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Sustainability Initiatives and Failure Risk of a Firm: How Are They Linked?

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Abstract: This paper studies the link between corporate sustainability and failure risk. The two competing hypotheses rely on the controversies in the theoretical and empirical literature linking sustainability and financial performance. Analysis of a sample of Estonian non-listed companies of all sizes indicates that firms engaged in more sustainability initiatives exhibit a higher risk of failure in the short run. The results remain robust for different sustainability initiatives and periods, while being exclusively determined by firms active locally, not on foreign markets.

Keywords: corporate sustainability; environmental; social; failure risk; financial performance

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1. Introduction

In the past decades, a myriad of studies have been conducted about the interconnection of corporate sustainability (CS) and financial performance (FP) (Bătae et al. 2021; Akben-Selcuk 2019; Alshehhi et al. 2018; Friede et al. 2015; Orlitzky et al. 2003; Margolis and Walsh 2003), with substantially varying results. Such diversity partly originates from the lack of theoretical consensus on whether sustainability initiatives should enhance performance (e.g., Rodriguez-Fernandez 2016; Yu and Zhao 2015; Baird et al. 2012; Margolis and Walsh 2003). The theoretical explanations have varied from applying prominent frameworks such as agency or stakeholder theory (e.g., Baird et al. 2012), to more practical explanations by means of financial theory (e.g., Peylo and Schaltteger 2014). While various proxies of FP have been applied to test the association with CS empirically, the extant literature is relatively quiet about the connection between CS and failure risk (FR) as a complex indicator of FP. Still, very recent theorizations exist in this domain (e.g., Amankwah-Amoah and Syllias 2020).

During the recent decade, various studies have looked at the link of CS and FP among large and listed companies. However, the worldwide trend to be greener and pay more attention to the sustainability of society has spread not only in the latter firm segment, but also among the unlisted micro-, small- and medium-sized enterprises (SMEs). Most of the empirical studies have focused on Western countries, while studies about CS activities and practices in Eastern Europe have remained in a considerable minority (Horváth et al. 2017a).

Relying on the theoretical fragmentation and research mostly on the example of certain firm types in specific environments, this study aims to provide empirical proof of how different sustainability initiatives are linked with firm failure risk. For that purpose, we apply a sample of unlisted firms of all sizes from the population of Estonian firms, for which information about environmental and social sustainability initiatives has been collected from their websites based on a known taxonomy. Firm failure risk is portrayed with a universal robust model, which enables predicting financial resilience with an acceptably high accuracy. The results provide an answer to the theoretical postulate by Amankwah-Amoah and Syllias (2020) in the short run context and oppose the mainstream empirical findings on the interconnection of FP and CS.

2. Literature Review

2.1. Theories about the Link of Corporate Sustainability, Performance and Failure Risk

Various studies investigating the relationship between financial performance (FP) and corporate sustainability (CS) have relied on organizational theories or applied some business-related logic. Probably the most commonly used organizational theory applied in relevant studies is stakeholder theory (Bătae et al. 2021; Akben-Selcuk 2019; Rodriguez-Fernandez 2016; Baird et al. 2012; Tagesson et al. 2009), which provides the general framework between CS and FP, taking into consideration the interests of organizations' various stakeholders. The implication of CS on FP portrayed by the stakeholder theory is not straightforward, although a positive effect has been assumed in the long run in case all stakeholders' interests have been met (Baird et al. 2012). Another prominent theory, the resource-based view, has similarly suggested that the link between CS and FP is presumably positive (Bătae et al. 2021; Akben-Selcuk 2019; Friede et al. 2015; Orlitzky et al. 2003; Margolis and Walsh 2003). In turn, the studies describing this phenomenon through the lens of agency theory (Akben-Selcuk 2019; Lee and Lee 2019; Krüger 2015) are skeptical about the clearly positive nature of the link, pointing out that CEOs might be overinvesting in CS for the sake of their own reputation, rather than for the benefit of a company. The latter has also been referred to as the value-destroying theory (Yu and Zhao 2015). In addition, Bénabou and Tirole (2010), in their discussion on the benefits, costs and limits of socially responsible behavior, consider the possibility of a short term bias, i.e., the incentives of managers drive them to maximize short run profit rather than focusing on the long run and broader perspective. In addition, in the context of developing and emerging economies, investors could be more concerned about FP than long term sustainability and corporate responsibility (Akben-Selcuk 2019; Aras et al. 2010). Indeed, besides the traditional selection of views about the link of CS and FP, an explanation in both theoretical and empirical literature of finance is that sustainability investments might just not pay off, especially when made in excess amounts (e.g., Peylo and Schaltteger 2014).

