruppen.

Das zweite Kapitel präsentiert ein theoretisches Modell, welches zeigt wie unabhängige und untereinander konkurrierende Medien das Problem der asymmetrischen Information auf dem Markt für Non-Profit-Organisationen mindern. Non-Profit-Organisationen konkurrieren um Spenden der Individuen und bieten dafür Güter und Dienstleistungen, deren Qualität für die Spendern nicht oder wenig bekannt ist. Daraus entstehen Anreize für unehrliche Organisationen in den Markt einzutreten und das Vertrauen der Spender auszunutzen. In diesem Umfeld mit asymmetrischer Information hat freie Presse eine Wächterrolle, welche das Vertrauen der Spender steigert und als Ergebnis höhere Spendeneinnahmen mit sich bringt sowie höheres Niveau des öffentlichen Gutes herbeiführt.

Das Dritte Kapitel analysiert empirisch ein dynamisches Modell des Spendens. Die ökonometrische Spezifikation erlaubt den Effekt der vergangenen Spenden zu messen. Die Idee für diese Untersuchung entspringt den theoretischen Modellen des sequentiellen Spendens von Vesterlund (2003) und Andreoni (2006). Die Grundlage für die Untersuchung gibt ein Datensatz in Form eines 16 Jahre langes Panels mit Informationen aus der IRS Form 990, welche alle amerikanischen Non-Profit-Organisationen ausfüllen, abgeben und öffentlich zugänglich machen müssen. Insbesondere wurden Non-Profit-Organisationen aus folgenden Bereichen gewählt: Hochschulbildung, Museen, Kunst, Krankenhäuser, internationale Hilfstätigkeiten, Naturkatastrophenhilfe sowie Humandienstleistungen. Die Ergebnisse zeigen einen positiven Effekt der vergangenen Spenden sowie der Fund-Raising Ausgaben.

Das letzte Kapitel ist motiviert durch folgende Diskrepanz: die Vorhersagen aus den spieltheoretischen Modellen unterscheiden sich oft von den Ergebnissen der Experimente bzw. den Beobachtungen der Realität. Zum Beispiel für die Bereitstellung öffentlicher Güter wird ein hohes Maß des Trittbrettfahrens vorhergesagt. Allerdings ist die Bereitstellungsbereitschaft in den meisten Experimenten weit über dem vorhergesagten Niveau. Auch in der Realität scheint die Großzügigkeit der oft anonymen Spender unvereinbar mit den Prognosen zu sein. In vielen solchen Situationen können die sozialen Normen und Traditionen eine bessere Erklärung des individuellen Verhaltens liefern. Mein Ansatz ist die sozialen Normen explizit in ein Normalformspiel einzuführen und ein Lösungskonzept vorzuschlagen. Als Resultat entstehen, zusätzlich zu den üblichen Nash Gleichgewichten, Normgleichgewichte. Insbesondere kann mit diesem Konzept das Spendenverhalten besser erklärt und vorhegesagt werden.

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Bibliography

[1] Auer, L. von, and A. Kalusche. "Steuerliche Spendenanreize: Ein Reformvorschlag." Universität Trier, *Research Papers in Economics* 7/10 (2010).

[2] Andreoni, James. "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence." *Journal of Political Economy* 97, no. 6 (1989): 1447-58.

[3] Andreoni, James. "Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving." *Economic Journal* 100, no. 401 (1990): 464-477.

[4] Andreoni, James. "Toward a Theory of Charitable Fund-Raising" *Journal of Political Economy* 106, no. 6 (1998): 1186-1213.

[5] Andreoni, James, Brown, Eleanor and Isaac Rischall. "Charitable Giving by Married Couples. Who Decides and Why Does it Matter?." *J. Human Resources* Winter 38, no. 1 (2003): 111-133.

[6] Andreoni, James. “Leadership Giving in Charitable Fund-Raising.” *Journal of Public Economic Theory* 8 (2006a): 1-22.

