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ORIGINAL PAPER

# The Effect of Investor Sentiment on Nonprofit Donations

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**Abstract**
Prior work shows that capital market participants including investors, analysts, and managers are all impacted by the prevailing level of investor sentiment. We extend this line of work by investigating whether the effects of sentiment spill over into the nonprofit sector by affecting donors' spending to support moral causes. While donors are driven by ethical, altruistic, and other utility-maximizing motives, it is unclear whether behavioral biases stemming from sentiment would influence donors' decisions to give. We shed light on this issue using a large industry-diverse panel of over 115 thousand organization-years from 2008 to 2016. Results indicate that nonprofit organizations receive less in stock-based donations and more in cash-based donations during periods of high investor sentiment. Our inquiry separately considers cash and stock-based donations because we expect, and find, that market-related sentiment impacts these types of contributions differently. Moreover, we find that these effects are stronger for organizations with large donors, who are more closely tied to the capital markets, and therefore more susceptible to investor sentiment, as well as charitable organizations, consistent with "tug-at-the-heartstrings" type appeals inducing more emotional donation response. Taken together, the results suggest that market-wide investor sentiment impacts nonprofit organizations and the effects vary in the cross-section.

**Keywords** Investor sentiment · Nonprofit organizations · Cash donations · Stock donations · Endowment effect

## Introduction

Philanthropy and charitable giving are often looked at as fulfilling individuals' ethical obligation and moral duty to contribute to the welfare of others (e.g., Radley and Kennedy 1995; Cheung and Chan 2000; Manstead 2000; Warburton and Terry 2000; Oosterhof et al. 2009; Knowles et al. 2012; Gabriel 2017). Research has documented that altruism and other utility-maximizing factors contribute to donor intentions to support nonprofit organizations that serve missions that are important to them (e.g., Andreoni 1989, 1990; Rose-Ackerman 1996; Shehu et al. 2016). In turn, nonprofit organizations rely considerably on donations to finance their activities (e.g., Fischer et al. 2011; Okten and Weisbrod 2000).[1] Because donors, in general, are wealthier and have a higher income (Johnson and Rosenfeld 1991), they are likely to participate in and be impacted by capital market forces.[2] However, to our best knowledge, no studies to date shed light on whether and how donors' beliefs pertaining to the capital markets spillover to influence their philanthropic behavior. Echoing this, Liket and Simaens (2015) call for more research examining philanthropy and the moral dilemmas donors face while balancing ethics and economics in their decisions to give. Our study seeks to address this gap in the literature by examining the impact of investor sentiment on donors' giving decisions.

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[1] We acknowledge that nonprofit organizations may also rely on other funding sources. Nonetheless, donations remain a major source of funding and may be susceptible to market forces. Therefore, it is the focus of our study.

[2] It is reported that higher income individuals are more likely to donate and that the magnitude of their donations is larger. Available at: https://www.philanthropyroundtable.org/almanac/statistics/. Despite this, we acknowledge that data limitations prevent us from identifying donors who are and are not stock market participants. However, to the extent that our sample includes donations made by donors who are not stock market participants this would bias against study results.

A growing list of finance studies have examined behavioral biases, such as investor sentiment, and their impact on the capital markets (e.g., Baker and Wurgler 2006, 2007; Barberis et al. 1998; Da et al. 2015; Hengelbrock et al. 2013; Kumar and Lee 2006; Lemmon and Portniaguina 2006; Stambaugh et al. 2012, 2014). Investor sentiment is defined as investors' beliefs about future cash flows and firm performance which are not supported by rational expectations (Baker and Wurgler 2006). These biases come about as a result of investors' optimistic asset valuations and favorable market outlook. In addition to impacting stock prices, investor sentiment has also been linked to analysts' earnings estimates (Clement et al. 2011; Hribar and McInnis 2012; Keshk and Wang 2018), the market's response to earnings news (Mian and Sankaraguruswamy 2012), managerial decisions regarding financial disclosures (Bergman and Roychowdhury 2008; Brown et al. 2012; Hurwitz 2018), and[3] misstatements and auditor behavior (Amin, Eshleman, and Guo 2020).

To the extent that sentiment influences individuals' beliefs regarding their assets and valuations, we posit it may[4] also affect their decisions to give. Accordingly, we seek to build on existing literature by studying the effects of investor sentiment on donations. Our inquiry separately considers cash and stock-based donations because we expect, and find, that market-related sentiment impacts these types of contributions differently. Donating appreciated stock provides donors an income tax deduction for their market value, and nullifies the capital gains tax that would result from selling those shares. Nonprofit organizations typically convert the donated shares into cash shortly after receipt to support their missions without incurring capital gains tax. Despite these tax benefits, during times of high investor sentiment, donors' bullish attitudes about the increasing value of their securities, coupled with the endowment effect, may temper donors' willingness to donate appreciate shares. Endowment theory suggests that individuals value goods (i.e., shares of stock) that they own more than goods of equivalent value that they do not own (Knetsch 1989; Kahneman et al. 1990; 1991a, b). We argue that the optimism associated with high sentiment[5] exacerbates this overvaluation[6] by inflating individuals' beliefs about the value of their stock, making it less desirable for donors to donate shares of stock relative to an equivalent value in cash. As such, we posit an inverse relationship between sentiment and stock donations.

Cash donations, however, do not suffer from the endowment effect. That is, we do not expect donors' valuation of cash to vary with the level of investor sentiment and expect that cash donations become more desirable relative to stock donations as sentiment increases. Nonprofit literature documents that donors give more when they are financially well off (e.g., Auten, Sieg, and Clotfelter 2002; Andreoni 2006; Vesterlund 2006). Accordingly, sentiment-driven optimism could provide the perception of financial stability, motivating donors to give more in the form of cash contributions during periods of high sentiment. Moreover, increased investor sentiment, which is linked to optimism, may produce an elevated mood state among donors. Prior work documents that positive mood states are linked with higher donations and likelihood of giving (e.g., Dolinski et al. 2005; Bekkers and Wiepking 2011). Therefore, we hypothesize a positive relationship between sentiment and traditional cash donations.

Despite these arguments, it is also possible that the nonprofit sector is insulated from capital market forces such as investor sentiment either because donors are not significantly impacted by market forces or because donation decisions are made irrespective of market conditions. That is, a donor's decision to contribute to a nonprofit cause they believe is important may not depend on their attitude about the capital markets. In that case, donations would not be impacted by investor sentiment.

Notwithstanding this alternative scenario, we find, consistent with our predictions, that nonprofit organizations receive fewer stock-based donations during periods of high investor sentiment. We also find that nonprofit organizations receive more cash donations when sentiment is high. This supports the notion that donors' optimism about the capital markets motivates them to hold onto their shares, but the perception of financial well-being stimulates cash contributions to nonprofit causes.

While these findings suggest that donors respond meaningfully to investor sentiment, it is possible that our results are driven by other factors correlated with investor

[3] Corporations, foundations, and charitable bequests make up the balance of approximately 25 percent of total donations (US Census Bureau 2012).

[4] Cost-basis on securities is based on the historical cost of securities to the investor. The tax assessment of the capital gains is made on the difference between this cost-basis and the market value of the securities. By donating appreciated shares and then repurchasing them at market value, donors effectively adjust their cost-basis and reduce their capital gains tax assessment if the shares continue to appreciate in value.

[5] This imbalance of supply and demand causes prices to be elevated. Because prices do not reflect economic fundamentals during high sentiment periods, they are likely to revert when securities underperform relative to expectations. Nonetheless, investors do not foresee the impending reversion.

[6] All logged values are calculated as: ln(variable + 1) to address the issue of zero values being undefined.

sentiment. To address this, we conduct cross-sectional tests to examine whether the relationship between investor sentiment and nonprofit donations is moderated predictably by donor and organization type.

Although individual donors make up a large majority of nonprofit donations (US Census Bureau 2012), donor size varies considerably in the cross-section. Prior nonprofit literature identifies large donors as more sophisticated in terms of ensuring that their donations are used according to their wishes by placing restrictions on how their donation is used (Yetman and Yetman 2013). Further, larger donors, which could even include corporate donors, are likely to be more sensitive to capital market forces due to their wealth and income level. As a result, we expect this donor group to be more susceptible to investor sentiment than smaller donors, whose wealth-perceptions are less likely to be impacted by investor sentiment.

Prior literature has also classified organizations according to major donor sources (Balsam and Harris 2014). Organizations that rely on donors who are not customers are said to be more charitable in nature. Because charitable organizations rely on 'tug-at-the-heartstrings' type solicitations to induce emotional giving (e.g., Amin and Harris 2017; Andreoni 1990; Gordon and Khumawala 1999), we expect their donations to be more susceptible to sentiment-driven effects. On the other hand, organizations that provide a service to their donors may be less influenced by investor sentiment, given the reciprocal nature of the relationship and the relative lack of donor-beneficiary separation.

Consistent with these predictions, we find that the effects of investor sentiment on stock and cash-based donations are stronger for organizations that rely on larger donors as well as organizations classified as more charitable in nature. These cross-sectional tests support our main findings and alleviate concerns related to correlated omitted variables. That is, if our results were driven by a correlated omitted variable, then we would not expect such systematic cross-sectional variation in the effect of investor sentiment.

Our study adds to our knowledge about what motivates donors and therefore contributes to the literature on the determinants of donations in the nonprofit sector (e.g., Amin and Harris 2017; Balsam and Harris 2014; Petrovits et al. 2011; Weisbrod and Dominguez 1986). While the decision to give could be a way for donors to altruistically fulfill their ethical and moral duty in a utilitarian sense, their perceptions of the underlying economics certainly factor into their decision. Thus, we complement recent work that examines individuals' ethical and charitable behavior (Bock et al. 2018). Specifically, our findings are consistent with social exchange theory (Homans 1958; Emerson 1976), which suggests that donors give in anticipation of a return, and build on prior business ethics studies in this area (Chen and Choi 2005; Long and Mathews 2011; Slack et al. 2015). To that extent, policies that incentivize giving at a macrolevel as well as at the organization-level are likely to be effective. Moreover, our findings document the effects that sentiment has on different types of giving as well as how these effects vary by donor and organization type. Such insights are important for nonprofit organizations devising strategies to build donor loyalty and solicit donations during various market conditions (O'Reilly et al. 2012; Pitt et al. 2002). For example, nonprofit organizations that wish to boost cash (stock) donations during low (high) sentiment periods may consider policies that provide donors with a "warm glow" to offset the sentiment-induced disincentives to donate and recognize that ethical giving can be encouraged.