The empirical validation of the above-mentioned underlying theories seems to reveal conflicting findings, i.e., the relationship is either positive, neutral or negative. The variation in findings should also be contextualized in respect to which measures of FP and CS were used (Margolis and Walsh 2003), but also which other components of the study design (including statistical methods and population of firms) were applied. For instance, Ye et al. (2021), based on the review of earlier study designs, outlined the complexity of the interconnection of the two phenomena, i.e., FP and CS. Still, positive associations between CS and FP seem to dominate (Bătae et al. 2021; Akben-Selcuk 2019; Rodriguez-Fernandez 2016; Yu and Zhao 2015; Tagesson et al. 2009). The positive link explained that more CS leads to better FP, either reflected through market or accounting-based measures. On the other hand, some studies found the connection to be only partly positive (Cho et al. 2019), neutral (Nelling and Webb 2009) or even negative (Bătae et al. 2021; Krüger 2015; Moore 2001). Baird et al. (2012), for instance, found substantial variation in the effect directions through different industries. Another important aspect is that different CS initiatives have led to varying results for the same firms implementing them (see, e.g., the empirical results in Han et al. 2016; Bătae et al. 2021).

However, as already referenced above, another important question is which timeframe researchers are considering, namely whether the positive effect of CS is observable in the short and/or long run. Generally, in the long run, there are higher expectations about the positive effect, and in the short run, the effect could be negative (Aras et al. 2010; Bénabou and Tirole 2010) or neutral (Nelling and Webb 2009) as well. There is extant empirical evidence showing a negative effect in the short run, which turns positive in the course of time (e.g., Kuo et al. 2021).

The previous periodization logic has been adopted by theories linking CS and failure risk (FR) as well. A recent theoretical conceptualization by Amankwah-Amoah and Syllias (2020) postulated that in the short run, there are potential negative effects of environmental initiatives, and thus, they will increase the risk of business failure, while in the long run,

the effect is, in turn, positive. The latter relies on the inherent interconnection of FP and FR. Since the first multivariate failure prediction model by Altman (1968), such forecast tools have usually included FP measures as predictors (e.g., Dimitras et al. 1996), while performance decline has been found both theoretically and empirically occurring in failing firms (Lukason and Laitinen 2019). Annual and accumulated profitability, liquidity and solvency have historically been among the most common predictors, whereas lower values increase failure risk (Altman et al. 2017), i.e., make a firm less financially resilient. The latter is logically motivated by mounting losses and drainage from liquid assets as a consequence (Beaver 1966; Scott 1981). As CS initiatives demand investments and/or increase costs but the positive effects of those initiatives have not yet manifested (i.e., translated into improvement in performance), the probable short term outcome is poorer FP and derived from that, higher FR as well.

2.2. Specific Empirical Findings through the Lens of Meta-Studies

As extensive analyses of past empirical findings about the interconnection of CS and FP have been conducted in the form of meta-analyses (Alshehhi et al. 2018; Friede et al. 2015; Margolis and Walsh 2003; Orlitzky et al. 2003), this section relies on those studies rather than providing a track of individual empirical papers. The meta-analyses summarizing the findings of previous empirical articles (see Table 1) mainly suggest that the relation between CS and FP is positive (Alshehhi et al. 2018; Friede et al. 2015; Orlitzky et al. 2003), while a remarkable share of neutral and negative associations exists as well (Margolis and Walsh 2003).

Table 1. Overview of meta-analyses on the corporate sustainability (CS) and financial performance (FP) relationship.

Author and Year	Number of Studies	FP Instrument	Nature of CS and FP Relation	Remarks
Alshehhi et al. 2018	132	Accounting and market based	Positive (78%)	Mostly a positive relationship, while some studies report a negative, mixed or no significant relationship. The variation is explained by the usage of different research methodologies.
Friede et al. 2015	1902	Accounting and market based	Positive (90%)	Social aspects correlate with FP more strongly than environmental aspects.
Margolis and Walsh 2003	127	Accounting and market based	Positive (50%)	Focuses only on social performance. Link between social performance and FP has mostly a positive/slightly positive and to lesser extent neutral or negative effect. Nature of the link is context dependent.
Orlitzky et al. 2003	52	Accounting and market based	Positive correlation, bidirectional	Social performance has higher correlation than environmental performance.

