This is the title of my thesis

Pierrick Kinif

A thesis submitted for the Master's Degree in Business Management and Administration,
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Supervised by:

Prof. Sophie Béreau
Prof. Jean-Yves Gnabo

Faculty of Economics, Social Sciences and Business Administration
University of Namur, Belgium
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Abstract

This is an abstract

Aknowledgments

I would like to thank some of you . . .

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Introduction

Over the past decades, humanity is progressively becoming aware of the finiteness of earth's resources and its impact on the current global warming. On the one hand, Houghton and Change (1996) anticipated in their first report an average global warming between +1° and +3.5° C until 2100 relative to the temperature of 1990. They also warned that an increase of temperatures superior to +2° C could have some harsh climatic repercussions. On the other hand the Kyoto Protocol had been written in 1997, enforced in 2005 and led to the first Global Agreement on global warming during the Paris Conference in 2015. Those different solutions implemented over the past decades did not have any significant impacts on the fight against global warming. Greenhouse Gas Emissions (GGE) have still increased considerably across years. Although the environmental consciousness-raising had already gained ground, according to Jean Jouzel (2017) human being have to act now if he wants to have a chance to reduce effects of climate change.

For the last several decades, companies have been more and more considered as entities responsible for stewardship of the natural environment (Majumdar and Marcus 2001; Przychodzen and Przychodzen 2015). Ecosystem degradation and resources depletion engender a threat to firm's longevity (Dowell, Hart, and Yeung 2000), and as a reaction, firms have to pro-actively adopt an environmental strategy (Hart 1995). In his speech at Lloyds of London 2015, Mark Carney, Governor of the Bank of England and Chair of the Financial Stability Board (FSB), identified climate change as one of the most material threats to financial stability (Elliott 2015). Companies facing higher risks associated to climate change are the ones subject to greater incentives to develop green strategies (Hoffman 2005). However, both economic benefits and strategic opportunities deriving from sustainable development are usually underestimated by managers and still too many companies do not feel concerned about global warming (Berchicci and King 2007; Hart 1995). Moreover, according to Scarpellini, Valero-Gil, and Portillo-Tarragona (2016), green projects are not common in companies of many countries because of significant barriers and a negligible culture of excluding sustainable development from an organization's strategy. If we consider that people's actions reflect a variable mix of altruistic motivation, material self-interest, and social or self-image concerns (Bénabou and Tirole 2006), demonstrating that green development is a significant interest for firms could be a serious step forward in the fight against global warming.

Prendre en compte les remarques de Prof. Béreau 050418, see pdf dans dropbox

To be continued...

1 Literature Review

1.1 Two perspectives on Corporate Environmental Performance

The paradigm of profit maximization of Friedman (1970) have been widely challenged these last decades. Whereas Friedman (1970) considers investment in pollution efficient technology as deviation from the wealth maximization goal, the literature is showing growing evidences that improving a company's environmental performance can lead to better economic or financial performance, and not necessarily to an increase in cost. Ambec and Lanoie (2008) have demonstrated that the expenses incurred to reduce pollution can be partly or completely offset by gains made elsewhere. Porter and van der Linde (1995) argued that rather than simply adding to cost, properly crafted environmental standards can trigger innovation offsets, allowing companies to improve their resource productivity. He even redefined the self concept of value creation in advocating that the solution lies in the principle of shared value which involves creating economic value in a way that also creates value for society by addressing its needs and challenges (Porter and Kramer 2011, Porter and Kramer (2018)). Freeman (1984) call to a radical rethinking of our model of the firm. According to him, companies have to consider their stakeholder, namely *"any group or individual who can affect or is affected by the achievement of an organisation's objectives"* (p.25) or else face negative confrontation from non-shareholder groups, which can lead to diminished shareholder value, through boycotts, lawsuits and protests etc. In other words, Freeman (1984) summarizes the idea that companies should consider corporate environmental performance as unavoidable cost of doing business.

1.2 Does it pay to be green?

While more and more companies are embracing this new paradigm and develop profitable business strategies that deliver tangible social benefits, others keep the old fashion way of Friedman (1970). This dichotomy have interested scholars and since they have sought to empirically answer the question, *"Does it pay to be green?"*. In a competitive business world, answering this question is crucial to provide a genuine economic justification to the new paradigm (Lu et al. 2014). Although results are mixed, the large quantity of studies on the nexus between Corporate Environmental Performance (i.e. CEP) and Corporate Financial Performance (i.e. CFP) in the last two decades allowed the appearance of recent meta-analyses [1] (Orlitzky and Benjamin 2001, Orlitzky, Schmidt, and Rynes (2003), Wu (2006), Albertini

[1] Initially, the literature focused on the link between Corporate Social Performance (i.e. CSP) and Corporate Financial Performance (i.e. CFP). Orlitzky and Benjamin 2001 were the first to consider CEP as apart from CSP. Given that Busch and Friede 2018 could not detect statistically significant differences between the effects of environmental CEP and social-related CSP on CFP and concludes that good CSP pays off, whether social or environmental related, this study considers CSP equals to CEP.

(2013), Dixon-Fowler et al. (2013), Endrikat, Guenther, and Hoppe (2014), Lu et al. (2014), Wang, Dou, and Jia (2016), Busch and Friede (2018)) and all suggest that indeed it pays to be green. More precisely, a positive and bidirectional relationship does exist between CEP and CFP meaning that successful firms may have the resources necessary to improve their environmental performance, which in turn increases financial benefits that again can be invested back into further improvements of CEP (Endrikat, Guenther, and Hoppe 2014).

1.3 CEP and CFP as a broad meta-construct

CFP is a broad meta-constructs and the current literature have shown that each construct play a moderator role in the relationship between CEP and CFP (Orlitzky, Schmidt, and Rynes 2003, Lu et al. (2014), Busch and Friede (2018)).Scholars have mainly adopted three broad subdivisions of CFP: market-based (investor returns), accounting-based (accounting returns), and perceptual (survey) measures. Market-based measures (e.g. price-earning ratio, Tobin's Q, or share price appreciation) consider that returns should be measured from the perspective of the shareholders (Cochran and Wood 1984). Accounting-based measures require profitability and asset utilization indicators such as Return on Asset (i.e. ROA) or Return on Equity (i.e. ROE) (Cochran and Wood 1984, Wu (2006)). Finally perceptual measures of CFP is a more subjective approach based on the perception of survey respondents (Lu et al. 2014).

CEP is also a broad meta-constructs and no common definition exist in the literature (Albertini 2013, Endrikat, Guenther, and Hoppe (2014)). Scholars have used a wide variety of indicators as proxies for approaching the green performance of companies. Albertini (2013) use a three-group classification to summarize CEP measures : (i) Environmental Management Measures (i.e. EMV) which mostly refer to environmental strategy, integration of environmental issues into strategic planning processes, environmental practices, process-driven initiatives, product-driven management systems, ISO 14001 certification, environmental management system adoption, and participation in voluntary programs (Molina-Azorín et al. 2009, Schultze and Trommer (2012)). (ii) Environmental Performance Variables (i.e. EPV) which are mostly measures quantified in physical units (carbon dioxide emissions, physical waste, water consumption, toxic release) that can be positive (emission reduction) or negative (emission generated) (Albertini 2013). (iii) Environmental Disclosure Variables (i.e. EDV) such as information releases regarding toxic emission (Hamilton 1995), environmental awards (Chen, Ngniatedema, and Li 2018), environmental accidents and crises (Blacconiere and Patten 1994), and environmental investment announcements (Gilley et al. 2000). Endrikat, Guenther, and Hoppe (2014) split up CEP into two sub-dimensions, namely (i) process-based CEP which can be linked to the EMV approach of Albertini (2013) and (ii) outcome-based CEP which can be linked to the EPV dimension. According to Xie and Hayase (2007), process-based CEP can be considered as a preliminary step of outcome-based CEP. Scholars demonstrated that the first approach have a positive impact on the second one which in turn has a positive impact on financial performance (Li, Ngniatedema, and Chen 2017, Chen, Ngniatedema, and Li (2018)).

Although recent recent meta-analyses (Orlitzky and Benjamin 2001, Orlitzky, Schmidt, and Rynes (2003), Wu (2006), Albertini (2013), Dixon-Fowler et al. (2013), Endrikat, Guenther, and Hoppe (2014), Lu et al. (2014), Wang, Dou, and Jia (2016), Busch and Friede (2018)) have demonstrated the positive link between CEP and CFP, some scholars advanced that the multidimensionality of both CEP and CFP constructs are one reason why the conclusion of the relationship between CEP and CFP have been so mixed (Albertini 2013, Endrikat, Guenther, and Hoppe (2014), Miroshnychenko, Barontini, and Testa (2017)). For instance, Busch and Hoffmann (2011) found that process-based CEP (in terms of carbon management) negatively affects CFP, while outcome-based CEP (in terms of carbon emissions) has a positive influence on CFP. Cavaco and Crifo (2014) and Muhammad et al. (2015) have used both accounting-based indicators (i.e. ROA) and market-based indicators (i.e. Tobin's Q) as a proxy for CFP and got a positive relation between ROA and CEP while no relation between Tobin's Q and CEP. A general consensus have shown that accounting-based CFP are characterized by a stronger relation to CEP than market-based and perceptual indicators (Orlitzky, Schmidt, and Rynes 2003, Wu (2006), Albertini (2013), Lu et al. (2014), Busch and Friede (2018)).

Considering the varying findings with regards to process-based CEP and outcome-based CEP and with a motivation to answer the call of Endrikat, Guenther, and Hoppe (2014), I hypothesize the following :

Hypothesis 1. Process-based CEP have a positive impact on Outcome-based CEP

Hypothesis 2. Outcome-based CEP have a positive impact on CFP

Hypothesis 3. Process-based CEP have a positive impact on CFP

1.4 When does it pay to be green?

Griffin and Mahon (1997) was the first to call for research that looks at the CEP-CFP relation over time. While scholars had been mainly answering the question *"Does it pay to be green?"* some have recently tried to move forward and gained interest in answering the call of Griffin and Mahon (1997) with the following question : *"When does it pay to be green?"* (Manrique and Martí-Ballester 2017).