We also contribute to the investor sentiment literature by linking sentiment to nonprofit donations. We confirm that the prevailing level of investor sentiment indeed spills over into the nonprofit sector by influencing donors' decisions to give and highlights the interconnectedness of the capital markets and nonprofit sector. By documenting this evidence, we build on prior for-profit work that has established the effects of sentiment on investors, analysts, and managers (e.g., Baker and Wurgler 2006, 2007; Barberis et al. 1998; Brown et al. 2012; Clement et al. 2011; Da et al. 2015; Hribar and McInnis 2012; Kumar and Lee 2006; Lemmon and Portniaguina 2006; Stambaugh et al. 2012, 2014).

The remainder of this paper is organized as follows. "Hypotheses Development" section contains the hypotheses development, "Research Design" section outlines the research design,"Sample Selection and Descriptive Statistics" section describes the sample selection and presents descriptive statistics. "Empirical Results" section reports the empirical results and "Tests of Robustness" section concludes.

## Hypotheses Development

### Donor Motivations

To grasp how investor sentiment could impact donations, it is important to first understand what motivates donors to give. From a utilitarian standpoint, actions that create the "greatest happiness for the greatest number" are considered ethical and moral (Smart and Williams 1973). This suggests that individuals and corporations who strive to behave ethically and morally promote welfare and provide aid to those in need through philanthropy and donations (e.g., Shaw and Post 1993). Recent work in this area posits that donors often seek something in return and are more likely to engage in philanthropic and ethical behavior when they anticipate a tangible or intangible benefit (Pitt et al. 2002). This "give to receive" attitude is explained by social exchange theory (Homans 1958; Emerson 1976) which has been applied to a

variety of business ethics settings (e.g., Chen and Choi 2005; Long and Mathews 2011; Slack et al. 2015). In the context of donations, it suggests that donors give with the expectation that they will receive something in return. Bock et al. (2018) study individual traits that impact donors' ethical and moral behavior and find that social exchange theory indeed explains donations. However, as Bock et al. (2018, p. 1214) point out, "what one is looking to receive may vary greatly."

Andreoni (1989; 1990) documents that donors experience a "warm glow," thus deriving personal utility, by behaving ethically and contributing to a moral cause that matters to them. Glazer and Konrad (1996) posit that individuals make donations in order to signal their wealth in a socially acceptable way. Nonprofit organizations facilitate the signaling process by publishing donations in ranges, which affect the level of prestige associated with different levels of contributions. Harbaugh (1998a; 1998b) documents that when there is a change in the published ranges, donors modify their contributions by donating the minimum amount necessary to fall into a particular category. Ethical giving is also motivated by financial incentives, including tax deductions, which drive donations (e.g., Glenday et al. 1986; Green and Webb 1997). In sum, consistent with social exchange theory, donors may receive any number of payoffs in return for their donation.

The social exchange view also indicates that individuals and corporations explicitly or implicitly weigh the costs and benefits associated with their moral and ethical actions. For example, individuals engage in "helping" behavior, when they expect reciprocity (Deckop et al. 2003). So, it follows that if an economic phenomenon were to impact the perceived cost or benefit of giving, then it could significantly impact the giving behavior of individuals and corporations. We argue that investor sentiment indeed has this effect, and we discuss it in more detail below.

## Investor Sentiment

In its early stage, the literature on investor sentiment attempted to solve paradoxes in the financial markets that could not be fully explained by market participants acting purely based on fundamentals (e.g., Bodurtha et al. 1995; Lee et al. 1991; Shleifer and Summers 1990; Siegel 1992). Shleifer and Summers (1990) argue that investors' demand for risky assets is affected by their own set of beliefs that are not fully justified by fundamental news. Consistent with this, Lee et al. (1991) provide evidence that fluctuations in prices and discounts on closed-end funds can be explained by the changing sentiment of individual investors. Siegel (1992) concluded that investor sentiment contributed to the stock market crash during 1987. Exploiting an international setting, Bodurtha et al. (1995) document that international equity prices are impacted by risk at the local level, reflecting local market sentiment.

Subsequent studies further explored the theoretical underpinnings of investor sentiment to develop testable sentiment models (e.g., Baker and Wurgler 2006; 2007; Barberis et al. 1998; Da et al. 2015; Lemmon and Portniaguina 2006; Tetlock 2007). Baker et al. (2012) provide a compelling validation of the investor sentiment measures by documenting that dual-listed shares' relative prices are positively related to the relative local sentiment indices of their respective markets. Aside from affecting investor decisions, the concept of investor sentiment has been linked to analysts' earnings estimates, market's response to earnings news, and managerial decisions regarding financial disclosures and accruals.

Analysts' earnings forecasts tend to be more optimistic during periods of high investor sentiment, particularly for firms with more subjective valuations (Hribar and McInnis 2012). More recently, Keshk and Wang (2018) document that investor sentiment affects analysts' private information production. This suggests that earnings expectations are a channel through which investor sentiment may impact returns. Clement et al. (2011) use the sentiment index constructed by Baker and Wurgler (2006) as an indication of how informative changes in companies' stock prices are regarding the underlying fundamentals. During periods of extreme sentiment, securities are more subject to speculation and therefore prices should not reflect companies' true economic condition as precisely as during periods of moderate sentiment. Based on their findings, Clement et al. (2011) conclude that analysts that are more sensitive to the information content in stock price changes (i.e., can see past investor sentiment) obtain superior forecast accuracy. Mian and Sankaraguruswamy (2012) assess the effect of investor sentiment on how the market perceives earnings news. They document that the market overreacts to good news (bad news) during periods of high (low) sentiment.

Managers respond strategically to investor sentiment through their disclosure policies (Bergman and Roychowdhury 2008). Specifically, they attempt to maintain sentiment-driven optimistic earnings valuations through their long-horizon disclosure choices by remaining silent regarding earnings forecasts when sentiment is high. Consistently, managers have a higher propensity to voluntarily disclose pro forma (i.e., adjusted) earnings metrics that exceed the GAAP-based earnings when investor sentiment is high (Brown et al. 2012). As investor sentiment increases, managers exclude certain expense amounts in the pro forma figure and more prominently highlight pro forma earnings within the earnings press release. Moreover, managers exploit investors' inattention toward understanding the accrual and cash components of earnings during high sentiment periods by reporting more optimistic estimates of accruals (Ali and Gurun 2009). Consistent with this, Hurwitz (2018) documents that earnings forecasts are biased by investor sentiment. Recent work shows that overly optimistic managerial

disclosures attract more litigation (Rogers et al. 2011), as investors blame their losses on managers' unwarranted claims. Recently, Amin et al. (2020) document that higher sentiment periods are also associated with more earnings misstatements and lenient auditor behavior due to a reduced risk of auditor litigation. Taken together, these actions reflect managers' opportunistic motives during such periods and a potential increase in litigation exposure when valuations revert to their true figures.

## Investor Sentiment and Nonprofit Donations

While a relatively large body of work examines the effects of investor sentiment in the for-profit sector, we are not aware of any studies that investigate whether sentiment effects spillover into the nonprofit sector. Individuals account for nearly 75% of all donations (U.S. Census Bureau 2012); and, donors tend to be higher net worth individuals (Johnson and Rosenfeld 1991), who are likely to be susceptible to capital market forces, including investor sentiment.[7] Thus, we conjecture that the prevailing level of investor sentiment may significantly impact donations in the nonprofit sector.

In developing our hypotheses, we separately consider stock-based donations and traditional cash donations due to the differing economic and psychological incentives that may arise as a result of high investor sentiment. Stock-based donations, in particular, are susceptible to donors' bullish beliefs about the value of their securities during periods of high sentiment, as well as endowment effects related to their portfolio. Endowment theory suggests that individuals value goods that they own more than goods that they do not own (Knetsch 1989; Kahneman et al. 1990; 1991a, b). This leads to loss-aversion behavior, whereby individuals suffer a greater disutility from giving up ownership of the good than the utility they derive from acquiring it (Tversky and Kahneman 1991). In the capital markets setting, this phenomenon carries over to stock ownership. Specifically, investors value a stock that they own more than an equivalent stock that they do not own. According to Cabot Research, a consultancy firm based in Boston, even sophisticated investors "often overvalue their holdings, and it costs them an average of about 1% point per year," with some money managers losing up to 2.5% points due to the bias (O'Mahoney 2017).

Given that prospective donors value their shares higher than their true worth, and nonprofit organizations' relative indifference to the type of gift it receives (i.e., the gift type should not significantly impact the progression of the nonprofit organization's mission so long as the gift is of equivalent value), one would expect donors to have a preference to gift cash over shares of stock valued at the same amount. However, there are other benefits of donating shares of stock, making them a common type of contribution. Donating appreciated stocks allows donors to claim a tax deduction for the market value of their securities. Recipient nonprofit organizations typically sell donated securities immediately to convert them to cash, without incurring any capital gains tax, which can be used for their missions. Donors also benefit by having the ability to adjust the cost-basis of their investment portfolio when they donate stocks.[8] After donating a stock, repurchasing it at market price effectively updates the cost-basis to the market value at the time of the most recent repurchase. This reduces the capital gains tax for the donor in the future.