The focus of meta-studies has been diverse, highlighting the correlation of either the social, environmental, economic or some other dimensions of CS with FP. The study by Alshehhi et al. (2018) looked at three sustainability dimensions (environmental, social and economic) together and found a quite high 78% positive effect on FP over all studies. Similarly, Friede et al. (2015) reported based on an extensive review of previous studies a very high share (namely 90%) of positive effects of social, environmental and governance

CS dimensions on FP. The study by Margolis and Walsh (2003) focusing on social dimension's effects on FP concluded that the relationship could be positive, neutral, negative or insignificant, depending on the context. Orlitzky et al. (2003) applied both the environmental and social dimensions, outlining that social CS had a higher positive correlation with FP than environmental CS. Therefore, despite the dominant positive effect, the available empirical literature still lacks a final consensus on how FP and CS are interlinked (including differences in the studied timeframe), and thus, it is logical to assume the same for the empirically unstudied linkage of CS and FR, as the latter can be viewed as a complex indicator of FP.

2.3. Competing Hypotheses

The track of theoretical and empirical literature in earlier sections of the paper provides controversial foundations for whether firms with (more) sustainability initiatives could witness higher or lower failure risk. One strand of research saw CS initiatives mainly to improve FP (e.g., Orlitzky et al. 2003; Bătae et al. 2021) and derived from that also lower FR, while in turn, contrary propositions exist either focusing directly on the association of CS and FR (Amankwah-Amoah and Syllias 2020) or viewing the interrelation of CS and FP (Moore 2001; Bénabou and Tirole 2010). The latter fragmentation could be contingent on which exact study designs were applied in respective research (e.g., Ye et al. 2021; Sardana et al. 2020; Peylo and Schaltteger 2014; Lawrence et al. 2006). Still, in empirical research, more evidence has been found about the positive association of CS and FP (see, e.g., Friede et al. 2015 for the list of relevant studies), while to the knowledge of the authors no profound empirical research is available about the link between different CS initiatives and FR. Relying on the aforementioned motivation, we postulate two competing hypotheses, of which only one can be accepted:

H1a. *Firms with more CS initiatives are at a higher risk of failure in the short run.*

H1b. *Firms with more CS initiatives are at a lower risk of failure in the short run.*

Several considerations concerning the hypotheses should be pointed out. First, the application of a single hypothesis (postulating either a negative or positive association) is not a suitable option as in case of rejection it would not be disclosed whether the relationship is either opposite or neutral (i.e., insignificant). Second, we contextualize this research on the short run timeframe, as the theoretical literature has suggested to differentiate between the short and long timelines of effects (Bénabou and Tirole 2010; Baird et al. 2012) and the available empirical research usually focuses on shorter periods (e.g., Cho et al. 2019; Lee and Lee 2019; Aras et al. 2010; Tagesson et al. 2009; Moore 2001). Moreover, the long term payoff could be revealed in an undeterminable timeline and impacted by a vastly larger variety of additional factors (Böckin et al. 2022; Alshehhi et al. 2018; Peylo and Schaltteger 2014), making it either extremely difficult or even impossible to model reliably. Last, focusing on two groups of firms, namely those with(out) CS initiatives, would seriously oversimplify the real world, because firms vary remarkably in respect to the magnitude of applied initiatives. Some companies might "fashionably" apply a single initiative, while others would redesign the whole corporate strategy to account for CS. Thus, relying on theoretical explanations about the relationship of CS and FR, we extended the empirical strategy to account for the number of CS initiatives implemented by firms.

There is various extant evidence available that firms functioning in foreign markets might be intensively engaged in sustainability initiatives (e.g., Taherdangkoo et al. 2017; Arora and De 2020), while a positive effect from initiatives on exporting has often been reported (e.g., Villena and Souto-Pérez 2016; Lu et al. 2020). Exporters have also been found to be more productive than firms functioning domestically (Wagner 2007). The latter facts would suggest that the rejection of H1a could be more likely in case of exporters, which have better financial means to more purposefully implement initiatives. In turn, for firms functioning domestically, the implementation of initiatives could be more random and less likely to enhance financial well-being. Therefore, in the empirical portion of the paper the

two competing hypotheses should be additionally validated in separate subsamples of (non-)exporters.

3. Study Design

As unlisted firms, especially SMEs, usually do not provide sustainability information in their annual reports (Lääts et al. 2017), a different information source has to be used to collect the relevant data. The two main available options include primary data by means of questionnaires and secondary data by means of different disclosures. This study implemented the latter option by considering the published information on firms' websites. Sustainability disclosures in the web are a usual source of information in the relevant literature (e.g., Lodhia 2010; Moure 2019). Still, it should be acknowledged that while questionnaires can always be subject to a response bias, websites can be subject to a publishing bias, i.e., relevant information might have been left undisclosed. The latter should be differentiated from the disclosure bias (Fischer and Verrechia 2004), as that concerns annual reports, which unlike websites still follow certain international or local guidelines. It is reasonable to assume that the publishing bias is distributed randomly, i.e., it is not inherent to some specific type of firms.

