On Executive Stock Donations and Analyst Recommendations

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The present paper focuses on a very specific philanthropic aspect of corporate social responsibility (CSR), namely stock donations by executives. Specifically, we seek to investigate 1) the stock reaction to stock donations by executives and 2) the impact, if any, these executive stock donations have on analyst recommendations. We find support for agency theory in that there is a negative stock market reaction to the executive stock donation. However, we find strong support that larger executive stock donations precede higher analyst recommendations, analyst upgrades, and fewer sell recommendations, which indicates support of the stakeholder theory argument. Shareholders may view stock donations as wasteful, while analysts may view them as an expression of the firm's larger strategy. This supports the finding by Zhang et al. (2015) that CSR allows firms to build reputation, which may be captured in the analyst recommendation.

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1. Introduction and Motivation

In recent years, the impact of corporate social responsibility (CSR) and philanthropy on company performance has received a lot of attention in the financial literature. Similarly, the impact of analyst recommendations on a firm's stock price and performance has also received a lot of attention. However, the intersection of the two streams of literature, the impact of corporate social responsibility on analyst recommendations has received very little attention and is the focus of this paper.

The present paper focuses on a very specific philanthropic aspect of CSR, namely stock donations by executives. If an executive stock donation is viewed as a signal that the firm's stock is of a higher quality, then the stock donations would be effective in increasing the visibility of the executives' (and firm's) strategic philanthropy and may lead to an increase in analyst recommendations. Specifically, we seek to 1) examine the stock reaction to stock donations by executives and 2) investigate the impact, if any, these executive stock donations have on analyst recommendations. We are particularly interested in learning whether these stock donations increase the probability of a favorable analyst recommendation. To our knowledge, this issue has not been previously investigated.

In a broad sense, executive stock donations can be viewed as a very specific form of corporate philanthropy. Matten and Moon (2008) defined CSR as "clearly articulated and communicated policies and practices of corporations that reflect business responsibility for some of the wider societal good." Hill et al. (2007) more specifically define CSR as "economic, legal, moral, and philanthropic actions by

firms." Corporate philanthropy in general has come a long way from several decades ago. Porter and Kramer (2002) stated in a Harvard Business Review article that "strategic philanthropy" has come to cover basically any kind of philanthropy, as executives struggle to balance corporate social responsibility and demands by investors to maximize profits. In their opinion, the effective philanthropy is at the nexus of integrally connected social and economic goals.

Executive stock donations can be strategically used to communicate these goals. Stock donations in particular can be a very attractive form of philanthropy (Brumberg [2020]). In addition to the tax write-off, such a donation is, in fact, more effective than selling the stock and then donating the cash, because the donation itself avoids the capital gains tax. If analyst recommendations lead to a higher stock price and make the stock more desirable, then an executive's stock donation makes more sense from a tax write-off perspective. Due to the increased desirability of the firm's stock, these donations may also have a bigger impact on the firm in terms of visibility, and the entities receiving the donations may view the donating executives, and, by extension, their company, in a more favorable light. If the executive stock donation is viewed as a signal that the firm's stock is of a higher quality, then the stock donations would be effective in increasing the visibility of the executives' (and firm's) strategic philanthropy and may lead to an increase in analyst recommendations.

We seek to answer the question whether executive stock donations are effective in increasing the visibility of the firm's strategic philanthropy by first investigating the impact of the donation itself on the stock price and then investigating whether these donations increase the probability of a favorable analyst rating. While the impact of executive stock donations on stock prices has been investigating in previous literature, the impact of these donations on the probability of analyst recommendations has not been previously investigated.

The remainder of this paper is organized as follows. Section 2 presents a review of related literature for analyst recommendations and corporate philanthropy and develops the hypotheses. Section 3 presents the data and methodology. The results are presented in Section 4. Section 5 concludes.

2. Review of Related Literature and Hypotheses

2.1 Review of Related Literature

In seeking to determine whether corporate philanthropy in the form of executive stock donations leads to more favorable analyst recommendations, a review of the literature on analyst recommendations and corporate philanthropy is presented next. This literature focuses particularly on the agency and stakeholder theories. *Agency theory* argues that CSR is primarily a reflection of managers acting in their own interest, at the expense of shareholders (Brammer and Pavelin [2006]). Under this theory, it is likely that managers tend to overinvest in CSR to enhance their own reputations, as argued by Borghesi et al. (2014). Also, Masulis and Reza (2015) find that shareholders reduce their valuation of firm cash holdings as corporate giving

increases, suggesting misuses of corporate resources that reduce firm value. If this is accurate, then a higher level of CSR should be negatively associated with analyst recommendations (Levis [2006]). There is some support for this negative association in the late 20th century (Ioannou and Serafeim [2015]). Yermack (2009), in one of the few studies directly investigating the impact of stock donations on firm value, also finds a negative association, which supports *Agency Theory*.