In spite of these tax benefits, we argue that high investor sentiment exacerbates the overvaluation of shares, caused by the endowment effect, as well as investors' beliefs about their securities, expecting market prices to continue to increase foreseeably (Baker and Wurgler 2006). This is caused by the demand for securities outpacing its supply in the short run due to investors' optimistic bias.[9]This optimism in the markets confirms and validates investor beliefs that their shares are more valuable and that they should hold onto them in anticipation of further gains. Collectively, these factors decrease the personal utility that donors can derive from donating shares of stock relative to cash during high sentiment periods. Moreover, this is consistent with social exchange theory, that donors' ethical and philanthropic behavior is subject to what they will get in return for their donations.

Following this view, investors would hold back the donation of their shares until they believe share prices have peaked in order to maximize their tax deduction and cost-basis adjustment. This view predicts that sentiment negatively impacts nonprofit stock-based donations based on the economic incentives that arise due to the endowment effect and sentiment-driven optimism, bringing us to our first hypothesis:

**H1** Ceteris paribus, investor sentiment is negatively associated with stock-based donations.

[7] All results are robust to alternatively defining *Sentiment* using the Michigan Consumer Confidence Index (MCCI) as in Bergman and Roychowdhury (2008) as well as the Consumer Sentiment Index (CSI).

[8] Our results are robust to alternatively calculating *Sentiment* using monthly data to calculate twelve month rolling averages for the *calendar* years in our sample.

[9] Our results are robust to including organizational age as an additional control variable, however, as noted by Harris et al. (2017) nonprofit organizational age can represent many different dimensions of the charity. That is, Petrovits et al. (2011) conclude that organizational age and size can be considered substitutes for one another given their significant correlation ($p$ value $<0.000$ in our sample).

By contrast, cash donations do not suffer from the endowment effect, and hence, we do not expect donors' valuation of cash to vary with the level of investor sentiment. Nonetheless, we do believe that sentiment influences donors' decisions to make cash donations. That is, we put forth two ways high investor sentiment could increase donors' tendency to engage in greater philanthropy by giving cash gifts. The first view suggests that higher levels of investor sentiment, which are associated with more optimism regarding asset valuations and future gains (e.g., Baker and Wurgler 2006; 2007; Stambaugh et al. 2012), trigger perceptions of greater financial well-being and stability. While it is well established in the nonprofit literature that financially well-off donors with greater income and wealth give more (e.g., Andreoni 2006; Auten et al. 2002; Vesterlund 2006), it has not been documented whether mere sentiment-driven beliefs regarding future gains would have the same effect. It is plausible that when donors perceive greater financial stability and wealth, they will be motivated to signal their wealth and contribute to derive a private benefit in the form of warm glow or social prestige. Thus, higher sentiment could motivate cash donations to moral and ethical causes that matter to donors.

Second, sentiment-driven optimism may enhance donors' moods. Previous work in this area links positive mood states with higher donations and likelihood of giving (e.g., Bekkers and Wiepking 2011; Dolinski et al. 2005). A positive mood state invokes one's ability to empathize and relate to others. As a result, individuals engage in more ethical and prosocial behavior. Consistently, experiments show that happier participants were more likely to behave ethically and engage in prosocial spending (e.g., Aknin et al. 2012). Weyant (1978) documents that individuals having more positive mood states were more likely to help with various moral causes. Factors associated with good mood, including weather and comfort factors, have also been shown to increase ethical, good Samaritan behavior (Cunningham 1979; Carlson et al. 1988). Therefore, because high sentiment is indicative of elevated mood state, it may induce an increase in donations to support moral causes. This brings us to our second hypothesis.

**H2** Ceteris paribus, investor sentiment is positively associated with cash donations.

One might also argue that if higher investor sentiment increases optimism and individuals' beliefs about the stock market, then donors would prefer to allocate their cash to purchase more stock, potentially depleting the cash available to donate when investor sentiment is high. This would suggest that the level of cash donations would be inversely related to investor sentiment. However, this argument naively assumes that individuals' rate of savings is constant and that donors must substitute between cash donations and capital market investments. Behavioral economics literature documents that higher levels of optimism and confidence about the economy mediates individuals' rate of savings (e.g., Katona 1975; Williams and Defris 1981; Lunt and Livingstone 1991; Ewing and Payne 1998; Burdekin and Redfirn 2009). Specifically, individuals are likely to save less during such periods, opening up a larger pool of cash to be allocated to consumption, donation, investment, etc. Accordingly, it is quite feasible for there to be an increase in cash donations and capital markets investments when sentiment is high. Moreover, due to the loss aversion tendency that arises as a result of the endowment effect (i.e., investors exhibit a greater disutility from giving up their shares then the utility they would derive from purchasing them), potential increases in purchases of new stock need not necessitate such a substantial depletion in cash that it prevents donors from contributing more in cash gifts. Finally, because this argument would work against us finding a significant relationship in the direction of H2, we believe it is ultimately an empirical question.

## Donor and Organization Types

In addition to the overall effects of investor sentiment, we also consider whether donor size moderates the effect of sentiment on donations. Extant literature suggests that donor size influences donor behavior (Yetman and Yetman 2013) and responses to information (Balsam and Harris 2014). Larger donors are said to have intimate knowledge regarding a nonprofit organization's operations and financial condition (Amin and Harris 2017; Seifert et al. 2003). They are typically provided direct access to financial reports or actively seek out information to safeguard their significant donations. Large donors are also more likely to be members of the nonprofit's board of directors, which gives them greater access to the organization's operations. However, large donors may also have more wealth tied up in the capital markets. Therefore, their decisions to donate would be *more* susceptible to investor sentiment than those of smaller donors. This view predicts that the effect of investor sentiment on donations will be amplified for organizations with larger donors and brings us to our third hypothesis:

**H3** Ceteris paribus, the effects of investor sentiment on cash and stock donations are stronger for organizations with larger donors.

Next, we consider whether the association between investor sentiment and donations is moderated based on nonprofit organization type. Balsam and Harris (2014) classify nonprofit as either charitable or service-oriented based on the organization's primary revenue source (Hansmann 1980). Consistent with benefits theory (Fischer et al. 2011), charitable nonprofit organizations rely more on donations and government grants (Amin and Harris 2017). Examples of charitable organizations include soup kitchens, homeless shelters, and disaster

relief initiatives, where donors are not the typical recipients of the organizations' work. Charitable organizations rely on 'tug-at-the-heartstrings' type solicitations to induce emotional giving to moral and ethical causes motivated by warm-glow giving (Andreoni 1990; Gordon and Khumawala 1999).

By contrast, service-oriented nonprofit organizations rely more on program service revenues to support their operations (Balsam and Harris 2014). Examples of service-oriented nonprofit organizations include hospitals and universities, where donors are often recipients of the organizations' services. Moreover, donors may also have ongoing commitments as members of those organizations. Because charitable and service-oriented nonprofit organization types differ so greatly from one another, we expect sentiment to differentially impact their donations. Specifically, due to service-oriented organizations' reciprocal relationship with donors causing a relative lack of donor-beneficiary separation, we expect their giving to be less susceptible to sentiment. Prior work suggests that reciprocity plays an important role in determining donations (e.g., Moody 2008; Deckop et al. 2003; Sugden 1984). This is also consistent with social exchange theory which posits that individuals and corporations engage in moral and ethical behaviors, in the form of donations, because they expect to receive something in return. By contrast, due to charitable organizations' reliance on emotional giving, we expect their donations to be more susceptible to sentiment-driven biases. This brings us to our fourth and final hypothesis.

**H4** Ceteris paribus, the effects of investor sentiment on cash and stock donations are stronger for charitable organizations.

## Research Design

### Donations Model

In order to test whether investor sentiment is associated with nonprofit donations in the form of either cash or stock donations, we estimate the following model:

$$\begin{aligned}\log\left(Donations_{it}\right) &= \alpha_0 + \alpha_1\, Sentiment_t + \alpha_2\, Total\,Assets_{it-1} \\ &+ \alpha_3 Program\,Efficiency_{it-1} + \alpha_4\, Fund\,raising\,Expenses_{it-1} \\ &+ \alpha_5\, Government\,Grants_{it-1} + \alpha_6\, Program\,Service\,Revenues_{it-1} \\ &+ \alpha_7\, Governance\,Index_{it} + \alpha_8\, Cash\,Donations_{it-1} \\ &+ \alpha_9\, Stock\,Donations_{it-1} + \alpha_{10}\, Trend_t \\ &+ Industry\,Fixed\,Effects + \varepsilon\end{aligned} \tag{1}$$

where subscripts $i$ and $t$ represent the organization and year, respectively. We utilize left censored Tobit for all regression models due to the potential for left censoring in our dependent variables, cash and stock donations, which are bounded from below at zero (Maddala 1983). We also cluster our standard errors by year because our variable of interest, *Sentiment*, varies over time but not in the cross-section.

The dependent variable is alternatively *Stock Donations* or *Cash Donations*. *Stock Donations* are the natural log of publicly traded securities revenue from Form 990, Schedule M, Part I.[10] Schedule M reports all noncash contributions received by the organization. Specifically Part I, lines 9–12, from which we draw our data, reports the dollar value of stock donations received by the organization during the period. *Cash Donations* are the natural log of direct donations reported on Form 990, Part VIII and represent cash donations made to the organization from individuals. The variable of interest is *Sentiment* short for investor sentiment, measured as in Baker and Wurgler (2006).[11] In particular, *Sentiment* is a continuous variable which ranges between negative 0.63 and positive 0.13, in our sample, representing the investor sentiment index developed by Baker and Wurgler (2006) calculated as the first principal component of five investor sentiment proxies: growth in industrial production, growth in durable, nondurable, and services consumption, as well as growth in employment. We use the measure of *Sentiment* where each of the sentiment proxies have first been orthogonalized with respect to a set of macroeconomic indicators in order to strip away any correlation between sentiment and those economic factors. Monthly data are obtained from Jeffrey Wurgler's website (https://people.stern.nyu.edu/jwurgler), which we use to calculate twelve month rolling averages for the fiscal year ends represented in our sample.[12]

We follow prior nonprofit literature and include control variables which have been found to affect donations, namely: size, organizational efficiency, fundraising expenses, government grants, program service revenues, governance, as well as lagged donations. Tinkelman (1998) and Krishnan and Schauer (2000) both found a positive relation between nonprofit size and support. We include year-end *Total Assets* and expect it to be positively associated with donations.[13]

[10] Although *Program Efficiency* is a mainstay of donation demand model literature (Weisbrod and Dominguez 1986; Posnett and Sandler 1989; Callen 1994; Tinkelman 1998; Khumawala and Gordon 1997; Parsons 2003; Tinkelman and Mankaney 2007; Parsons and Trussel 2008; Tinkelman 2009), we acknowledge that more recent studies indicate that *Program Efficiency* is not a true measure of efficiency given that it does not actually measure program inputs and outputs (Tinkelman and Donabedian 2007; Coupet and Berrett 2019).