[7] Andreoni, James. “Philanthropy.” In *Handbook of Giving, Reciprocity and Altruism*, edited by L.-A. Gerard-Varet, S.-C. Kolm, J.M. Ythier. 1201-69. North-Holland: Elsevier, 2006b.

[8] Akerlof, George A. “The Economics of Caste and of the Rat Race and Other Woeful Tales.” *The Quarterly Journal of Economics* 90, no. 4 (1976): 599-617.

[9] Arrelano, M. and S. Bond. “Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations.” *Review of Economic Studies* 58 (1991): 277-97.

[10] Aumann, Robert. “Correlated equilibrium as an expression of Bayesian rationality.” *Econometrica* 55 (1987): 1-18.

[11] Baber, William R., Daniel,Patricia L. and Andrea A. Roberts. “Compensation to Managers of Charitable Organizations: An Empirical Study of the Role of Accounting Measures of Program Activities.” *The Accounting Review* 77, no. 3 (2002): 679-693.

[12] Bacharach, Michael, Natalie Gold and Robert Sudgen, eds. *Beyond individual choice: teams and frames in game theory.* Princeton University Press, 2006.

[13] Bakija, Jon. "Distinguishing transitory and permanent price elasticities of charitable giving with pre-anounced changes in tax law." *Working Paper Department of Economics Williams College* (2000).

[14] Bakija, Jon and Bradley T. Heim. "How does charitable giving respond to incentives and income? New estimates from panel data." *National Tax Journal* 2, no. 2 (2011): 615-650.

[15] Barett, K.S., McGuirk, A. M. and R. Steinberg. "Further evidence of the dynamic impact of taxes on charitable giving." *National Tax Journal* 50, no. 2 (1997): 321-334.

[16] Bekkers, René. "Trust, Accreditation, and Philanthropy in the Netherlands." *Nonprofit and Voluntary Sector Quarterly* 32, no. 4 (2003): 596-615.

[17] Besley, Timothy, and Robin Burgess. "The political economy of government responsiveness: theory and evidence from India." *The Quarterly Journal of Economics* 117, no. 4 (2002): 1415-52.

[18] Bicchieri, Christina. *Rationality and Coordination.* Cambridge University Press, 1993.

[19] Bicchieri, Christina. *The Grammar of Society.* Cambridge University Press, 2006.

[20] Bicchieri, Christina. "Norms, preferences and conditional behavior." *Politics, Philosophy and Economics* 9, no. 3 (2010): 297-313.

[21] Bicchieri, Cristina and Muldoon, Ryan. "Social Norms." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta (Spring 2011), http://plato.stanford.edu/archives/spr2011/entries/social-norms/.

[22] Biglaiser, G. "Middlemen as experts." *RAND Journal of Economics* 24 (1993): 212-223.

[23] Bikhchandani, Sushil, Hirshleifer, David and Ivo Welch. "Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades." *Journal of Economic Perspectives* 13, no. 3 (1998): 151-170.

[24] Bond, Stephen R. "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice." *Portuguese Economic Journal* 1, no. 2 (2002): 141-162.

[25] Borgloh, Sarah. "What Drives Giving in Extensive Welfare States? The Case of Germany." *ZEW Discussion Paper* 08-123 (2008).

[26] Bönke, Timm, Massarrat-Mashhadi, Nima and Christian Sielaff. "Charitable Giving in the German Welfare State: Fis-

cal Incentives and Crowding Out." *Public Choice* (2011) forthcoming.

[27] Bracha, Anat, Menietti, Michael and Lise Vesterlund. "Seeds to succeed?: Sequential giving to public projects." *Journal of Public Economics* 95, no. 5-6 (2011): 416-427.

[28] Bradley, Ralph, Holden, Steven and Robert McClelland. "A Robust Estimation of the Effects of Taxation on Charitable Contributions." *Contemporary Economic Policy* 23, no. 4 (2005): 545-554.

[29] Broman, Amy J. "Statutory Tax Rate Reform and Charitable Contributions: Evidence from a Recent Period of Reform." *Journal of the American Taxation Association* 10 (1989): 7-21.