Zhang and Chen (2017) have shown that CEP has a negative relationship with short-term financial performance and a positive relationship with long-term CFP. Delmas, Nairn-Birch, and Lim (2015) observed that the more a firm decreases carbon emissions the more positive the investors perceptions of future market performance and the lower its short term financial performance. Song, Zhao, and Zeng (2017) have shown that corporate environmental management has a significant positive correlation with future financial performance, however it has no significant correlation with current financial performance. Manrique and Martí-Ballester (2017) demonstrated that in times of economic crisis firms which improve their corporate environmental performance improve their corporate financial performance, this effect being weaker for firms in developed countries, where only the short-term corporate financial performance improves, than for firms in emerging and developing countries, where the short- and long-term corporate financial performance improve. Chen, Ngniatedema, and Li (2018) have shown that a firms green performance not only impact an organization's financial performance in that particular year but also impact the year that follows.

Those empirical results provide evidences that no common consensus have be found yet to answer the question *"When does it pay to be green?"*. Busch and Friede (2018) demonstrated that at a meta-research level, the evidence of a time dependency on the CEP-CFP link is not significant and that the call of Griffin and Mahon (1997) remains to date unanswered.

To capture the time dimension in the CFP-CEP nexus, scholars consider accounting-based measures as a proxy for short term CFP and market-based measures as a proxy for long term CFP (Endrikat, Guenther, and Hoppe 2014, Delmas, Nairn-Birch, and Lim (2015), Zhang and Chen (2017), Manrique and Martí-Ballester (2017), Miroshnychenko, Barontini, and Testa (2017)). According to Endrikat, Guenther, and Hoppe (2014) :

> *"While accounting-based measures may capture immediate impacts, they may not appropriately account for intangible and long-term effects which are likely to be involved in the CEP-CFP link. Market-based measures, on the other hand, integrate estimations of a firm's future prospects and reflect the notion of external stakeholders (primarily investors) (Orlitzky, Schmidt, and Rynes 2003, Peloza (2009), Delmas and Nairn-Birch (2011)). Thus, market-based measures may better to capture the long-term value of certain environmental activities."*

Taking into account theoretical arguments and empirical findings and in order to move forward in answering the call of Griffin and Mahon (1997), I hypothesize the following :

Hypothesis 4. CEP have a stronger impact on short term CFP than on long term CFP

2 Research Framework

Based on the literature review I have developed four hypotheses. My research framework is summarized in the Figure 2.1. The latter, inspired by Li Suhong, Ngniatedema Thomas, and Chen Fang (2017) and Chen, Ngniatedema, and Li (2018), aims at answering three calls. Firstly Endrikat, Guenther, and Hoppe (2014) have highlight the need for a better understanding of the multidimensionality of both CEP and CFP constructs. To do that I will examine the combined effects of process-based and output-based CEP on both accounting-based and market-based measures of CFP. Secondly, to the best of my knowledge, Li Suhong, Ngniatedema Thomas, and Chen Fang (2017) and Chen, Ngniatedema, and Li (2018) were the first scholars to use the NewsWeek Green Ranking as a proxy for both process-based and output-based CEP and performed their analysis with a time frame of one year. Therefore apply a longitudinal study on this new database can help to provide a better understanding of the CEP-CFP nexus. Lastly, Busch and Friede (2018) claimed that to date and at a meta-research level, the call of Griffin and Mahon (1997) regarding the research that looks at the CEP-CFP relation over time remains unanswered and confused. Therefore capturing the short term vs long term CFP through the use of accounting-based and market-based measures could help to collect data for future meta-analysis.

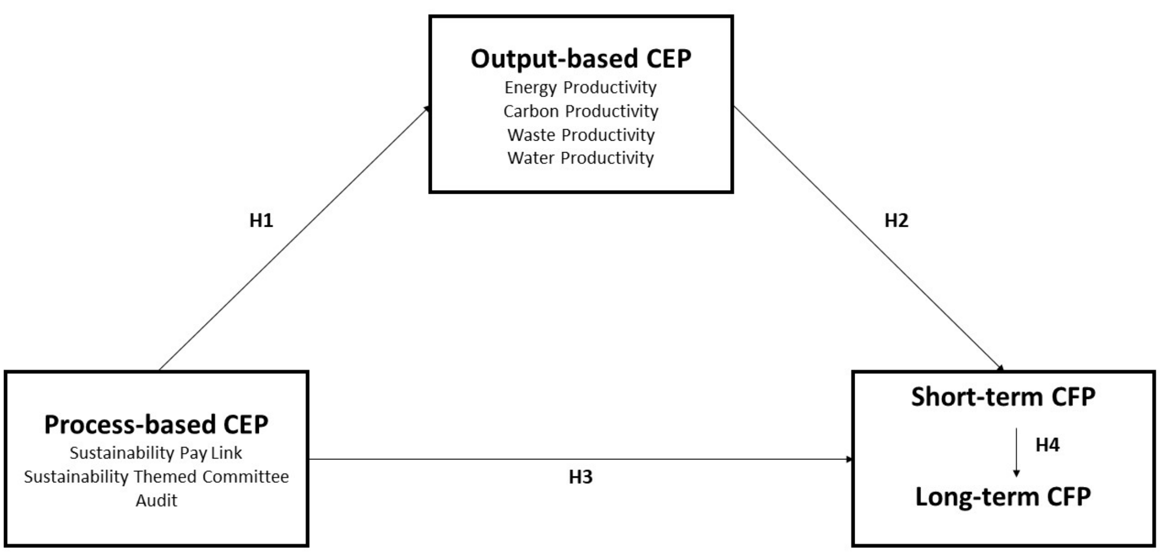

Figure 2.1: Research Framework

3 Data

3.1 Overview

The starting point of my data collection was the Newsweek Green Ranking which had assessed the world's largest publicly-traded companies in the US and in the world since 2009. This ranking had been developed through a collaboration between Newsweek, Corporate Knights Capital, HIP Investor Inc and leading sustainability minds from nongovernmental organizations and the academic and accounting communities. The ranking attribute an overall green score to companies. The score is based on a weighted average of key performance indicators (KPI's). This study uses these KPIs to measure both process-based and outcome-based of the 500 largest publicly-traded companies in the United States. Due to a methodology change \footnote{As a result of making a transition to a 100% rules-based approach, the methodology for the 2014 Newsweek Green Rankings differs considerably from the framework used in the 2012 Newsweek Green Rankings. Therefore ranking results prior to 2014 and ones subsequent can not be compared.} in the 2014 Newsweek Green Rankings, only the 2014, 2015 and 2016 ranking were considered. Among those three ranking and of the 500 US companies, 405 companies were listed for each years.

Even though green rankings were published in 2014, 2015 and 2016, each company is evaluated based on the 2012, 2013 and 2014 data. Therefore, measures for financial performance of companies will be based on the 2012, 2013 and 2014 fundamental data. Financial data have been mainly collected on Stockpup, Morningstar, Ycharts, YahooFinance and Alphavantage. Of the 405 initial companies, a total of 31 were dropped because of missing data. The final sample includes 374 publicly-traded companies in the US covering the period from 2012 till 2014 inclusively.

?? describes my variables and following sections deeply explained each variables.

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##
## \begin{table}[h] \centering
##   \caption{Variables Description}
##   \label{VarDef}
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## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
## Variables & Description \\
## \hline \\[-1.8ex]
## ROA & Earnings before interest over total firm assets \\
```

