ESG Scores Impact on the Market Value of the Stock

Michelle Quinn

Abstract:

This paper investigates the effects of the ESG scores on a firm's stock valuation, using the Tobin's Q ratio. This study will incorporate both the ESG index as a whole and the individual factors: environmental, social and governance to consider the firm's corporate social responsibility. This model uses the Tobin's Q measurement to evaluate if the stock is over or undervalued while including the size, risk, and development within the firm. The paper found that there is little significant evidence to prove that there is a relationship between the ESG scores and the valuation of the stock, but there is significant in both governance and social scores.

JEL Classification: G11, G10, G34, C21, K32

Keywords: ESG, Corporate Social Responsibility, Stock Return, TobinQ

[a] Bryant University, 1150 Douglas Pike, Smithfield, RI02917. Phone: (978)-325-1563. Email: mquinn9@bryant.edu

1.0 INTRODUCTION

This study aims to enhance the understanding of the impact of firm's participating in corporate social responsibility and the stock price. Using the ESG score as an indicator of the corporate social responsibility this study will investigate the impact of Tobin's Q, using the S&P 500 data from 2017. The ESG scores can be broken down into three different sections; environmental, social and governance scores as well as a comprehensive ESG score. For each of the areas, there is a score ranging before zero to 100. The model for this index includes 132 key performance indicators (KPI) that evaluate their sustainability rating as a firm. The ESG model is different for each sector to give an accurate representation of their efforts for sustainability. (Clubb, Takahashi, & Tiburzio, 2016)

This paper is going to investigate an updated analysis of the impact of the ESG score on the stock's value. The corporate social responsibility variable can be broken down into subsections to identify the underlying influences of different types of corporate social responsibility. There will be an in depth analysis of the environmental, social or governance scores individually and as a combined score. This study will use data from the 2017 S&P 500, will allow the study to be a comprehensive analysis of the whole U.S. stock market.

This paper was guided by two research questions. First it will investigate the impact that the ESG scores have on the valuation of the S&P 500 stocks. We will look to see if the ESG score of a firm has a significant impact on the Tobin's Q ratio. Second, this study will consider each ESG score broken down into each sections. This will help identify if there are different signs and magnitudes within each section of corporate social responsibility. Each of these questions will be answered using a regression analysis to evaluate the link between the ESG scores and the stock's valuation. Since the S&P 500 stocks are various sizes and industries this analysis will take into consideration both the natural log of the company's assets and their debt to asset ratio. The economic model which this empirical analysis is based off is published by Velte (2014), which analysed a similar model using the German stock market and will be changed to consider the U.S. Stock Market.

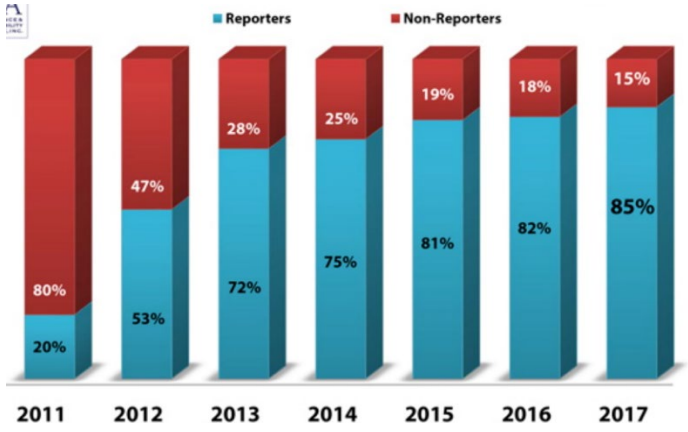
The rest of the paper is organized as follows: Section 3 gives a brief literature review. Section 4 outlines the empirical model, data and estimation methodology is discussed. Finally,

section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

2.0 INCREASING INTEREST IN CORPORATE SOCIAL RESPONSIBILITY

Figure 1 shows that there has been an increasing number of the S&P 500 Companies who are reporters of sustainability. Although sustainability reporting in the United States stock market is presently voluntary there has been an increase in the number of firms choosing to report. According to the Governance and Accountability Institute (GAI) there has been a substantial increase in the percentage of S&P 500 companies reporting. Reporting jumped from 20% in 2011 to 85% in 2017. By 2016, over 13,000 companies had produced more than 80,000 sustainability reports globally.

Figure 1: S&P 500 Companies Sustainability Reporting



Source: Governance & Accountability Institute, Inc. 2017 Research-www.ga-institute.com

Looking at Figure 2 below, the number of non-reporter is separated by industry there has been an increasing amount of U.S. companies who choose to report on the sustainability. In both the telecommunication and utilities industry there is 100% reporting. Looking at the increasing number of companies who are choosing to publish a sustainability report helps the overall analysis of the impact of a company's participation in corporate social responsibility and their financial performance.