[30] Brooks, Arthur C. "Welfare receipt and private charity." *Public Budgeting and Finance* 22, no. 3 (2002): 101-114.

[31] Brooks, Arthur C. und David M. van Slyke. "Why Do People Give? New Evidence and Strategies for Nonprofit Managers." *American Review of Public Administration* 35, no. 3 (2005): 199-222.

[32] Brunetti, Aymo and Beatrice Weder. "A free press is bad news for corruption." *Journal of Public Economics* 87 (2003): 1801-1824.

[33] Buschle, Nicole. “Spenden in Deutschland, Ergebnisse der Einkommensteuerstatistik 2001.” *Wirtschaft und Statistik* 2 (2006): 151-159.

[34] Clotfelter, Charles T. *Federal tax policy and charitable giving.* Chicago, 1985.

[35] Costa-Gomes, Miguel A. and Vincent P. Crawford. “Cognition and Behavior in Two-Person Guessing Games: An Experimental Study.” *American Economic Review* 96, no. 5 (2006): 1737-1768.

[36] Crawford, Sue E. S. and Elinor Ostrom. “A Grammar of Institutions.” *American Political Science Review* 89, no. 3 (1995): 582-600.

[37] Cutlip, Scott M. *Fund raising in the United States: its role in America's philanthropy.* Transaction Publishers, 1990.

[38] De, Sankar, and Prafulla Nabar. “Economic implications of imperfect quality certification.” *Economic Letters* 37 (1991): 333-337.

[39] Diamond, Peter. “Optimal tax treatment of private contributions for public goods with and without warm glow preferences.” *Journal of Public Economics* 90, no. 4-5 (2006): 897-919.

[40] Engel, Christoph. “Dictator Games: A Meta Study.” *Preprints of the Max Planck Institute for Research on Collective Goods* 7 (2010).

[41] Fack, Gabrielle and Camille Landais. “Are tax incentives for charitable giving efficient? Evidence from France.” *American Economic Journal: Economic Policy* 2, no. 2 (2010): 117-141.

[42] Feenberg, Daniel R. “Are tax price models really identified: the case of charitable giving.” *NBER Working Paper* W0988 (1988).

[43] Feldstein, Martin and Amy Taylor. “The Income Tax and Charitable Contributions.” *Econometrica* 44, no. 6 (1976): 1201-1222.

[44] Fleishman, Joel. *The Foundation.* Public Affairs, 2007.

[45] Frumkin, Peter, und Mark T. Kim. “Strategic positioning and the financing of nonprofit organizations: Is efficiency rewarded in the contributions marketplace?.” *Public Administration Review* 61, no. 3 (2001): 266-275.

[46] Gächter, Simon and Benedikt and Herrmann. “Reciprocity, culture and human cooperation: previous insights and a new cross-cultural experiment.” *Philosophical Transactions of the Royal Society* 364 (2009): 791-806.

[47] Gambetta, Diego. "Can we trust trust?." In *Trust: Making and Breaking Cooperative Relations*, edited by Diego Gambetta, 213-237. University of Oxford, 2000.

[48] Gigerenzer, Gerd and Reinhard Selten, ed. *Bounded Rationality, The Adaptive Toolbox*. MIT Press, 2002.

[49] Glazer, Amihai, und Kai A. Konrad. "A Signaling Explanation for Charity." *American Economic Review* 86, no. 4 (1996): 1019-1028.

[50] Greene, William H. *Econometric Analysis*. Prentice Hall, 2008.

[51] Greenlee, J ., and K. Brown. "The impact of accounting information on contributions to charitable organizations." *Research in Accounting Regulation* 13 (1999): 111-125.

[52] Hager, Mark A., Pollak, Thomas, and Patrick Rooney. "Variations in Overhead and Fundraising Efficiency Measures: The Influence of Size, Age, and Subsector." *Overhead Cost Study Working Paper* (2001).