In more recent times, the literature seems to indicate a positive link between analyst recommendations and CSR, which is more supportive of *stakeholder theory* (Freeman [1984]). As described by Aguinis and Glavas (2012), stakeholder theory emphasizes the value-enhancing effects of corporate philanthropy which benefits all stakeholders, including shareholders. Under this theory, there are several performance-related benefits of CSR. Some studies argue that it can enhance shareholder wealth (Eccles et al. [2014]; Donaldson and Preston [1995]). Moreover, Orlitzky et al. (2003), Waddock and Graves (1997), and Cochran and Wood (1984) show that CSR can improve both operational efficiency and profitability. Under stakeholder theory, several ancillary benefits are also evident, such as lower risk, as shown by Bouslah et al. (2013) and Sassen et al. (2016), and lower costs of capital, as shown by Dhaliwal et al. (2011) and El Ghoul et al. (2011), among others. The *conflict resolution hypothesis* argued by Jo and Harjoto (2014) also supports stakeholder theory by reducing conflicts between managers and non-shareholder stakeholders. Zhang et al. (2015) in an interesting twist, argue that CSR allows firms to build reputation, which enhances their competitive advantage. This is more recently hinted at by Arco-Castro et al. (2020), who argue that companies use philanthropy to tie into a larger corporate strategy.

Since stakeholder theory suggests value creation due to CSR, there are several extensions that are of significance to the present study. First, if shareholder and stakeholder interests are compatible, Jo and Harjoto (2011) argue that monitoring by analysts would motivate firms to engage in CSR activities. However, if monitoring by financial analysts motivates companies to reduce their non-value-added activities, such as CSR, then a negative link between analyst monitoring and CSR would be observed (Adhikari [2016]; (Orlitzky [2013]). Extending this argument to analyst recommendations, Jain et al. (2016) argue that higher CSR performance should be reflected in more favorable analyst recommendations, since the latter view CSR as value-enhancing. Conversely, if CSR is not considered to be value-enhancing, as argued by Levis (2006), then CSR would be negatively associated with analyst recommendations.

Several studies have affirmed the mostly positive link between CSR and analyst recommendations. Notably, Luo et al. (2015) find that CSR is positively related to analyst recommendations. Likewise, Chang et al. (2014) find superior CSR performance is associated a higher percentage of hold recommendations, while Ioannou and Serafeim (2015) find that, while CSR was interpreted somewhat

negatively by analysts in the 1990s, it is perceived as less pessimistic in recent years, perhaps due to a reevaluation of the value of CSR by analysts.

An interesting twist to this literature is the study by Hogarth et al. (2016), who argue that there is a negative association between corporate giving and shareholder value, as measured by Tobin's Q. However, that effect is mitigated by reputation; if reputation is increased, there is actually an increase in Tobin's Q in response to corporate giving. Yermack (2009) also finds that CEOs make large charitable contributions just before sharp drops in their share prices, thereby increasing both CSR and their own charitable deductions. It is unclear, however, whether the timing of these donations is due to inside information or retroactive backdating.

Overall, while the direct impact of executive stock donations on firm value appears to be negative, which would support an *Agency Theory* view, the more recent literature on the relationship between philanthropy and analyst recommendations seems to support a view of the *Stakeholder Theory*, particularly in more recent years. Higher levels of CSR and philanthropy, particularly if they are used to communicate their strategy and enhance their reputation, result in more favorable coverage by analysts. The hypotheses below were developed with these findings in mind.

2.2 Hypothesis Development

A finding that stock donations result in higher analyst recommendations can be interpreted as a signal that the analyst recommendation is viewed as validation of the firm's strategy, despite the potentially lucrative tax write-offs for the executive. Higher analyst recommendations may thus indicate a higher-quality firm, which successfully ties CSR and philanthropy into their firm's strategy. Third, if it is true that higher analyst recommendations signal firm quality with a more advanced CSR strategy, then executive stock donations should not only imply higher analyst recommendations down the line, but they would also increase the probability of an upgrade in the analyst recommendation. By extension, this would also imply that executive stock donations would be accompanied by fewer analyst sell recommendations down the line.

Based on agency theory, we would expect a higher level of corporate philanthropy in the form of stock donations to be associated with a negative impact on the firm's stock, as these donations would appear to be non-value added by shareholders and only in the interests of managers. Based on stakeholder theory, however, we would expect a higher level of corporate philanthropy in the form of stock donations by company executives to have a positive impact on the firms' stock. Since stakeholder theory has become more dominant in recent years (see Ioannou and Serafeim [2015]), we hypothesize:

H1: Investors react positively to stock donations of the executive team, especially stock donations by CEOs.