This paper is based on a sample of firms from Estonia, which was obtained during research conducted in early 2020 and fully reported in Pajur and Saaroja (2020). Therefore, the sample's formation particulars and collection of sustainability information described herewith is a summary of the detailed track provided in Pajur and Saaroja (2020). To avoid firm selection bias, the sample was collected by Pajur and Saaroja (2020) by using four different sources as follows. First, the Google-based search with different sustainability keywords was conducted to find firms having relevant notifications on their website. Second, the first search was complemented with firms achieving a CSR label in Estonia. Third, the latter searches were complemented with national award-winning Estonian firms. Finally, firms not present in the first three pools were complemented with those present in the Estonian Competitiveness Chart. The latter four-step sampling strategy resulted in 452 firms that had some sustainability-related information on their websites.

The final sample in this study included 421 observations, as for 31 firms additional information about dependent and control variables was not fully available. Because of the versatility of sample composition, this potentially provides a representative perspective of Estonian firms posting their sustainability initiatives on websites. It should also be pointed out that the majority of Estonian VAT-responsible firms either did not have a website or had one listing only basic information, without any focus on sustainability.

The sample was balanced over different firm characteristics (see also Table 2), with none of the firm types dominating. Namely, the breakdown of firms through size groups was as follows: 140 micro-, 106 small-, 102 medium- and 73 large-sized firms. Out of the sample, 37.5% of firms were majority foreign-owned, while for the rest domestic owners dominated. The highly aggregated sectoral breakdown was as follows: agriculture and mining 5, manufacturing 88, construction 45, sales 132, services 151. The average age of a firm in the sample was 19 years (SD = 11.5), therefore evenly representing entities from young to old. Thus, the threat that the analysis would be firm context-specific was minimized.

Table 2. Breakdown of the sample by different characteristics.

Characteristic	Breakdown
Aggregate sectoral	5 firms agriculture and mining, 88 manufacturing, 45 construction, 132 sales, 151 services
Size	140 firms micro, 106 small, 102 medium, 73 large
Age	86 firms < 10 years, 138 10 $\leq$ years < 20, 197 20 $\geq$ years
Foreign ownership	263 non-foreign owned, 158 foreign owned

The dependent variable (see Table 3) of the study focused on failure risk (coded as FR), and the most-cited recent universal tool by Altman et al. (2017) was applied in this study. Specifically, the model with the largest number of control variables to account for various firm-specific risks was applied from that study (see Model 8 in Altman et al. (2017, p. 154) in the last column of the respective table). The latter logistic regression model from Altman et al. (2017) includes four classical and widely used financial ratios, namely working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets and book value of equity to total debt. Besides these financial ratios, the model includes various controls, respectively portraying year dummies, size, age, country risk, and industry dummies. The respective model has a high precision (by means of area under the curve) in the Estonian context, and thus, there is no need to apply a comparative local model. Moreover, using a well-established universal failure risk determination tool helps to generalize the study's results to other environments. The input needed to calculate the Altman et al. (2017) model's values in this study originated from Bureau van Dijk's Amadeus database.

Table 3. Variables of the study.

Code	Content and Calculation
	Dependent
FR	Failure risk calculated from Altman et al.'s (2017) model #8 multiplied by 100 from year 2019 or 2018 noted as a subscript
	Independents
ENSU	Number of environmental sustainability initiatives of the company {0, . . . , 9}
SOSU	Number of social sustainability initiatives of the company {0, . . . , 7}
SUSUM	Number of environmental and social sustainability initiatives of the company {0, . . . , 16}
	Controls
SIZE	Ordinal variable to reflect micro, small, medium or large firm {1, . . . , 4}
AGE	Firm age in years from foundation at the end of 2019 or 2018 divided by 100
SAGRI	Binary variable if a firm belongs to NACE sec. A
SMAN	Binary variable if a firm belongs to NACE sec. B, C, D or E
SCONS	Binary variable if a firm belongs to NACE sec. F or L
SSALE	Binary variable if a firm belongs to NACE sec. G
FOWN	Binary variable if a firm is >50% foreign owned

Note: Service sector serves as a base category in the analysis.

The three independent variables focused on the sustainability initiatives the firm had implemented. In Pajur and Saaroja (2020), the sustainability initiatives disclosed on the websites were classified based on their content to detailed categories of sustainability (9 for environmental and 7 for social) by using the well-known Global Reporting Initiative standards. A similar approach has been applied in earlier research (Horváth 2017; Horváth et al. 2017b). In this study, the number of different environmental (coded as ENSU) and social (coded as SOSU) sustainability initiatives was applied. In addition to using ENSU and SOSU separately, the summed count of initiatives was applied (SUSUM = ENSU + SOSU). The latter provided a holistic view of the linkages, as specific initiatives could potentially lead to varying results, which in turn could differ from the results obtained from the full complex of initiatives. The collection of CS information by Pajur and Saaroja (2020) was conducted in the beginning of 2020 to enhance the comparability with the fiscal year 2019 financial performance, while in order to enhance reliability, the coding protocol was established and the respective process administered by two researchers. The number of different environmental sustainability initiatives (ENSU) ranged from 0 to 9, while it was from 0 to 7 in respect to social sustainability (SOSU) in this study. Derived from the latter, SUSUM ranged from 0 to 16.