[53] Harsanyi, John. "Games with randomly distributed payoffs: A new rationale for mixed strategy equilibrium points." *International Journal of Game Theory* 3 (1973): 211-25.

[54] Hong, Harrison and Marcin Kacperczyk. "The price of sin: The effects of social norms on markets." *Journal of Financial Economics* 93 (2009): 15-36.

[55] Honorè, Bo. "Trimmed LAD and Least Squares Estimation of Truncated and Censored Regression Models with Fixed Effects." *Econometrica* 60, no. 3 (1992): 533-565.

[56] Huck, S. and I. Rasul. "Matched Fundraising: Evidence from a Natural Field Experiment." *Journal of Public Economics* 95 (2011): 351-362.

[57] Isaac, R. Mark, James M. Walker and Susan H. Thomas. "Divergent evidence on free riding: An experimental examination of possible explanations." *Public Choice* 43 (1984): 113-149.

[58] Isaac, R. Mark und James M. Walker. "Group Size Effects in Public Goods Provision: The Voluntary Contributions Mechanism." *Quarterly Journal of Economics* 103, no. 1 (1988): 179-199.

[59] Jackson, Elton F., Bachmeier, Mark D., Wood, James R. and Elizabeth A. Craft. "Volunteering and Charitable Giving: Do Religious and Associational Ties Promote Helping Behavior?" *Nonprofit and Voluntary Sector Quarterly* 24 (1995): 59-78.

[60] Kahan, Dan M. "Social Influence, Social Meaning, and Deterrence." *Virginia Law Review* 83, no. 2 (1997): 349-395.

[61] Kandori, Michihiro. "Social Norms and Community Enforcement." *Review of Economic Studies* 59 (1992): 63-80.

[62] Karlan, D, and J. A. List. "Does Price Matters in Charitable Giving? Evidence from a Large-Scale Natural Field Experi-

ment." *American Economic Review* 97, no. 5 (2007): 1774-1793.

[63] Katz, S. H., M. L. Hediger, and L.A. Valleroy. "Traditional maize processing techniques in the New World." *Science* 184 (1974): 765-773.

[64] Khanna, Jyoti und Todd Sandler. "Partners in Giving: The Crowding-in effects of UK government grants." *European Economic Review* 44 (2000): 1543-1556.

[65] Klein, B., Leffer, K. "The role of market forces in assuring contractual performance." *Journal of Political Economy* 89 (1981): 615-641.

[66] Kliemt, H. "Constitutional Commitments: On the Economic and Legal Philosophy of Rules." *Jahrbuch für Neue Politische Ökonomie* 12 (1993): 145-73.

[67] Kriete-Dodds, Susan and Daniel Vorgrimler. "Das Taxpayer-Panel der jährlichen Einkommensteuerstatistik." *Wirtschaft und Statistik* 1 (2007): 77-85.

[68] Lahno, Bernd. "Rational Choice and Rule-Following Behavior." *Rationality and Society* 19, no. 4 (2007): 425-450.

[69] Lahno, Bernd. "Norms as reasons for action." *Archiv fuer Rechts- und Sozialphilosphie* 95, no. 4 (2010): 563-578.

[70] Leland, Jonathan and Jordan Grafman. "Experimental tests of the Somatic Marker hypothesis." *Games and Economic Behavior* 52 (2005): 386-409.

[71] List, J. A, and D. Lucking-Reiley. "The Effects of Seed Money and Refunds on Charitable Giving: Experimental Evidence from a University Capital Campaign." *Journal of Political Economy* 110 (2002): 215-233.

[72] Marudas, Nicolas P. and Fred A Jacobs. "Determinants of Charitable Donations to Large U.S. Higher Education, Hospital, and Scientific Research Nonprofit-Organisationen: New Evidence From Panel Data." *Voluntas* 15, no. 2 (2004): 157-179.

[73] Marudas, Nicholas P. "Effects of Nonprofit Organization Wealth and Efficiency on Private Donations to Large Nonprofit Organizations." *Research in Governmental and Nonprofit Accounting* 11 (2004): 71-92.