Figure 2: The Diminishing Number of Non-Reporters

SECTOR	2014 NON-REPORTERS	2015 NON-REPORTERS	2016 NON-REPORTERS	2017 NON-REPORTERS	2017 % OF SECTOR NOT REPORTING
Consumer Discretionary	24	24	22	15 (+7)	18.5%
Financials	24	24	15*	14 (+1)	20.9%
Real Estate*	n/a*	n/a*	7*	8 (-1)	24.2%
Information Technology	20	15	10	10 (NC)	14.7%
Industrials	18	11	11	8 (+3)	11.6%
Health Care	15	13	14	13 (+1)	21.3%
Energy	12	8	8	4 (+4)	12.5%
Consumer Staples	4	1	2	2 (NC)	5.9%
Telecommunication Services	3	1	1	0 (+1)	0.0%
Materials	2	0	0	1 (-1)	4.0%
Utilities	1	2	0	0 (NC)	0.0%
TOTAL	123	99	90	75	

Source: Governance & Accountability Institute, Inc. 2017 Research-www.ga-institute.com

Figure 3, was created by Calvert Investments to show the difference between Top ESG Score and the Bottom ESG Score. After the 1998, the growth of $1 has been increasing at a growing rate for the Top ESG Scores compared to the Bottom ESG Scores. From 1993 until 2014 there has been growth in both of the traditional stocks, but visually an investor would be able to see that ESG scores have had an impact on the return of the stocks. Although the trend of the ESG scores shows that the Top ESG scored companies have a higher growth this does not guarantee the future results. Also, though the trends show that there is a higher growth within the Top ESG Score this does not meant the correlation is caused by the ESG scores. There are different factors that studies consider to see the significance of the ESG scores on the stock returns.

Figure 3: ESG Factors to Traditional Stock Selection

Source: Calvert Investments. The Calvert-Serafeim Series, June 2016

3.0 LITERATURE REVIEW

Although the stock market trends cannot be described perfectly using an empirical study many researchers have taken into consideration the impact of corporate social responsibility on firm's stocks. Some researchers have investigated companies ESG ratings and if this has an effect on the stock price and financial performance. There are multiple ways to analyze the financial performance of a firm and many past research have used different financial indicators to analyze this relationship. There are some limitations in each of the studies, but each have concluded some positive impact in a company's performance if they participated in better corporate social responsibility.

A study conducted by Ng (2015) investigated the impact of the ESG on the cost of equity capital. Using more than 3000 firms during 1990-2013, the results showed that a company's ESG sustainability performance interactively affects the cost of equity. The research found that in general, the cost of capital is strengthened when ESG performance was strong. This is one way to measure a firm's financial performance, other studies chose other indicators. Another study by Peiris (2009) looked at the relationship between ESG factors and the US Stock Performance. This study looked into different measurements of a company's financial performance including market to book value and return on assets. This study concluded that both were found to have a significant positive relationship with ESG ratings. The study also focused specifically on valuation and operating performance. Peiris argued that the relationship with valuation and operating performance were more clearly identified since this data was part of a firm's annual recordings. These annual data records were more consistent with ESG rating data than the stock return. Peiris found it difficult to conclude some of the impact of the ESG on stock return because this is impacted by other short term variables.

One study by Kweh (2016), breaks down the ESG scores using a panel data set from 2006-2012. Using this data, the study attempted to look at the efficiency of the firms. Breaking down the ESG score it was found the governance factor was most important in improving a company's efficiency followed by social then environmental. By breaking down the ESG score this study was able to identify which subsection of the ESG improved the company's financial performance while focusing on efficiency. Another study by Nollet(2016), et al. examined the relationship in both a linear and a nonlinear model. There was a U shaped relationship between

the governance score and financial performance. By breaking down the score into sub-components we can see what drives the financial performance of the stocks. Another similar study was conducted using the Australian Securities Exchange broke down the score into sub-components. This study by Limriangkrai (2017), used the largest stocks in the Australian Equity market to analyze the stock return and financial policies. It was found that firms with high ESG ratings tend to increase their leverage. Also, "portfolios with high E and S ratings generate higher average monthly returns of approximately 1.32% and .62%, respectively." Similarly, these two studies have investigated different stock markets and have found similar results regarding the impact of the ESG scores. Both studies were able to separate the ESG ratings into each individual titles including environmental, social and governance to get more in depth results.

