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Are High-ESG Companies More Profitable? Evidence from Newly-Public Firms

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## **ABSTRACT**

This paper examines the relationship between Environmental, Sustainability, and Governance (ESG) metrics and the profitability of newly-public firms. Using ESG ratings data from Sustainalytics and firm financial data from Compustat, we find no systematic relationship between profitability, time since Initial Public Offer (IPO), and ESG metrics.

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## **Chapter 1**

### **Introduction**

This thesis focuses on examining the relationship between environment, sustainability, and governance (ESG) metrics and the effects on firm profitability. This thesis offers an expansion of work on the economic impact of ESG rankings on companies and extends prior research, such as (Cornaggia and Cornaggia). Their findings examined how firms influence their ESG ratings when participating in the ESG process. Further expansion of their idea in this thesis examines how firm profitability could be influenced positively by ESG metrics.

ESG and Corporate Social Responsibility (CSR) have grown in popularity as a variable in financial growth and sustainability. However, since its creation, there has been controversy about whether ESG can make a firm more profitable. When defining CSR itself, there are many approaches and theories on becoming more sustainable; one of the consensuses is policies for improving our socioeconomic society and the natural world. However, other definitions have been discussed and studied in the past decades as well. This thesis will discuss the different implications of CSR/ESG on firms and their performance. This literature review provides a broad insight into the financial dimensions of ESG. It will look at the expansive insights and interdependencies that comprise the different methods and theories of ESG implications. While they provide insight, the overall findings regarding a tangible correlation must be more conclusive. This literature review will go over different concepts and ideas of ESG that have been discussed and theorized in financial journals.

## Chapter 2

### Background Research

The discussion surrounding the ideas and concept of CSR could be more transparent. Debates around these initiatives' actual effect and meaningful change have had support and disapproval. Extensive research has been conducted to predict correlations and explore the ongoing controversy surrounding CSR/ESG between company performance and the metric itself.

One ideology of CSR is the value of the state is in place to correct market failures, as the market reflects people's self-interest. Old economics reside on exploiting shareholders' wealth; however, in recent years, there has been a change towards responsible investing and sustainability practices. The study demonstrates multiple behaviors toward CSR, and if any of them are in tandem, they can create a correlation to the growth of a firm (Benabou, 2010). One of the studies demonstrates that when humans do not know the outcome of their actions to affect others, they take advantage of their moral wiggle room. Self-esteem also plays a role in this decision-making. This study suggests that CSR is merely a social construct that argues that good corporate behavior can make a firm more profitable.

Furthermore, theories claim that ESG requires sacrificing some profit for social good. An analysis of three alternative theoretical situations simulated the effects of companies and their relationship to CSR, focusing on 'win-win,' where being a good corporate citizen can make a firm more profitable (Benabou, 2010). However, as the article notes, this claim requires supporting evidence.

Another measurement done to examine the interdependencies of ESG/CSR and company performance suggests that companies engage in socially responsible behavior (SRB) on behalf of stakeholders (Benabou, 2010). In this case, CSR is further defined as firms exercising CSR in response to consumer and investor demand. However, empirical studies often link corporate



profitability with socially responsible behavior, with no or slightly positive correlations observed (Benabou, 2010). In conclusion, among the three definitions of CSR discussed. There are too many interdependencies and unknown variables to directly link ESG/ CSR to improving firm performance. However, empirical data could provide insight into the interworkings and concepts of how different variables contribute to CSR and its effects on a firm's performance.

Further research examined the interworking of ESG, which could account for company performance. An analysis of what a firm prioritizes, shareholder welfare or firm market value, was conducted to see if ESG was an actual incentive for firm performance (Hart, 2017). This theory depicts prosocial behavior similarly to Benabou, arguing that many investors are prosocial even if they are willing to hold shares in companies like tobacco or gun companies, leaving "moral wiggle room." They suggest that each individual puts some weight on doing the right or socially efficient thing, but only if they feel responsible for the action (Hart, 2017). This formulation implies that consumers may vote for a company to adopt clean technology even if it reduces profit, supporting the argument that ESG ranking can influence company action. However, even if individuals were to invest in doing the "right thing", research still implies they will be willing to hold shares in a dirty company if they are not responsible for the decision affecting the interests of shareholders, such as workers, consumers, producers, creditors, and shareholders, and the relationship between a firm and its stakeholders (Hart, 2017).

In the theory of doing right versus negligence, a theorized model determines the outcome in these particular fixed situations: suppose company A is in duopolistic competition with a second company, B, that has chosen a dirty technology. Assume that the companies produce a homogeneous good at constant marginal cost (with no capacity constraints) and that competition proceeds. Shareholders of company Company A are in a dilemma where they have to choose between producing clean or dirty products. If they choose clean, they might lose the market to Company B if B's marginal cost is lower. However, if they choose dirty, they may end up causing a

significant amount of environmental damage (possibly more minor) to themselves and make money—a study based on the economic model Bertrand Competition (Salish).

Furthermore, another theory of CSR/ ESG is an "invest and engage" strategy. This strategy actively invests in companies or projects demonstrating vital CSR/ESG metrics. Unfortunately, this theory involves outside funding and regular shareholder votes on moral issues but often leads to more success (Starks, 2023). Furthermore, these prosocial investors feel responsibility only when faced with a choice. They may refrain from voting and engagement, a rather specific relationship in which many interdependencies of different variables are forgone. The analysis is logical; however, this study's limitations are constrained to the research type this thesis would like to explore.

However, it seems necessary to consider a stakeholder perspective towards a financial situation as moral obligations vary between individuals. With this CSR interpretation, it would only be possible to draw correlations based on human morality instead of empirical statistics, a methodology that cannot be used for this study (Benabou, 2010). This thesis aims to mitigate as much human moral variability as possible and focus on situations in which there could be a correlation to ESG driving firm performance under specific variable conditions.

In order to obtain a thorough grasp of the fixed effects in this study, it is imperative to analyze companies that have recently undergone corporate actions. The topic of study: CSR reports and allowing fund managers to mandate ESG services. This theory aims to determine whether ESG/CSR benefits shareholders or results from poor governance. Research indicates the location of work and its geographic location are influences of ESG ranking. Moreover, economic development and policy regulation have been found to hold robust predictions for firms' growth (Gillan, 2021). With regulations and mandates becoming more impactful on the company's performance, the influence of company executive boards on ESG/CSR finds that U.S. firms with

directors exposed to changes in regulations and reporting requirements experience an increase in ESG/CSR performance of about 4.4% (Gillan, 2021).