[74] Marudas, Nicholas P., Hahn, TeWhan and Fred A. Jacobs. "An Improved Model of Donations to Nonprofit Organizations." *Proceedings of ASBBS* 19, no. 1 (2012): 545-559.

[75] McClelland, Robert and Arthur C. Brooks. "What is the real relationship between Income and charitable giving?" *Public Finance Review* 32 (2004): 483-497.

[76] Meier S. “A Survey of Economic Theories and Field Evidence on Prosocial Behavior.” In *Economics and Psychology: A Promising New Cross-Disciplinary Field*, edited by B.S. Frey and A. Stutzer. Boston: MIT Press, 2007.

[77] Meier, Stephan and Bruno S. Frey. “Matching donations: Subsidizing charitable giving in a field experiment.” *IEER Working Paper* 181 (2004).

[78] Milgrom, Paul and John Roberts. “Price and advertising signals of product quality.” *Journal of Political Economy* 94, no. 4 (1986): 796-821.

[79] Nelson, P. “Advertising as information.” *Journal of Political Economy* 82, no. 4 (1974): 729-754.

[80] Okten, Cagla and Burton A. Weisbrod. “Determinants of donations in private nonprofit markets.” *Journal of Public Economics* 75 (2000): 255-272.

[81] Olson, Mancur. *The logic of collective action.* Cambridge: Harvard University Press, 1965.

[82] Ostrom, Elinor. “A Behavioral Approach to the Rational Choice Theory of Collective Action.” *American Political Science Association* 92, no. 1 (1998): 1-22.

[83] Paqué, K.-H. *Philanthropie und Steuerpolitik - Eine ökonomische Analyse der Förderung privater Wohltätigkeit.* Tübingen: Mohr Siebeck, 1986.

[84] Peloza J and Steel P. “The Price Elasticities of Charitable Contributions: A Meta-Analysis.” *Journal of Public Policy & Marketing* 24 (2005): 260-72.

[85] Petrova, Maria. “Inequality and Media Capture.” *Journal of Public Economics* 92, no. 1-2 (2008): 183-212.

[86] Posnett, John and Todd Sandler. “Demand for charity donations in private non-profit markets: The case of the U.K.” *Journal of Public Economics* 40, no. 2 (1989): 187-200.

[87] Potters, Jan, Sefton, Martin, and Lise Vesterlund. “Leading-by-Example and Signaling in Voluntary Contribution Games: An Experimental Study.” *Economic Theory* 33 (2007) 169-182.

[88] Priller, Eckhard und Jürgen Schupp. “Soziale und ökonomische Merkmale von Geld- und Blutspendern in Deutschland.” *DIW Wochenbericht* 29 (2011): 3-10.

[89] Priller, Eckhard und Jana Sommerfeld. “Wer spendet in Deutschland, Eine sozialstrukturelle Analyse.” *WZB Discussion Paper* SP I 2005 - 202 (2005a).

[90] Priller, Eckhard und Jana Sommerfeld. “Wer spendet in Deutschland.” *WZB-Mitteilungen* 108 (2005b): 36-39.

[91] Rabin, Matthew. “Incorporating Fairness into Game Theory and Economics.” *The American Economic Review* 83, no. 5 (1993): 1281-1301.

[92] Randolph, William C. "Dynamic income, progressive taxes, and the timing of charitable contributions." *Journal of Political Economy* 103, no. 4 (1995): 709-738.

[93] Rapoport, Amnon. "Order of Play in Strategically Equivalent Games in Extensive Form." *International Journal of Game Theory* 26 (1997): 113-136.

[94] Reece, W. and K. Zieschang. "Consistent Estimation of the Impact of Tax Deductibility on the Level of Charitable Contributions." *Econometrica* 53, no. 2 (1985): 271-94.

[95] Reinikka, Ritva, and Jakob Svensson. "Fighting corruption to improve schooling: evidence from a newspaper campaign in Uganda." *Journal of the European Economic Association* 3, no. 2-3 (2005): 259-267.