Relying on past research (e.g., Akben-Selcuk 2019; Barbosa et al. 2022; Arora and De 2020) and in order to disclose various contextual variations, multiple controls were appended to the study. These can be followed in Table 3 and portray the size (coded as SIZE), age (AGE), foreign ownership (FOWN) and high-level sectoral (SAGRI, SMAN,

SCONS, SSALE) contexts of the firms, while for the latter the service sector remains as the base category.

As the aim was to find out whether the greater volume of either or summed initiatives leads to higher or lower failure risk, ordinary least squares regression (OLS) was applied in SPSS statistical package. For that purpose, we used failure risk calculated from the year 2019 financial data as our base model. In order to find out whether the results were not subject to a single year bias, the same analysis was repeated with year 2018 failure risk, as most of the initiatives were expected to have started earlier than in 2019. In addition, the usage of samples could result in a portion of observations having a strong influence on the final estimates. Thus, we conducted additional bootstrapping with 50 samples by using the year 2019 failure risk to find out the effect of subsamples on the final results. Because of the high significant correlation (0.74 with $p < 0.001$) between ENSU and SOSU, we ran separate regressions with these independent variables rather than applying them in a single regression. Indeed, it is logical that firms involved in more sustainability initiatives might focus on both social and environmental contexts. Moreover, the latter organically enabled obtaining "pure" results of how both of those independent variables associate with failure risk. Lastly, we broke the sample in two based on whether the firm was an exporter or not and reran the regressions with year 2019 data. The latter originated from the fact that exporters could be more active investors in sustainability initiatives (e.g., Sardana et al. 2020).

4. Empirical Results

The descriptive statistics are provided in Table 4. Firms in the sample usually reported a few sustainability initiatives, as the means for ENSU and SOSU are respectively 2.05 and 1.38, summing the same value for SUSUM to be 3.43. The medians equaling zero for ENSU and SOSU point to the fact that firms chose either of those initiatives, rather than focusing on both simultaneously.

Table 4. Descriptive statistics of independent and dependent variables.

Statistic	FR_{2019}	FR_{2018}	SOSU	ENSU	SUSUM
N	421	421	421	421	421
Mean	0.056	0.054	1.38	2.05	3.43
Std. Deviation	0.098	0.090	2.10	2.91	4.69
Median	0.018	0.019	0	0	1.00
Minimum	0	0	0	0	0
Maximum	0.87	0.59	7.00	9.00	16.00
N	421	421	421	421	421

In turn, the median value of 1 for SUSUM indicates that the majority of firms were focusing at least on one initiative. Still, the high standard deviations for those three variables reflected a remarkable fluctuation in the number of initiatives. Both failure risks, i.e., FR_{2019} and FR_{2018}, calculated based on the financial reports reflect a low threat of corporate collapse and high financial resilience. Indeed, many of the entities included in the sample were top ranking Estonian firms. The descriptive statistics of control variables are not provided herewith, as the frequencies of their classes were already disclosed in the study design section.

Tables 5–7 document the results for the OLS regressions composed with either ENSU, SOSU or SUSUM as independent variables and FR_{2019} or FR_{2018} as the dependent variable. For all regressions, the higher number of CS initiatives indicates a significant increase in firms' failure risk, although it should be pointed out that the p-values for ENSU were much lower than for SOSU for both years (i.e., 2018 and 2019), therefore reflecting a weaker link in the case of the latter independent variable. Still, for SOSU, the results remained under the universally acceptable threshold of $p < 0.05$ as well. The year 2019 results were reconfirmed with the previous year's failure risk (FR2018), reflected through

specific columns in Tables 5–7. In addition, the bootstrapping of FR_{2019} revealed that the coefficients of independent variables did not change signs, indicating that the sample of firms is relatively homogenous. Therefore, the findings can be considered reasonably robust, i.e., the periodization and sampling are likely not to affect the findings.

Table 5. Models with ENSU as the independent variable (N = 421).