Next, given the positive link in the literature between CSR and analyst

recommendations, we similarly expect a higher level of corporate philanthropy to lead to a change in analyst recommendations. Moreover, the more likely the executive will be to engage in corporate philanthropy, the larger an analyst's upgrade of the company's stock, based on an endorsement of the firm's strategy by the analyst. As argued by Maung et al. (2020), charitable donations are viewed more positively by investors when seen to be based on authentic generosity that builds moral capital. Insofar as the analyst recommendation can be viewed as an endorsement of the firm's strategy, the donation may be tied more closely to corporate strategy than to self-serving motives such a tax write-offs.

H2: A CEO's stock donation will result in a greater probability of a buy or strong buy analyst recommendation for the company's stock.

H3: A CEO's stock donation will result in a higher probability of an analyst recommendation upgrade.

By extension, we would also expect firms with executive stock donations experience fewer sell recommendations

H4: A CEO's stock donation will lower the percentage of analysts that issue a sell recommendation for the company's stock.

We thus expect to find a positive association between CSR and the stock price as well as a greater chance of higher analyst recommendations due to philanthropy. This would indicate strong support of stakeholder theory. However, it is possible that a negative stock market reaction to the donation, which would support agency theory, is still accompanied by a positive association between stock donations and analyst recommendations, which would support the stakeholder theory argument. In other words, it is possible that shareholders view stock donations as wasteful, while analysts may view them as an expression of the firm's larger strategy. The data and methodology sections are discussed next.