While there are observable environmental improvements in industries with low environmental impact, firms in high-impact industries have been focusing more on improving their social performance than ecological performance despite the expected correlation (Gillan, 2021). However, if policy regulation and mandates provide a transparent and predictable future regarding ESG implications for firms, they can reinvest in ESG/CSR ideas and create self-growth. This presents a potential study area as the economic atmosphere becomes more regulated and strategic. Furthermore, research finds that other regularity variables within the company could indicate that the employee environment has changed dramatically in the past five years, as many companies are now stakeholder-oriented. CEO pay may be influenced by ESG/CSR activities, which may be consistent with good governance. Studies show that CEOs at firms with Higher ESG/CSR performance have lower salaries, suggesting that ESG/CSR expenditures are not complementary to CEO pay. Excessive CEO pay negatively correlates with ESG/CSR scores, and CEOs with high pay unrelated to performance invest less in ESG/CSR activities (Gillan, 2021). While these exhibits of interdependencies have an underlying relationship, they provide no statistical significance towards ESG rankings improving a company's profitability. Research is needed to correlate if there is a positive relationship between investors' attraction to more ESG-correlated firms.

This literature provided insight into the construction of methodology that could allow for a controlled environment to test other interdependent variables. Policy regulation, reporting requirements, gender, and geographic location could all be used as filters to try and better identify variables determining growth.

The theory suggests that ESG investment decisions are driven by financial value, with a focus on several critical variable indicators such as environmental impact, reputation, human

capital, litigation, regulatory compliance, corruption, and climate risk. ESG investing can be motivated by a combination of values and value. Various investment approaches include impact investing, socially responsible investing (SRI), and traditional sustainability investing. ESG investment can be a way to express nonfinancial preferences or to mitigate risks and enhance returns. Movements in the market, as explained by Google searches and the down Jones and SNP, have shown that there has been a shift to ESG investing (Starks, 2023).

Different motivations drive the growing interest in ESG investing. Some of these particular incentives are value investors who focus on driving firm value and risk-return prospects, while 'values' investors are interested in societal and environmental effects. Academic research on ESG risks includes value investors with nonfinancial preferences and value investors with primarily financial motivations. Recent research on ESG motivation has shown that social preferences and social signaling are the primary motivations for investors to hold Socially Responsible Investment (SRI) funds. The study reveals that 7% of Vanguard investors believe ESG investments will outperform the market, while 25% believe they hedge climate risk (Starks, 2023). ESG investor motivations vary, with some willing to give up some return for sustainable investments (Baker, 2021). The increasing interest in ESG funds and differences in investor motivations are evident in assets under management (AUM) and cash flow into ESG funds versus non-ESG funds. ESG framework is often viewed as constrained optimization. However, the ESG approach is based on a value perspective. In that case, the study theorizes that it may result in better risk management or identify return opportunities, potentially leading to lower risks or higher returns. The results conclude that ESG investing's meaning depends on context, with ESG value referring to financial importance through risk management and return opportunities. This can make it quite tricky to identify a relationship pattern if the definition of ESG differs amongst companies' ideologies. This could play a role in a company's business strategy, ultimately affecting its relationship with ESG,

regardless of company performance. Understanding these differences is vital for future financial economic research, which provides an insightful bedrock for this article's thesis.

The last theory observed an analysis regarding and discusses how ESG ratings are valuable financial indicators for investors, and investment managers use ESG criteria in portfolio allocation decisions. This includes IPOs, where information disparities exist between participants (Baker, 2021). IPO firms often need formal regulatory disclosures, leading to information asymmetry. Information asymmetry occurs when one party in a financial transaction has different information. To alleviate uncertainty, greater transparency about a firm's environmental, social, and governance risks is crucial. Information asymmetry can drive the negative relationship between ESG ratings and underpricing. The study determined more substantial negative correlations in countries with more nontransparent financial disclosures, higher liability standards, and stronger shareholder protections.

Furthermore, information asymmetry leads to a negative correlation between ESG ratings and underpricing, with this relationship being more robust in countries with transparent financial disclosures (Baker, 2021). IPOs are underpriced by 27.0% in countries with a high ESG government rating. More analysis examines the relationship between country-level ESG ratings and firm-level IPO underpricing; research suggests countries with higher ESG Government Ratings have a lower underpricing. It also considers the impact of environmental, social, and governance risk management on firm-level underpricing. The results show that first-day returns are significantly lower in countries with higher Environmental RM scores. Furthermore, that governance risk management is associated with lower first-day returns (2021).

In conclusion, amongst other variables, the relationship between the value of data and its relationship to the current perceptions of CSR/ESG is the factor of measurement we cannot account for in this study. This information and other articles on ESG and firm performance are helpful in extension of this thesis.

Furthermore, this literature review reveals extensive methodology surrounding the topic of ESG and firm performance. However, statistical significance is generally lacking after thousands of studies and observations. Considering this research, this thesis will aim to explore the potential relationship between the ESG scores of newly public companies and their financial performance, specifically profitability.

## Chapter 3

### Data and Methodology

We obtained data on ESG ratings from Sustainalytics and data on firm financial and accounting information from Compustat. Both datasets were accessed through Wharton Data Research Services (WRDS). We then used Stata to perform linear regressions with high-dimensional fixed effects using data from 2005 -2023

The dependent variables are measures of firms' profitability; the independent variables include the firm's ESG scores, time since IPO, and other firm financial data, and the regressions include firm and time fixed-effect variables. Since Compustat data is reported quarterly, Sustainalytics scores were averaged over the three months in each quarter and matched with Compustat data for the quarter-end date.

#### ESG Rating Rationale

ESG raw scores were used from Sustainalytics and merged with Compustat company financial data to explore correlations between ESG ratings, firm age, and profitability. ESG metrics are split into three pillars, but all are derived to form a firm: transparency, legitimacy, honesty, and sustainability goals. These goals of ESG set a commitment to the firm on the impact of its initiatives on the environment in a more quantifiable way. For example, it can include greenhouse gas emissions, diversity, inclusion, and giving back to the community ("Benefit

Corporations”). This newly formed benchmark has gained attention as environmental concerns have grown in the last few decades. Shareholders of ESG include the public, investors, governments, and business partners, making it vital that public firms show they are transparent. Attention to commitment in ESG needs to be grounded in data, as ESG is one of the only quantifiable metrics in ethical reporting.

Sustainalytics is an independent provider of ESG ratings and research (Sustainalytics). Data was taken from the Sustainalytics North American Raw Scores database; ratings from U.S. companies from 2005 to 2023. The averaging of environmental, social, and government ratings is done from this specific data range, creating three variables: "overall\_e," "overall\_s," and "overall\_g" for a given year for each company. From the average independent ESG ratings, a total average variable weighted to 100 was created, "s\_mean." For creating the date variable "database," company dates were not subjugated to the same constraints as ESG scores and were merged on months and years with the date variable in Compustat. After creating a newly generated variable, "database," the months were divided into the fiscal quarters of the year to determine four points of measured profitability in an annual year. Four data points in a year compared to twelve make it easier to find a relationship between profitability in younger companies and ESG scores. Months Jan-March = 1, April-June = 2, July-Sept = 3, Oct-Dec =4. The data can be analyzed without seasonal, cyclical effects by creating seasoned averaged variables by fiscal quarters of measure.