Variable	FR_{2019}			FR_{2018}			BS FR_{2019}	
	U. Coef.	S. Coef.	*p*-Value	U. Coef.	S. Coef.	*p*-Value	Lower	Upper
Constant	−0.029		0.010	−0.037		0.000	−0.050	0.010
ENSU	0.006	0.192	0.000	0.005	0.174	0.000	0.004	0.010
SIZE	0.041	0.458	0.000	0.038	0.460	0.000	0.033	0.053
AGE	0.006	0.007	0.878	0.049	0.064	0.149	−0.100	0.113
SAGRI	−0.021	−0.024	0.571	−0.013	−0.016	0.703	−0.052	0.003
SMAN	−0.012	−0.049	0.302	−0.008	−0.037	0.426	−0.036	0.006
SCONS	0.016	0.049	0.272	0.021	0.074	0.093	−0.016	0.052
SSALE	−0.024	−0.111	0.020	−0.021	−0.109	0.020	−0.038	−0.004
FOWN	−0.035	−0.172	0.000	−0.020	−0.108	0.019	−0.055	−0.015
R^2		0.297			0.323			

Note: U. and S. refer to (un)standardized coefficients, BS to bootstrapping.

Table 6. Models with SOSU as the independent variable (N = 421).

Variable	FR_{2019}			FR_{2018}			BS FR_{2019}	
	U. Coef.	S. Coef.	*p*-Value	U. Coef.	S. Coef.	*p*-Value	Lower	Upper
Constant	−0.032		0.005	−0.040		0.000	−0.052	−0.001
SOSU	0.006	0.123	0.010	0.004	0.101	0.030	0.001	0.010
SIZE	0.043	0.483	0.000	0.040	0.486	0.000	0.035	0.054
AGE	0.002	0.003	0.949	0.048	0.061	0.170	−0.113	0.113
SAGRI	−0.029	−0.032	0.453	−0.019	−0.023	0.583	−0.070	−0.002
SMAN	−0.006	−0.026	0.590	−0.004	−0.017	0.725	−0.037	0.020
SCONS	0.015	0.046	0.307	0.021	0.071	0.111	−0.012	0.040
SSALE	−0.020	−0.096	0.047	−0.019	−0.096	0.043	−0.045	−0.004
FOWN	−0.031	−0.151	0.001	−0.016	−0.086	0.064	−0.047	−0.013
R^2		0.282			0.309			

Note: U. and S. refer to (un)standardized coefficients, BS to bootstrapping.

Table 7. Models with SUSUM as the independent variable (N = 421).

Variable	FR_{2019}			FR_{2018}			BS FR_{2019}	
	U. Coef.	S. Coef.	*p*-Value	U. Coef.	S. Coef.	*p*-Value	Lower	Upper
Constant	−0.030		0.009	−0.038		0.000	−0.056	−0.024
SUSUM	0.004	0.180	0.000	0.003	0.158	0.001	0.000	0.005
SIZE	0.041	0.461	0.000	0.038	0.465	0.000	0.031	0.047
AGE	0.001	0.001	0.977	0.046	0.059	0.182	−0.016	0.229
SAGRI	−0.025	−0.027	0.512	−0.016	−0.019	0.642	−0.053	0.012
SMAN	−0.009	−0.038	0.425	−0.006	−0.027	0.565	−0.028	0.013
SCONS	0.016	0.049	0.272	0.021	0.074	0.095	−0.003	0.054
SSALE	−0.022	−0.102	0.033	−0.019	−0.101	0.033	−0.046	−0.006
FOWN	−0.035	−0.172	0.000	−0.020	−0.106	0.022	−0.048	0.008
R^2		0.293			0.319			

Note: U. and S. refer to (un)standardized coefficients, BS to bootstrapping.

Based on the additionally calculated marginal effects (with the dependent FR2019), ENSU's change (dy/dx = 0.0065) affected FR more than SOSU's (dy/dx = 0.0057). Similar to single initiatives (i.e., ENSU or SOSU), the total number of initiatives (SUSUM) had a positive coefficient and was significant in respective regressions (see Table 7). In the case instead of SUSUM, the joint effect of two sustainability initiatives in the form of

ENSU×SOSU was applied, it also remained significant at $p < 0.001$ with a positive sign. This indicates that besides the total number of initiatives, their joint effect led to the same conclusion. The explanatory power of regressions by means of R^2 was around 0.3, while in empirical economics the given figure has usually been lower (Eisenhauer 2009). Friede et al. (2015) reported that for 1902 empirical studies analyzed, the average correlation of sustainability initiatives was only 0.118. In Friede et al. (2015), only 2 meta studies out of 25 with a relatively small number of papers (respectively 22 and 31 papers) reported a 0.3 correlation between the two phenomena, while those analyzing more than 100 papers all reported the correlation to be below 0.2 (and several even below 0.1). The correlations in this study were respectively 0.30 between ENSU and FR_{2019}, and, 0.24 between SOSU and FR_{2019}. Thus, the results obtained in this study indicate the strength of association to be well above the majority of what the extant literature has found. Still, by classical statistical standards, the correlations in this study can be considered weak, as the breakeven between weak and moderate has been noted to be 0.3 (see Gerber and Finn 2005). The models were free from multicollinearity threat, as the highest correlation between variables (independent and control) did not exceed 0.4 threshold in this study.

