Sustainability and Performance in the German Equity Market

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Abstract: There have been numerous studies devoted to finding the relationship between corporate sustainability and market performance in the US. Outside of the US, however, research on this topic dwindles. This paper focuses on Germany, examining the relationship between sustainability and market return for firms in the German Prime Standard. I find that there is indeed a statistically significant positive relationship between corporate sustainability and market performance in Germany, which, coupled with Germany's unique regulatory structure and cultural focus on sustainability, establishes a strong case for German corporate sustainability and sustainable investing.

I.   **Introduction**

In the context of capital longevity, sustainability helps to ensure that an investment or venture maintains consistent long-term value (Eccles et al, 2012). A firm that does not treat its employees right will not be able to sustain morale and avoid public outrage and scandal for long. A firm that consistently abuses the environment will eventually find itself on the wrong side of the ever-evolving environmental regulations, rules, and hefty fines. As the term itself implies, sustainability offers investors a promise of longevity and durable quality.

There are various ways to measure sustainability in investment[1]. One metric that has garnered a lot of attention as of late has been ESG investing. ESG investing can take multiple forms, but at its most basic level, it means considering Environmental, Social, and Governance issues of investments as a pre-investment screen (Giese et al., 2019). ESG investing has been especially popularized by the 2006 *United Nations Principles of Responsible Investment*, which is an investor pledge to consider ESG issues as an integral part of the investment evaluation process[2]. As of this date, an estimated $30 trillion of capital is allocated worldwide towards ESG-conscious strategies[3], with many more in other forms of sustainable investing.

There are many skeptics of the cult of sustainability and sustainable investing, though. Many investors believe that it is not possible to focus on sustainability without sacrificing at least a small share of performance[4]. However, these critiques are mostly unfounded. Hundreds of academic and industry studies have shown that it is possible to sustain competitive investing performance while screening for sustainability (Choi and Wang, 2009; Lyn and Zychowitz,

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[1] https://www.barrons.com/articles/the-abcs-of-esg-how-to-parse-all-the-metrics-for-measuring-sustainability-51561159677
[2] https://www.unpri.org/
[3] https://www.cnbc.com/2019/12/14/your-complete-guide-to-socially-responsible-investing.html
[4] https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/from-why-to-why-not-sustainable-investing-as-the-new-normal

2010; Wu, 2006). In fact, many of these studies have actually shown that sustainability is positively correlated with performance—i.e. sustainable investments beat the market (Godfrey et al., 2009; Orlitzky et al., 2003; Fulton et al, 2012).

In this paper, I will add to the existing literature by researching the relationship between sustainability and performance in the German equity market. The structure of the paper is as follows. First, I will outline motivating theory behind the subject, review relevant literature of previous studies, and detail my theory of equations based on the aforementioned literature. I will then discuss my data and the results found, and conclude with closing thoughts about potential applications for investors and managers.

II. __Motivating Theory__

Neoclassical economics has seen the corporation emerge as a key player in the free market (Veblen, 1904; Hovenkamp, 2009). Management theories like the shareholder theory posit that a corporation's primary goal should be to maximize returns for shareholders (Friedman, 1970)[5]; everything tangential to that is misguided capital at best and downright dividend theft at worst[6]. These theories are well grounded in classical capitalist models and run concurrently to theories arguing that the wellbeing of society at large is increased when firms operate at full profit-maximization mode (Abbot and Monsen, 1979).

However, it is hard to take an objective look at the historical evolution and activities of corporations and argue that their profit-maximizing activities have generally aligned with the interests of society. Corporate history of the last century is littered with countless examples of

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[5] https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html

[6] (see: *Dodge Brothers v. Ford Motor Company, 170 N.W. 668*)

corporations who, in their quest for shareholder profits, have created abundant societal issues—and then promptly absolved themselves of all responsibility, leaving it to the government or larger community to clean up after their messes[7]. In response to these concerns, a different theory of the firm has emerged: Stakeholder Theory (Freeman, 1984). Stakeholder theory posits that a firm has many stakeholders, both internal and external. With varying amounts of power, there are inevitably some stakeholders who tend to get pushed to the wayside; however, that does not mean that they do not exist, or that a firm is not still indebted to them. Thus, the shareholders are only one of many stakeholders that a firm should consider in its decision making.