## **Compustat Rationale**

Compustat was used to derive market information of financial metrics from corporations from 2005-2023 to explore the growth and change of firms and corporations across the United States. Like Sustainalytics, some financial metrics needed to be added to individual dates within the data and adjusted to fit the criteria. Using Compustat data, we computed metrics such as assets, profitability, liabilities, stock prices, and other metrics that indicate firms' financial growth over the years.

In order to see if there was a relationship between profitability, firm age, and ESG ratings, we then created a few new variables in Stata based on raw data from Compustat and Sustainalytics. The newly created variables are financial ratios that give insight into a company's internal and external performance, and overall, they depict the current "health" and trajectory of a firm's potential horizon. The variables created and used are ROE, ROA, market to book, and sales to assets. Once formulated, the ratios underwent winsorizing. Winsorizing is the statistical technique used to minimize the influence of outliers in the data set ("Unrecognized Command: Winsor - Statalist"). The threshold used for this Winsor was 5% up and down. This 95th percentile will provide a more robust and less skewed data set for observation and analysis by taking the outliers in the top and bottom 5% and placing them in the 95th percentile.

## **Process Overview**

The following methodology assessed the statistical significance of ESG ratings and scores against firm profitability growth dating back to 2005. A linear regression model with high-dimensional fixed effects will be used to conduct the analysis.

#### Step 1: Collecting Data Metrics

Utilizing Wharton Research Data Services, Sustainalytics, and Compustat Metrics were taken and exported to be used in Stata. As stated above, the variables utilized in Stata were the company-specific ID, "gvkey," dates, and ESG rankings, which came out of Sustainalytics. The Financial metrics of the firms linked to their specific company ID key and "datadate" were also taken and exported. Once installed in Stata, the two data sets were overlapped via their "gvkey" and data date variables, creating some 35,000 observations with 1,061 variables derived from Compustat and Sustainalytics. All other variables dropped as an ESG ranking did not correlate to a firm with Compustat data.

Once merged, the data used dated from 2009 to 2019 and was incorporated under the same principles as above, averaging four data points per year per company. The data, once merged, could then be adjusted to the variables specified above to be appropriate for the regressions needed.

The Sustainalytics data Environmental, Social, and Governance had an average score between 0 and 100 for each "overall\_e," "overall\_s," and "overall\_g." A total average was then taken of the combined ESG scores for a company in a year to produce a final number of ESG rankings to regress.

The Compustat data used was similarly adjusted to fit the criteria of fiscal quarter earnings reports. Once ESG metrics aligned with the companies' fiscal reporting, commands in

Stata were used in tandem with variable generation to form financial ratios to determine the firms' performance concerning ESG and to evaluate the companies' external and internal performance, the "gen" command in Stata generated variables "roe," "roa," "market-to-book," and "sales to assets." These variables will provide valuable insights into the companies' overall financial health.

## Step 2: Fixed Effect Regression/ Multiple Regression

Stata was the preferred choice for performing regression analysis due to its ability to handle large samples efficiently, making it a better alternative to Excel. A multiple linear regression analysis was deemed the most fit for this analysis as it allows for numerous variable effects. In multiple linear regression, two or more independent variables act on a dependent variable and attempt to predict the outcome of the single dependent variable. In this study, the dependent variables will be ROE or Market-to-Book ratio, and the independent variables will be ESG rankings and company metrics in combination with interaction terms of varying degrees. These interaction terms examine a relationship between the target-dependent variable and the changes in independent variables (Lewinson). Furthermore, this thesis will look at interaction terms that identify age, size, and ESG ranking of the U.S. For this thesis, it is essential to examine not only the effects of an independent variable on the dependent but also how an independent variable, such as ESG rankings, can change depending on the value of another independent variable, such as the company's age.

The formula below used multiple linear regression with fixed effects to analyze multiple regression. In Stata, denoted with the command:

Reghdfe , abs() vce()

`reghdfe` estimates multiple linear regression models with high-dimensional fixed effects. In its most general form, the model can be represented as:

$$y_{it} = X_{it}\beta + \mu_i + \gamma_t + \epsilon_{it}$$

Y represents the dependent variable while X represents the quantity and magnitude of the independent variables. Beta represents the vector coefficient of the independent variables, and mu and gamma represent the fixed effects of time-specific and individual-specific (Cornaggia and Cornaggia). Fixed effects are used in the final regression command to keep the characteristics of firms' size and age constant. For the working data set, to keep specific fixed effects in place with this command, "absolute value" abs and "variance-covariance estimator" vce were used on variables "gvkey" and "datadate". The commands specify which variables in the regression model are treated with fixed effects, such as size and age in analysis.

Dependent variables were selected from the Compustat data set to perform the regression. In the first regressions, the dependent variable was ROE from each company. The independent variables selected in this regression to be compared with the ROE were the age of the firms and the ESG score. Amongst the different regressions were adjusting for median splits, covariance, and adjustments to r square. Ultimately, these metrics lay a framework for finding correlations between the dependent Compustat variables and the independent Sustainalytics variables with fixed effects on companies and their age. The result will determine the data sets' coefficient of determination or goodness of fit. The result will be a value between 0 and 1. 0 Is

no relationship, and 1 means perfect fit. For more information on interpreting r-squared, go to the article ["How to Interpret R-squared?"](#).

The second dependent variable of the measure was the Market-to-Book ratio. Market to Book values a company's market capitalization over its book value. Typically, investors use this ratio to perceive the company's stock value or projected worth. A normal Market-to-book is suggested to be around 1 (CFI Team). For this second grouping of regressions, more independent variable variations associate a specific variable to the correlation of firm growth. Like the regressions in grouping 1, the median split upon age and Sustainalytics rankings to adjust for differences in characteristics of older versus younger companies. Amongst these variables, the regression included Sustainalytic's average rankings, age, and ROA.

### Step 3: Repeat Regressions to Build Story

The process of constructing a repeated story of the data involves repeating a specific procedure. This procedure uses two dependent Compustat variables, namely ROE and Market-to-Book. To adjust independent variables, interaction terms on Sustainalytics data and fixed effects on size and age are incorporated. This approach helps to produce a comprehensive and accurate analysis of the data suitable for sharing with an external audience.

## **Chapter 4**

### **Results**

The study of this paper will explore the potential relationship between the ESG scores of newly public companies and their financial performance, specifically regarding profitability. Companies with robust ESG practices are better equipped to tackle the challenges and opportunities of the public market, ultimately leading to improved financial outcomes. ESG factors reflect a company's commitment to sustainability, social responsibility, and effective corporate governance, which can contribute to long-term value creation and investor confidence.

#### **Univariate Analysis**

We start with investigating the weights and raw scores of ESG rankings and metrics on Sustainalytics. From the derived data sets of variables ranging from 2009 to 2019, environmental, sustainability, and governance metrics were all observed for this study. Furthermore, variables were regenerated upon date: "datadate" and company-specific ID denoted: "gvkey" to merge the data set onto the Compustat data. After newly generated adjustments, the individual Sustainalytics dataset contained 181 variables and 38,910 observations.