[11] Our results are robust to other combinations of governance control variables including indexes of 5, 7, and 12 governance indicators variables also defined by Boland et al. (2019)

[12] Our results are identical throughout if we exclude the lagged dependent variables from our models.

[13] In untabulated analyses, we find that our results are robustness to including unemployment and real disposable income as additional controls; however, due to multicollinearity we exclude these variables from our main model.

Weisbrod and Dominguez (1986), Posnett and Sandler (1989), Callen (1994), Tinkelman (1998), Khumawala and Gordon (1997), Parsons (2003), Tinkelman and Mankaney (2007), Parsons and Trussel (2008), and Tinkelman (2009) all find that organizational efficiency is associated with the ability to attract donations. We use *Program Efficiency*, defined as the ratio of program expenses to total expenses, to measure efficiency and expect it to be positively associated with our dependent variable.[14] Weisbrod and Dominguez (1986) and Tinkelman (1998) find that *Fundraising Expenses* are positively related to donations, therefore we also expect a positive coefficient on this variable.

Several studies (Callen 1994; Posnett and Sandler 1989; Weisbrod and Dominguez 1986) propose that donors refrain from making donations to organizations that have high levels of *Government Grants* or *Program Service Revenues* as they feel that the nonprofits' financial needs are being met from other sources. However, other literature (Petrovits et al. 2011; Yetman and Yetman 2013) suggests donors may feel more comfortable contributing to a nonprofit that has other sources of revenue. Consequently, we include both *Government Grants* and *Program Service Revenues*, however, given mixed results in prior literature, we do not predict the coefficients of these variables.

We include *Governance Index* following Harris et al. (2015) and Boland et al. (2019) who find that good governance is associated with higher future contributions. As suggested by Boland et al. (2019) we define *Governance Index* using a simple index of three governance policies reported on Form 990, increasing in good governance. Specifically, we tally indicator variables for independent board (equal to 1 for boards made up of over 50% independent directors), audit committee, and CEO salary setting process.[15] Finally, we include lagged stock and cash donations to aid in ruling out concerns related to omitted correlated variables. Lagged donations control for time-invariant organizational characteristics, such as fundraising ability. In order for an omitted variable to cause the observed association between cash donations and *Sentiment*, the omitted variable would have to be correlated with our dependent variable and *Sentiment*, but not correlated with lagged donations.[16] Finally, following investor sentiment literature, we also control for time trend (e.g., Bergman and Roychowdhury 2008; Brown et al. 2012). *Trend* is a counter variable equal to 1 for fiscal year 2008, 2 for fiscal year 2009, and so on.

To provide greater confidence that the *Sentiment* effects we are estimating are not being influenced by other macroeconomic covariates, we also estimate our models after including controls for gross domestic product, Dow Jones Industrial Average, and interest rates.[17] We gather *Real GDP Growth* data from the US Bureau of Economic Analysis website. *Dow Jones Industrial Avg* is the average index during the organization's fiscal year, acquired from Yahoo finance. Finally, *Interest Rates* represent historical daily interest rates averaged over each rolling fiscal year. Lower interest rates during the financial crisis years encouraged more borrowing and repurchasing of shares (limiting the outstanding shares). As a result, interest rates, which may be correlated with sentiment could have an effect on stock donations.

We measure our donations control variables with a one year lag to allow time for the Form 990 to be incorporated into donor decisions consistent with prior literature (Trussel and Parsons 2007); however, our test, governance, and macroeconomic variables (*Sentiment, Governance Index, Trend*, *Real GDP Growth, Dow Jones Industrial Avg,* and *Interest Rates*) are measured contemporaneously given that sentiment and annual economic conditions impact donations throughout the organizations' fiscal year. Finally, the model includes industry fixed effects, where industries are measured using the twelve major categories defined by the National Taxonomy of Exempt Entities (NTEE).

## Moderating Role of Nonprofit Type

In order to test whether the association between investor sentiment and donations is stronger for larger donors (H3) and charitable institutions (H4), we test two separate models which include interaction terms between our *Sentiment* test variable and large donor and charitable organization indicator variables, respectively. In sum, we estimate the following Tobit model, once again, bounded from the left at zero, to test H3 and H4:

[14] Our results are robust if we alternatively defined *Large Donors* as donors placing both permanent and temporary restrictions on their donations, however, given that over 65 percent of sample firms have either permanently or temporarily restricted donations we take the more conservative approach of only identifying permanently restricted donations as an indication of donor size as this identifies approximately 40 percent of donors as large. Our results are also robust to alternatively defining *Large Donors* as a continuous measure of permanently restricted donations or the ratio of permanently restricted donations to total net assets.

[15] Our results are robust to alternatively defining *Charitable* as the continuous ratio of donations to total revenue.

[16] We acknowledge that while SOI data cover the vast majority of donations in the nonprofit sector, it covers larger nonprofit organizations. Therefore, our findings should be interpreted with caution regarding their generalizability for smaller nonprofit organizations, whose donors may not be impacted by investor sentiment in the same manner.

[17] Our data begin in 2008 following the IRS Form 990 redesign which implemented Schedule M from which we draw our stock donation data.

$$\log\left(Donations_{it}\right) = \alpha_0 + \alpha_1 Sentiment_t + \alpha_2 Moderator_{it} + \alpha_3 Sentiment_t \times Moderator_{it} + \sum Controls + Industry\ Fixed\ Effects + \varepsilon \quad (2)$$

where subscripts $i$ and $t$ represent the organization and year, respectively. In Eq. 2, *Donations* represents both stock and cash donations; and *Moderator* stands-in for the two moderating variables, *Large Donor* and *Charitable*, corresponding to H3 and H4. *Large Donor* is an indicator variable activated for organizations with nonzero permanently restricted donations. That is, following Yetman and Yetman (2013) we identify organizations reporting net assets which have been donated with permanent restrictions as to their use as an indication of larger donors.[18] We define *Charitable* as an indicator variable activated for organizations with a ratio of donations to total revenues above the sample median.[19] Following this definition, we classify organizations with the largest ratios as *Charitable* following the rationale that these organizations are considered to be more donation reliant or charitable in nature.

## Sample Selection and Descriptive Statistics

Our sample is drawn from the Statistics of Income (SOI) file for nonprofits organized and operating for exempt purposes allowed under section 501(c)(3) of the Internal Revenue Code. While we obtain this dataset from the National Center for Charitable Statistics (NCCS), it is compiled from Form 990 s provided by the Statistics of Income division of the US Internal Revenue Service. Although the SOI dataset does not include every nonprofit organization for every year, it does reflect "over 90% of all nonprofit revenues" according to Yetman and Yetman (2013, p. 1049).[20] Sample years span the nine most recent fiscal years for which data are available: 2008–2016 providing for 131,866 firm-year observations.[21] From this we exclude 16,365 firm-year observations with missing model variables. This yields a final sample of 115,501 firm-year observations for 17,636 unique nonprofit organizations.

Table 1 provides industry and year frequencies for our sample observations. Panel A, indicates that 25% of sample firms come from the Human Services industry, this is followed closely by Hospitals (18%), Education and Health (both 14%). Remaining industries represented in order of prominence are: Public and Societal Benefit, Universities, Arts, Environmental, Religious, International, and Mutual Benefit. Turning to year frequencies in Panel B we note that all years represent between 10 and 12 represent of our sample. Panel B also includes average investor sentiment for our sample years ranging from -0.6336 in the recession year of 2010 to a high of 0.1296 in pre-recession months of 2008. Average investor sentiment over the entire sample period is -0.1283.

Table 2 provides descriptive statistics for our model variables. Here, we note that stock donations are a mere 6% of cash donations, indicating that the organizations in our sample, on average, receive very few stock donations. We also note that mean investor sentiment is negative, consistent with the recession time period covered (2009–2010) noted above. With respect to organizational features, we note that sample organizations are rather efficient with 82% of expenses directed toward programs and relatively large with mean total assets and program revenues over $149 and $59 million, respectively. Sample organizations are also well governed with 2.39 out of 3 governance policies in place, on average. Finally, we find that approximately 39% of sample firms have large donors, and by definition, half of our sample organizations are classified as *Charitable*.

Table 3 presents univariate relationships between our model variables by reporting their respective correlation coefficients. Consistent with our hypotheses we find that sentiment is negatively related to stock donations and positively related to cash donations, providing preliminary evidence of our expected relationships. Despite a few relatively high correlations, (0.45 between *Fundraising Expenses* and *Cash Donations* and 0.45 between *Program Service Revenues* and *Total Assets*), all variance inflation factors (VIFs) are sufficiently low (average model VIFs are reported in each table), alleviating potential multicollinearity concerns.

[18] Our sample mean for investor sentiment is − 0.13 and a standard deviation is 0.28. To provide more intuition regarding fluctuations in the sentiment proxy, one may consider how sentiment fluctuated during the financial crisis which started in mid-2007. Investor sentiment was 0.58 prior to the onset of the crisis in April of 2007, when the economy appeared to be booming to the average investor. Then, sentiment dropped to its lowest low mid-crisis in November of 2009 to − 0.90. Visualizing this swing of nearly 1.5 from an optimistic pre-crisis period to a grim mid-crisis period should help provide better context for what our sample mean of − 0.13 and an increase of 0.28 implies.