While the two theories—shareholder theory and stakeholder theory—may seem like two radically different ideas, many scholars have attempted to reconcile them by showing that enhanced stakeholder responsibility ultimately leads to better financial performance and thus better returns for shareholders (Godfrey et al., 2009; Orlitzky et al., 2003; Fulton et al, 2012). This relationship has been so thoroughly researched, in fact, that Harvard Business School even features a course called *Creating Shared Value: Competitive Advantage Through Social Impact*[8]. In an article in the Harvard Business Review, Mark Kramer, one of the instructors of the course, details multiple examples of business creating an economic and financial edge by developing socially and/or environmentally responsible strategies. The opposite is true, too, he says, detailing accounts of business performing poorly due to lax sustainability practices—such as, for example, in the cases of Volkswagen or Valeant Pharmaceuticals. "We must censure those CEOs

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[7] See, for example: https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html, https://www.bbc.com/news/business-34324772, https://fortune.com/2015/10/31/valeant-scandal/
[8] https://www.exed.hbs.edu/creating-shared-value/

who fail to take social consequences into account and, as a result, harm their shareholders' returns", he says[9].

Arguably, this censureship has been happening. Granted a voice through social media, the general public has found itself with more power than previously realized. Repercussions to a corporation that begrudges the masses can be swift and painful[10]. In this current media culture, the link between satisfying external stakeholders and placating shareholders becomes especially obvious (Orlitzky et al, 2003). In a sense, the public has effectively taken on the role of a quasi-social regulator.

While in the US these regulating forces have largely been left to the free market, this issue is much more structurally regulated in Germany. There are many regulations in Germany requiring disclosure of sustainability information by corporations[11]. Since the 2008 financial crisis these regulations have only gotten stricter, requiring firms to report much more than is generally required by firms in the US (Velte, 2016; Velte, 2017). Many German firms publicize stand-alone sustainability reports; in fact, this is considered mandatory for larger German firms (Hoffmann et al., 2018). The disclosures by German firms largely follow the guidelines by the German Sustainability Code which consider various stakeholder concerns[12]. German firms are also much more involved in the International Integrated Reporting Council (IIRC)[13], which promotes integrated corporate reporting of financial and nonfinancial disclosures (Eccles and Krzus, 2010; Velte and Stawinoga, 2016). Additionally, the culture in Germany is much more sustainability focused, with active green and social movements, and even a large political party

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[9] https://hbr.org/2019/01/the-backlash-to-larry-finks-letter-shows-how-far-business-has-to-go-on-social-responsibility
[10] See, for example:
https://www.cbsnews.com/news/boycott-uber-2019-faces-boycott-threats-after-ceo-calls-jamal-khashoggis-murder-a-mistake/
[11] See: German Commercial Law, section 289 par 3
[12] https://www.deutscher-nachhaltigkeitskodex.de/en-gb/
[13] https://integratedreporting.org/

focused on sustainability (*die Grünen*). This culture is top-down motivated as well, as the government, too, is very actively involved in sustainability movements. The German *Energiewende*, for example, is a large-scale meticulous program designed to transform Germany's energy system and switch its entire energy supply to renewables[14]. Ongoing projects to completely phase out nuclear and coal energy, for instance, fall under this detailed plan[15]. As the public and the government raise the country's bar for sustainability, corporations must adjust. These unique regulatory, cultural, and governmental factors make Germany an interesting subject for an analysis of corporate sustainability and sustainable investing.

III.   Literature Review

The relationship between sustainability and financial performance in the US markets has been rigorously tested. Academics have produced hundreds of studies on the topic (Margolis and Walsh, 2003; Landler and Nair, 2009; Choi and Wang, 2009; Lyn and Zychowitz, 2010); several researchers have even compiled many of these studies into large meta-studies, summarizing previous results (Orlitzky et al., 2003; Wu, 2006; Fulton et al., 2012). Overwhelmingly, researchers have found that there exists a positive and statistically significant relationship between sustainability and performance (Godfrey et al., 2009; Orlitzky et al., 2003; Fulton et al, 2012). Divergence in results is often attributable to the definition and operationalization of variables. Earlier studies overwhelmingly use Corporate Social Responsibility (CSR) measurements to account for sustainability (Alexander and Bucholz, 1978; Orlitzky et al., 2003), while in recent years using ESG as a metric has become more common (Fulton et al., 2012).