Similarly, the Compustat dataset underwent a similar process of regeneration of variables as the unique variables in the datasets were labeled "datadate" and "gvkey," respectively. The individual dataset of Compustat contained 51 variables and 422,096 observations. This overlap in variable names "datadate" and "gvkey" allows datasets to be merged. Sustainalytics is then overlapped onto the Compustat data using commands:

\* Load the first dataset

```
use "first_dataset.dta", clear
```

\* Load the second dataset

```
use "second_dataset.dta", clear
```

\* Merge the datasets using a common identifier

```
merge 1:1 common_identifier using "second_dataset.dta"
```

\* Save the merged dataset

```
save "merged_dataset.dta", replace ()
```

The merge ended in a complete dataset of 877 variables and 35,465 observations (decrease). New variables were generated under the individual dataset, including Sustainalytics and Compustat variables. Sustainability variables used weighted criteria of each pillar: environmental, sustainability, and governance. An overall mean was taken of all ESGs and denoted with variables "overall\_e," "overall\_s," "overall\_g." Each pillar was weighted with each variable to meet a 0 out of 100 scale ranking. A total Sustainalytics variable was then generated, taking the average of all three scores "s\_mean" and put on a scale of 0 to 100.

Compustat variables indicating financial metrics were then generated into financial ratios to better allow a visual of financial health internally and externally for companies, with a distribution and variance table for each. ROE and ROA are presented in the first table distribution.

Table 1. Variable Table Distribution

s_mean					roc				
-----	-----	-----	-----	-----	---	-----	-----	-----	-----
	-	---	---			---	--	---	
	Percentiles	Smallest				Percentiles	Smallest		
<b>1%</b>	31.72621	24.09412			1%	- 0.0759235	- 0.0759235		
<b>5%</b>	35.29589	24.09412			5%	- 0.0748985	- 0.0759235		
<b>10%</b>	37.39899	24.09412	Obs	35,465	10%	- 0.0163904	- 0.0759235	Obs	35,465
<b>25%</b>	41.79012	24.09412	Sum of wgt.	35,465	25%	0.0128679	- 0.0759235	Sum of wgt.	35,465
<b>50%</b>	48.14815		Mean	49.58458	50%	0.0307109		Mean	0.0346146
		Largest	Std. dev.	10.35586			Largest	Std. dev.	0.0484666
<b>75%</b>	56.2386	100			75%	0.0538848	0.1441245		
<b>90%</b>	63.9394	100	Variance	107.2439	90%	0.0998824	0.1441245	Variance	0.002349
<b>95%</b>	68.10417	100	Skewness	0.7027554	95%	0.1441245	0.1441245	Skewness	0.1664792
<b>99%</b>	75.32818	100	Kurtosis	3.754255	99%	0.1441245	0.1441245	Kurtosis	3.809331
<b>age</b>					<b>roa</b>				



	-----	-----	-----	-----	---	-----	-----	-----	-----
	-	---	---	---		---	--	---	---
	Percentiles	Smallest				Percentiles	Smallest		
<b>1%</b>	1.60274	0.0493151			1%	- 0.0164345	- 0.0164345		
<b>5%</b>	3.80548	0.0520548			5%	- 0.0161155	- 0.0164345		
<b>10%</b>	5.553425	0.0547945	Obs	16,733	10%	- 0.0033183	- 0.0164345	Obs	35,465
<b>25%</b>	11.12877	0.060274	Sum of wgt.	16,733	25%	0.0034162	- 0.0164345	Sum of wgt.	35,465
<b>50%</b>	17.12055		Mean	17.2162	50%	0.0115658		Mean	0.0140395
		Largest	Std. dev.	9.294387			Largest	Std. dev.	0.0159293
<b>75%</b>	21.98356	73.01096			75%	0.0232407	0.0475033		
<b>90%</b>	26.68493	73.25754	Variance	86.38563	90%	0.0386022	0.0475033	Variance	0.0002537
<b>95%</b>	31.03014	73.50685	Skewness	1.188988	95%	0.0475033	0.0475033	Skewness	0.3704369
<b>99%</b>	50.03288	73.7589	Kurtosis	6.728126	99%	0.0475033	0.0475033	Kurtosis	2.795628

ESG rankings and scores. Furthermore, "s\_mean" exhibited a mean of 49.58, and the standard deviation was 10.355, respectively. Furthermore, the variable listed below, "age," indicates the company's age in IPO correlated to the date of ESG ranking or metric taken. This

data showed a mean of 17.22 years and a standard deviation of 9.29, indicating a more mature set of companies with an average of 17.2 years old. Furthermore, the data shows a diverse mix of companies lacking skew, proving further useful when running regressions to depict a correlation between age and ESG ranking due to even distribution. ROE, ROA, and market-to-book (Table 2) were the ratios selected for the comparative dependent variables to examine distribution first.

The ROE distribution resulted in a wide distribution with a mean of 0.0346 and a standard deviation of 0.0485. The resulting data set indicates a relatively low ROE, with the 99th percentile having .14412. ROA looked similar, producing a mean of 0.014 and a standard deviation of 0.0159, indicating even smaller asset volatility. Lastly, the market-to-book ratio was the final formula for a distribution. "Market\_to\_book" had a mean of 3.488 and a standard deviation of 2.64 with a 1st percentile of 1.17 and 99th percentile of 10.735.

**Table 2. Market-to-Book Distribution**

<b>market_to_book</b>				
---	-----	-----	-----	-----
	Percentiles	Smallest		
<b>1%</b>	1.173338	1.173338		
<b>5%</b>	1.174127	1.173338		
<b>10%</b>	1.382478	1.173338	Obs	35,465
<b>25%</b>	1.819466	1.173338	Sum of wgt.	35,465
<b>50%</b>	2.477563		Mean	3.488407
		Largest	Std. dev.	2.624285
<b>75%</b>	3.823149	10.75335		
<b>90%</b>	8.156486	10.75335	Variance	6.886872

To further eliminate outlier bias within the regressions, all variables used in regression underwent Winsorizing to the 5th percentile to eliminate any extreme outliers. Significant effects and skewness were not observed in the standard distribution variables and the archetype Winsorized variables used in the regression. Further transformation was imposed on the variables with a log to create new positive variables more suited to statistical regression. This will help focus the regression on the listed variables above to interpret a statistical relationship better.

Further variable generation and translation were done to a few other variables that could indicate financial performance within the companies under analysis. This completed chart is referred to as "Distributions of Variables" (Appendix A).

### Analysis/ Results

The dependent variables for the regressions, namely ROE, ROA, and Market-to-book ratio, were determined based on the variables derived from Compustat. These dependent variables were then pitted against the independent variables of ESG scores, time since IPO, and their interaction.