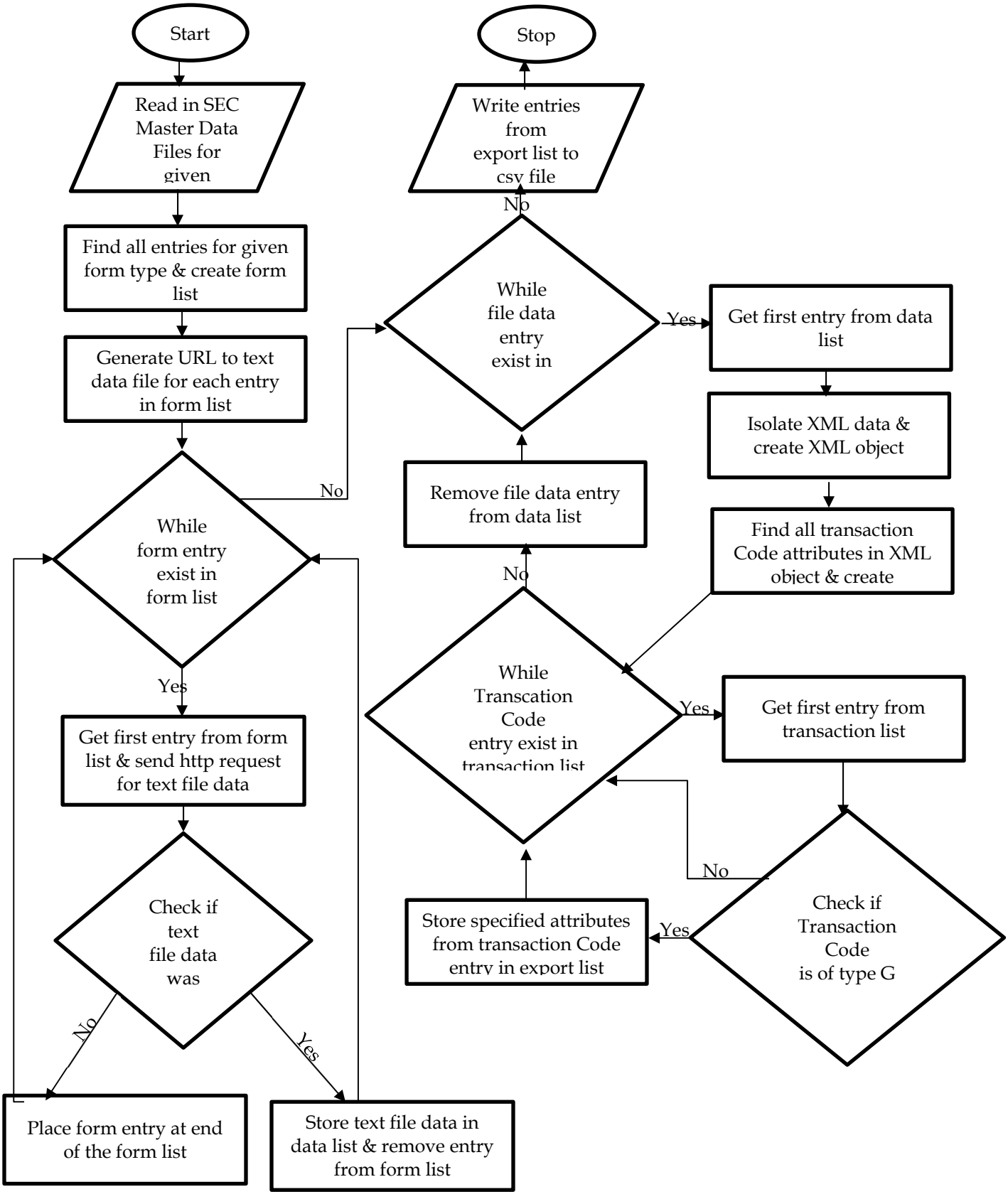
3. Data and Methodology

3.1 Data

The dataset used in this paper was collected from the U.S. Securities and Exchange Commission's EDGAR (Electronic Data Gathering, Analysis, and Retrieval) system. Over seven million Form 4 and Form 5 filings from the years 2003 to the 2nd quarter of 2021 were downloaded and processed to generate the presented dataset. The flowchart in Figure 1 shows the process that was used to collect and parse the filings for each given year. The master index files for the EDGAR system list all filings for each year and can be used to generate a valid URL to the text file that stores the relevant form data. The text file contains XML data that can be isolated and loaded into an XML object which can then be used to locate the desired information.

Figure 1

EDGAR data extraction through Python algorithm. The flow chart shows the entire process from the start at the master index files to the final data collection.



The process outlined in Figure 1 was implemented in Python and ran on multiple virtual machines with public IP addresses. This was done to speed up the collection process since EDGAR restricts the number of HTTP request a single public address can send to 10 per second. Additionally, EDGAR does not allow anonymous HTTP requests and requires that the HTTP header include a user agent variable specifying the requester.

From the EDGAR data, only information was extracted under the transaction code G which implies that the transactions are bona fide gifts. The EDGAR sample is merged with information from several other databases; Compustat, Center for Research in Security Prices (CRSP) and Institutional Brokers Estimate System (IBES). The resulting final sample comprises firms with stock donations for the executive team (including the CEOs) during the period between 2003 and 2020, offering a total of 56,405 firm-years.

3.2 Stock Price Reactions to CEO Donations

We compute the unanticipated stock price changes surrounding the stock donation date reflected on the SEC Form 4 or Form 5 to determine the reaction of stock market to the CEO stock donations. The abnormal return (AR) on trading day t is measured as follows:

$$AR_{it} = R_{it} - \hat{R}_{it} \tag{1}$$

where R_{it} is the daily return of security i on day t and $\hat{R}_{it}$ is the expected daily return, which can be calculated by the market model in Equation (2).

$$\hat{R}_{it} = \hat{a}_i + \hat{\beta}_i R_{mt} + \hat{s}_i SMB_t + \hat{h}_i HML_t + \hat{m}_i MOM_t \tag{2}$$

where $\hat{a}_i$, $\hat{\beta}$, $\hat{s}_i$, $\hat{h}_i$ and $\hat{m}_i$ are OLS parameters over a period of 100 trading days ending at 15 days prior to each stock donation. R_{mt} is the market return for day t. SMB_t and HML_t are the excess returns of small caps over big caps and of value stocks over growth stocks respectively on day t. MOM_t are the excess returns of winner stocks over loser stocks. Cumulative abnormal return (CAR) are calculated in an event window by summing daily ARs over the event period to examine the extent to which the stock market responds to the stock donations.

3.3 Financial Analysts and Stock Donations

In this paper, we study how CEO stock donations may affect the probability of analyst stock recommendations (i.e., buy and strong buy recommendations, upgrades in analyst recommendation and high percentage of sell recommendations). Yet, a major issue with this type of analysis is the likely endogeneity between the stock recommendations of a company's stock with other factors that may also affect the probability of CEO stock donations. In part, the relationship between stock recommendation and firm's performance could indirectly influence a CEO's gift. We use the method which lessens this effect introduced by Yu (2008) and generate an uncorrelated instrument for each of the analyst recommendation measures as follows.

First, we estimate the following model for each of the analyst recommendation measures:

$$AR_t = FS_{t-1,12} + SR_{t-1,12} + TR_{t-1,6} + SR_{t-7,12} + YD \quad (3),$$

where AR_t is the stock recommendation (average analyst recommendation, change in average analyst recommendation or percentage of sell recommendations), $FS_{t-1,12}$ is firm size computed in the prior year (12 months), $TR_{t-1,12}$ is the industry-adjusted ROA measured in the prior year (month *t*-1 to *t*-12), $SR_{t-1,6}$ is the industry-adjusted stock return in the six-month period prior (month *t*-1 to *t*-6), $SR_{t-7,12}$ is the industry-adjusted stock return in the 6-month period prior to the period used to measure the analyst recommendations (*t*- 7 to *t*-12), and *YD* are 17-year dummies.