[96] Ribar, David C., and Mark O Wilhelm. "Altruistic and joy-of-giving motivations in charitable behavior." *Journal of Political Economy* 110 (2002): 425-457.

[97] Roodman, David. "How to Do xtabond2: An Introduction to Difference and System GMM in Stata." *Working Paper, Center for Global Development, Washington* 103 (2006).

[98] Rustichini, Aldo, John Dickhaut, Paolo Ghirardato, Kip Smith and Jose V. Pardoe. "A brain imaging study of the choice procedure." *Games and Economic Behavior* 52 (2005): 257-282.

[99] Saez, Emmanuel. "The optimal treatment of expenditures." *Journal of Public Economics* 88, no. 12 (2004): 2657-2684.

[100] Samuelson, Paul A. "The Pure Theory of Public Expenditure." *Review of Economics and Statistics* 36, no. 4 (1954): 387-389.

[101] Salamon, Lester M. and S. Wojciech Sokolowski. *Global Civil Society: Dimensions of the Nonprofit Sector.* Volume Two, Bloomfield, CT: Kumarian Press, 2004.

[102] Schelling, Thomas C. *The Strategy of Conflict.* Harvard University Press, 1960.

[103] Shang, Jen and Rachel Croson. "A Field Experiment in Charitable Contribution: The Impact of Social Information on the Voluntary Provision of Public Goods." *The Economic Journal* 119, no. 540 (2009): 1422-1439.

[104] Sommerfeld, Jana. "Evaluierung von Auswirkungen des Gesetzes zur weiteren Stärkung des bürgerschaftlichen Engagements. Empirische Untersuchung der Entwicklungen im Regelungsbereich, insbesondere zum Spendenaufkommen." *DZI Bericht zum Forschungsauftrag* fe 17/07 (2007).

[105] Spence, M. "Job market signalling." *Quarterly Journal of Economics* 87 (1973): 355-374.

[106] Strausz, Roland. "Honest certification and the threat of capture." *International Journal of Industrial Organizations* 23 (2005): 45-62.

[107] Strömberg, David. "Mass media and public policy." *European Economic Review* 45 (2001): 652-63.

[108] Strömberg, David. "Radio's impact on public spending." *The Quarterly Journal of Economics* 119, no. 1 (2004): 189-221.

[109] Svítková, Katarina and Andreas Ortmann. "Certification As A Viable Quality Assurance Mechanism: Theory and Suggestive Evidence." *CERGE-EI Working Paper Series* 288 (2006).

[110] Tinkelman, Daniel. "Differences in sensitivity of financial statement users to joint cost allocations: The case of nonprofit organizations." *Journal of Accounting, Auditing, and Finance* 13, no. 4 (1998): 377-394.

[111] Tinkelman, Daniel. "Factors affecting the relation between donations to not-for-profit organizations and an efficiency ratio." *Research in Governmental and Nonprofit Accounting* 10 (1999): 135-161.

[112] Tinkelman, Dan and Kamini Mankaney. "When is Administrative Efficiency Associated with Charitable Donations?" *Nonprofit and Voluntary Sector Quarterly* 36 (2007): 41-64.

[113] Triest, Robert K. "Econometric issues in estimating the behavioral response to taxation: A nontechnical introduction." *National Tax Journal* 51, no. 4 (1998): 761-72.

[114] Tullock, Gordon. "Efficient rent seeking." In *Towards a Theory of the Rent-Seeking Society*, edited by J. Buchanan, R.

Tollison and G. Tullock, 97-112. College Station, Texas A&M University Press, 1980.

[115] Vesterlund, Lise. "The informational value of sequential fundraising." *Journal of Public Economics* 87 (2003): 627-657.

[116] Vesterlund Lise. "Why do People Give?" In *The Nonprofit Sector: A Research Handbook*, edited by W.E. Powell, R. Steinberg, 568-90. New Haven, CT: Yale University Press, 2006.