The selection of the three dependent variables was based on achieving the most accurate regressions correlating with firm profitability. Additionally, these variables were chosen for consistency in variation and distribution under the transformed archetype variables. The initial regression was carried out on the Compustat dependent variable, "roe\_winsor," followed by including six independent variables to observe if there is a significant relationship between "roe\_winsor" and the listed independent variables. The subsequent tables explore the relationship results between the independent and three dependent variables, with some variables held constant.

**Table 3. ROE Regression Analysis 1**

VARIABLES	roe_winsor
s_mean	-3.68e-05

	(0.000277)
<b>o.age</b>	-
<b>age_smean</b>	1.36e-06
	(1.25e-05)
<b>market_to_book_winsor</b>	0.00646***
	(0.00163)
<b>ln_sale_winsor</b>	0.0234***
	(0.00528)
<b>ln_assets_winsor</b>	-0.0172***
	(0.00460)
<b>Constant</b>	0.00541
	(0.0269)
<b>Observations</b>	16,686
<b>R-squared</b>	0.476

The following text showcases the statistical significance of the independent variables and interaction terms on the dependent variable "roe\_winsor," as presented in Table 3. The independent variable "s\_mean" along with the interaction term "age\_smean" and "o.age," were

analyzed to ascertain their relationship with ROE. The variables "Market\_to\_book," "ln\_sale\_winsor," and "ln\_assets\_winsor" were used as constants in this regression and were found to be statistically significant at the 1%\*\*\* level, indicating their impact on the dependent variable roe\_winsor. This was to be expected from the financial variables as they indicate the company's financial performance and are presumed to affect the r-squared to some extent within the regression analysis.

The independent variables coming from the Sustainalytics dataset, namely "s\_mean," "o.age," and the interaction term "age\_smean," were further examined for their impact on the ROE. However, from the output of 16,686 observations in this regression, no significance was observed for ESG, age, or the interaction term score affecting the return on equity. Variable "s\_mean" had a coefficient of  $-3.68e-05$  with no significance, "o.age" with no significance to be computed, and interaction term with a coefficient of  $1.36e-06$  and no significance. If variable "roe\_winsor" was a dependent, then a negative interaction term would be present, indicating younger companies with high ESG scores would have higher profitability.

As no significance was observed for the Sustainalytics archetype variables, further interaction terms were created to identify a negative interaction term. This interaction term would apply to more variable volatility. It will be used to combine the effect of two or more variables without an additive manner, specifically looking at the influences on age and ESG score of a company. The following regression included "score" and "ln\_age" and interaction term "ln\_age\_score."

**Table 4. ROE Regression Analysis 2**

VARIABLES	roe_winsor
-----------	------------

<b>score</b>	-0.0354
	(0.0503)
<b>ln_age_score</b>	0.0118
	(0.0180)
<b>ln_age</b>	-0.00461
	(0.00928)
<b>Constant</b>	0.0456*
	(0.0254)
<b>Observations</b>	16,686
<b>R-squared</b>	0.441

Table 4 shows the second set of variables regressed and interaction terms for the second regression of "roe\_winsor." Interaction terms "score," "ln\_age\_score," and "ln\_age" were created to find an interaction between ESG scores and time since IPO, forming a negative relationship about profitability. The three interaction terms showed insignificance, resulting in a coefficient of -0.0354, 0.0118, and -0.00461, showing no relationship to support the hypothesis. This lack of sensitivity indicates that there is no relationship between the profitability of a firm about its age "ln\_age" and its ESG ranking "score" or combined effects "ln\_age\_score."

Table 5 displays a change in the dependent variable for the regression determining younger firms with high ESG scores would have higher profitability, with a different measure of net profitability "roa\_winsor." Instead of using the complete variable of ESG rankings and time since IPO to try and determine a linear relationship to profitability, a median split on variable "s\_mean" was used to determine if there was any underlying relationship between ESG score and time since IPO relative to ROA. A new variable, "s\_mean\_split," was created and regressed, producing a coefficient of 0.000690 and statistically significant at the 0.05 level.

This new binary variable allows the dependent financial ratios of companies to undergo any pattern or underlying relationship between the ESG score and the financial ratios of a company stated above. While this might not indicate a linear correlation between the dependent variable "roa\_winsor," a median split produces a nonlinear transformation of variable "s\_mean\_split." Data can then assume any possible shape, allowing for more flexibility in the functional form of the independent variables. This allows for both positive and negative relationships to be observed on ESG rankings compared to the ROA of companies looking for a negative relationship between the interaction terms (DeCoster et al.).

**Table 5. ROA Regression Analysis**

VARIABLES	roa_winsor
s_mean_split	0.000690*
	(0.000393)
market_to_book_winsor	-0.000465***



	(0.000118)
<b>ln_assets_winsor</b>	-0.00989***
	(0.00133)
<b>ln_sale_winsor</b>	0.0122***
	(0.00156)
<b>Constant</b>	0.0190***
	(0.00702)
<b>Observations</b>	35,375
<b>R-squared</b>	0.587

Table 5 shows the significance of "s\_mean\_split" under the variable "roa\_winsor". ROA demonstrates how efficiently the company uses assets to generate money compared to ROE, which looks at how companies use shareholders' investments to generate profits. ROE and ROA are a measure of net Profitability:

$$\text{ROE} = \text{Net Income} / \text{Shareholder Equity} \times 100$$

$$\text{ROA} = \text{Net Income} / \text{Total Assets} \times 100$$

Another regression was then run again using the old variable "roe\_winsor" to see if there was also significance between the variables. Table 6 shows an identical setup to the regression setup compared to Table 5, with the dependent variable "roe\_winsor" being the only substitute.

**Table 6. ROE regression Analysis 3**

<b>VARIABLES</b>	<b>roe_winsor</b>
<b>s_mean_split</b>	0.00291**
	(0.00121)
<b>market_to_book_winsor</b>	0.00632***
	(0.000248)
<b>ln_assets_winsor</b>	-0.00145

Table 7 indicates that variable "s\_mean\_split" has a coefficient of 0.00291 and is statistically significant at the 5% level compared to "roe\_winsor." This suggests that while there is not a linear correlation between profitability and ESG rankings, there is potentially an underlying relationship between the dependent and independent variables of these different companies, similar to the results in Table 5 analysis on "roa\_winsdor. To try and further to depict a pattern of causation, the following dependent variable depicting a financial metric of companies was generated "market\_to\_book\_winsor .