The positive residuals from these regression models will function as an instrument of the firm's analyst recommendations that has no direct link to firm size, time period, and the firm's prior financial performance thereby removing possible endogeneity (Yu, 2008). For the subsequent analysis we will use logit regression, which will lead to consistent and unbiased coefficient estimates in case of a binary dependent variable (Greene, 2004). In logit regressions, estimates are determined by using the method of maximum likelihood estimation (MLE) which focuses on the significance of each estimated coefficient. The overall significance of the model is computed by a chi-square statistic derived from the ratio of the log-likelihoods of two models: a full model that includes all explanatory variables and a partial model that includes only a constant term. A pseudo R-square as suggested by Hoetker (2007) is used to determine goodness-of-fit of the logit model.

3.4 Variables

To construct the independent binary CEO variable, we extract data from all data available on the SEC Edgar website. We use a Python algorithm to extract information from Form 4 and Form 5 and limit the data to transaction code G. The raw data contains stock donation information from any executive team member in a given fiscal year. Each CEO from the executive team is identified and is designated a dummy variable, which is 1 for CEOs; 0 if not.

We calculate three measures of analyst stock recommendations extracted from the IBES summary consensus database: mean average analyst recommendation, change in average analyst recommendation and percentage of sell recommendations. The stock recommendation data from IBES has a range from 1 (strong buy) to 5 (sell), which implies that a higher score indicates a lower stock recommendation. For this study, we subtract the mean recommendation score from 6, implying that a higher score then refers to a higher stock recommendation.

Average analyst recommendation is calculated as the mean analyst recommendation for all analysts (weighted by the number of analysts) who cover a firm in the six-month period after the stock donation or the period from July 1 to December 1 for firms without a CEO stock donation event. For our sample of firms, the average analyst recommendation ranges from 1 to 5, with a mean of 3.7006, which is

consistent with the theory stating that analysts tend to be more optimistic. We use the positive residuals as a binary dependent variable for all average stock recommendation that are either 'buy' or 'strong buy'.

Change in average analyst recommendation is computed as the difference between the average analyst recommendation in the six-month period immediately after the year in which CEO stock donation occurred (t+1 to t+6) and the average analyst recommendation in the 6-month period six months prior to the year in which the CEO stock donation occurred (t−1 to t−6). For our sample of firms, the change in average analyst recommendation ranges from −4.00 to 4.00, with a mean of −0.0209. We use the positive residuals as a dummy variable as a proxy for an analyst upgrade.

Percentage of sell recommendations is measured as the weighted average percentage of analyst recommendations in the six-month period that are rated either as underperform (4) or sell (5). For our sample of firms, the percentage of sell recommendations ranges from 0 to 1 with a mean of 0.0572. We also use the positive residuals as a dummy variable for a higher sell percentage.

Firm performance is calculated with two measures of prior firm performance adjusted for industry differences. Industry adjusted return on assets (ROA) is measured as a firm's return on assets in the prior year minus the median firm ROA in the firm's two-digit Standard Industrial Classification [SIC] code in the prior year (Huson, Malatesta, and Parrino, 2004). Industry-adjusted stock return for the six-month period prior is measured by the firm's total return to shareholders, minus the median stock return of firms in the focal firm's core two-digit industry. We controlled for *firm size* which is measured as the log of the firm's market capitalization at the end of the prior year.

Analyst coverage is the average number of analysts who follow a firm over the six-month period after the year of the CEO stock donation. *Analyst consensus* is the dispersion of recommendations. Greater dispersion might lead to a lower CEO response. This measure was calculated as the standard deviation of analyst recommendations multiplied by -1 and weighted by the number of analysts for each firm in the six-month period after the year of the CEO stock donation. We added seventeen time-dummy variables for the years 2004 to 2020 using 2003 as the omitted year. The entire sample consists of 56,405 firm-years, of which 6,648 firm-years show CEO stock donations.

Tables 1, 2, and 3 present descriptive statistics, sample distribution, and correlations for the full dataset we use in our analysis. Table 1 shows the sample distribution of the entire sample, as well as the stock donation sample. The number of CEO gifts range from 121 (2003) to 458 in 2016. The total percentage of CEO stock donations per year relative to the total number of firms is 13.63%. Table 2 shows the descriptive analysis on the firm-specific, analyst-specific and corporate-governance-specific variables while Table 3 shows the correlation coefficients of the variables used in the subsequent analysis.

Table 1

This table shows the distribution of CEO stock donations per year for a total of 6648 stock donations (Column 1). Column 2 show the percentages for each year relative to the total stock donations. Column 3 shows the total number of firms per year for a total of 48,778 firms. Column 4 shows the percentages of firms per year relative to the total. Column 5 shows the percentages of stock donations for the number of firms in that fiscal year. The total number of observations in the sample is 56,405 firm-year, which implies that members of the executive team also donated stock that year or CEOs made more than one donation.