```
## Tobins Q & The ratio of a firm’s market value to the replacement cost of its assets \\
## Carbon Productivity & Revenue (\$US) / Total Greenhouse gas Emissions (CO2) \\
## Water Productivity & Revenue (\$US) / Total water (m3) \\
## Waste Productivity & Revenue (\$US) / [Total waste generated (metric tonnes)-waste recycl
## Sustainability Pay Link & A mechanism to link the remuneration of any member of a company
## Sustainable Themed Commitment & Refers to the existence of a committee at the Board of Di
## Audit Score & Refers to the case where a company provides evidence that the latest report
## Capital Structure & The ratio of long-term debt to common shareholders' equity (sharehold
## Growth & The ratio of earnings to revenue \\
## Firm Size & Log of total assets \\
## Industry & Global Industry Classification Standard (GICS) of the firm. The variable take
## Financial Risk & Jensen's alpha measured as the stock return  - [Risk Free Rate + Stock B
## \hline \\[-1.8ex]
## \end{tabular}
## \end{table}
```

3.2 Dependent Variables

Regarding dependent variables, Endrikat, Guenther, and Hoppe (2014) claim that accounting-based measures (e.g. ROA, ROE, Return on Sales) capture immediate impacts and can be used as a proxy to measure short-term CFP while market-based measures (e.g. Tobin’s Q, market capitalization, market to book value) integrate estimations of a firm’s future prospects and can be better used as a proxy for long-term CFP. Among scholars that used both measures simultaneously, ROA and Tobin’s Q are the ones that have been used the most frequently (Lioui and Sharma 2012, Cavaco and Crifo (2014), Muhammad et al. (2015), Delmas, Nairn-Birch, and Lim (2015), Semenova and Hassel (2016), Manrique and Martí-Ballester (2017)). Therefore I have decided to use ROA and Tobin’s Q as a proxy for both short and long-term CFP.

ROA is a standard accounting measure of financial performance, which is calculated by dividing earnings before interest by total firm assets. Tobin’s Q is defined as the ratio of the market value of a firm to the replacement cost of its assets (Chung and Pruitt 1994). Broadly speaking, firms displaying Tobin’s Q greater than one are judged as using scarce resources effectively and those with Tobin’s Q less than one as using resources poorly (Lewellen and Badrinath 1997). In other words investors prefers companies with Tobin’s Q superior to one. Due to the complexity of calculating the replacement cost of a firm, the literature have seen several attempts to approximate Tobin’s Q (Perfect and Wiles 1994). Tobin’s Q value had been directly collected on Ycharts and this platform use the simple approximation of Chung and Pruitt (1994) which is summarized in Equation 1.

$$Tobin'sQ = \frac{MVE + PS + DEBT}{TA} \tag{1}$$

where MVE is the product of a firm's shares prices and the number of common stock shares outstanding, PS is the liquidating value of the firm's outstanding preferred stock, $DEBT$ is the value of the firm's short term liabilities net of its short-term assets, plus the book value of the firm's long-term debt and TA is the book value of the total assets of the firms.

3.3 Independent Variables

Concerning independent variables, both process-based and outcome-based CEP had been approached with the KPI's of the Newsweek Green Ranking. More precisely, I have used "Sustainability Pay Link", "Sustainability Themed Committee", and "Audit" as a proxy for process-based CEP and "Energy Productivity", "Carbon Productivity", "Water Productivity" and "Waste Productivity" as a proxy for outcome-based CEP.

A Sustainability Pay Link is a mechanism to link the remuneration of any member of a company's senior executive team with the achievement of environmental performance targets. A score of 100% accrues to the company when such a link exists and a score of 0% is attributed if there is no such link in place.

A Sustainability Themed Committee refers to the existence of a committee at the board of directors level whose mandate is related to the sustainability of the company, including but not limited to environmental matters. A score of 100% accrues to the company when such a link exists and a score of 0% is attributed if there is no such link in place.

An Audit refers to the case where a company provides evidence that the latest reported environmental metrics were audited by a third party. A score of 100% if such an audit has been performed, and a score of 0% is given when such audit was not performed.

Energy Productivity (i.e. EnP), Carbon Productivity (i.e. CaP), Water Productivity (i.e. WatP) and Waste Productivity (i.e. WastP) are calculated through equation 2, 3, 4 and 5.

$$EnP = \frac{Revenue}{TEC} \tag{2}$$

$$CaP = \frac{Revenue}{TGGE} \tag{3}$$

$$WatP = \frac{Revenue}{TW} \tag{4}$$

$$WastP = \frac{Revenue}{(TWG - TWRR)} \tag{5}$$

where $Revenue$ is the total revenue in US$, TEC is the total energy consumption, $TGGE$ is the total greenhouse gaz emissions in co_2, TW is the total water in m_3, TWG is the total waste generated in metric tons and $TWRR$ is the total waste recycled and reused in metric tons.