[19] Despite the fact that we use Baker and Wurgler's (2006) measure of investor sentiment which is orthogonalized with respect to six macroeconomic factors to remove any correlation between investor sentiment and the economy, we confirm the robustness of our findings by controlling for the state of the economy in our model.

[20] Our results are identical if we alternatively use OLS regressions with winsorized variables at the 1 and 99% levels.

[21] https://www.thenonprofittimes.com/news-articles/nonprofits-worth-887-3-billion-u-s-economy/

**Table 1** Sample frequencies

| Industry | Total | % |
|---|---|---|
| Panel A: industries | | |
| Human services | 28,704 | 25 |
| Hospitals | 20,416 | 18 |
| Education | 16,588 | 14 |
| Health | 16,326 | 14 |
| Public and societal benefit | 10,450 | 9 |
| Universities | 8,767 | 8 |
| Arts | 6,891 | 6 |
| Environmental | 2,937 | 3 |
| Religious | 2,036 | 2 |
| International | 1,815 | 2 |
| Mutual Benefit | 571 | 0 |
| Total | 115,501 | 100 |

| Year | Frequency | % | Average investor sentiment |
|---|---|---|---|
| Panel B: years | | | |
| 2008 | 13,634 | 12 | 0.1296 |
| 2009 | 13,116 | 11 | −0.5706 |
| 2010 | 12,818 | 11 | −0.6336 |
| 2011 | 12,467 | 11 | 0.0000 |
| 2012 | 12,952 | 11 | −0.0094 |
| 2013 | 12,999 | 11 | 0.0303 |
| 2014 | 13,551 | 12 | −0.0068 |
| 2015 | 12,063 | 10 | 0.0505 |
| 2016 | 11,901 | 10 | −0.1488 |
| Total | 115,501 | 100 | −0.1283 |

**Table 2** Descriptive statistics

| $N = 115{,}501$ | Q25 | Mean | Median | Q75 | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| Stock Donations$_t$ | 0 | 169,216 | 0 | 0 | 812,131 | 0 | 6,460,771 |
| Cash Donations$_t$ | 41,827 | 6,139,134 | 606,996 | 3,660,235 | 17,480,518 | 0 | 116,429,928 |
| Sentiment$_t$ | −0.17 | −0.13 | −0.02 | 0.04 | 0.28 | −0.69 | 0.55 |
| Program Efficiency$_{t-1}$ | 0.78 | 0.82 | 0.85 | 0.91 | 0.15 | 0.01 | 1.00 |
| Total Assets$_{t-1}$ | 8,518,626 | 149,632,201 | 41,574,016 | 118,000,000 | 346,776,628 | 60,841 | 2,440,444,672 |
| Fundraising Expenses$_{t-1}$ | 0 | 612,665 | 5,307 | 388,999 | 1,753,874 | 0 | 12,568,407 |
| Program Service Revenues$_{t-1}$ | 108,852 | 59,438,742 | 4,705,442 | 34,400,000 | 159,526,626 | 0 | 1,079,634,688 |
| Government Grants$_{t-1}$ | 0 | 2,843,020 | 0 | 423,789 | 12,420,738 | 0 | 101,452,040 |
| Governance Index$_t$ | 2.00 | 2.39 | 3.00 | 3.00 | 0.85 | 0.00 | 3.00 |
| Trend$_t$ | 10.00 | 11.93 | 12.00 | 14.00 | 2.58 | 8.00 | 16.00 |
| Real GDP Growth$_t$ | 1.02 | 1.01 | 1.02 | 1.02 | 0.02 | 0.97 | 1.03 |
| Dow Jones Industrial Avg$_t$ | 10,913 | 13,733 | 12,952 | 16,827 | 3,323 | 7,063 | 19,763 |
| Interest Rates$_t$ | 0.11 | 0.54 | 0.15 | 0.25 | 1.01 | 0.08 | 4.97 |
| Large Donors$_t$ | 0.00 | 0.39 | 0.00 | 1.00 | 0.49 | 0.00 | 1.00 |
| Charitable$_t$ | 0.00 | 0.50 | 0.00 | 1.00 | 0.50 | 0.00 | 1.00 |

We present unlogged, winsorized variables for ease of interpretation but all continuous variables are logged in the multivariate tests

See Appendix Table 10 for variable definitions

**Table 3** Correlation matrix

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Stock Donations$_t$ | 1.00 | | | | | | | | | |
| 2. Cash Donations$_t$ | **0.42** | 1.00 | | | | | | | | |
| 3. Sentiment$_t$ | **−0.39** | **0.01** | 1.00 | | | | | | | |
| 4. Program Efficiency$_{t-1}$ | **0.02** | **0.02** | **0.01** | 1.00 | | | | | | |
| 5. Total Assets$_{t-1}$ | **0.14** | **0.40** | **0.01** | **0.03** | 1.00 | | | | | |
| 6. Fundraising Expenses$_{t-1}$ | **0.06** | **0.45** | **0.02** | **0.01** | **0.43** | 1.00 | | | | |
| 7. Program Service Revenues$_{t-1}$ | **0.01** | **0.10** | **0.00** | **0.04** | **0.45** | **0.12** | 1.00 | | | |
| 8. Government Grants$_{t-1}$ | **0.03** | **0.26** | **0.00** | **0.03** | **0.31** | **0.25** | **0.10** | 1.00 | | |
| 9. Governance Index$_t$ | **0.01** | **0.05** | **−0.09** | **−0.01** | **0.06** | **0.08** | **0.05** | **0.03** | 1.00 | |
| 10. Trend | **0.01** | **0.01** | **0.31** | **0.01** | **0.02** | 0.00 | **0.02** | 0.00 | **0.22** | 1.00 |

Bolded coefficients have significant $p$ values at the 1% level (two-tailed)

See Appendix Table 10 for variable definitions

## Empirical Results

### Main Results

Empirical results for our test of H1 are presented in Table 4, Panel A. Column I tests the relationship between investor sentiment and stock donations, after controlling for known donation covariates. Consistent with H1, we find a negative relationship between *Sentiment* and *Stock Donations*, supporting the notion that investors prefer to hold onto shares because they expect to enjoy continued appreciation in share prices during high sentiment periods. Also, following expectations, the magnitude of the effect of investor sentiment on stock donations is greater than cash donations. This is because investor sentiment is a capital market phenomenon. As such, assets that have been committed to the capital markets (i.e., stocks) will be more prone to its effects than uncommitted assets (i.e., cash). On average, a one standard deviation increase in investor sentiment is associated with a 27.9% decrease in stock donations (on average, $47,211).[22] For robustness, we also control for the state of the economy by including *Real GDP Growth, Dow Jones Industrial Avg,* and *Interest Rates* in column II. We continue to find a negative relationship between *Stock Donations* and *Sentiment*. Collectively, the findings suggest that investor sentiment indeed influences the ethical giving behavior of individuals and corporations to moral causes supported by nonprofit organizations.

In Table 4, Panel B, we test H2 by examining the relationship between *Sentiment* and *Cash Donations*. Consistent with our expectation, we find a strong positive association between *Cash Donations* and *Sentiment*, indicating that indeed, the prevailing level of investor sentiment spills over into the nonprofit sector by influencing donors' decisions to engage in moral and ethical spending. Moreover, the results are also economically significant. On average, a one standard deviation increase in investor sentiment is associated with a 36.7% increase in donations (on average, $2,250,607). These results are also robust to the inclusion of macroeconomic control variables, in column II.

To provide further evidence on this issue, we test H3 and H4 by conducting cross-sectional tests to examine whether the relationship between investor sentiment and nonprofit donations is moderated predictably by donor and organization type. Our first cross-sectional result relates to larger donors who are expected to be more involved in the capital markets due to their wealth and income, making them more susceptible to investor sentiment than smaller donors. Results reported in Table 5 confirm these predictions, as the interaction between investor sentiment and large donors provides an incremental association, above and beyond the effect of investor sentiment alone. In Columns I and II of Table 5, once again, controlling for both donations demand model covariates and economic factors, we find that the interaction between *Sentiment* and *Large Donor* is negative and significant in our *Stock Donations* model. Reliably, in Columns III and IV, we also find that the interaction between *Sentiment* and *Large Donor* is positive and significant for our *Cash Donations* model. In sum, we find the relationship between investor sentiment and donations is stronger for organizations that rely on large donors, more closely tied to the capital markets.

The results of our second cross-sectional test are reported in Table 6. These results shed light on whether the effects of sentiment are moderated based on organization type. Consistent with H4, we find that indeed the effect of *Sentiment* on *Stock Donations* and *Cash Donations* is stronger for organizations with a less reciprocal relationship with their donors (i.e., more donor-beneficiary separation), or those defined as being charitable in nature. Once again, our

[22] https://www.charitynavigator.org/index.cfm?bay=content.view&cpid=42.