Year	Stock Donations (1)	Percent (2)	Firms (3)	Percent (4)	(1)/(3)
2003	121	1.82%	430	0.88%	28.14%
2004	429	6.45%	2600	5.33%	16.50%
2005	395	5.94%	2708	5.55%	14.59%
2006	412	6.20%	2781	5.70%	14.81%
2007	369	5.55%	2815	5.77%	13.11%
2008	283	4.26%	2761	5.66%	10.25%
2009	299	4.50%	2830	5.80%	10.57%
2010	350	5.26%	2724	5.58%	12.85%
2011	334	5.02%	2642	5.42%	12.64%
2012	419	6.30%	2706	5.55%	15.48%
2013	369	5.55%	2749	5.64%	13.42%
2014	391	5.88%	2819	5.78%	13.87%
2015	397	5.97%	2844	5.83%	13.96%
2016	458	6.89%	2950	6.05%	15.53%
2017	440	6.62%	3012	6.17%	14.61%
2018	388	5.84%	3017	6.19%	12.86%
2019	386	5.81%	3130	6.42%	12.33%
2020	408	6.14%	3260	6.68%	12.52%
Total	6648	100.00%	48778	100.00%	13.63%

Table 2: Sample descriptive analysis

This table reports CEO stock donation characteristics, firm and analyst specific information. The CEO stock donation variable was coded a '1' when the CEO gifted stock any given year and a '0' otherwise. Prior industry-adjusted stock returns are calculated in the 6-month period (*t*-7 to *t*-12) before the year of the stock donation while industry-adjusted returns as well as the industry-adjusted ROA are calculated in the 6 month-period (*t*-1 to *t*-6) before the year of the gift. The average analyst recommendation and percentage of sell recommendations are all calculated in the 6 months after the stock donation year and are on a reverse scale so that a higher score means a higher recommendation. The change in analyst recommendation is calculated as the difference between the 6-month average analyst recommendations (*t*+1 to *t*+6) and the 6-month period (*t*-1 to *t*-6) average analyst recommendation that started 6 months before the CEO stock donation. Analyst coverage is the number of analysts that follow the firm in the 6-month period before the donation and analyst consensus is the standard deviation of analyst recommendation in the 6-month period. Firm size is the market capitalization in millions $ at the end of the prior year.

Variable	Mean	Std	Minimum	Maximum
Average analyst recommendations	3.7006	0.5714	1.0000	5.0000
Change in analyst recommendations	-0.0209	0.3605	-4.0000	4.0000
Percentage of sell recommendations	0.0572	0.1280	0.0000	1.0000
Firm Size (in millions $)	9394.9405	38495.7453	0.0031	1966078.9230
Industry-adjusted ROA	-0.0248	1.1369	-150.1900	165.8888
Prior Industry-adjusted stock returns	0.0058	0.0568	-0.5263	2.8328
CEO stock donations	0.1229	0.3283	0.0000	1.0000
Industry-adjusted stock returns	0.0030	0.0551	-0.4660	0.9260
Analyst coverage	8.9867	7.5941	1.0000	53.0000
Analyst consensus	0.6886	0.3628	0.0000	2.8300

Table 3: Correlations ab

This table reports the correlations coefficients of the variables used in the subsequent analysis.

	Variables	1		2		3		4		5	6		7		8		9		10
1	Average analyst recommendations	1																	
2	Change in analyst recommendations	0.41	***	1															
3	Percentage of sell recommendations	-0.60	***	-0.23	***	1													
4	Firm Size	0.01		-0.02		0.00		1											
5	Industry-adjusted ROA	-0.01		0.00		0.01		0.01		1									
6	Prior Industry-adjusted stock returns	0.11	***	-0.03	**	-0.05	***	-0.01		0.01	1								
7	CEO stock donations	0.01		0.01		-0.03	**	0.04	***	0.01	0.02		1						
8	Industry-adjusted stock returns	0.05	***	-0.08	***	-0.03	**	0.00		0.01	0.21	***	-0.01		1				
9	Analyst coverage	-0.09	***	0.01		0.02		0.36	***	0.02	0.04	***	0.11	***	-0.03	**	1		
10	Analyst consensus	-0.06	***	0.00		0.19	***	0.07	***	0.01	0.02		0.06	***	-0.03	**	0.36	***	1

N=56,405 firm years

[a] Year dummies are omitted

[b] *** p < 0.01, ** p < 0.05

4. Results

4.1. Stock Reactions to CEO Donations

Table 4 shows the results of the CAR for three different time periods and their associated *t*-statistics and statistical significance. The results in table 4 show that the CAR in the time period leading up to the CEO stock donations (Days -2, -1) is 0.03% and not statistically significant. This result implies that investors do not have any prior knowledge of CEO donations and that there is no evidence of previous confounding events coinciding with the donations.