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[14] http://www.energiewende-global.com/en
[15] https://www.bbc.com/news/world-europe-51133534

Performance usually gets operationalized as either market performance—such as measures of stock return, Tobin's Q, or Dividend Yield—or accounting performance—such as ROA, ROE, or Cost of Capital, which yield different results (Fulton et al., 2012). Researchers have also used a combination of various control factors, such as firm size, risk, or sector (Scholtens and Zhou, 2008; Orlitzky et al., 2003), and some researchers have also studied the specific effects of sustainability on these and various other control factors (Giese et al, 2019). A 2012 meta-analysis by Fulton et al., for example, finds that 100% of the over 150 studies surveyed found a negative significant relationship between sustainability and firm cost of capital. A 2019 MSCI study by Giese et al. goes one step further, testing the various channels by which ESG information is transmitted to stock performance.

There has also been a lot of research that has examined the disaggregated effects of various components of sustainability on performance. A paper by Blackwell et al. examines the effect of corporate diversity on company performance, and finds that advancing corporate diversity ultimately drives innovation and lends firms a competitive edge[16]. A 2012 meta-study by Fulton et al. finds that the most researched part of ESG tends to be the governance aspect, and that researchers generally find it leads to outperformance on a firm basis. A 1996 paper by Hart and Ahuja titled *Does it Pay to be Green?* found that reducing carbon emissions in one year has a significant positive effect on the corporate bottom line the following year.

US markets can differ significantly from other international markets; thus, it is important to not take the results of the US studies as necessarily holding true for other markets as well. In terms of this topic, there has been limited research outside the US. Some studies take an international approach; a 2002 study on European listed firms, for instance, finds a significant

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[16] https://www.fsg.org/publications/competitive-advantage-racial-equity

positive relationship between environmental sustainability and market performance (Schröder et al., 2002), and a 2016 study examining the relationship between ESG and firm risk in European markets finds a significant negative relationship (Sassen et al., 2016). In terms of our market of interest, Germany, one researcher particularly active over the past few years has been Patrik Velte. Velte has written several papers on corporate governance and sustainability in Germany, and has generally found a positive relationship between ESG and performance across German markets (Velte 2017; Nuber, Velte, and Hörisch, 2019). However, he largely studies the effects of ESG on accounting performance, and operationalizes market performance as a simplified version of Tobin's Q; I aim to add to the body of literature by studying the relationship between ESG and total shareholder return in Germany.

IV. <u>Theory of Equations</u>

To maintain consistency with previous research (Velte, 2017; Nuber, Velte, and Hörisch, 2019), I will be operationalizing sustainability by sourcing data from the Thomson Reuters Asset4 ESG database. Asset4 creates its ESG ratings by measuring various environmental, social, and governance pillars of a firm, and equal-weighting the individual pillar scores. This rating thus reflects a balanced view of a firm's overall ESG performance. Asset4 ESG scores range from 0 (lowest) to 100 (highest) (Thomson Reuters, 2015).

Previous research attempting to find a relationship between ESG and market performance in Germany (Velte 2017; Nuber, Velte, and Hörisch, 2019) use a simplified version of Tobin's Q—i.e. market value divided by book value—as a proxy for market performance. This variable, otherwise known as simple Q, is an imperfect measure of market return (Bartlett and Partnoy,

2019). Since my research is geared towards stock market investors, I aim to use a more direct variable to measure return. Thus, I will be operationalizing financial performance by looking at the natural log of yearly total return (TR) for each security. TR represents stock price plus dividends, assuming that dividends are reinvested upon receipt.

Based on previous research (Fischer and Sawczyn, 2013; Choi and Wang, 2009; Velte, 2017), I will be using the following controls in my regressions. Since risk metrics have been shown to be correlated with both ESG and return (Orlitzky and Benjamin 2001; Godfrey et al. 2009), I will incorporate measures of systematic and unsystematic risk into my regressions. Beta, the systematic risk of a stock to the overall market—calculated in relation to the local market, in this case the German equity universe—will be used as a proxy for systematic risk, while unsystematic firm risk will be operationalized as total debt divided by total assets (King and Lenox 2001; Nelling and Webb 2009). Size is another factor to consider. A 2003 study by the *Deutsches Aktieninstitut* found that sustainability concerns are more highly valued at large companies (Kachel and von Flotow, 2003); additionally, research has shown that size is related to financial return (Orlitzky et al., 2003, Wu, 2006). I will thus be including a variable of total assets, logged since size often brings economies of scale or scope (Roberts and Dowling, 2002; Velte 2017). Previous research (Clarkson et al., 2008; Fulton et al, 2012) has shown that high measures of free cash flow are positively linked to financial performance as well as to ESG performance; thus, I will be including a measure of cash flow, operationalized as net cash flow divided by sales (Nuber, Velte, and Hörisch, 2019). Fischer and Sawczyn (2013) find a relationship between innovation and ESG and return; I will thus be including innovation,

operationalized as total R&D expenses divided by sales, into my regression (Hart and Ahuja, 1996). Figure I lists and defines the variables used.