**Table 4** Investor sentiment main effects

| Dependent variable: defined in column heading | Stock Donations$_t$ (I) | Stock Donations$_t$ (II) |
|---|---|---|
| | Coefficient *p* value | Coefficient *p* value |
| Panel A: stock donations | | |
| Constant | −115.041*** | −113.977*** |
| | 0.000 | 0.000 |
| Sentiment$_t$ | −5.937*** | −4.905*** |
| | 0.000 | 0.000 |
| Total assets$_{t-1}$ | 1.574*** | 1.580*** |
| | 0.000 | 0.000 |
| Program efficiency$_{t-1}$ | 2.499* | 2.542* |
| | 0.075 | 0.075 |
| Fundraising expenses$_{t-1}$ | 0.724*** | 0.722*** |
| | 0.000 | 0.000 |
| Program service revenues$_{t-1}$ | −0.154** | −0.155** |
| | 0.021 | 0.027 |
| Government grants$_{t-1}$ | −0.134** | −0.137* |
| | 0.047 | 0.051 |
| Governance index$_t$ | 2.395*** | 2.366*** |
| | 0.000 | 0.000 |
| Cash donations$_{t-1}$ | 1.312*** | 1.316*** |
| | 0.001 | 0.000 |
| Stock donations$_{t-1}$ | 0.851*** | 0.842*** |
| | 0.000 | 0.000 |
| Trend$_t$ | 0.295*** | 1.325*** |
| | 0.001 | 0.000 |
| Real GDP growth$_t$ | | 11.069*** |
| | | 0.000 |
| Dow Jones industrial Avg$_t$ | | −7.308*** |
| | | 0.000 |
| Interest rates$_t$ | | 0.420** |
| | | 0.041 |
| *N* | 115,501 | 115,501 |
| Industry fixed effects | Yes | Yes |
| Standard errors clustered by | Year | Year |
| Model *p* value | 0.0000*** | 0.0000*** |
| Pseudo $R^2$ | 0.2212 | 0.2218 |
| Average VIF | 1.418 | 3.761 |
| Dependent variable: defined in column heading | Cash Donations$_t$ (I) | Cash Donations$_t$ (II) |
| | Coefficient *p* value | Coefficient *p* value |
| Panel B: cash donations | | |
| Constant | −1.165** | −15.556*** |
| | 0.021 | 0.000 |
| Sentiment$_t$ | 0.837*** | 0.254*** |
| | 0.003 | 0.001 |
| Program efficiency$_{t-1}$ | 0.308 | 0.314 |
| | 0.413 | 0.406 |

**Table 4** (continued)

| Dependent variable: defined in column heading | Cash Donations$_t$ (I) | Cash Donations$_t$ (II) |
|---|---|---|
| | Coefficient *p* value | Coefficient *p* value |
| Total assets$_{t-1}$ | −0.001 | −0.011 |
| | 0.972 | 0.738 |
| Fundraising expenses$_{t-1}$ | 0.088*** | 0.083*** |
| | 0.001 | 0.002 |
| Program service revenues$_{t-1}$ | −0.002 | −0.003 |
| | 0.504 | 0.252 |
| Government grants$_{t-1}$ | 0.019*** | 0.018*** |
| | 0.000 | 0.000 |
| Governance index$_t$ | 0.268*** | 0.329*** |
| | 0.000 | 0.000 |
| Cash donations$_{t-1}$ | 0.900*** | 0.902*** |
| | 0.000 | 0.000 |
| Stock donations$_{t-1}$ | 0.007 | 0.015*** |
| | 0.225 | 0.005 |
| Trend$_t$ | −0.120** | −0.085 |
| | 0.013 | 0.172 |
| Real GDP growth$_t$ | | 12.426*** |
| | | 0.000 |
| Dow Jones industrial Avg$_t$ | | 0.557 |
| | | 0.180 |
| Interest rates$_t$ | | 0.274*** |
| | | 0.000 |
| *N* | 115,501 | 115,501 |
| Industry fixed effects | Yes | Yes |
| Standard errors clustered by | Year | Year |
| Model *p* value | 0.0000*** | 0.0000*** |
| Pseudo $R^2$ | 0.2469 | 0.2480 |
| Average VIF | 1.418 | 3.761 |

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level (two-tailed)

See Appendix Table 10 for variable definitions

results are robust to including controls for both donations demand and economic conditions. These findings underscore the relationship between charitable organizations and their donors, which makes those donors more susceptible to emotional giving driven by the "good mood" effects of investor sentiment and support social exchange theory.

## Tests of Robustness

### Change Analysis

In addition to our main analysis, we conduct change analyses to confirm the robustness of our results. Specifically, we examine whether a change in sentiment from period $t-1$ to period $t$ is associated with a change in stock and/or cash donations over this same period. In a change specification, time-invariant unobservable variables are cancelled out. As such, utilizing a change specification allows us to rule out potential endogeneity concerns arising from such issues. In this model, all variables are defined as the difference between period $t-1$ to period $t$ if they are measured in period $t$ in our levels analysis or the difference between period *t-2* to period $t-1$ if they are measured in period $t-1$ in our levels analysis. Results of this test are reported in Table 7.

Column (1) and column (2) report the results for stock and cash-based donations, respectively. The coefficient on the variable of interest, *Change in Sentiment*, is negative and significant in column (1). This suggests that a positive change in investor sentiment from period $t-1$ to period $t$ is associated with a negative change in

**Table 5** Large donor interaction models

| Dependent variable: defined in column heading | Stock Donations$_t$ (I) | Stock Donations$_t$ (II) | Cash Donations$_t$ (III) | Cash Donations$_t$ (IV) |
|---|---|---|---|---|
| | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value |
| Constant | −115.966*** | −162.283*** | −0.990 | −16.373*** |
| | 0.000 | 0.000 | 0.312 | 0.000 |
| Sentiment$_t$ | −3.422*** | −2.877*** | 0.847*** | 0.120** |
| | 0.004 | 0.006 | 0.000 | 0.025 |
| Sentiment × large donors$_t$ | −2.986** | −4.572*** | 0.102* | 0.343*** |
| | 0.026 | 0.000 | 0.068 | 0.000 |
| Total assets$_{t-1}$ | 1.577*** | 1.540*** | −0.009*** | −0.024*** |
| | 0.000 | 0.000 | 0.000 | 0.001 |
| Program efficiency$_{t-1}$ | 2.722* | 2.831* | 0.331 | 0.006 |
| | 0.059 | 0.059 | 0.223 | 0.414 |
| Fundraising expenses$_{t-1}$ | 0.695*** | 0.652*** | 0.084*** | 0.077*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Program service revenues$_{t-1}$ | −0.148** | −0.152** | −0.001 | −0.002 |
| | 0.030 | 0.030 | 0.773 | 0.398 |
| Government grants$_{t-1}$ | −0.135* | −0.135* | 0.019*** | 0.019*** |
| | 0.051 | 0.056 | 0.000 | 0.000 |
| Governance index$_t$ | 1.654*** | 1.730*** | 0.248*** | 0.308*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Cash donations$_{t-1}$ | 1.284*** | 1.261*** | 0.898*** | 0.898*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Stock donations$_{t-1}$ | 0.855*** | 0.905*** | 0.004*** | 0.012*** |
| | 0.000 | 0.000 | 0.005 | 0.000 |
| Trend$_t$ | 0.702*** | 1.934*** | −0.124*** | −0.113*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Large donors$_t$ | 3.290*** | 5.021*** | 0.259*** | 0.398*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Real GDP growth$_t$ | | 45.801*** | | 13.368*** |
| | | 0.000 | | 0.000 |
| Dow Jones industrial Avg$_t$ | | −3.673*** | | 0.787*** |
| | | 0.000 | | 0.000 |
| Interest rates$_t$ | | 1.689*** | | 0.295*** |
| | | 0.000 | | 0.000 |
| *N* | 115,501 | 115,501 | 115,501 | 115,501 |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Clustered standard errors by | Year | Year | Year | Year |
| Model *p* value | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Pseudo $R^2$ | 0.2235 | 0.2254 | 0.2471 | 0.2485 |
| Average VIF | 1.656 | 3.837 | 1.552 | 3.629 |

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level (two-tailed)

See Appendix Table 10 for variable definitions

stock donations over the same period, supporting H1. The coefficient on *Change in Sentiment*, is positive and significant in column (2). This suggests that a positive change in investor sentiment from period $t-1$ to period $t$ is associated with a positive change in cash donations for the same period, supporting H2. Because a change specification renders variables with little temporal variation unmeaningful, we are unable to conduct our cross-sectional tests with respect to donor size and organization type in change format. This is because although donor

**Table 6** Charitable organization interaction models

| Dependent variable: defined in column heading | Stock donations$_t$ (I) | Stock donations$_t$ (II) | Cash donations$_t$ (III) | Cash donations$_t$ (IV) |
|---|---|---|---|---|
| | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value |
| Constant | −117.581*** | −115.658*** | −2.986*** | −5.479*** |
| | 0.000 | 0.000 | 0.000 | 0.004 |
| Sentiment$_t$ | −3.936*** | −3.470*** | 0.583*** | 0.396** |
| | 0.001 | 0.002 | 0.002 | 0.015 |
| Sentiment × charitable$_t$ | −3.685** | −2.652* | 0.284** | 0.306*** |
| | 0.014 | 0.063 | 0.020 | 0.005 |
| Total assets$_{t-1}$ | 1.817*** | 1.827*** | 0.095** | 0.093** |
| | 0.000 | 0.000 | 0.018 | 0.022 |
| Program efficiency$_{t-1}$ | 3.107** | 3.159** | 0.517 | 0.515 |
| | 0.029 | 0.036 | 0.155 | 0.159 |
| Fundraising expenses$_{t-1}$ | 0.685*** | 0.683*** | 0.042** | 0.041** |
| | 0.000 | 0.000 | 0.017 | 0.017 |
| Program service revenues$_{t-1}$ | −0.118* | −0.118* | 0.035*** | 0.034*** |
| | 0.077 | 0.091 | 0.000 | 0.000 |
| Government grants$_{t-1}$ | −0.129* | −0.132* | 0.024*** | 0.025*** |
| | 0.057 | 0.060 | 0.000 | 0.000 |
| Governance index$_t$ | 2.422*** | 2.378*** | 0.303*** | 0.314*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Cash donations$_{t-1}$ | 0.995*** | 0.997*** | 0.794*** | 0.794*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Stock donations$_{t-1}$ | 0.833*** | 0.821*** | 0.011* | 0.010** |
| | 0.000 | 0.000 | 0.063 | 0.035 |
| Trend$_t$ | 0.288*** | 1.318*** | −0.110*** | −0.205*** |
| | 0.002 | 0.000 | 0.000 | 0.000 |
| Charitable$_t$ | 3.811*** | 3.965*** | 2.612*** | 2.604*** |
| | 0.000 | 0.001 | 0.000 | 0.000 |
| Real GDP growth$_t$ | | 9.874*** | | 2.497 |
| | | 0.000 | | 0.245 |
| Dow Jones industrial Avg$_t$ | | −7.397*** | | 0.753* |
| | | 0.000 | | 0.060 |
| Interest rates$_t$ | | 0.373* | | 0.251*** |
| | | 0.071 | | 0.000 |
| *N* | 115,501 | 115,501 | 115,501 | 115,501 |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Clustered standard errors by | Year | Year | Year | Year |
| Model *p* value | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Pseudo $R^2$ | 0.2234 | 0.4372 | 0.2630 | 0.2631 |
| Average VIF | 1.680 | 3.699 | 1.514 | 3.102 |

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level (two-tailed)

See Appendix Table 10 for variable definitions

size and organizational type vary in the cross-section, they have 94 and 99% autocorrelations, respectively. As such, we limit this analysis to our main stock and cash donation tests.