This outcome is verified by the results in the Pos/Neg column that shows that there is no significant difference between positive – and negative returns. The results also show that the stock market reaction is -0.05% (which is statistically significant) on the day of the donation, supporting the hypothesis that investors believe that stock donations are not beneficial to the health of the firm and reduce the overall firm value, which is consistent with the findings reported by Yermack (2009). This contradicts our hypothesis 1 and strongly supports agency theory. Additionally, the CAR for days +1, +2 are -0.27% (statistically significant), implying that the stock price reaction is more negative the days after the donation. The daily CAR results (not shown here) point to a statistically significant return of -0.17% on the day after the CEO stock donation while day +2 shows a statistically significant return of -0.09%.

Table 4

This table shows the outcome of CAR for three different time periods (Days). N is the total number of CEO stock donations with useable returns. CAR is the cumulative abnormal returns for the respective days. Patell shows the t-stat for the Patell Z-tests and their associated p-values. Pos/Neg shows the total number of positive returns versus negative returns and the statistical significance indicates the results of the difference-in-means tests.

Days	N	CAR	*t*-stat	Pos/Neg
(-2,-1)	5930	0.03%	1.078	2887:3043
(0,0)	5930	-0.05%	-2.617***	2812:3118*
(+1,+2)	5842	-0.27%	-7.204***	2604:3238***

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.

4.2 Financial Analysts

Table 5 reports the results from regressions we use to identify whether or not CEO stock donations have an independent effect above and beyond that of prior firm performance on the probability of analyst stock recommendations. As shown in table, average analyst recommendations are negatively related to firm size, positively related to prior industry-adjusted stock return and not to industry-adjusted ROA. The change in average analyst recommendation is not related to industry-adjusted ROA and positively related to prior industry-adjusted stock return and firm size. The percentage of sell recommendations is negatively related to prior industry-adjusted stock return, positively related to firm size and not to industry-adjusted ROA. We

use the residuals from these models as proxies for the analyst recommendation measures to test our hypotheses.

Table 5: Regressions for residuals of security analyst measures

This table shows the results from three different stock recommendation models where average analyst recommendation, change in average analyst recommendation or percentage of sell recommendations are regressed against firm size, prior industry-adjusted stock return, and industry-adjusted ROA as well as time dummies formed for the years 2003-2020 to calculate residuals. The residuals can be considered as a component of the firm's analyst recommendations that is uncorrelated with firm size, time-period, and the firm's prior financial performance (Yu, 2008). This approach removes potential endogeneity between the firm's analyst recommendations and its prior reported financial performance and stock return.

Variables	**Dependent Variables**					
	Average analyst recommendation		Change in average analyst recommendation		Percentage of sell recommendations	
Constant	3.8030	***	-0.0447	**	0.0661	***
Firm Size	-0.0266	***	0.0081	***	0.0030	***
Industry-adjusted ROA	-0.0010		0.0005		-0.0005	
Prior industry-adjusted stock return	1.0276	***	0.1760	***	-0.1098	***
Year 2004	0.0192		0.0179		-0.0002	
Year 2005	0.0557	*	-0.0551	***	-0.0133	*
Year 2006	0.0773	**	-0.0374	*	-0.0213	***
Year 2007	0.0850	***	-0.0461	**	-0.0274	***
Year 2008	0.1095	***	-0.0237		-0.0270	***
Year 2009	0.0348		-0.0673	***	-0.0109	
Year 2010	0.1518	***	0.0373	*	-0.0264	***
Year 2011	0.1991	***	-0.0404	*	-0.0388	***
Year 2012	0.1961	***	-0.0687	***	-0.0415	***
Year 2013	0.1502	***	-0.0679	***	-0.0380	***
Year 2014	0.1644	***	-0.0153		-0.0389	***
Year 2015	0.1704	***	-0.0428	**	-0.0426	***
Year 2016	0.1461	***	-0.0657	***	-0.0377	***
Year 2017	0.1334	***	-0.0306		-0.0390	***
Year 2018	0.1673	***	-0.0102		-0.0391	***
Year 2019	0.1662	***	-0.0399	*	-0.0378	***
Year 2020	0.1804	***	-0.0311		-0.0391	***
R-square	0.0290		0.0093		0.0136	
Adjusted R-square	0.0286		0.0088		0.0131	

N= 56,405 firm-years.

* p<0.1; ** p<0.05; *** p<0.01

Table 6: Logistic regression results for the probability of CEO stock donation [ab]
This table reports the estimated coefficients of the random-effect logistic regression which we used to estimate the effect of CEO stock donations on the probability of a positive analyst recommendation. We used the positive residuals from the OLS regression as proxies for analyst recommendation dependent variables.