A prime concern of operationalization in this area of research are temporal considerations. There are three main theories to consider (Fischer and Sawczyn, 2013):

1. The Good Management Theory

The good management theory proposes that a firm with high sustainability ranking will ultimately be managed better, and good management translates to higher profits. Thus, high ESG must come before the resulting increase in TR will be observed. A temporal lag of at least one year is necessary in order to observe this relationship. Thus:

Equation I: $TR_t = \alpha + \beta_1\, ESG_{(t-1)} + \beta_2\, Beta_t + \beta_3\, Debt_t + \beta_4\, Size_t + \beta_5\, CF_t + \beta_6\, R\&D_t + \varepsilon$

2. The Slack Resources Theory

Many studies look for a relationship between ESG and TR, find one, and then conclude it is due to the good management theory. However, the slack resources theory proposes that the causality might be reversed. In this theory, sustainability investment is seen as a luxury good that a firm invests in only if it has slack resources to do so. To test this theory, the regression equation must be reversed and a temporal lag in the opposite direction must be applied. Thus:

Equation II: $ESG_{t+1} = \alpha + \beta_1\, TR_t + \beta_2\, Beta_t + \beta_3\, Size_t + \beta_4\, Debt_t + \beta_5\, CF_t + \beta_6\, R\&D_t + \varepsilon$

3. The Controversy Theory

While the Good Management Theory and the Slack Resources Theory are the two most common theories, I propose a third one: the Controversy Theory. As outlined in section II above, since sustainability has become more of a hot-button issue in recent years, the public, with the help of the media, has been able to censure corporations for sustainability controversies more immediately. This is especially true in Germany, where there is, as mentioned above, a stronger cultural focus on sustainability; sustainability controversies can thus garner outrage quickly and in turn significantly affect a firm's share price. Consequently, while in previous years a temporal lag has been more necessary in order to observe the relationship between ESG and TR, I believe that in the current-day media culture it is also worth studying the more short-term effects of sustainability on firm performance. Thus:

Equation III: $TR_t = \alpha + \beta_1\, ESG_t + \beta_2\, Beta_t + \beta_3\, Size_t + \beta_4\, Debt_t + \beta_5\, CF_t + \beta_6\, R\&D_t + \varepsilon$

Based on the above literature and theory, my hypothesis states:

H_1: there is a bidirectional simultaneous and time-lagged relationship between ESG and TR.

V. **Data**

My original sample includes the 110 largest German firms in all sectors whose securities make up the DAX, TecDAX, and MDAX, which together comprise over 95% of the total market capitalization of German firms. The sample can thus be viewed as a representative slice of the

German equity universe. Following previous research (Velte, 2019) I decided to only look at data from 2008 and on, since that is when sustainability reporting standards were reformed in Europe and ESG disclosures started becoming more standardized in Germany. Given that the data is sourced from Asset4, there were some firms which did not have complete ESG data for all the years. After dropping all of those data points, as well as dropping firms that are subsidiaries of other firms, the total sample consists of 490 firm-year observations. Figure II provides an overview of the final sample. Figure III lists descriptive statistics for all variables used in the regressions. Figure IV outlines the Pearson correlation matrix for all of the variables.

VI.   **Results**

After significant Lagrange multiplier tests, F tests for overall significance, and Hausman tests, it was determined that dynamic panel data regression with firm and time fixed effects would be most appropriate for the data. Regression results for all three equations can be found in table V. The relationship between ESG and TR for all three equations are positive and statistically significant, showing that the relationship is indeed, as hypothesised, bidirectional, simultaneous, and time-lagged. More specifically, the results for Equation I show that a one-point increase in ESG score (out of 100 possible points) in year t-1 is associated with a 2.5% increase in TR in the following year, in line with the Good Management Theory. The results for Equation II show that a 1% increase in TR in year t is associated with a 1.77 increase in ESG score in year t+1, in line with the Slack Resources Theory. The results for Equation III show that a one-point increase in ESG score in year t is associated with a 1.4% increase in TR in the same year, in line with the Controversy Theory.

VII.   <u>**Discussion**</u>

This study focuses on the relationship between ESG performance and TR for firms in the German Prime Standard (DAX, TecDAX, MDAX). The results show, as hypothesised, that there is a bidirectional simultaneous and time-lagged relationship between ESG and TR. These findings show that in the German equity universe, ESG can be used as a reliable indicator of a quality stock which yields above-market risk-adjusted return.