[117] Voss, T. "Game-theoretical perspectives on the emergence of social norms." In *Social norms*, edited by M. Hechter and K.-D. Opp. New York, 2001.

[118] Weisbrod, Burton A. und Nestor D. Dominquez. "Demand for Collective Goods in Private Nonprofit Markets: Can Fundraising Expenditures Help Overcome Free-Rider Behavior?." *Journal of Public Economics* 30 (1986): 83-95.

[119] Winter, Eyal, Garcia-Jurado, Ignacio and Luciano Mendez-Naya. "Mental Equilibrium and Rational Emotions." *Discussion Paper Series, The Center for the Study of Rationality, Hebrew University, Jerusalem* 9 (2009).

Newspaper and magazine articles:

[120] Schwarzer, Alice, "Hatun & Can, Die bittere Wahrheit", *EMMA* 3/2010 (summer 2010), accessed October 4, 2012. http://www.emma.de/hefte/ausgaben-2010/sommer-2010/hatun-can/.

[121] “Sweetened charity”, 2012, The Economist, Jun 9th 2012, accessed June 18, 2012. http://www.economist.com/node/21556570.

[122] Thieme, Matthias, “Paradies für Berater”, *Frankfurter Rundschau*, 20.12.2007, accessed October 4, 2012. http://www.fr-online.de/unicef/unicef-paradies-fuer-berater,1477342,2680618.html.

[123] Loy, Thomas, “Hol schon mal den Maserati”, *Der Tagesspiegel*, 22.12.2008, accessed October 4, 2012. http://www.tagesspiegel.de/berlin/stadtleben/berliner-treberhilfe-hol-schon-mal-den-maserati/1402336.html.

[124] “Sweetened charity”, *The Economist*, 9.06.2012, accessed October 4, 2012. http://www.economist.com/node/21556570.

[125] “Unicef verliert 38.000 Fördermitglieder”, *Frankfurter Rundschau*, 24.06.2008, accessed October 4, 2012. http://www.fr-online.de/unicef/geschaeftsberichts-2007-unicef-verliert-38-000-foerdermitglieder,1477342,2727340.html.

Internet sources:

[126] “GuideStar: A Brief History”, *GuideStar.org*, accessed September 21, 2012, http://www.guidestar.org/rxg/about-us/history.aspx.

[127] “Deutscher Spendenmonitor 2011: Weniger Deutsche spenden mehr Geld” *TNS-Infratest.com*,

22.12.2011, accessed September 21, 2012, www.tns-infratest.com/presse/presseinformation.asp?prID=832.

[128] "Tax-Exempt Organizations, Improvements Possible in Public, IRS, and State Oversight of Charities", *gao.gov* GAO, United States General Accounting Office, GAO-02-526, 2002, accessed September 21, 2012 http://www.gao.gov/assets/240/234450.pdf.

[129] "Giving USA 2011" , *aafrc.org*, 2011, accessed November 6, 2011, http://www.givingusa.org/press_releases/gusa/GUSA-2011-Final-Release.pdf.

[130] "President & CEO's 2010 Year-End Report", *CharityNavigator.org*, 22.12.2010, accessed September 21, 2012, http://www.charitynavigator.org/index.cfm?bay=content.view &cpid=1184.

[131] "International comparisons of charitable giving", *cafonline.org*, 2006, accessed April 13, 2012, https://www.cafonline.org/publications/archive/international-giving.aspx.

[132] "Panel Data Models: Fixed Effects Models" , *limdep.com*, accessed September 21, 2012, http://www.limdep.com/features/capabilities/panel_data/fixed _effects_models_4.php.

[133] "Some Gauss Programs" Pantob, accessed September 21, 2012, http://www.princeton.edu/~honore/programs/.

[134] "Welfare Expenditure Report", *oecd.org*, Organisation for Economic Co-operation and Development (OECD), 2001, accessed April 13, 2012, http://www.oecd.org/dataoecd/56/37/31613113.xls.