Variables	**Model 1a**		**Model 2a**		**Model 3a**	
Panel A	Buy and strong Buy recommendation		Analyst recommendation upgrade		High percentage of sell recommendations	
Constant	0.1059		0.5211	***	-3.8831	***
Firm size	0.0156	**	-0.0233	***	-0.0021	
Industry-adjusted ROA	-0.0015		-0.0228		0.0018	
Industry-adjusted stock return	3.5571	***	2.8000	***	-2.6122	***
Analyst coverage	-0.0067	***	-0.0089	***	0.0279	***
Analyst Consensus	-0.2806	***	-0.4327	***	3.3717	***
CEO stock donations	0.2011	***	0.0364		-0.2733	***
Wald Chi-square	628.3622	***	826.8568	***	4598.6815	***
Pseudo R-square	0.0109		0.0142		0.1435	
Panel B						
Marginal Effects						
Analyst measure	0.0496	***	0.0089	***	-0.0475	***

N= 56,405 firm-years.
* p<0.1; ** p<0.05; *** p<0.01.
[a] All models include time dummies
[b] Analyst measure refers to the residual of the respective analyst measure from the analysis conducted in Table 5

Table 6 reports the estimated coefficients of the logistic regression we used to estimate the effect of a CEO stock donation on the probability of buy or strong buy analyst recommendation. We used the positive residuals from the OLS regression as instruments for analyst recommendation. For each model, we show the Wald chi-square that indicates strong significance ($p < 0.001$), as well as the McFadden pseudo R-square measure that ranges from 0.0109 to 0.1435. These results suggest that our models have good predictive ability of analyst recommendation measures

The coefficient on the CEO stock donation in Model 1a of Table 6 (Panel A) shows a positive value (0.2011), which is statistically significant at conservative levels. However, it should be noted that the coefficients in a limited-dependent variable model do not equal the exploratory variable's marginal effect (the effect of a unit change in the exploratory variable on the dependent variable) (Wiersema & Bowen, 2009). We therefore also test for the direction and the significance of the marginal effect of a CEO stock donation on the probability of the buy or strong buy analyst recommendation over all values of the model variables. Panel B in Table 6 shows the marginal effect of a CEO stock donation on the probability of a buy or strong buy analyst recommendation. The coefficient on CEO stock donation is positive and statistically significant (0.0496; $p < 0.01$) implying that Hypothesis 2, which states that

a CEO's stock donation will result in a greater probability of a buy or strong buy analyst recommendation for the company's stock, is supported.

As shown in Model 2a, the coefficient for CEO stock donation (0.0364) is positive and not significant at conservative levels. Panel B in Table 6 shows the direction and statistical significance of the marginal effect of CEO stock donation on the probability of an upgrade in analyst recommendation over all the values of the model variables. However, we find the value of the marginal effect is positive and significant, with the marginal effect computed at the mean value of all variables to be 0.0089 ($p < 0.01$). Thus, Hypothesis 3, which proposes that a CEO's stock donation will result in a higher probability of an analyst recommendation upgrade, is marginally supported.

As shown in Model 3a, the coefficient for the CEO stock donations (-0.2733, $p < 0.01$) is negative and significant. Panel B in Table 6 shows the direction and statistical significance of the marginal effect of a CEO stock donation on the probability of a high percentage of sell recommendations are negative and significant, with the marginal effect computed at the mean value of all variables to be -0.0475 ($p < 0.001$). These results support Hypothesis 4, which proposes that a CEO's stock donation will lower the percentage of analysts that issue a sell recommendation for the company's stock.

5. Conclusion

Contrary to the findings of Ioannou and Serafeim (2015), who find that stakeholder theory has become more dominant in recent years, we find support for agency theory in that there is a negative stock market reaction to the stock donation. This implies that stock market participants believe stock donations to be non-value added. However, we find strong support for our remaining hypotheses; larger executive stock donations appear to precede higher analyst recommendations. Moreover, the greater the donation, the greater the probability of an analyst upgrade of the firm's stock. Lastly, larger the stock donation, the fewer sell recommendations there are for a stock.

This study is the first study to directly investigate the impact of executive stock donations, which can arguably be viewed as self-serving for the executives, on the probability of analyst recommendations, including upgrades. The results reported here appear to support these findings of Hogarth et al. (2016), Masulis and Reza (2015), Yermack (2009) and Maung et al. (2020). Specifically, while the negative stock market reaction to the donation reported here supports agency theory, is still accompanied by a positive association between stock donations and analyst recommendations, which would support the stakeholder theory argument. In other words, it is possible that shareholders view stock donations as wasteful, while analysts may view them as an expression of the firm's larger strategy. This finding also supports the finding by Zhang et al. (2015) that CSR allows firms to build reputation; this reputation building may be captured in the analyst recommendation.

This is also supported by our findings that executive stock donations are associated with larger upgrades and a lower percentage of sell recommendations.

An additional avenue of future research might be to more closely analyze how executive stock donations and philanthropy are expressly incorporated into a firm's mission, vision, and, ultimately, its annual report. Based on the findings reported here and on arguments in previous research, we would generally expect the results to be more pronounced for those firms who explicitly tie their philanthropy into their strategy.

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