## Robust Regression Models

Leone et al. (2019) conclude that robust regressions are appropriate for analyses that may be susceptible to influential observations and outliers. This could be a potential problem when working with IRS Form 990 data, from which we draw

**Table 7** Change analyses

| Dependent variable: defined in column heading | Change in stock donations$_t$ (I) | Change in cash donations$_t$ (II) |
|---|---|---|
| | Coefficient *p* value | Coefficient *p* value |
| Constant | 0.078*** | 0.017*** |
| | 0.000 | 0.000 |
| Change in sentiment$_t$ | −5.609*** | 0.045*** |
| | 0.000 | 0.000 |
| Change in program efficiency$_{t-1}$ | −0.985*** | −0.037*** |
| | 0.000 | 0.006 |
| Change in total assets$_{t-1}$ | 0.871 | −0.097*** |
| | 0.134 | 0.000 |
| Change in fundraising expenses$_{t-1}$ | −0.040** | 0.002*** |
| | 0.031 | 0.002 |
| Change in program service revenues$_{t-1}$ | −0.086*** | 0.002** |
| | 0.001 | 0.011 |
| Change in government grants$_{t-1}$ | −0.001 | 0.002*** |
| | 0.834 | 0.000 |
| Change in governance index$_t$ | 3.516*** | 0.026*** |
| | 0.000 | 0.000 |
| Change in cash donations$_{t-1}$ | −0.067*** | |
| | 0.000 | |
| Change in stock donations$_{t-1}$ | | −0.004*** |
| | | 0.000 |
| Change in real GDP growth$_t$ | −3.914 | 0.652*** |
| | 0.738 | 0.000 |
| Change in Dow Jones industrial Avg$_t$ | 0.001** | 0.012* |
| | 0.042 | 0.067 |
| Change in Interest Rates$_t$ | −2.232*** | 0.016*** |
| | 0.000 | 0.000 |
| *N* | 125,720 | 125,720 |
| Industry fixed effects | Yes | Yes |
| Clustered standard errors by | Year | 0.0000*** |
| Model *p* value | 0.0000*** | 0.0030 |
| Pseudo $R^2$ | 0.0744 | 0.017*** |
| Average VIF | 1.260 | 1.263 |

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level (two-tailed)

See Appendix Table 10 for variable definitions

our sample (Tinkelman and Neely 2011). While we utilize Tobit for our main analyses, given that many of our sample organizations report zero *Cash Donations* and to a greater extent zero *Stock Donations*, we test the robustness of our results to using iteratively reweighted least squares, robust regressions. This method assigns a weight to each observation with higher weights given to observations which meet the assumptions underlying standard multiple regression. Results for this specification are reported in Table 8, Panels A-C, and are qualitatively similar to our main findings.

## Sample Restricted to Market Participants

To further test the robustness of our results we create a subsample of organization-years for organizations that report nonzero stock donation revenues at any point during our sample period. This purges organizations that do not receive any stock donations over the sample period. We expect this restricted sample to be composed of donors who are market participants and thus will be most affected by investor sentiment. Using this criterion, we identified 24,956 or approximately 22% of our sample as reporting nonzero stock donation revenues over our sample period. Results are reported in Table 9 and are qualitatively similar to our main findings.

**Table 8** Robust regressions

| Dependent variable: defined in column heading | Stock donations$_t$ (I) | Stock donations$_t$ (II) | Cash donations$_t$ (III) | Cash donations$_t$ (IV) |
|---|---|---|---|---|
| | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value |
| Panel A: investor sentiment main effects | | | | |
| Constant | −5.672*** | −10.285 | 0.097*** | −1.614*** |
| | 0.000 | 0.466 | 0.000 | 0.000 |
| Sentiment$_t$ | −0.853*** | −0.803*** | 0.109*** | 0.068*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Program efficiency$_{t-1}$ | 0.498*** | 0.501*** | 0.007 | 0.006 |
| | 0.000 | 0.000 | 0.372 | 0.424 |
| Total assets$_{t-1}$ | 0.255*** | 0.255*** | −0.001 | −0.001 |
| | 0.000 | 0.000 | 0.160 | 0.251 |
| Fundraising expenses$_{t-1}$ | 0.104*** | 0.103*** | 0.002*** | 0.002*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Program service revenues$_{t-1}$ | −0.023*** | −0.023*** | 0.000 | 0.000 |
| | 0.000 | 0.001 | 0.753 | 0.803 |
| Government grants$_{t-1}$ | −0.014*** | −0.014*** | 0.001*** | 0.001*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Governance index$_t$ | 0.136*** | 0.141*** | 0.011*** | 0.011*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Cash donations$_{t-1}$ | 0.044*** | 0.045*** | 0.996*** | 0.996*** |
| | 0.001 | 0.000 | 0.000 | 0.000 |
| Stock donations$_{t-1}$ | 0.473*** | 0.473*** | 0.001** | 0.001 |
| | 0.000 | 0.000 | 0.039 | 0.127 |
| Trend$_t$ | 0.037*** | 0.226*** | 0.001 | −0.019*** |
| | 0.000 | 0.000 | 0.611 | 0.000 |
| Real GDP growth$_t$ | | 3.783*** | | 1.795*** |
| | | 0.000 | | 0.000 |
| Dow Jones industrial Avg$_t$ | | −1.172*** | | 0.109*** |
| | | 0.000 | | 0.000 |
| Interest rates$_t$ | | 0.125*** | | 0.001 |
| | | 0.000 | | 0.678 |
| *N* | 115,501 | 115,501 | 115,501 | 115,501 |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Model p− value | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Adjusted $R^2$ | 0.4321 | 0.4330 | 0.6560 | 0.6562 |
| Dependent variable: defined in column heading | Stock Donations$_t$ (I) | Stock Donations$_t$ (II) | Cash Donations$_t$ (III) | Cash Donations$_t$ (IV) |
| | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value |
| Panel B: large donor interaction models | | | | |
| Constant | −5.069*** | −11.347*** | 0.127*** | −1.781*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Sentiment$_t$ | −0.507*** | −0.684*** | 0.075*** | 0.022*** |
| | 0.000 | 0.000 | 0.000 | 0.004 |
| Sentiment$_t$ × large donors$_t$ | −0.466*** | −0.345*** | 0.108*** | 0.117*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Total assets$_{t-1}$ | 0.224*** | 0.220*** | −0.001 | −0.001 |
| | 0.000 | 0.000 | 0.129 | 0.135 |

**Table 8** (continued)

| Dependent variable: defined in column heading | Stock Donations$_t$ (I) | Stock Donations$_t$ (II) | Cash Donations$_t$ (III) | Cash Donations$_t$ (IV) |
|---|---|---|---|---|
| | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value |
| Program efficiency$_{t-1}$ | 0.575*** | 0.581*** | 0.007 | 0.006 |
| | 0.000 | 0.000 | 0.392 | 0.414 |
| Fundraising expenses$_{t-1}$ | 0.086*** | 0.083*** | 0.002*** | 0.002*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Program service revenues$_{t-1}$ | −0.017*** | −0.018*** | −0.000 | 0.000 |
| | 0.001 | 0.000 | 0.862 | 0.896 |
| Government grants$_{t-1}$ | −0.012*** | −0.012*** | 0.001*** | 0.001*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Governance index$_t$ | 0.053*** | 0.073*** | 0.010*** | 0.010*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Cash donations$_{t-1}$ | 0.030*** | 0.031*** | 0.996*** | 0.996*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Stock donations$_{t-1}$ | 0.462*** | 0.464*** | 0.001 | 0.001 |
| | 0.000 | 0.000 | 0.124 | 0.255 |
| Trend$_t$ | 0.031*** | 0.167*** | −0.002*** | −0.021*** |
| | 0.000 | 0.000 | 0.002 | 0.000 |
| Large donors$_t$ | 1.037*** | 1.082*** | 0.017*** | 0.022*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Real GDP growth$_t$ | | 5.198*** | | 1.940*** |
| Dow Jones industrial Avg$_t$ | | −0.585*** | | 0.122*** |
| | | 0.000 | | 0.000 |
| Interest rates$_t$ | | 0.168*** | | 0.004** |
| | | 0.000 | | 0.028 |
| *N* | 115,501 | 115,501 | 115,501 | 115,501 |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Model *p* value | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Adjusted $R^2$ | 0.4417 | 0.4427 | 0.6560 | 0.6562 |
| Dependent variable: defined in column heading | Stock Donations$_t$ (I) | Stock Donations$_t$ (II) | Cash Donations$_t$ (III) | Cash Donations$_t$ (IV) |
| | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value |
| Panel C: Charitable Organization Interaction Models | | | | |
| Constant | −6.349*** | 10.358*** | −0.008*** | −1.779*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Sentiment$_t$ | −0.314*** | −0.264** | 0.080*** | 0.040*** |
| | 0.000 | 0.022 | 0.000 | 0.000 |
| Sentiment$_t$ × charitable$_t$ | −1.148*** | −1.115*** | 0.054*** | 0.054*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Total assets$_{t-1}$ | 0.282*** | 0.281*** | 0.005*** | 0.005*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Program efficiency$_{t-1}$ | 0.540*** | 0.543*** | 0.017** | 0.016** |
| | 0.000 | 0.000 | 0.038 | 0.048 |
| Fundraising expenses$_{t-1}$ | 0.091*** | 0.090*** | 0.001 | 0.000 |
| | 0.000 | 0.000 | 0.748 | 0.900 |
| Program service revenues$_{t-1}$ | −0.012*** | −0.013*** | 0.002*** | 0.002*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 8** (continued)