**Table 7. Market to Book Regression Analysis 1**

<b>VARIABLES</b>	<b>market_to_book_winsor</b>
<b>s_mean_split</b>	0.103
	(0.159)

<b>split_age</b>	0.00137
	(0.00806)
<b>o.age</b>	-
<b>roa_winsor</b>	-7.066***
	(1.729)
<b>ln_assets_winsor</b>	0.406**
	(0.193)
<b>ln_sale_winsor</b>	-0.0514
	(0.127)
<b>Constant</b>	-0.00482
	(1.570)
<b>Observations</b>	16,686
<b>R-squared</b>	0.777

Table 7 compares the dependent variable "market\_to\_book\_winsor" to previously selected independent variables that indicated no significance or previous results with ROE or ROA. Instead of measuring net profitability for correlation, market-to-book will measure the valuation of a company to try and link the underlying pattern to ESG rankings. The results

showed that the independent variables "s\_mean\_split" and "split\_age" had coefficients of 0.103 and 0.00137, showing no significance level. The interaction term "o.age" indicated overall age and was found to be significant even in computing. These variables, upon regression, repeated similar outcomes to the regression results in Table 1. Since the variables of ESG ranking and age regarding the median split did not foresee a significant relationship. Continued regressions were done using the variable "market\_to\_book\_winsor" to determine if not profitability, that market valuation could be a linear correlation to ESG rankings. More Regressions was to assess if there was a possible relationship between the ESG rankings and the market value of a company relative to its accounting value (CFI Team).

**Table 8. Market-to-Book Regression Analysis 2**

<b>VARIABLES</b>	<b>market_to_book_winsor</b>
<b>s_mean</b>	0.00867**
	(0.00393)
<b>roa_winsor</b>	-5.414***
	(1.313)
<b>ln_sale_winsor</b>	-0.105
	(0.0971)
<b>ln_assets_winsor</b>	0.496***
	(0.161)

<b>Constant</b>	-0.681
	(1.303)
<b>Observations</b>	35,375
<b>R-squared</b>	0.821

Table 8 shows that the dependent variable "market\_to\_book" has a significant relationship with the independent variable of this regression set. Variable "s\_mean" is used alternatively to "s\_mean\_split" to look at a linear relationship between Market-to-book and ESG rankings in a linear form. Under these circumstances, "s\_mean" showed statistical significance at the 5% level with a coefficient of 0.00867 compared to the "s\_mean\_split" coefficient of 0.103. To further see if a relationship does exist between Market-to-book-ESG scores and time since IPO interaction terms of previous regressions were lastly tested. Table 9 shows a similar relationship between variables of previous charts as the set of interaction terms: "score" and "ln\_age" resulted in a coefficient of 0.805 and 0.127 with zero level of significance in correlation to "market\_to\_book."

**Table 9. Market-to-book Regression Analysis 3**

<b>VARIABLES</b>	<b>market_to_book_winsor</b>
<b>score</b>	0.805
	(0.609)

<b>ln_age</b>	0.127
	(0.188)
<b>ln_sale_winsor</b>	-0.131
	(0.127)
<b>ln_assets_winsor</b>	0.476**
	(0.190)
<b>Constant</b>	-0.849
	(1.648)
<b>Observations</b>	16,686
<b>R-squared</b>	0.776

While the results of this study did not attribute to finding a specific correlation of ESG scores being higher in younger companies producing more profitability, underlying relationships were found, and further background research was explored. Previous research indicates that a company's market valuation is affected by ESG rating.

In terms of correlation, organizations have increasingly been integrating ESG metrics into corporate strategies. Much of this switch in ideology has arisen due to the relatively new establishment of regulatory requirements, consumer response, and the competitive landscape. A study has found that higher ESG scores tend to have higher market valuations measured by their

EV/EBITDA Multiple. The EV/EBITDA Multiple is similar to ROE, ROA, and MTB in that they all measure a metric of financial performance to assess a company's well-being. EV/EBITDA multiples are often used not to look at a company's profitability but rather its valuation (Deloitte). Like MTB, this EV/EBITDA Multiples looks at a company's market value. While a company can show profitability without high market value levels, profitability can be interrelated to market value through expenses, productivity, and competition (“Economic Profit vs Accounting Profit (Video)”).

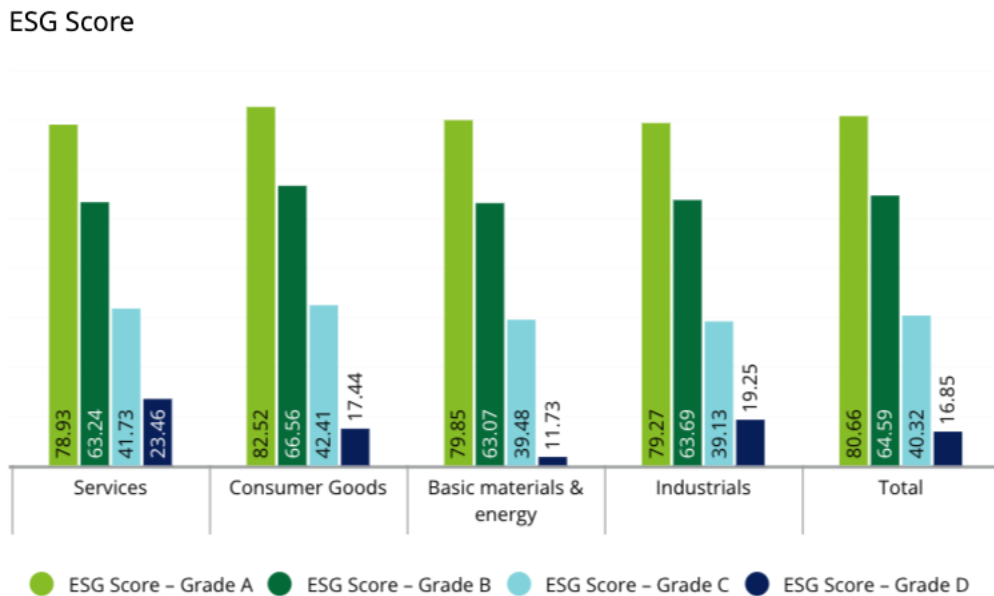
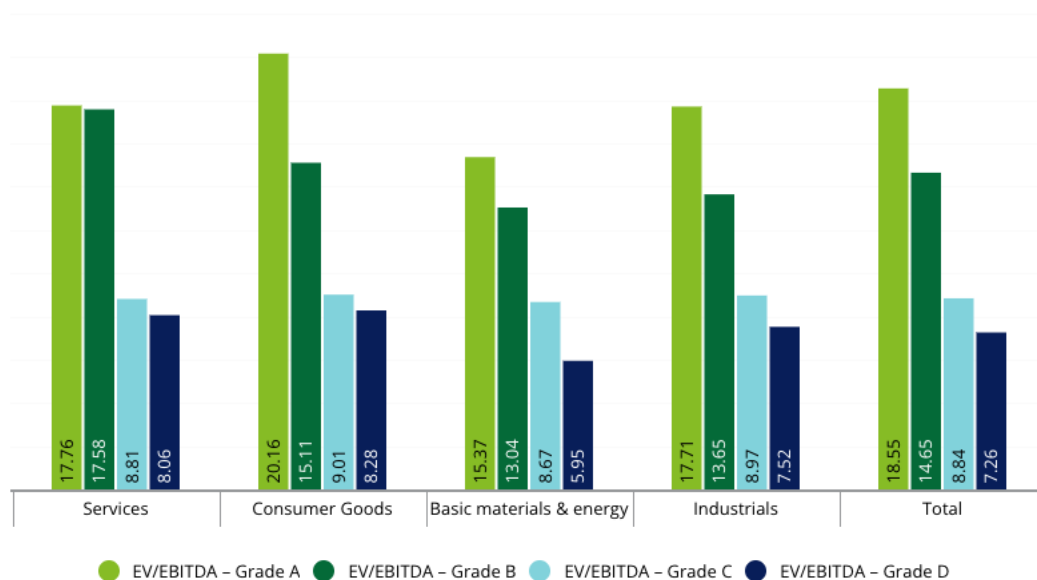