3.4 Control Variables

Several scholars (Telle 2006, McWilliams, Siegel, and Wright (2006), Surroca, Tribó, and Waddock (2010)) have argued that misspecified models may be the reason for the inconsistency of the empirical results in the CEP-CFP nexus. In order to improve the construct and to avoid the endogeneity issue due to omitted variables (Roberts and Whited 2013), Endrikat, Guenther, and Hoppe (2014) have highlighted potential determinants of the relationship between CEP and CFP : firm size, industry sector, financial risk, R&D activities, advertising intensity and capital structure (i.e leverage). In a meta-analysis study, Lu et al. (2014) argued that growth rate is equally important. Consequently this study use those seven variables control.

The common way to approach *firm size* is to use the natural logarithm of total assets (Delmas, Nairn-Birch, and Lim 2015, Miroshnychenko, Barontini, and Testa (2017)). To approach the company *industry sector* I use the Global Industry Classification Standard (GICS) [2]. A dummy for each industry sector had been included in the model. The Beta/Jensen's alpha (**to be defined**) is adopted as aproxy for *financial risk*. *Capital structure* is approximated with the ratio of long-term debt to common shareholders' equity (shareholders equity minus preferred equity). *R&D activities* had been measured as ... (**see Ycharts**). *Advertising intensity* had been... (**see when find a way to get those data**)

[2] The GICS classification is composed of eleven industry sectors, namely : Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Information Technology, Materials, Pharmaceuticals / Biotechnology, Telecommunication Services and Utilities.

4 Methodology

4.1 Econometric model

Panel data is a common approach to adress the CFP-CEP nexus (Albertini 2013). Panel data, also called longitudinal data include observations on N cross section units (i.e., firms) over T time-periods (Hsiao 2007a). Bell and Jones (2015) make a clear distinction between panel data and time-series cross-sectional (i.e. TSCS) data and highlights that the difference lies partly in its sample structure. TSCS data has comparatively few higher-level entities (usually groups of individuals such as countries, rather than individuals) and comparatively many measurement of time-periods (Beck and Katz 1995).

Panel data analysis using variation in both individuals and time dimensions is considered to be one of the most efficient analytical methods for data analysis(Dimitrios Asteriou 2006). It usually contains more degrees of freedom, less collinearity among the variables, more efficiency and more sample variability than one-dimensional method (i.e.cross-sectional data and time series data) giving a more accurate inference of the parameters estimated in the model (Hsiao 2007b, Hsiao (2014)). Roberts and Whited (2013) also argued that using panel data offer a partial, but by no means complete and costless, solution to the problem of omitted variables in model, namely the most common causes of endogeneity in empirical corporate finance. Consequently this study use equation 6 to test the combined effect of process and outcome-based CEP on CFP (short term vs long term).

$$
\begin{aligned}
Y_{it+1} = \quad & \beta_0 + \beta_1(SPL_{it}) \\
& +\beta_2(STC_{it}) + \beta_3(A_{it}) \\
& +\beta_4(EnP_{it}) + \beta_5(CaP_{it}) \\
& +\beta_6(WatP_{it}) + \beta_7(WastP_{it}) \\
& +(Controls_{it}) + \varepsilon_{it}
\end{aligned} \tag{6}
$$

where Y_{it+1} is a proxy of CFP measured as ROA (i.e. Model 1) or Tobin's Q (i.e. Model 2), SPL_{it} is a proxy for a firm's sustainability pay link, STC_{it} is a proxy for a firm's sustainability themed commitment, A_{it} is a proxy for a firm's audit score, EP_{it} is a proxy for a firm's energy productivity, CP_{it} is a proxy for a firm's carbon productivity, $WatP_{it}$ is a proxy for a firm's water productivity, $WasP_{it}$ is a proxy for a firm's waste productivity, $Controls_{it}$ is a vector of control variables that includes firm size, industry sector, financial risk, R&D activities, advertising intensity and capital structure and lastly ε_{it} which is the error term.

FE vs RE based on (Bell and Jones 2015) –> développez + appliquer sa méthode?