A primary limitation of this analysis is the ESG rating source. Since the Asset4 data is for the most part a black box, it is hard to be able to tell exactly how the ratings are produced. This adds an element of uncertainty to the data. There is much inter-rating variation in the ESG rating universe (Gibson et al., 2019), which makes it difficult to trust one provider in particular. As this industry matures and raters are consolidated, this variation will grow smaller; for the meantime, however, investors should take several rating sources into account when analyzing ESG scores[17].

Another thing to consider with ESG ratings is the potential of greenwashing by firms. Greenwashing occurs when firms, as a PR move, announce large environmental, social, and governance improvals, but in actuality do not do much to improve their sustainability. As the value of sustainability has risen, greenwashing has become increasingly more rampant. Investors should be careful when they analyze ESG components to account for greenwashing.

Finally, a meta-critique on the analysis of sustainability and performance in and of itself. Margolis and Walsh, in their 2003 paper *Misery Loves Companies*, say that we approach companies to solve the misery of the world; sustainability of a company, then, is a measure of how much good the company gives back to society. I believe this analysis is lacking, however.

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[17] https://sustainability.com/rate-the-raters/

Misery doesn't love companies; rather, companies love misery. We measure sustainability to keep companies accountable for the negative fallout of their profit-seeking actions, not to reward them for the benefits they accrue onto the universe. Sustainability metrics thus don't measure the net good a company produces, but rather the net bad it doesn't produce. In this sense, sustainability is an important metric to consider as part of the investment underwriting process regardless of its relationship with financial performance. A responsible investor should examine the sustainability of a potential investment regardless of its relationship with financial return; the positive relationship with TR found in this analysis is a bonus, but it should not necessarily be a prerequisite for sustainable investing.

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Dependent Variable	Explanation
TR	Natural logarithm of total return of stock, assuming dividends are reinvested when received
Independent Variable	*Explanation*
ESG	Environmental, Social, and Governance score calculated by Thomson Reuters Asset4 database
Control Variables	*Explanation*
Beta	Beta factor, calculated using local index (systematic firm risk)
Debt	Total debt/total assets (unsystematic firm risk)
Size	Natual logarithm of total assets
CF	(Net Cash Flow)/(Sales)*100
R&D	(R&D expenses)/(Sales)*100

Table I.
Variables

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Listed German companies in DAX, TecDAX, MDAX	110	110	110	110	110	110	110	110	110	110
Final Sample	39	39	40	47	47	48	56	58	58	58

Table II.
Survey sample

	Mean	SD	Minimum	Maximum
Dependent Variable				
TR	6.528	1.655	0.554	10.056
Independent Variable				
ESG	65.048	17.265	18	95.57
Control Variables				
Beta	0.926	0.39	-0.733	2.223
Debt	23.745	14.703	0	71.97
Size	16.111	1.698	11.051	19.837
CF	11.939	13.133	-119.76	67.82
R&D	0.661	1.769	-4.605	5.107

Table III.
Descriptive Statistics

Variables	TR	ESG	Beta	Debt	Size	CF	R&D
TR	1						
ESG	0.238*	1					
Beta	0.062	0.035	1				
Debt	-0.074	0.04	0.002	1			
Size	0.338*	0.5*	0.041	0.155*	1		
CF	-0.064	-0.047	-0.037	0.332*	0.094*	1	
R&D	-0.13*	-0.04	-0.04	-0.239*	-0.26*	-0.689*	1

Table IV.
Pearson Correlation Matrix

Variables	Correlation Coefficient (Standard Error)		
	Equation I	**Equation II**	**Equation III**
	TR_t	ESG_{t+1}	TR_t
TR_t	-	1.771** (0.819)	-
ESG_t	-	-	0.014*** (0.003)
ESG_{t-1}	0.025*** (0.004)	-	-
$Beta_t$	-0.137 (0.107)	-0.722 (1.44)	-0.226** (0.088)
$Debt_t$	-0.023*** (0.004)	-0.063 (0.062)	-0.02*** (0.004)
$Size_t$	0.724*** (0.066)	3.511*** (1.165)	0.755*** (0.062)
CF_t	0.01** (0.004)	0.024 (0.076)	0.012** (0.005)
$R\&D_t$	-0.001 (0.006)	0.003 (0.099)	-0.001 (0.006)
R^2 (adj.)	0.126	0.171	0.127
Observations	359	359	406

Table V.
Regression Results