The control variables in both regressions indicate that larger firms (SIZE) were in higher and foreign-owned firms (FOWN) were in lower failure risk. The latter can be logically explained by better capitalization of entities, where a cross-border parent is present. Concerning the variable SIZE, a probable explanation is that as there was a significant increase in sustainability initiatives through firm size categories (the SUSUM medians being respectively 0, 1, 2 and 6 from micro to large firms' categories), the costs of initiating and keeping them demanded more resources, therefore reducing performance. A noteworthy finding is that the standardized coefficient of SIZE is in all regressions much larger than for the independent variable (either SOSU, ENSU or SUSUM). Other controls are mostly insignificant throughout the composed regressions.

As a separate analysis, the sample was broken in two, depending on whether the firm was an exporting entity in 2019 (N = 234) or not (N = 187). The parametric ANOVA and non-parametric median tests clearly point to the fact that exporters included in the sample were characterized by significantly more sustainability initiatives. For instance, the mean and median for SUSUM for exporters were 4.1 and 1.0, respectively, while the same figures for non-exporters were 2.6 and 0, respectively. The succeeding regression analyses in the two sub-populations led to the following results. First, when the regressions were repeated in the exporters' pool, none of the independent variables (ENSU, SOSU, SUSUM) were significant. Second, in the pool of non-exporters, in turn all of the three independent variables were significant and the association was more pronounced when compared with those documented in Tables 5–7. Thus, the positive association of failure risk and sustainability initiatives was dominatingly determined by the same phenomenon among firms active in the local market. Indeed, in most countries, the latter firms make up the vast majority of the firm population.

5. Discussion of Findings

The median values presented in Table 4 indicate that an average firm is not paying attention to both initiatives at the same time, while it has implemented one initiative of either kind. Therefore, the analyzed firms could on an average be considered modestly focused on sustainability. Similar to previous research (e.g., Lawrence et al. 2006; Aras et al. 2010; Kantcheva 2016; Lääts et al. 2017), the additional analysis of sustainability initiatives by firm size groups showed that smaller companies tend to have lower interest in sustainability initiatives. As the studied sample can be considered to a certain extent shifted towards firms that were likely to have implemented at least some sustainability initiatives, it could be deduced from the latter that sustainability initiatives are not widespread in the general population of Estonian SMEs.

The results enable accepting H1a postulating the higher short run failure risk of firms engaged in more sustainability initiatives, while the latter holds in the case of all initiatives,

i.e., for environmental, social and combined sustainability initiatives. Respectively, H1b postulating the opposite of H1a is therefore rejected.

The results support theories postulating poorer performance of more sustainable firms, at least in the short run perspective. In particular, the theoretical concept of Amankwah-Amoah and Syllias (2020) postulating that more focus on sustainability potentially increases failure risk in the short run was validated with the current study. In addition, the results were in line with the value-destroying theory (Yu and Zhao 2015) and short term managerial-incentives-based explanation by Bénabou and Tirole (2010), who concluded that managers who need to satisfy owners' profit expectations and who are awarded for that tend to choose financial aims ahead of sustainability objectives. More generally, the latter is in accordance with the agency-theory-based explanations of the negative effect (Akben-Selcuk 2019; Lee and Lee 2019; Krüger 2015). A practical explanation could point to the fact that sustainability initiatives just do not pay off financially, at least in the short run (Peylo and Schaltteger 2014). More generally, this could be explained with the theoretical perspectives of obfuscation and selective disclosure pointing out that favorable developments are quickly and excessively presented, in order to reduce the negative effects from underperformance (Lukason and Camacho-Miñano 2019). Indeed, this phenomenon could be especially characteristic to start-up firms, which have not exceeded the break-even point to be profitable.

The findings contrasted a considerable amount of empirical research (Alshehhi et al. 2018; Friede et al. 2015; Orlitzky et al. 2003) presenting the more likely positive effect of sustainability initiatives. The usually applied FP measures (e.g., profitability ratios) capture firms' performance in a less complex way compared to aggregate indicators such as failure or survival probability. In addition, it has been long established that financial performance of a firm can be affected by a large number of internal and external determinants (e.g., Hansen and Wernerfelt 1989; Rumelt 1991). Failure prediction models (including the one applied in this study) usually include a variety of financial indicators, accompanied by other firm-specific and environmental characteristics. The composition logic of such models also positions different firms in a ranking in comparison to each other. Thus, the given approach is less vulnerable to limitations inherent to single financial indicators, the values of which can be more random in time and contingent on specific context.