Panel data setting implies that endogeneity occurs in cases where the independent variable in a regression model is correlated with the error term, or due to simultaneous causality between the dependent and the independent variable (Sánchez-Ballesta and García-Meca 2007, Biørn and Krishnakumar (2008), Roberts and Whited (2013)). Consequently, the presence of endogeneity implies that the fourth and fifth assumptions of OLS[3] are violated and scholars have to use a different method to produce consistent estimators (Wooldridge 2008, Roberts and Whited (2013)). Recent meta-analysis provided evidences that the CFP-CEP nexus is characterized by a bidirectional causality (Orlitzky and Benjamin 2001, Orlitzky, Schmidt, and Rynes (2003), Wu (2006), Albertini (2013), Dixon-Fowler et al. (2013), Endrikat, Guenther, and Hoppe (2014), Lu et al. (2014), Wang, Dou, and Jia (2016), Busch and Friede (2018)). In order to adress potential endogeneity problems in my model, firstly, I have lagged observations in dependent and control variables one year behind financial performance. This method allows to increase the confidence of the direction of the relationship (Hart and Ahuja 1996, Delmas, Nairn-Birch, and Lim (2015), Miroshnychenko, Barontini, and Testa (2017)) and *in fine* reduce the potential simultaneity bias. Secondly, given that the standard Hausman test had rejected the null hypothesis of random effect (see Annex... for results of the test or find a way to insert p-value in the table of regression idem for cross sectionnal dependence) I use a fixed effect model to regress the equation 6. According to Roberts and Whited (2013), fixed effect model improve endogeneity concerns.

4.2 Outliers treatment

Lyu (2015) defines outliers as observations in the dataset that appear to be unusual and discordant and which could lead to inconsistent results. Osborne and Overbay (2004) 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 [4] (Cousineau and Chartier 2010). I have used the Cook's distance (Cook 1977) test which is a common statistical tool to assess the influence of outliers (JP Stevens 1984, Cousineau and Chartier (2010), Zuur, Ieno, and Elphick (2010)). Cook's Distance observe 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 (Orr John, Sackett Paul, and Dubois Cathy 1991, Cousineau and Chartier (2010)). Tabachnick and Fidell (2007) argue that the imputation with the mean is the best method while Cousineau

[3]Five assumptions are required to produce consistent estimators with OLS : (i) a random sample of observations on y and $(x_1, ..., x_n)$, (ii) a mean zero error term, (iii) no linear relationship among the explanatory variables, (iv) an error term that is uncorrelated with each explanatory variables and (v) an error term with zero mean conditional on the explanatory variables.

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

and Chartier (2010) highlights that it tends to reduce the spread of the population, make the observed distribution more leptokurtic, and possibly increase the likelihood of a type-I error. Dang, Serfling, and Zhou (2009) argues that more elaborate technique involves replacing outliers with possible values while Barnett and Lewis (1994) would prefere to remove or windsorized them. Alternatively, Pollet and Meij (2017) propose an 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 Pollet and Meij (2017), I have concluded that model 1 using ROA as CFP proxies give better results with outliers and model 2 using Tobin's Q as CFP proxies give better results without outliers. See annex outliers for furthers details.

4.3 Sensitivity Analysis

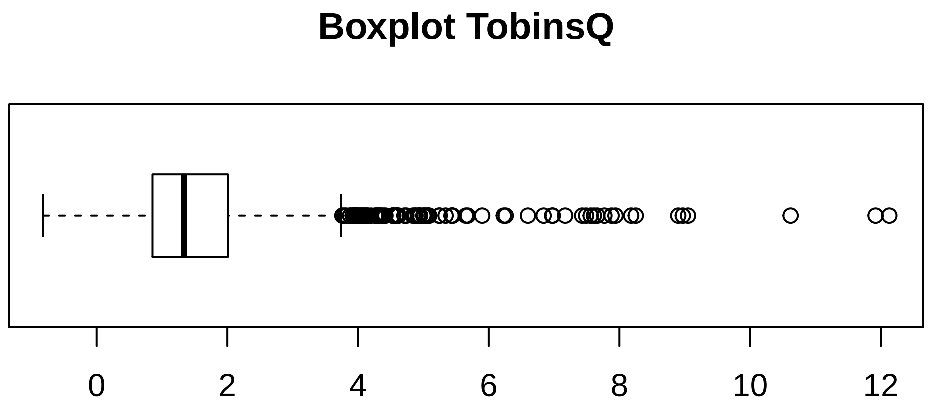
Take ROE as another proxy of short term CFP. I need to find an other proxy for market-based indicator. I will also consider ESG factor of yahoo finance as a proxy for CEP.

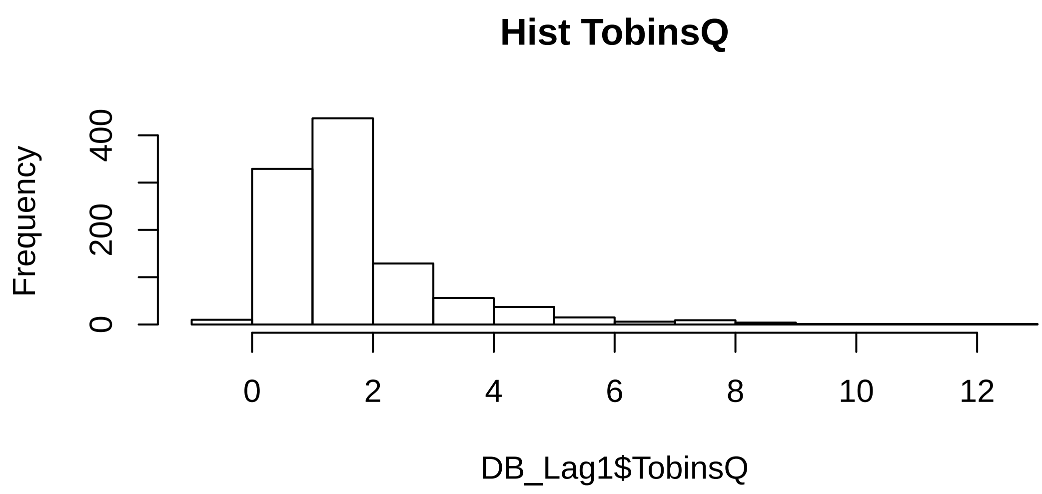
To be continued…

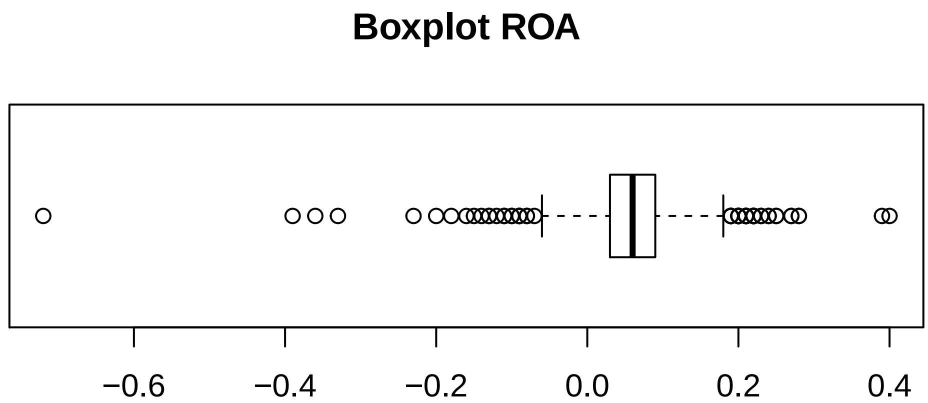
5 Results

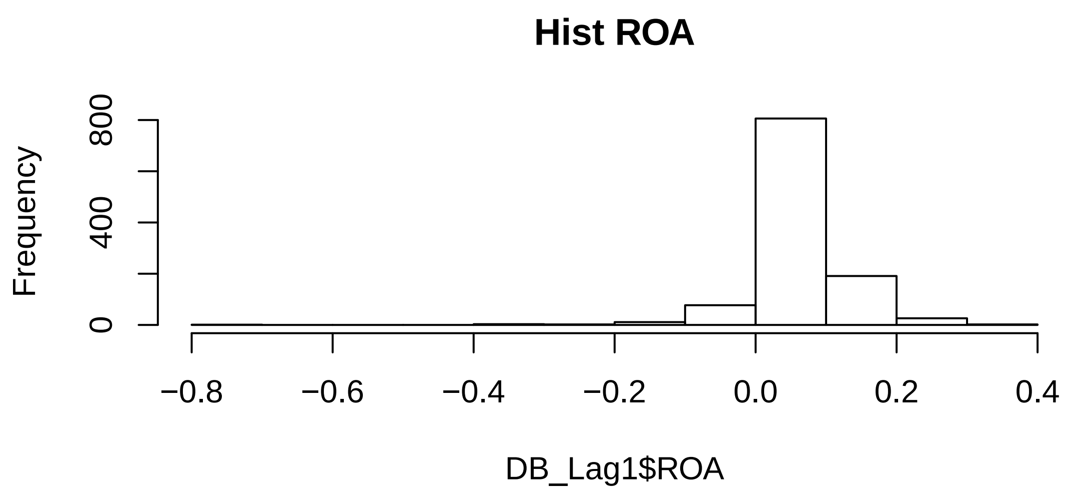
5.1 Descriptive Statistics

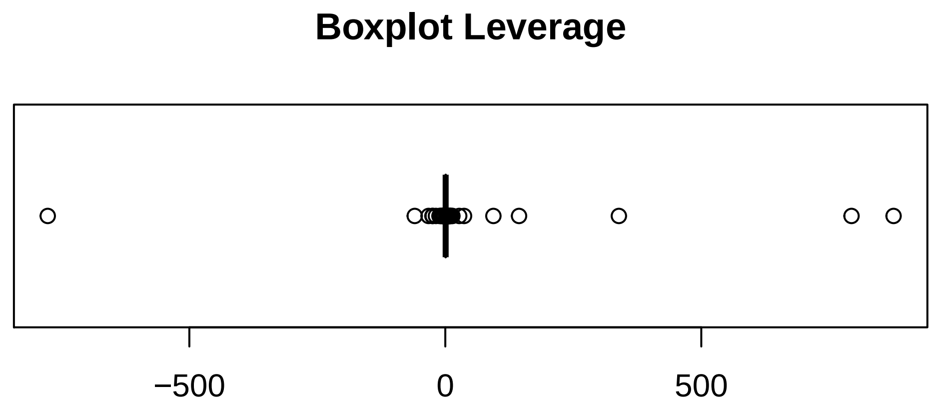
5.2 Some boxplots and histogram

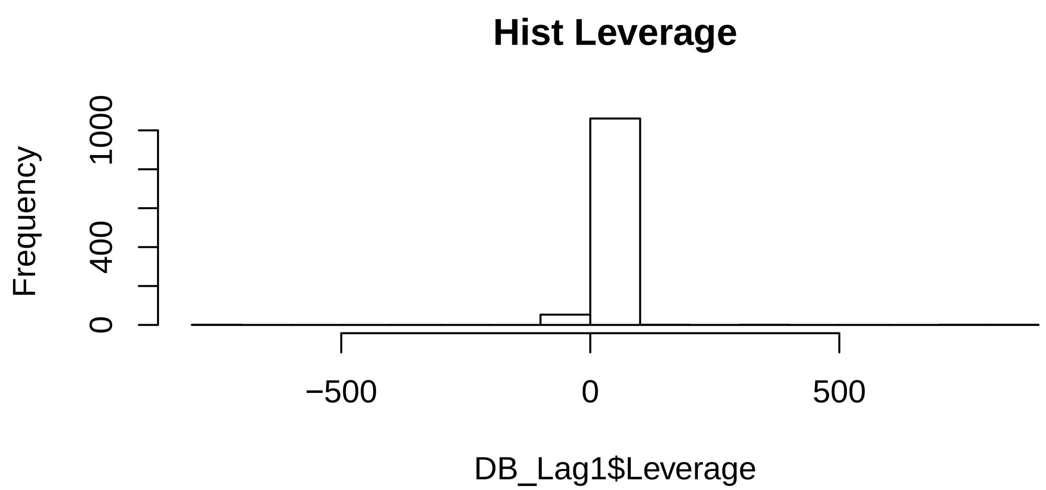


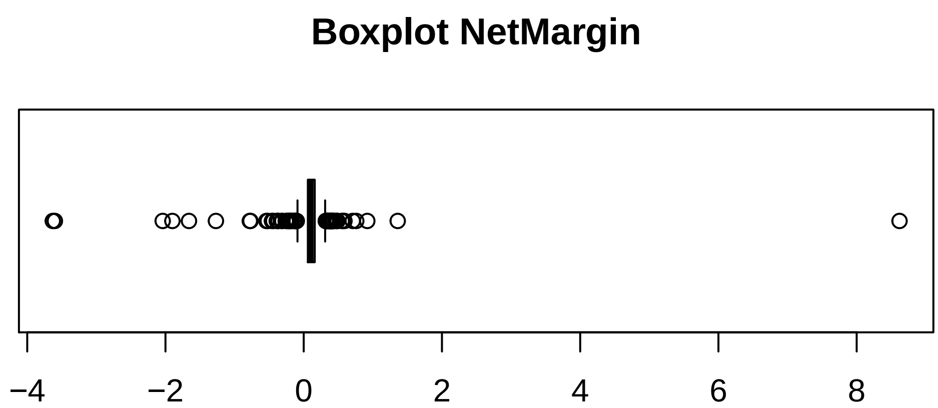


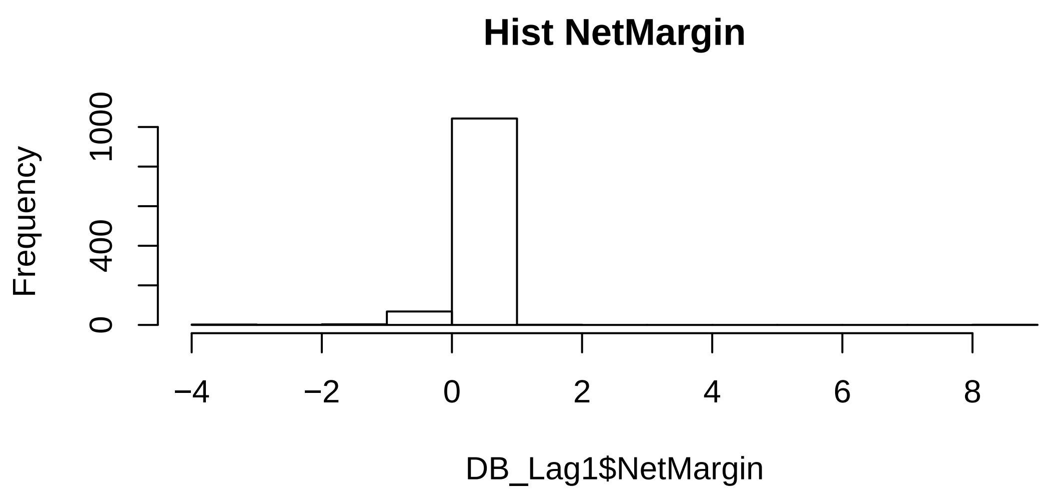

Boxplot ROA
−0.6
−0.4
−0.2
0.0
0.2
0.4

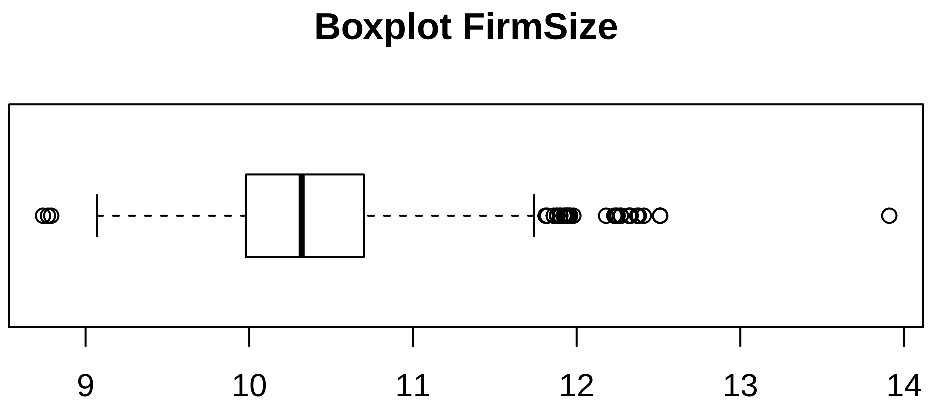

Hist ROA
Frequency
0
400
800
−0.8
−0.6
−0.4
−0.2
0.0
0.2
0.4
DB_Lag1$ROA

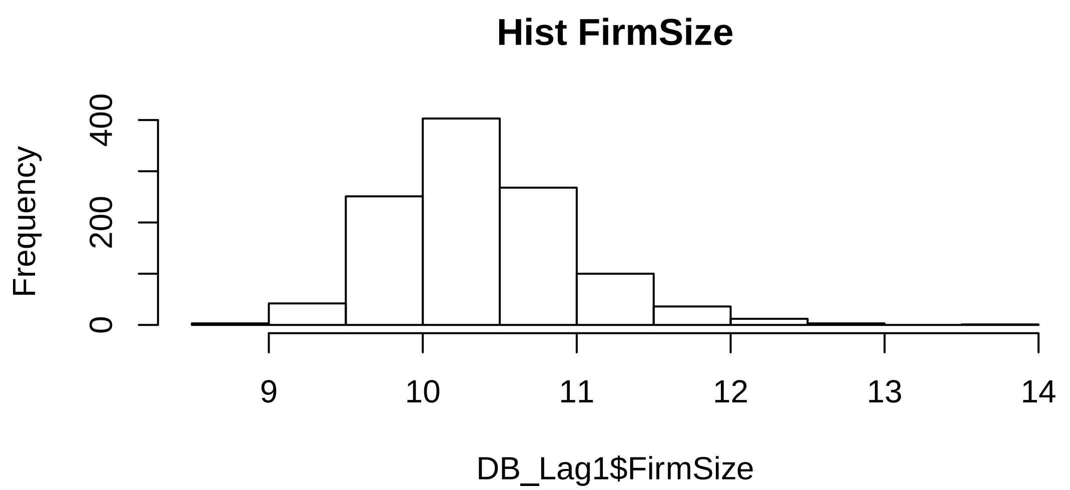

Boxplot Leverage
−500
0
500


Hist Leverage
Frequency
0
400
1000
−500
0
500
DB_Lag1$Leverage


Boxplot NetMargin
−4
−2
0
2
4
6
8


Hist NetMargin
Frequency
0
400
1000
−4
−2
0
2
4
6
8
DB_Lag1$NetMargin

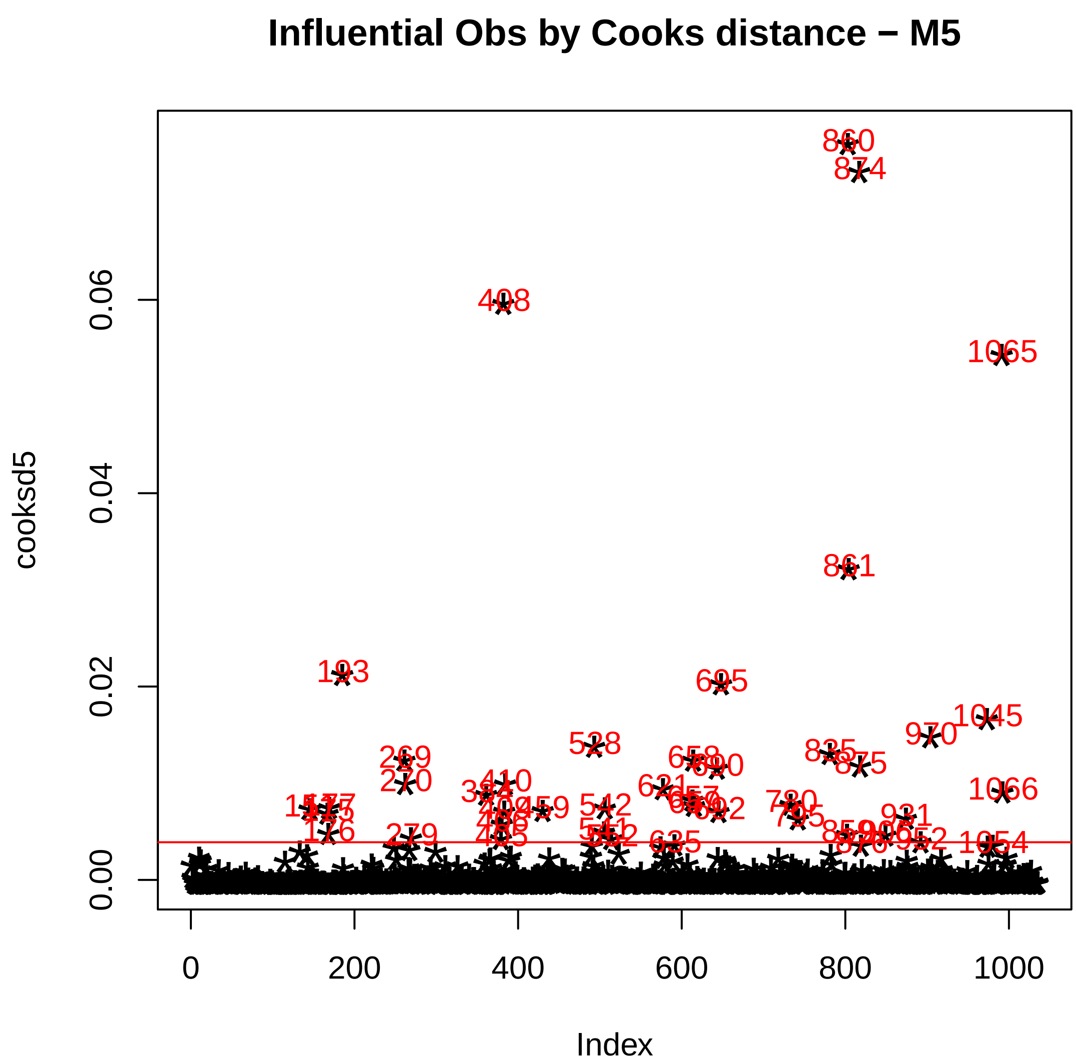

Boxplot FirmSize
9
10
11
12
13
14

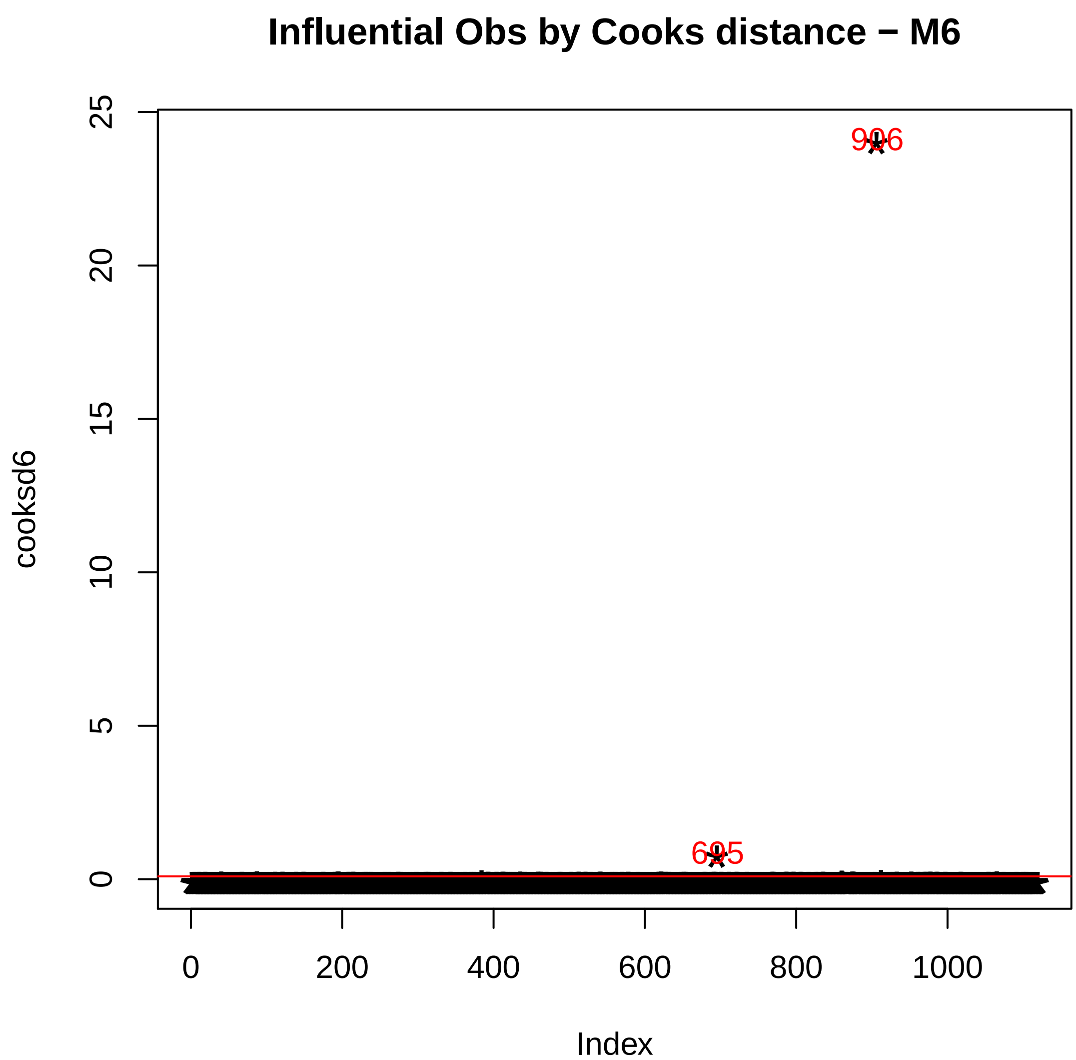

Hist FirmSize
Frequency
0
200
400
9
10
11
12
13
14
DB_Lag1$FirmSize

5.3 Cooks Distance

This section will not be in the final document. Here I measure the cook's distance of my model 5 and 6. Cook's distance is a measure computed with respect to a given regression model and therefore is impacted only by the X variables included in the model. Cook's distance computes the influence exerted by each data point (row) on the predicted outcome. I summarise on a graph (i.e. one for each model), those observations that have a cook's distance greater than 4 times the mean and which may be classified as influential. I want to detect which observations is an outlier. See below both graphics.

Should I redo this process for each Model?





Here the function outlierTest from *car* package gives the most extreme observation based on the given model. **Should I remove those observations from my database?**