Kim (2014)'s study examined whether corporate social responsibility impacts the price stocks crash risk. It was found that the crash risk is more pronounced when firms have less effective corporate governance or lower level of institutional ownership. Although corporate social responsibility is not the same as ESG they are interrelated measurements that can be used to set a standard for how a firm operates. Another study by Ruf, et al. (2001) concluded that there was a positive relationship between a company's participation corporate social responsibility and their financial performance. This research considered the changes in both the CSR scores and the financial indicators. This research was different from other studies because it took into consideration the changes year over year rather than the scores a whole. Although there was correlation between the two variable, the researchers found that it is difficult to conclude a definite causal relationship because of the other factors that could have been significant in the financial performance changes.

The final study and the focus for this paper was Velte (2017) which performed a regression analysis on selected companies from the list of German Prime Standard between 2010-2014. The study found that the ESG had a positive impact on the Return on Asset and Tobin's Q ratio for the companies selected. The analysis separated each of the section of the ESG performance and found that the strongest impact came from the governance performance. The Tobin's Q regression found that there was significance within the ESG scores on the value of the stock in the German Prime Standard Stock Exchange.

Each of these studies have attempted to conclude the impact of a firm's corporate social responsibility on the firm's performance. Most of the research has tried to identify the underlying factors that alter financial performance or stock return. Since there are short term and unmeasurable changes that impact performance it difficult to make an accurate model leading to a lower r-square. Although it is impossible to make a perfect regression analysis to predict a stock's price we can still conclude there are various impacts the ESG scores could have on different firms.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

The purpose of this paper is to determine the impact of the ESG scores of a firm on their valuation of firm's stocks. Using simple least-squared regression models, two different models will be constructed to evaluate the impact of the ESG scores as a combined measurement and three independent scores consider Environment, Social and Governance. This study used annual data from 2017 retrieved from Bloomberg's Historical Data. Any firm in the S&P 500 without reported ESG scores were excluded from this analysis decreasing the number of firms. The Summary Statistics for the data is provided in Table 1.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ESG Score	427	34.884	14.248	12.8099	70.539
Environmental	384	28.3689	18.024	1.5504	69.42
Social	427	30.7758	14.25	3.509	73.438
Governance	427	60.2919	7.9846	8.9286	85.7143
Tobin's Q	426	2.329	1.7489	.8757	19.549
Beta	427	1.0722	.3635	.1741	2.518
LogAssets	427	10.107	1.3652	6.2322	14.75
Debt to Assets	427	.6505	.21718	.09531	2.1926
RD	343	803.91	1.3652	6.232	14.745

4.2 Empirical Model

Following Velte (2016) this study adapted and modified the model to fit the U.S. Stock Market. First the stock market of interest is now the United States while Velte studied the German Prime Standard Stock Exchange. This study also has updated the data to 2017's information, which is the most recently published ESG scores for the majority of the S&P 500. We also have created two different models. One is considering the impact of the whole ESG score and the broken down scores in three subsections. Both of these models follow the regression completed by Velte, excluding the industry.

The first model could be written as the following:

$$Tobin's\ Q = \alpha + \beta_1 ESG + \beta_2 Beta + \beta_3 Debt + \beta_4 RD + \beta_5 logassets + \varepsilon$$

The second model could be written as the following:

$$Tobin's\ Q = \alpha + \beta_1 Environmental + \beta_2 Social + \beta_3 Governance + \beta_4 Beta + \beta_5 Debt + \beta_6 RD + \beta_7 logasset + \varepsilon$$

Tobin's Q is the ratio of the Market Value of Firm to the Total Asset Value of Firm to see if the stock is over or under valued. If the Tobin's Q ratio is between 0-1 then the stock is considered to be undervalued, while greater than 1 is consider to be overvalued. This ratio is used for the study to see if the ESG score has an impact on the valuation of the stock. Each of the firm's Tobin's Q was retrieved from the Bloomberg terminals. The Tobin's Q ratio is not used to determine the future of the stock market, but rather to see if the amount an investor would pay for the stock would be worth the asset value within the company. This ratio is helpful to use to analyze if investors are willing to spend more in a company that is corporate socially responsible.