Of specific findings, the results were robust in respect to which sustainability initiatives were considered. Some earlier studies (e.g., Han et al. 2016; Bătae et al. 2021) indicated a conflicting behavior of different sustainability investments, while this study's results are less radical. Namely, only the strength of the association of different initiatives varies, more environmental sustainability initiatives leading to a larger increase in failure risk when compared with social ones. Indeed, such a finding could be explained by a certain financial logic, as environmental initiatives might per se demand larger investments, which in turn translate into respective costs.

The study indicates that in the pool of independent and control variables, sustainability initiatives are one of the few having a significant relationship with failure risk. From the control variables, size and foreign ownership were systematically linking to failure risk, respectively the former positively and the latter negatively. In addition, the standardized coefficient of size indicates it to be a more important predictor of failure risk than the sustainability performance. While such an interconnection itself is not surprising, an unusual feature was that the increase in firm size led to greater failure risk. As indicated earlier, this might be explained by the fact that as the majority of studied firms were financially quite well off, because otherwise they probably might not have had funds for sustainability investments at all, then ceteris paribus, larger firms that made more sustainability investments also reduced their short term financial performance more.

An additional important finding concerned the exporting activities of the analyzed firms. Firms engaged in exporting showed no significant association with any of the variables reflecting sustainability initiatives. This could mean that in the target markets of Estonian firms, of which the Nordic countries are the most prominent (Vissak and Masso 2015), high attention was paid to sustainability initiatives. As many of the exporting firms

are foreign-owned, often by owners originating from their target market, putting these two facts together could organically mean that Nordic-owned firms with Nordic markets are rather homogenously sustainable. Indeed, firms in Nordic countries have been long known to be the frontrunners in sustainable development (see e.g., Sustainability for all 2021). In turn, in the case of firms with local market orientation, the initiatives do not seem to pay off in the short run. It might be that firms voluntarily engaged in initiatives are automatically less well off when compared with their competitors, which without a state's regulatory pressure might be very reluctant to adopt sustainability in their business models, partly because Estonian customers do not seem to value sustainability enough (Kantcheva 2016).

6. Conclusions

This paper looked at the association of different corporate sustainability initiatives and firm failure risk with a sample of Estonian firms of varying sizes. As the main scientific conclusion, we would postulate that frequent adherence to sustainability initiatives could increase firms' failure risk, at least in the short run. Of course, the latter does not mean that such firms would be in an actual threat of failure.

Whether the initiatives pay off in the long run, will remain an avenue of future research. In addition, while this paper focused on the association, one should acknowledge the challenges connected to setting up a study design to outline both the short and long term causal effects of initiatives. For instance, one would probably need factual information about the change of customer preferences to buy a certain product or service because of increased sustainability of a firm. In addition, the profitability analysis of sustainability initiatives would demand precise information about the money invested in those activities, which is usually not available through public financial information, especially for SMEs. A limitation of this paper to be resolved in future studies is that it looked only cross-sectionally at the relationship between sustainability initiatives and firm failure risk to validate a specific theoretical concept and resolve the controversies in earlier theoretical and empirical literature. For the portrayal of a longitudinal causal relationship one would need, besides the proper variables, their dynamic reflection over a lengthy timeframe. Still, multiple years and bootstrapping applied in this study provided sufficiently strong evidence that firms at least denoting their greater commitment to sustainability might not be as well off financially as their counterparts in the short time horizon.

Multiple practical implications can be derived from the results. First, corporate managers should acknowledge that performance declines due to (over)investing in sustainability initiatives could be the likely reality. Thus, a proper profitability analysis of the implementations by the firm's management should be a rule rather than an exception. A challenging facet of the latter is to forecast the long term revenues and costs of sustainability investments, while the latter could benefit from the fact that firm valuation methodologies have advanced enough in the "start-up era", in which classical discounted cash flow approaches have been deemed to be insufficient. Probably, firms should choose one or a few most beneficial and feasible initiatives rather than implementing a wide range, which they cannot handle, therefore leading to value destruction. Corporate stakeholders (e.g., creditors and suppliers) should be aware that excess focusing on sustainability should be taken conservatively, as firms' classical financial indicators (e.g., liquidity and profitability as an input to failure risk calculation) could be impacted negatively by that tendency. Namely, the nice façade of a firm might not match the interior. Public sector institutions that are determining and monitoring sustainability strategies the corporate sector is subject to should carefully consider not to exaggerate with the additional burden of activities set on firms.

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