```
##        rstudent unadjusted p-value Bonferonni p
## 906 -16.974126         1.3160e-57   1.4727e-54
## 695  -9.328576         5.6696e-20   6.3443e-17
## 87   -7.511830         1.1989e-13   1.3415e-10
## 860  -5.344184         1.1025e-07   1.2337e-04
## 912  -5.319149         1.2612e-07   1.4112e-04
## 195   5.318096         1.2683e-07   1.4192e-04
## 194   5.143142         3.1939e-07   3.5740e-04
```

```
## 861  -4.475985         8.3930e-06   9.3918e-03
```

```
##      rstudent unadjusted p-value Bonferonni p
## 861 7.378343         3.3123e-13   3.4283e-10
## 860 7.125634         1.9541e-12   2.0225e-09
## 874 6.916053         8.1746e-12   8.4607e-09
## 658 6.378093         2.7118e-10   2.8067e-07
## 408 5.804558         8.6055e-09   8.9067e-06
## 659 5.140279         3.2859e-07   3.4009e-04
## 657 4.831031         1.5661e-06   1.6209e-03
## 151 4.618573         4.3562e-06   4.5087e-03
## 406 4.448749         9.5839e-06   9.9194e-03
## 269 4.134028         3.8568e-05   3.9918e-02
```

6 Discussion

Let's speak...

Conclusion

This is my conclusion…

Appendix

Appendix A : Outliers

First I measure the cook's distance of my models. Observations that have a cook's distance greater than 4 times the mean are considered as influential and are summarized in figures 6.1, 6.2 and 6.3.