Independent variables consist of several variables all obtained using Bloomberg terminals. Appendix A provide data source, descriptions, expected signs, and justifications for using the variables. The first variable is ESG scores or the Environmental, Social and Governance Scores are used to determine socially responsible of the firm. This number ranges from 0-100, with a high score meaning better corporate social responsibility. Firms are given both a comprehensive score and three different score representing each section. Many of the companies reporting a full ESG score do not report their environmental scores for various reasons. The second independent variable is Beta which is a measure of a stock's volatility in relation to the market in 2017. This

is considered within the regression to take into account the systematic firm risk. Third, Debt is which is used to see how much liabilities the firm has compared to the amount of assets this is used to determine the unsystematic firm risk. The amount of debt that a firm hold can have an impact on the valuation of the stock. This variable is also known as the firm's debt to asset ratio. The fourth variable is R&D which is the amount of money spent on research and development. If a company has a lot invested in research and development, hopeful investors might be investing in the stock because they believe in the future growth of the company because of their research. R&D was a significant variable in Velte's study which could indicate being a significant variable that effects the Tobin's Q ratio. Fifth, LogAssets is used to consider the size of the company. The S&P 500 includes various firms all different sizes which needs to be considered. By including the LogAssets this will avoid the problems between the various sizes of the firms. Each of these independent are consider to be important in analysis of different firms.

5.0 EMPIRICAL RESULTS

Table 2: Regression Analysis

	Combined ESG	Separated ESG
ESG	-.004383 (.0065)	…
Environmental	…	.00423 (.0060)
Social	…	-.0164** (.00744)
Governance	…	.02467* (.01391)
Beta	-.1646 (.2479)	-.5126*** (.19208)
Debt/Assets	.4409 (.4401)	.1238 (.3722)
R&D	.000256*** (.000038)	.00020*** (.0000295)
LogAssets	-.9283*** (.085574)	.06983*** (.06983)
Constant	11.54*** (.8764)	8.371*** (.9112)
R^2	30.82	28.27
F-Statistic	29.94	16.89
Observations	342	308

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses

The empirical estimations results are presented in Table 2. Each of these two different regressions were performed to analyze the ESG scores impact on the Tobin's Q ratio or valuation of the stock compared to the market value. In the first regression, the ESG score was not found to be statistically significant compared to the other variables. The magnitude compared to the other variables was also lower compared to the other variables. Within the first model, it was found that there was not enough evidence to prove that the ESG score as a whole has an impact on the value of the stock compared to the market value. The only significant variables are the R&D, LogAssets and Constant. The sign for R&D came out as expected because companies that participate in high R&D may be overvalued compared to the asset value because investors might be investing in the future of the firm believing that the value will increase. Although R&D was

found to be significant with an increase of $1,000 in Research and Development there is only an increase of Tobin's Q ratio of .000256 which is a really small insignificant amount. To have a substantial change in the valuation the firm would have to invest a significant amount into R&D. The LogAssets was found to be significant at 1% with the sign being negative. This means that with each percentage increase in the size of the firm the less likely the firm is to be overvalued. A 1% increase in a firm's assets will decrease Tobin's Q by approximately .9283 which is quite significant for this ratio. The beta which controls for the unsystematic risk and the debt to asset ratio were not found to be significant in the first ESG regression.

The second regression, which separated the scores of the firms into three different variables had only a slight decrease in the R-squared. In this regression Social was found to be significant at 5% and Governance at 10%. This regression shows that firm with a high social score decreased the likelihood to be overvalued and a higher governance had an opposite effect increasing the likelihood of a stock being overvalued. Governance was found to have the highest significance and magnitude compared to the other scored factors. This model estimates that with a Governance score increase of 1 there would be an increase of the Tobin's Q ratio of.0247, leading the stock to be overvalued. Looking at the Social score there is an opposite impact. It was found that the Tobin's Q would decrease by .0164, leading the firm's stock to be more undervalued. Although the Environmental score was not found to be significant, an increase in the score was estimated to increase the likelihood that the stock was overvalue, but by a much smaller amount than the two other factors. By separating these indicators into different subcategories it is easier to see how the different corporate responsibilities will impact the valuation of the stock compared to the market value. These finding were consistent with the finding from Velte (2017), where the only insignificant variable was the environmental score. The most significant variable in both studies was governance having an inverse effect while social had a positive effect on the Tobin's Q ratio. Still within the second regression, R&D and LogAssets was found to have a positive impact on the Tobin's Q ratio. The sign, significant and magnitude for the R&D was consistent for both models.

Both of these regressions found that the most important variables in determining the Tobin's Q ratio were R&D and LogAssets. The R&D was expected to have a positive impact on the Tobin's Q. It is important to note that R&D was consistent between both models leading us to

believe that this variable is extremely significant in estimating a firm's Tobin's Q ratio. The LogAssets did not follow the same pattern as R&D. Between the two models the signs and magnitude of the LogAssets changed, but still was considered to be significant. Since the signs were switched between the two regressions it cannot be concluded the impact that the size or LogAssets has on the Tobin's Q ratio. The R-squared for both regressions are quite low compared to other studies, but because this regression is analyzing the stock market this is not a concern. Many of the other studies from the literature review also faced the problems with a low R-squared ranging from .25-.40 which compared to other studies is low. This model is attempting to predict the stock market change which is impossible because there are infinite number of unpredictable measure that are involved including the decisions investors make.