Figure 1. ESG scores (Deloitte)

## EV/EBITDA



**Figure 2. EV/EBITDA Multiple (Deloitte)**

A sample of 300 companies from four different industries observed a correlation between ESG score and EV/EBITDA multiple. According to the regression analysis, a 10 point increase in ESG score is attributed to a positive shift of 1.2 in the EV/EBITDA multiple (Deloitte). This could suggest a similar relationship seen in the results from the market-to-book analysis in Table 9. Additionally, it should be noted that although there is no concrete evidence to indicate that ESG rankings have a direct impact on a company's profitability, however, there is reason to believe that they do have an underlying influence on its external valuation.

### ESG Correlation to Profitability



The tables and figures presented above indicate that ESG metrics rankings did not have an impact on the profitability of companies in the study. In Tables 1 and 2, the ROE of companies in relation to their ESG ranking was tested, yielding a non-significant coefficient of  $-3.68e-05$ . Similarly, the relationship between company age and ESG ranking was evaluated, revealing a non-significant coefficient of  $1.36e-06$ . In order to mitigate the effects of attempting to establish a linear relationship, a median split variable was created and tested against the ROE variable in Table 3. The regression analysis suggested that the ESG rankings, when divided in a median split, demonstrated significance at the 10% level with a coefficient of 0.00069. Table 4 reverted back to the dependent ROE variable for testing against the median split ESG rankings variable, and showed a 0.00291 coefficient with a 5% significance level. This suggests that while not from profitability, ESG rankings and a company's financial performance could have an underlying relationship.

The market-to-book variable measured a firm's valuation from an internal and external perspective. Upon applying the new dependent variable in a regression with the split median ESG ranking variable, no correlation was found between the two. Reverting back to the linear variable for ESG rankings to be tested against market-to-book, a linear relationship of ESG rankings was found between firm capitalization and book value. These findings depicted a significance at the 5% level with a coefficient of 0.00811, as seen in Table 8.

The analysis suggests that ESG rankings affect the valuation of a company's internal and external value by influencing investors' decisions to invest in ESG-related regulations and strategies.

While this pattern was exhibited in valuation once, no significant indicators point to a relationship from this research. Furthermore, there were no notable positive or negative

relationships between higher ESG rankings and the younger age of companies leading to profitability, making ESG metrics a non-influential factor in determining a company's growth.

## Chapter 5

### Summary

This thesis explores the relationship between ESG rankings and metrics from Sustainalytics and companies' financial performance data. The study intended to further contribute to the broader role of sustainability in the business world and offer actionable insights for companies aiming to integrate ESG and CSR initiatives into their planning for long-term financial growth and sustainability. By collecting data sets between the financial variables of dependency and the ESG rankings of the companies, data from 2005-2019 contributed to a regression analysis that theorized a positive correlation between ESG rankings and firm profitability.

An interest in using ESG initiatives in business strategies to determine business performance and a background in securities settlements brought this study to my attention. Furthermore, reading previous theses on ESG rankings and their proposed relationship with financial growth influenced the writing of this paper.

As reflected in the results and analysis, ESG scores and time since the IPO did not positively impact younger companies' profitability. ESG exhibited no influence on the returns generated on net assets and the company's ability to generate money. Similarly, the effect of being young and having high ESG scores did not correlate to profitability either. Furthermore, through an analysis of different regressions under different functions, forms, and commands, an underlying positive correlation was linked to ESG rankings' effect on the outcome of a firm's market capitalization over book value. However, the next test run under the same constraints proved an insignificant relationship. Further evidence in previous research supported by ESG rankings affecting EV/EBITDA multiple was noted, but no significance was found with this study (Deloitte).

A takeaway from this study is that ESG rankings could affect companies but at an alternative place of financial measurement. This study has indicated that ESG rankings have a significant impact on a

company's valuation, which is consistent with previous research. However, this inference should be further explored with additional research to gain a more comprehensive understanding of this relationship. In addition, it would be beneficial to conduct regression tests with ESG rankings, age, external funding, and various financial ratios and performance metrics to understand better the interdependencies between ESG rankings and a company's economic performance.

If further research were to be conducted on the effects of ESG rankings, an analysis of external and internal valuation of a company and its relationship to shareholder inclination. An improvement would be made to the generative property of variables, creating more sufficient weights of measurement on ESG rankings and their metrics. Furthermore, financial ratios could be improved by expanding the number of variables and testing more statistical distributions. Additionally, metric data on external funding will be observed in relation to ESG rankings and market value. Previous research suggests that other variables of interdependency should be followed as being dependent on the valuation of a company.

ESG interdependencies have been researched for decades, but no underlying patterns or relationships have been observed to prove that ESGs have positively affected companies' financial performance. Complete data provides individuals with a more holistic view, creating better decision-making. Further research is intended within this area of study as ESG metrics play an essential role in how we view the ethical standards of companies and corporations and what will create the highest returns in the long run.



## Appendix A

### Variable Distribution Table

The following appendix shows the generated variables in Compustat that were used in the linear regression with high fixed effects. Below shows the statistical distribution of each variable used.