```
Companies Year          Ra   ROA   ROE TobinsQ AlphaJensen
```

87 128 2015 -0.35634138 -0.39 -1.01 0.84 -0.31495564 695 32 2015 -0.10067229 -0.72 -1.62 0.93 -0.07101781 906 389 2015 -0.04402664 0.06 0.60 1.40 -0.01423819 CarbonProductivity WaterProductivity WasteProductivity 87 0.08 0.08 0.00 695 0.04 0.00 0.00 906 0.09 0.05 0.04 EnergyProductivity SustainabilityPayLink SustainableThemedCommitment 87 0.00 1 1 695 0.00 1 0 906 0.08 1 1 AuditScore FirmSize Leverage NetMargin Industry Beta 87 1 10.47 1.72 0.08 3 1.911785 695 1 10.28 3.54 -3.63 3 1.371174 906 1 9.99 5.22 8.62 1 1.377348 Companies Year Ra ROA ROE TobinsQ AlphaJensen 175 156 2013 0.127380439 0.03 -0.73 1.03 -0.10124740 176 156 2014 -0.169292057 0.00 -0.11 1.03 -0.16753157 177 156 2015 -0.242467824 0.00 -0.08 1.03 -0.21502220 193 161 2013 0.003869318 0.14 0.28 5.25 -0.05460717 235 174 2013 0.016699218 0.00 0.01 0.05 -0.01584460 339 208 2015 -0.457272090 0.07 0.01 0.91 -0.43264394 CarbonProductivity WaterProductivity WasteProductivity 175 0.00 0.00 0 176 0.00 0.00 0 177 0.00 0.00 0 193 0.83 0.00 0 235 0.29 0.04 0 339 0.01 0.00 0 EnergyProductivity SustainabilityPayLink SustainableThemedCommitment 175 0.00 0 0 176 0.00 0 0 177 0.00 0 0 193 0.88 0 0 235 0.12 1 1 339 0.00 0 0 AuditScore FirmSize Leverage NetMargin Industry Beta 175 0 12.51 339.01 -0.05 4 8.136222 176 0 12.51 875.59 -0.05 4 2.934143 177 0 12.51 793.47 -0.01 4 1.269384 193 0 10.35 0.35 0.27 5 2.081014 235 1 11.44 0.33 0.01 4 1.158143 339 0 10.92 1.21 0.05 3 1.139546 Companies Year Ra ROA ROE TobinsQ AlphaJensen 40 111 2013 -0.053511418 0.22 2.22 NA -0.120841296 175 156 2013 0.127380439 0.03 -0.73 1.03 -0.101247399 176 156 2014 -0.169292057 0.00 -0.11 1.03 -0.167531570 177 156 2015 -0.242467824 0.00 -0.08 1.03 -0.215022198 336 207 2015 0.073454769 0.11 3.65 3.57 0.091583025 363 215 2015 0.004287896 0.11 -2.54 4.00 0.009278811 CarbonProductivity WaterProductivity WasteProductivity 40 0.30 0.89 0.77 175 0.00 0.00 0.00 176 0.00 0.00 0.00 177 0.00 0.00 0.00 336 0.02 0.02 0.01 363 0.06 0.00 0.00 EnergyProductivity SustainabilityPayLink SustainableThemedCommitment 40 0.12 1 1 175 0.00 0 0 176 0.00 0 0 177 0.00 0 0 336 0.03 1 1 363 0.00 1 0 AuditScore FirmSize Leverage NetMargin Industry Beta 40 1 10.72 0.84 0.28 6 2.3960811 175 0 12.51 339.01 -0.05 4 8.1362220 176 0 12.51 875.59 -0.05 4 2.9341434 177 0 12.51 793.47 -0.01 4 1.2693837 336 1 10.17 8.57 0.19 2 0.8400118 363 1 9.90 -8.76 0.07 1 0.2346044 Companies Year Ra ROA ROE TobinsQ AlphaJensen 40 111 2013 -0.05351142 0.22 2.22 NA -0.1208413 52 116 2013 -0.12946070 0.09 0.21 1.18 -0.1288045 87 128 2015 -0.35634138 -0.39 -1.01 0.84

-0.3149556 145 147 2013 -0.10159427 0.04 0.34 0.40 -0.1306005 175 156 2013 0.12738044 0.03 -0.73 1.03 -0.1012474 177 156 2015 -0.24246782 0.00 -0.08 1.03 -0.2150222 CarbonProductivity WaterProductivity WasteProductivity 40 0.30 0.89 0.77 52 0.25 0.48 0.14 87 0.08 0.08 0.00 145 0.35 0.70 0.65 175 0.00 0.00 0.00 177 0.00 0.00 0.00 EnergyProductivity SustainabilityPayLink SustainableThemedCommitment 40 0.12 1 1 52 0.18 1 1 87 0.00 1 1 145 0.57 1 1 175 0.00 0 0 177 0.00 0 0 AuditScore FirmSize Leverage NetMargin Industry Beta 40 1 10.72 0.84 0.28 6 2.39608109 52 0 9.95 0.79 0.12 5 -0.02335071 87 1 10.47 1.72 0.08 3 1.91178492 145 0 11.31 4.35 0.05 1 1.03225025 175 0 12.51 339.01 -0.05 4 8.13622199 177 0 12.51 793.47 -0.01 4 1.26938370 Companies Year Ra ROA ROE TobinsQ AlphaJensen 40 111 2013 -0.05351142 0.22 2.22 NA -0.12084130 139 145 2013 0.08959874 0.03 0.11 1.47 0.10163216 175 156 2013 0.12738044 0.03 -0.73 1.03 -0.10124740 176 156 2014 -0.16929206 0.00 -0.11 1.03 -0.16753157 177 156 2015 -0.24246782 0.00 -0.08 1.03 -0.21502220 307 2 2013 0.07267722 0.08 0.28 0.36 -0.03982472 CarbonProductivity WaterProductivity WasteProductivity 40 0.30 0.89 0.77 139 0.79 0.00 0.00 175 0.00 0.00 0.00 176 0.00 0.00 0.00 177 0.00 0.00 0.00 307 0.14 0.16 0.23 EnergyProductivity SustainabilityPayLink SustainableThemedCommitment 40 0.12 1 1 139 0.97 0 0 175 0.00 0 0 176 0.00 0 0 177 0.00 0 0 307 0.05 1 1 AuditScore FirmSize Leverage NetMargin Industry Beta 40 1 10.72 0.84 0.28 6 2.3960811 139 0 9.89 0.58 0.05 1 -0.4282355 175 0 12.51 339.01 -0.05 4 8.1362220 176 0 12.51 875.59 -0.05 4 2.9341434 177 0 12.51 793.47 -0.01 4 1.2693837 307 0 10.63 0.69 0.06 6 4.0036277

Table 6.1: Model 1 - Energy

	Dependent variable:	
	ROA	
	(1)	(2)
SustainabilityPayLink	−0.001	0.002
	(0.004)	(0.003)
SustainableThemedCommitment	0.009	0.012***
	(0.005)	(0.004)
AuditScore	−0.004	−0.002
	(0.005)	(0.004)
CarbonProductivity	−0.025	−0.009
	(0.017)	(0.012)
EnergyProductivity	0.012	−0.004
	(0.014)	(0.010)
WaterProductivity	0.032***	0.023***
	(0.012)	(0.008)
WasteProductivity	0.004	0.005
	(0.012)	(0.008)
Leverage	−0.00000	−0.00002
	(0.00004)	(0.00003)
NetMargin	0.056***	0.173***
	(0.004)	(0.007)
FirmSize	−0.026***	−0.034***
	(0.004)	(0.004)
Industry	−0.003***	−0.003***
	(0.001)	(0.001)
AlphaJensen	0.101***	0.007
	(0.023)	(0.016)
Constant	0.341***	0.403***
	(0.045)	(0.038)
Observations	1,119	1,116
R^2	0.191	0.387
Adjusted R^2	0.182	0.381
F Statistic	21.752*** (df = 12; 1106)	58.138*** (df = 12; 1103)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 6.2: Model 1 - No Energy

	Dependent variable:	
	ROA	
	(1)	(2)
SustainabilityPayLink	−0.001	0.002
	(0.004)	(0.003)
SustainableThemedCommitment	0.009*	0.012***
	(0.005)	(0.004)
AuditScore	−0.004	−0.002
	(0.005)	(0.004)
CarbonProductivity	−0.013	−0.012*
	(0.011)	(0.007)
WaterProductivity	0.034***	0.022***
	(0.012)	(0.008)
WasteProductivity	0.002	0.006
	(0.012)	(0.008)
Leverage	−0.00000	−0.00002
	(0.00004)	(0.00003)
NetMargin	0.056***	0.173***
	(0.004)	(0.007)
FirmSize	−0.027***	−0.034***
	(0.004)	(0.004)
Industry	−0.003***	−0.003***
	(0.001)	(0.001)
AlphaJensen	0.101***	0.007
	(0.023)	(0.016)
Constant	0.342***	0.403***
	(0.045)	(0.038)
Observations	1,119	1,116
R^2	0.190	0.387
Adjusted R^2	0.182	0.381
F Statistic	23.673*** (df = 11; 1107)	63.449*** (df = 11; 1104)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 6.3: Model 1 - Short Version

	Dependent variable:
	ROA
SustainabilityPayLink	0.001
	(0.003)
SustainableThemedCommitment	0.012***
	(0.004)
AuditScore	−0.002
	(0.004)
Leverage	−0.00002
	(0.00003)
NetMargin	0.175***
	(0.007)
FirmSize	−0.034***
	(0.004)
Industry	−0.003***
	(0.001)
AlphaJensen	0.005
	(0.016)
Constant	0.403***
	(0.039)
Observations	1,116
R^2	0.380
Adjusted R^2	0.375
F Statistic	84.683*** (df = 8; 1107)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 6.4: Model 1 - Short Version

	Dependent variable:
	ROA
CarbonProductivity	-0.014^{*}
	(0.007)
WaterProductivity	0.023^{***}
	(0.008)
WasteProductivity	0.004
	(0.008)
Leverage	-0.00002
	(0.00003)
NetMargin	0.173^{***}
	(0.007)
FirmSize	-0.032^{***}
	(0.004)
Industry	-0.003^{***}
	(0.001)
AlphaJensen	0.009
	(0.016)
Constant	0.387^{***}
	(0.038)
Observations	1,116
R^2	0.381
Adjusted R^2	0.377
F Statistic	85.180^{***} (df = 8; 1107)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 6.5: Model 2 - Comparaison with and without outliers