The variables of interest within this study included ESG, Environmental, Social and Governance. Similar to many of the other studies within the Literature Review there was little to no significance from the ESG score on the financial performance of the firm, especially the Tobin's Q ratio. But many of the other studies that broke down the score into the three components did find some significance within Social and Governance. The ESG score might be a poor representation of the impact on a firm's financial performance because it is too broad and the impact of two of the most significant subsection have opposite impact on the Tobin's Q ratio.

6.0 Conclusions

In summary, the most important subsections to consider are Governance and Social while the total ESG score has not yet made a significant impact on the market value of a firm's stock. The study found that the overall ESG score had no significant impact to the Tobin's Q ratio. The ESG score needed to be broken down into sections to identify the underlying factors within corporate social responsibility that change the way the stock market reacts. This study found that both Governance and Social were important measures, but the Environmental score was still lagging. Although there is no current evidence from this study to prove the impact of ESG scores on this specific indicator, this does not mean the ESG have no significance in the long run. Considering the trends of the percentage of the S&P 500 company's reporting their corporate sustainability in the next few years there might be a shift towards socially responsible investing(SRI).

There were limitations to this study forcing the data to be analyzed as cross-sectional rather than panel data. This study was a cross-sectional data set because stocks reported for the first time in

2017 and other had no change in scores over the last five years. Since ESG scores and corporate social responsibility are new measures which this study might be analyzed before the impact can be quantified.

Analyzing the stock market and the decision made by investors will never be able to be perfectly predicted because of the volatility within the stock market and the infinite number of small impacts that should be considered. Even though a perfect regression cannot be completed it is important to consider the impact of the corporate social responsibility could have on the performance of the firm.

Appendix 1:

	Description	Source	Expected Sign
ESG	Corporate social responsibility score consider three factors	*Bloomberg Terminals*	+
Environmental	Corporate social responsibility score consider environment	*Bloomberg Terminals*	+
Social	Corporate social responsibility score consider social	*Bloomberg Terminals*	+
Governance	Corporate social responsibility score consider governance	*Bloomberg Terminals*	+
Beta	Stock's measurement of unsystematic risk	*Bloomberg Terminals*	-
Debt/Assets	Firm's Debt to Asset ratio for systematic risk	*Bloomberg Terminals*	-
R&D	The amount of money the firm invests in research and development in thousands	*Bloomberg Terminals*	+
LogAssets	Natural log asset to take into account the size of the firm in thousands	*Bloomberg Terminals*	+

Bibliography

Clubb, R., Takahashi, Y., & Tiburzio, P. (2016). Evaluating the Relationship Between ESG and Corporate Fixed Income. *Laboratory for Sustainable Business,*.

Gillan, S. L., Hartzell, J. C., Koch, A., & Starks, L. T. (2010). Fims' Environmental, Social and Governance (ESG)Choices, Performance and Managerial Motivation. *Texas Tech University*, 1-44.

Kim, Y., Li, H., & Li, S. (2014). Corporate social responsibility and stock price crash. *Journal of Banking & Finance*, 1-13.

Limkriangkrai, M., Koh, S., & Durand, R. B. (2017). Environmental, Social, and Governance (ESG) Profiles, Stock Returns and Financial Policy: Australian Evidence. *International Review of Finance*, 461-471.

Long Kweh, Q., Alrazi, B., Chan, Y. C., & Wan Abdullah, M. T. (2016). The Effects of Environmental, Social, and Governance on the Corporate Performance of Malaysian Linked Companies. *ICGA*.

Ng, A., & Rezaee, Z. (2015). Business sustainability performance and cost of equity capital. *Journal of Corporate Finance*, 128-149.

Nollet, J., Filis, G., & Mitrokostas, E. (2016). Corporate social responsibility and financial performance: A non-linear and disaggregated approach. *Economic Modelling, 52*(B), 400-407.

Peiris, D. (2009). The Relationship Between Environmental Social Governance Factors and US Stock Performance. *University of New South Wales*, 1-139.

Ruf, B. M., Muralidhar, K., Brown, R. M., Janney, J. J., & Paul, K. (2001). An Empirical Investigation of the Relationship Between Change in Corporate Social Performance and Financial Performance: A Stakeholder Theory Perspective. *Journal of Business Ethics*(32), 143-156.

Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility; Bingley*, 169-178.