s_mean		roe						roe_winsor					
	Percentiles	Smallest				Percentiles	Smallest			Percentiles	Smallest		
<b>1%</b>	31.72621	24.09412				1%	-0.0759235	-0.0759235					
<b>5%</b>	35.29589	24.09412				5%	-0.0748985	-0.0759235					
<b>10%</b>	37.39899	24.09412	Obs	35,465	10%	-0.0163904	-0.0759235	Obs	35,465	10%	-0.0759235	Obs	35,465
<b>25%</b>	41.79012	24.09412	Sum of wgt.	35,465	25%	0.0128679	-0.0759235	Sum of wgt.	35,465	25%	-0.0759235	Sum of wgt.	35,465
<b>50%</b>	48.14815		Mean	49.58458	50%	0.0307109		Mean	0.0346146	50%	0.0307109	Mean	0.0346146
		Largest	Std. dev.	10.35586			Largest	Std. dev.	0.0484666		Largest	Std. dev.	0.0484666
<b>75%</b>	56.2386	100			75%	0.0538848	0.1441245			75%	0.1441245		
<b>90%</b>	63.9394	100	Variance	107.2439	90%	0.0998824	0.1441245	Variance	0.002349	90%	0.1441245	Variance	0.002349
<b>95%</b>	68.10417	100	Skewness	0.7027554	95%	0.1441245	0.1441245	Skewness	0.1664792	95%	0.1441245	Skewness	0.1664792
<b>99%</b>	75.32818	100	Kurtosis	3.754255	99%	0.1441245	0.1441245	Kurtosis	3.809331	99%	0.1441245	Kurtosis	3.809331
<b>age</b>					<b>roa</b>					<b>roa_winsor</b>			
	Percentiles	Smallest				Percentiles	Smallest			Percentiles	Smallest		
<b>1%</b>	1.60274	0.0493151			1%	-0.0164345	-0.0164345			1%	-0.0164345		
<b>5%</b>	3.80548	0.0520548			5%	-0.0161155	-0.0164345			5%	-0.0164345		
<b>10%</b>	5.553425	0.0547945	Obs	16,733	10%	-0.0033183	-0.0164345	Obs	35,465	10%	-0.0164345	Obs	35,465
<b>25%</b>	11.12877	0.060274	Sum of wgt.	16,733	25%	0.0034162	-0.0164345	Sum of wgt.	35,465	25%	-0.0164345	Sum of wgt.	35,465
<b>50%</b>	17.12055		Mean	17.2162	50%	0.0115658		Mean	0.0140395	50%	0.0115658	Mean	0.0140395
		Largest	Std. dev.	9.294387			Largest	Std. dev.	0.0159293		Largest	Std. dev.	0.0159293
<b>75%</b>	21.98356	73.01096			75%	0.0232407	0.0475033			75%	0.0475033		
<b>90%</b>	26.68493	73.25754	Variance	86.38563	90%	0.0386022	0.0475033	Variance	0.0002537	90%	0.0475033	Variance	0.0002537
<b>95%</b>	31.03014	73.50685	Skewness	1.188988	95%	0.0475033	0.0475033	Skewness	0.3704369	95%	0.0475033	Skewness	0.3704369
<b>99%</b>	50.03288	73.7589	Kurtosis	6.728126	99%	0.0475033	0.0475033	Kurtosis	2.795628	99%	0.0475033	Kurtosis	2.795628
<b>age_s</b>	mean				<b>market_to_book</b>					<b>market_to_book_winsor</b>			
	Percentiles	Smallest				Percentiles	Smallest			Percentiles	Smallest		

1%	67.77544	2.359349			1%	1.173338	1.173338			1%	1.173338	1.173338			
5%	162.1462	2.645935			5%	1.174127	1.173338			5%	1.174127	1.173338			
10%	240.5707	2.66435	Obs	16,733	10%	1.382478	1.173338	Obs	35,465	10%	1.382478	1.173338	Obs	35,465	
25%	491.6406	2.711196	Sum of wgt.	16,733	25%	1.819466	1.173338	Sum of wgt.	35,465	25%	1.819466	1.173338	Sum of wgt.	35,465	
50%	771.2734		Mean	830.09	50%	2.477563		Mean	3.488407	50%	2.477563		Mean	3.488407	
			Largest	Std. dev.	536.1843			Largest	Std. dev.	2.624285			Largest	Std. dev.	2.624285
75%	1050.68	4906.987			75%	3.823149	10.75335			75%	3.823149	10.75335			
90%	1366.491	4958.096	Variance	287493.6	90%	8.156486	10.75335	Variance	6.886872	90%	8.156486	10.75335	Variance	6.886872	
95%	1716.726	4958.237	Skewness	2.15196	95%	10.75335	10.75335	Skewness	1.67588	95%	10.75335	10.75335	Skewness	1.67588	
99%	2892.158	4969.665	Kurtosis	12.51669	99%	10.75335	10.75335	Kurtosis	4.751453	99%	10.75335	10.75335	Kurtosis	4.751453	
<b>In_ag</b>	<b>e</b>				<b>In_</b>	<b>sale</b>				<b>In_sale_wins</b>	<b>or</b>				
	Percentiles	Smallest				Percentiles	Smallest			Percentiles	Smallest				
1%	0.4717145	-3.009526			1%	4.930228	4.930228			1%	4.930228	4.930228			
5%	1.336442	-2.955458			5%	4.935452	4.930228			5%	4.935452	4.930228			
10%	1.714415	-2.904165	Obs	16,733	10%	5.396868	4.930228	Obs	35,465	10%	5.396868	4.930228	Obs	35,465	
25%	2.409533	-2.808855	Sum of wgt.	16,733	25%	6.174598	4.930228	Sum of wgt.	35,465	25%	6.174598	4.930228	Sum of wgt.	35,465	
50%	2.840279		Mean	2.666695	50%	7.048398		Mean	7.12035	50%	7.048398		Mean	7.12035	
			Largest	Std. dev.	0.6802091			Largest	Std. dev.	1.279367			Largest	Std. dev.	1.279367
75%	3.090295	4.290609			75%	8.0227	9.569273			75%	8.0227	9.569273			
90%	3.284099	4.293981	Variance	0.4626844	90%	9.021598	9.569273	Variance	1.636779	90%	9.021598	9.569273	Variance	1.636779	
95%	3.434959	4.297379	Skewness	-1.461309	95%	9.569273	9.569273	Skewness	0.18802	95%	9.569273	9.569273	Skewness	0.18802	
99%	3.91268	4.300802	Kurtosis	7.056249	99%	9.569273	9.569273	Kurtosis	2.251958	99%	9.569273	9.569273	Kurtosis	2.251958	
<b>young</b>					<b>In_</b>	<b>assets</b>				<b>In_assets_wi</b>	<b>nsor</b>				
	Percentiles	Smallest				Percentiles	Smallest			Percentiles	Smallest				
1%	0	0			1%	6.993376	6.993376			1%	6.993376	6.993376			
5%	0	0			5%	6.996929	6.993376			5%	6.996929	6.993376			
10%	0	0	Obs	16,733	10%	7.453616	6.993376	Obs	35,465	10%	7.453616	6.993376	Obs	35,465	
25%	0	0	Sum of wgt.	16,733	25%	8.184244	6.993376	Sum of wgt.	35,465	25%	8.184244	6.993376	Sum of wgt.	35,465	
50%	0		Mean	0.0827108	50%	9.025083		Mean	9.190916	50%	9.025083		Mean	9.190916	
			Largest	Std. dev.	0.2754528			Largest	Std. dev.	1.355051			Largest	Std. dev.	1.355051
75%	0	1			75%	10.12619	11.9104			75%	10.12619	11.9104			
90%	0	1	Variance	0.0758743	90%	11.21709	11.9104	Variance	1.836164	90%	11.21709	11.9104	Variance	1.836164	
95%	1	1	Skewness	3.029932	95%	11.9104	11.9104	Skewness	0.3469554	95%	11.9104	11.9104	Skewness	0.3469554	
99%	1	1	Kurtosis	10.18049	99%	11.9104	11.9104	Kurtosis	2.307921	99%	11.9104	11.9104	Kurtosis	2.307921	

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