| Dependent variable: defined in column heading | Stock Donations$_t$ (I) | Stock Donations$_t$ (II) | Cash Donations$_t$ (III) | Cash Donations$_t$ (IV) |
|---|---|---|---|---|
| | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value | Coefficient *p* value |
| Government grants$_{t-1}$ | −0.012*** | −0.012*** | 0.001*** | 0.001*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Governance index$_t$ | 0.134*** | 0.138*** | 0.012*** | 0.012*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Cash donations$_{t-1}$ | 0.016*** | 0.017*** | 0.988*** | 0.988*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Stock donations$_{t-1}$ | 0.467*** | 0.467*** | 0.001 | 0.001 |
| | 0.000 | 0.000 | 0.727 | 0.372 |
| Trend$_t$ | 0.040*** | 0.225*** | −0.001 | −0.017*** |
| | 0.000 | 0.000 | 0.478 | 0.000 |
| Charitable$_t$ | 0.610*** | 0.614*** | 0.186*** | 0.185*** |
| | 0.000 | 0.000 | 0.000 | 0.000 |
| Real GDP growth$_t$ | | 3.232*** | | 1.807*** |
| | | 0.002 | | 0.000 |
| Dow Jones industrial Avg$_t$ | | −1.163*** | | 0.098*** |
| | | 0.000 | | 0.000 |
| Interest rates$_t$ | | 0.116*** | | 0.001 |
| | | 0.001 | | 0.424 |
| *N* | 115,501 | 115,501 | 115,501 | 115,501 |
| Industry fixed effects | Yes | Yes | Yes | Yes |
| Model *p* value | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000*** |
| Adjusted $R^2$ | 0.4363 | 0.4372 | 0.6574 | 0.6577 |

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level (two-tailed)

See Appendix Table 10 for variable definitions

### Alternative Large Donor Definitions

Finally, given that our measure of large donors is based on the presence or absence of permanently restricted donations which are by definition permanently included in the organizations net assets (until the restriction is satisfied), we acknowledge the imprecise nature of our proxy and test the robustness of our results to three alternative measures. First, we use an indicator variable activated for organizations with positive changes in permanently restricted net assets from $t-1$ to t (26% of sample observations). Using this alternative measure, we continue to find that investor sentiment is more pronounced for organizations with large donors. Second, we define an indicator variable equal to one for organizations with nonzero permanently restricted donations during any of the last three years (41% of sample observations), once again finding robust results. And finally using a continuous, logged measure of changes in permanently restricted net assets from $t-1$ to t. In all three alternative specifications we continue to find results consistent with our hypotheses that large donors are more sensitive to investor sentiment.

## Conclusion

Nonprofit organizations contribute close to $1 trillion to the US economy and generated nearly $3 trillion in revenue during 2012. Due to their significant economic impact, it is crucial to examine forces that influence the supply of their most important source of funding, donations. Nonprofit organizations received almost $400 billion in donations in 2016. While previous studies have investigated the effects of organization-specific attributes on donations, no studies to our knowledge link capital market forces to nonprofit donations.Thus, our study is the first to provide empirical evidence on the spillover of investor sentiment into the nonprofit sector through its impact on donors' ethical and moral behavior surrounding decisions to give.

Our analyses contrast the effects of investor sentiment on two types of giving: stock-based and cash donations. While higher investor sentiment is associated with more cash donations, it is negatively associated with stock-based donations. These effects are more pronounced

**Table 9** Organizations receiving stock donations

| Dependent variable: Stock Donations$_t$ | Main model (I) | | Large donors model (II) | | Charitable model (III) | | Changes model (IV) | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient | $p$ value | Coefficient | $p$ value | Coefficient | $p$ value | Coefficient | $p$ value |
| Constant | −95.448 | | −120.876*** | | −33.303 | | 1.763 | |
| | 0.000 | | 0.000 | | 0.000 | | 0.354 | |
| Sentiment$_t$ | −1.304*** | | −1.370*** | | −2.441*** | | −1.524*** | |
| | 0.000 | | 0.000 | | 0.000 | | 0.000 | |
| Sentiment$_t$ × large donors$_t$ | | | −0.742** | | | | | |
| | | | 0.041 | | | | | |
| Sentiment$_t$ × charitable$_t$ | | | | | −3.915*** | | | |
| | | | | | 0.000 | | | |
| Total assets$_{t-1}$ | 0.570*** | | 0.481*** | | 1.152*** | | 1.891*** | |
| | 0.000 | | 0.000 | | 0.000 | | 0.000 | |
| Program efficiency$_{t-1}$ | 1.091*** | | 1.317*** | | 2.644*** | | −0.743 | |
| | 0.002 | | 0.000 | | 0.000 | | 0.464 | |
| Fundraising expenses$_{t-1}$ | 0.165*** | | 0.089*** | | 0.089*** | | 0.077 | |
| | 0.000 | | 0.000 | | 0.000 | | 0.100 | |
| Program service revenues$_{t-1}$ | −0.029*** | | −0.028*** | | −0.016* | | −0.030 | |
| | 0.000 | | 0.000 | | 0.087 | | 0.442 | |
| Government grants$_{t-1}$ | −0.010 | | −0.011* | | −0.033*** | | −0.050** | |
| | 0.146 | | 0.085 | | 0.000 | | 0.036 | |
| Governance index$_t$ | 0.506*** | | 0.165** | | 0.982*** | | 3.087*** | |
| | 0.000 | | 0.041 | | 0.000 | | 0.000 | |
| Cash donations$_{t-1}$ | 0.772*** | | 0.527*** | | 0.213*** | | −0.068* | |
| | 0.000 | | 0.000 | | 0.000 | | 0.086 | |
| Stock donations$_{t-1}$ | 0.070*** | | 0.021*** | | 0.606*** | | | |
| | 0.000 | | 0.001 | | 0.000 | | | |
| Trend$_t$ | 0.565*** | | 0.356*** | | 0.876*** | | | |
| | 0.000 | | 0.000 | | 0.000 | | | |
| Large donors or charitable$_t$ | | | 1.846*** | | 1.460*** | | | |
| | | | 0.000 | | 0.000 | | | |
| Real GDP growth$_t$ | 76.689*** | | 106.865*** | | 4.715 | | −3.855 | |
| | 0.000 | | 0.000 | | 0.335 | | 0.303 | |
| Dow Jones industrial Avg$_t$ | −3.955*** | | −2.480*** | | −4.338*** | | 0.001*** | |
| | 0.000 | | 0.000 | | 0.000 | | 0.000 | |
| Interest rates$_t$ | 1.412*** | | 1.958*** | | 0.676*** | | −0.328** | |
| | 0.000 | | 0.000 | | 0.000 | | 0.011 | |
| $N$ | 24,956 | | 24,956 | | 24,956 | | 24,956 | |
| Industry fixed effects | Yes | | Yes | | Yes | | Yes | |
| Model $p$ value | 0.0000*** | | 0.0000*** | | 0.0000*** | | 0.0000*** | |
| Adjusted $R^2$ | 0.1594 | | 0.1924 | | 0.2665 | | 0.1224 | |

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level (two-tailed)

See Appendix Table 10 for variable definitions

for organizations with donors that are more susceptible to investor sentiment and organizations that have a less reciprocal relationship with their donors. The insights provided by our study add to our knowledge about what motivates donors. The utilitarian view suggests that donors seek to altruistically fulfill their ethical and moral duty by giving back and supporting others in need to maximize social welfare. On the other hand, social exchange theory suggests that donors are motivated by what they receive in return (Homans 1958; Emerson 1976). Our findings suggest that indeed donors are influenced by economic incentives and disincentives that exist at different levels

of investor sentiment. Thus, governments and nonprofit organizations may consider policies that stimulate and encourage ethical giving, during periods which may otherwise disincentivize it, to continue to promote social welfare. Our study also contributes to the investor sentiment literature, which has well documented the effects of investor sentiment in the capital markets and for-profit companies. Moreover, our findings raise questions about what other market related forces could impact the supply of donations, or more broadly, the ethical, moral, and prosocial behavior of individuals and corporations.

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**Data Availability** The data used in this study are from publicly available sources cited in the text including at IRS.gov.

## Compliance with Ethical Standards

**Conflict of interest** The authors declare that they have no conflicts of interest.

**Ethical Approval** The authors declare that they have complied with all ethical standards.

## Appendix

See Table 10 in Appendix.

**Table 10** Variable definitions

| | |
|---|---|
| Sentiment | Rolling 12-month fiscal year average of the Baker and Wurgler (2006) sentiment index calculated as the first principal component of five investor sentiment proxies |
| Stock Donations | Log of Publicly traded securities—Revenues from Form 990, Schedule M (NonCash Contributions), Part I |
| Cash Donations | Log of Direct Donations from Form 990, Part VIII |
| Total Assets | Log of year-end Total Assets from Form 990, Part X |
| Program Efficiency | Program Service Expenses / Total Expenses from Form 990, Part IX |
| Fundraising Expenses | Log of Fundraising Expenses from Form 990, Part IX |
| Government Grants | Log of Government Grants from Form 990, Part VIII |
| Program Service Revenues | Log of Program Service Revenues from Form 990, Part VIII |
| Governance Index | = 0- 3 for the sum of three indicator variables for governance variables reported on Form 990, Part VI following Boland et al. (2019): independent board (= 1 for boards made up of over 50% independent directors), audit committee, CEO salary setting process |
| Trend | Whole integers between 8 and 16 representing the nine sample years between 2008–2016 |
| Large Donors | = 1 for organizations reporting nonzero Permanently restricted net assets from Form 990, Part X; 0 otherwise |
| Charitable | = 1 for organizations reporting above sample median donations to total revenues; 0 otherwise |
| Real GDP Growth | Percentage growth in Real Gross Domestic Product reported by the US Bureau of Economic Analysis |
| Dow Jones Industrial Avg | Dow Jones Industrial Average index averaged over each rolling fiscal year |
| Interest Rates | Historical daily interest rates averaged over each rolling fiscal year |

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