Results

Get a feel of the data

Table 1: Descriptive statistics

Statistic	N	Mean	St. Dev.	Min	Max
Roa	1,176	0.063	0.071	−0.618	0.423
TobinsQ	1,038	0.219	0.870	−2.996	2.496
FinancialLeverage	1,130	1.515	8.015	0.000	157.900
Growth	1,174	0.117	0.240	−2.045	5.958
FirmSize	1,172	23.830	1.390	19.450	28.816
Industry	1,177	4.594	2.645	1	11
CarbonProductivity	1,177	0.119	0.183	0.000	0.970
WaterProductivity	1,177	0.085	0.184	0.000	0.990
WasteProductivity	1,177	0.072	0.170	0.000	0.970
SustainabilityPayLink	1,177	0.488	0.500	0	1
SustainableThemedCommitment	1,177	0.483	0.500	0	1
AuditScore	1,177	0.469	0.499	0	1

This section gives an overview of the database. Table 1 presents the main descriptive statistics of each variables. The sample size of ROA (i.e. N = 1176) is superior to the sample size of TobinsQ (i.e. N = 1038). Indeed, compared to ROA, calculating Tobin's Q requires a relatively high number of financial variables and is more susceptible to missing values. This creates a disparity among the number of observations for each dependent variables. @Delmas2015 encountered the same issue and conducted an identical analysis to check whether this introduces sample bias. I did the same and the p-value of the unpaired two-samples t-test equals 0.365 meaning that they is not significant difference between both samples.

Table 2 contains the matrix of correlation of my database. There are statistically significant correlations between outcome-based CEP variables (i.e. carbon, water and waste productivity) suggesting that my model could suffer from multicollinearity. Table 3 reports the variance inflation factor (i.e. VIF) of all the variables. The maximum VIF is 2.4768 meaning that there is no multicollinearity in the model [@Obrien2007].

The R code of this section is available in annex Data.

Outliers treatment

@Lyu2015 defines outliers as observations in the dataset that appear to be unusual and discordant and which could lead to inconsistent results. @Osborne2004 have shown that even a small proportion of outliers can significantly affect simple analyses (i.e. t-tests, correlations and ANOVAs). Outliers are an issue only and only if they are influential [1] [@Cousineau2010]. I have used the Cook's distance [@Cook1977] test which is a common statistical tool to assess the influence of outliers [@JPStevens1984, @Cousineau2010, @Zuurprotocoldataexploration2010]. Cook's Distance observes the difference between the regression paramater of a given model, $\hat{\beta}$ and what they become if the i_{th} data points is deleted, let's say $\hat{\beta}_i$. One difficulty with treatment of outliers is that the literature have not found common theoretical framework yet for the treatment of influential outliers [@OrrJohn1991, @Cousineau2010]. @Tabachnick2007 argues that the imputation with the mean is the best method while @Cousineau2010 highlight that it tends to reduce the spread of the population, making the observed distribution more leptokurtic, and possibly increase the likelihood of a type-I error. @Dang2009 argue that more elaborate technique involves replacing outliers with possible values while @Barnett1994 would prefer to remove or windsorized them. Alternatively, @Pollet2017 propose an

[1] Influential obervations are observations whose removal causes a different conclusion in the analysis

other route to handle outliers and argue that inclusion or exclusion of outliers depend on the significativity of the results, meaning that if results are more significant without outliers, scholars should remove them and vice versa. Following the mindset of @Pollet2017, I have removed outliers from my database. See annex outliers for furthers details.

The impact of process-based on outcome-based CEP

The impact of CEP on CFP

Table 2: Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
1. Roa											
2. TobinsQ	0.40***										
3. FinancialLeverage	-0.02	0.03									
4. Growth	0.19***	-0.02	-0.07**								
5. FirmSize	-0.27***	-0.66***	-0.02	0.09***							
6. Industry	-0.10***	-0.09***	-0.05*	0.00	0.06**						
7. CarbonProductivity	0.09***	0.02	0.03	0.00	0.07**	0.04					
8. WaterProductivity	0.08***	0.03	0.06**	-0.02	0.08***	0.02	0.67***				
9. WasteProductivity	0.07**	0.01	0.08***	-0.01	0.07**	0.08***	0.56***	0.69***			
10. SustainabilityPayLink	-0.05*	-0.11***	-0.02	-0.02	0.29***	0.09***	0.06**	0.14***	0.15***		
11. SustainableThemedCommitment	0.00	-0.10***	-0.01	-0.04	0.29***	0.06**	0.21***	0.26***	0.24***	0.48***	
12. AuditScore	-0.04	-0.08**	0.01	0.05*	0.26***	0.04	0.21***	0.26***	0.28***	0.50***	0.46***

Note : * p<0.1; ** p<0.05; *** p<0.01

Table 3: The Variance Inflation Factor

	Roa	Tobin's Q
SustainabilityPayLink	1.543	1.487
SustainableThemedCommitment	1.507	1.475
AuditScore	1.527	1.514
CarbonProductivity	1.862	1.846
WaterProductivity	2.477	2.425
WasteProductivity	1.966	2.008
FinancialLeverage	1.021	1.027
Growth	1.029	1.026
FirmSize	1.155	1.134
Industry	1.025	1.020