	Dependent variable:	
	log(TobinsQ)	
	(1)	(2)
SustainabilityPayLink	0.035	0.031
	(0.026)	(0.025)
SustainableThemedCommitment	0.032	0.070^{**}
	(0.037)	(0.035)
AuditScore	0.036	0.070^{**}
	(0.036)	(0.034)
CarbonProductivity	−0.019	−0.059
	(0.057)	(0.056)
WaterProductivity	0.057	0.082
	(0.063)	(0.062)
WasteProductivity	-0.172^{***}	-0.175^{***}
	(0.062)	(0.062)
Leverage	0.0001	−0.001
	(0.0002)	(0.002)
NetMargin	−0.011	0.024
	(0.022)	(0.058)
FirmSize	-0.694^{***}	-1.028^{***}
	(0.045)	(0.050)
Industry	−0.021	-0.024^{**}
	(0.013)	(0.012)
AlphaJensen	0.761^{***}	0.767^{***}
	(0.125)	(0.127)
Constant	7.496^{***}	10.946^{***}
	(0.464)	(0.513)
Observations	1,025	995
R^2	0.227	0.333
Adjusted R^2	0.218	0.326
F Statistic	26.974^{***} (df = 11; 1013)	44.614^{***} (df = 11; 983)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 6.6: Model 3 - Comparaison with and without outliers

	Dependent variable:	
	ROE	
	(1)	(2)
SustainabilityPayLink	0.007	0.010
	(0.029)	(0.016)
SustainableThemedCommitment	0.141***	0.066***
	(0.035)	(0.020)
AuditScore	0.003	−0.005
	(0.035)	(0.020)
CarbonProductivity	−0.103	−0.056
	(0.070)	(0.037)
WaterProductivity	0.084	0.046
	(0.079)	(0.042)
WasteProductivity	0.076	0.009
	(0.077)	(0.041)
Leverage	0.003***	−0.007***
	(0.0003)	(0.001)
NetMargin	0.111***	0.516***
	(0.028)	(0.043)
FirmSize	−0.099***	−0.050***
	(0.030)	(0.018)
Industry	−0.005	−0.003
	(0.007)	(0.004)
AlphaJensen	0.351**	0.170**
	(0.152)	(0.082)
Constant	1.140***	0.620***
	(0.306)	(0.182)
Observations	1,119	1,103
R^2	0.135	0.160
Adjusted R^2	0.126	0.151
F Statistic	15.719*** (df = 11; 1107)	18.864*** (df = 11; 1091)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 6.7: Model 4 - Comparaison with and without outliers

	Dependent variable:	
	AlphaJensen	
	(1)	(2)
SustainabilityPayLink	0.0002	0.00003
	(0.004)	(0.003)
SustainableThemedCommitment	0.001	0.002
	(0.004)	(0.003)
AuditScore	0.002	0.001
	(0.004)	(0.003)
CarbonProductivity	−0.004	−0.011
	(0.012)	(0.010)
WaterProductivity	−0.004	0.004
	(0.014)	(0.012)
WasteProductivity	0.003	−0.001
	(0.014)	(0.012)
Leverage	−0.0001***	−0.0002***
	(0.00004)	(0.0001)
NetMargin	0.014***	0.019**
	(0.005)	(0.008)
FirmSize	−0.003	−0.002
	(0.003)	(0.003)
Industry	0.001	0.0003
	(0.001)	(0.001)
Beta	−0.015***	−0.013***
	(0.002)	(0.002)
Constant	0.041	0.034
	(0.030)	(0.026)
Observations	1,119	1,097
R^2	0.066	0.054
Adjusted R^2	0.057	0.044
F Statistic	7.145*** (df = 11; 1107)	5.631*** (df = 11; 1085)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 6.8: Model 5 - Comparaison with and without outliers

	Dependent variable:	
	Ra	
	(1)	(2)
SustainabilityPayLink	-0.007^{***}	-0.006^{***}
	(0.002)	(0.001)
SustainableThemedCommitment	-0.001	-0.002
	(0.002)	(0.001)
AuditScore	-0.005^{***}	-0.004^{***}
	(0.002)	(0.001)
CarbonProductivity	0.039^{***}	0.042^{***}
	(0.005)	(0.005)
WaterProductivity	0.012^{**}	0.015^{***}
	(0.006)	(0.005)
WasteProductivity	0.017^{***}	0.013^{**}
	(0.006)	(0.005)
Leverage	0.00003^{**}	0.00004
	(0.00002)	(0.00002)
NetMargin	0.001	0.005
	(0.002)	(0.004)
FirmSize	0.001	0.0003
	(0.001)	(0.001)
Industry	0.00003	0.00003
	(0.0003)	(0.0002)
AlphaJensen	0.998^{***}	1.010^{***}
	(0.012)	(0.012)
Constant	-0.012	-0.003
	(0.012)	(0.011)
Observations	1,119	1,096
R^2	0.869	0.881
Adjusted R^2	0.868	0.880
F Statistic	668.889^{***} (df = 11; 1107)	727.925^{***} (df = 11; 1084)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 6.9: Hausman Test PValue

Model	P-Value
Model 1 without outliers	0.0249
Model 2 without outliers	0.9994
Model 3 without outliers	0
Model 5 without outliers	0

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Table 6.10: Fixed Effect Model - NoOutlier NoEnergy (1/2)

	Dependent variable:		
	ROA	log(TobinsQ)	ROE
	(1)	(2)	(3)
SustainabilityPayLink	0.001	0.027	−0.007
	(0.004)	(0.026)	(0.018)
SustainableThemedCommitment	0.019***	0.070*	0.049*
	(0.006)	(0.040)	(0.029)
AuditScore	−0.001	0.050	−0.013
	(0.006)	(0.038)	(0.028)
CarbonProductivity	−0.014*	−0.065	−0.085**
	(0.008)	(0.056)	(0.039)
WaterProductivity	0.022**	0.071	0.051
	(0.008)	(0.061)	(0.044)
WasteProductivity	0.007	−0.175***	−0.004
	(0.008)	(0.062)	(0.043)
Leverage	−0.00003	−0.002	−0.008***
	(0.00003)	(0.002)	(0.002)
NetMargin	0.185***	0.024	0.503***
	(0.008)	(0.060)	(0.047)
FirmSize	−0.025***	−0.873***	−0.031
	(0.007)	(0.092)	(0.034)
AlphaJensen	0.005	0.732***	0.191**
	(0.016)	(0.126)	(0.084)
Observations	1,116	995	1,103
R^2	0.438	0.190	0.185
Adjusted R^2	0.144	−0.255	−0.244
F Statistic	57.114*** (df = 10; 732)	15.025*** (df = 10; 642)	16.376*** (df = 10;

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

Table 6.11: Fixed Effect Model - NoOutlier NoEnergy (2/2)

	Dependent variable:
	Ra
SustainabilityPayLink	-0.013^{***}
	(0.003)
SustainableThemedCommitment	-0.009^{*}
	(0.005)
AuditScore	-0.023^{***}
	(0.005)
CarbonProductivity	0.048^{***}
	(0.007)
WaterProductivity	0.017^{**}
	(0.008)
WasteProductivity	0.012
	(0.007)
Leverage	0.00004
	(0.00003)
NetMargin	0.013^{*}
	(0.008)
FirmSize	-0.015^{**}
	(0.006)
AlphaJensen	1.027^{***}
	(0.015)
Observations	1,096
R^2	0.877
Adjusted R^2	0.812
F Statistic	510.394^{***} (df = 10; 713)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 6.12: Best RE Model - No out 1/2

	Dependent variable:	
	ROA	ROE
	(1)	(2)
SustainabilityPayLink	0.002	0.010
	(0.003)	(0.016)
SustainableThemedCommitment	0.012***	0.066***
	(0.004)	(0.020)
AuditScore	−0.002	−0.005
	(0.004)	(0.020)
CarbonProductivity	−0.012*	−0.056
	(0.007)	(0.037)
WaterProductivity	0.022***	0.046
	(0.008)	(0.042)
WasteProductivity	0.006	0.009
	(0.008)	(0.041)
Leverage	−0.00002	−0.007***
	(0.00003)	(0.001)
NetMargin	0.173***	0.516***
	(0.007)	(0.043)
FirmSize	−0.034***	−0.050***
	(0.004)	(0.018)
Industry	−0.003***	−0.003
	(0.001)	(0.004)
AlphaJensen	0.007	0.170**
	(0.016)	(0.082)
Constant	0.403***	0.620***
	(0.038)	(0.182)
Observations	1,116	1,103
R^2	0.387	0.160
Adjusted R^2	0.381	0.151
F Statistic	63.449*** (df = 11; 1104)	18.864*** (df = 11; 1091)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 6.13: Best RE Model - No out 2/2

	Dependent variable:	
	log(TobinsQ)	Ra
	(1)	(2)
SustainabilityPayLink	0.031	−0.006***
	(0.025)	(0.001)
SustainableThemedCommitment	0.070**	−0.002
	(0.035)	(0.001)
AuditScore	0.070**	−0.004***
	(0.034)	(0.001)
CarbonProductivity	−0.059	0.042***
	(0.056)	(0.005)
WaterProductivity	0.082	0.015***
	(0.062)	(0.005)
WasteProductivity	−0.175***	0.013**
	(0.062)	(0.005)
Leverage	−0.001	0.00004
	(0.002)	(0.00002)
NetMargin	0.024	0.005
	(0.058)	(0.004)
FirmSize	−1.028***	0.0003
	(0.050)	(0.001)
Industry	−0.024**	0.00003
	(0.012)	(0.0002)
AlphaJensen	0.767***	1.010***
	(0.127)	(0.012)
Constant	10.946***	−0.003
	(0.513)	(0.011)
Observations	995	1,096
R^2	0.333	0.881
Adjusted R^2	0.326	0.880
F Statistic	44.614*** (df = 11; 983)	727.925*** (df = 11; 1084)
Note:		*p<0.1; **p<0.05; ***p<0.01

Figure 6.1: Observations considered as outliers in model 1 (i.e. Roa)

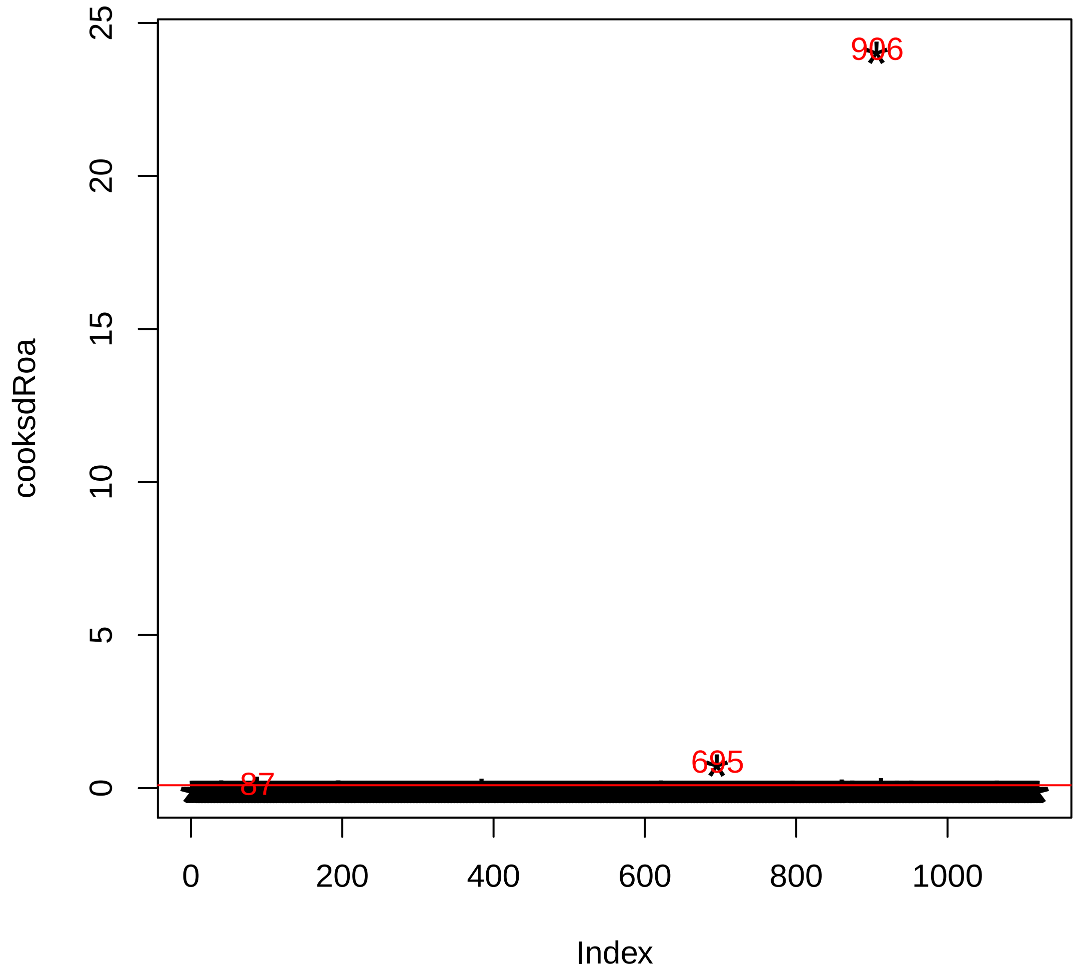

Figure 6.2: Observations considered as outliers in model 2 (i.e. Tobin's Q)

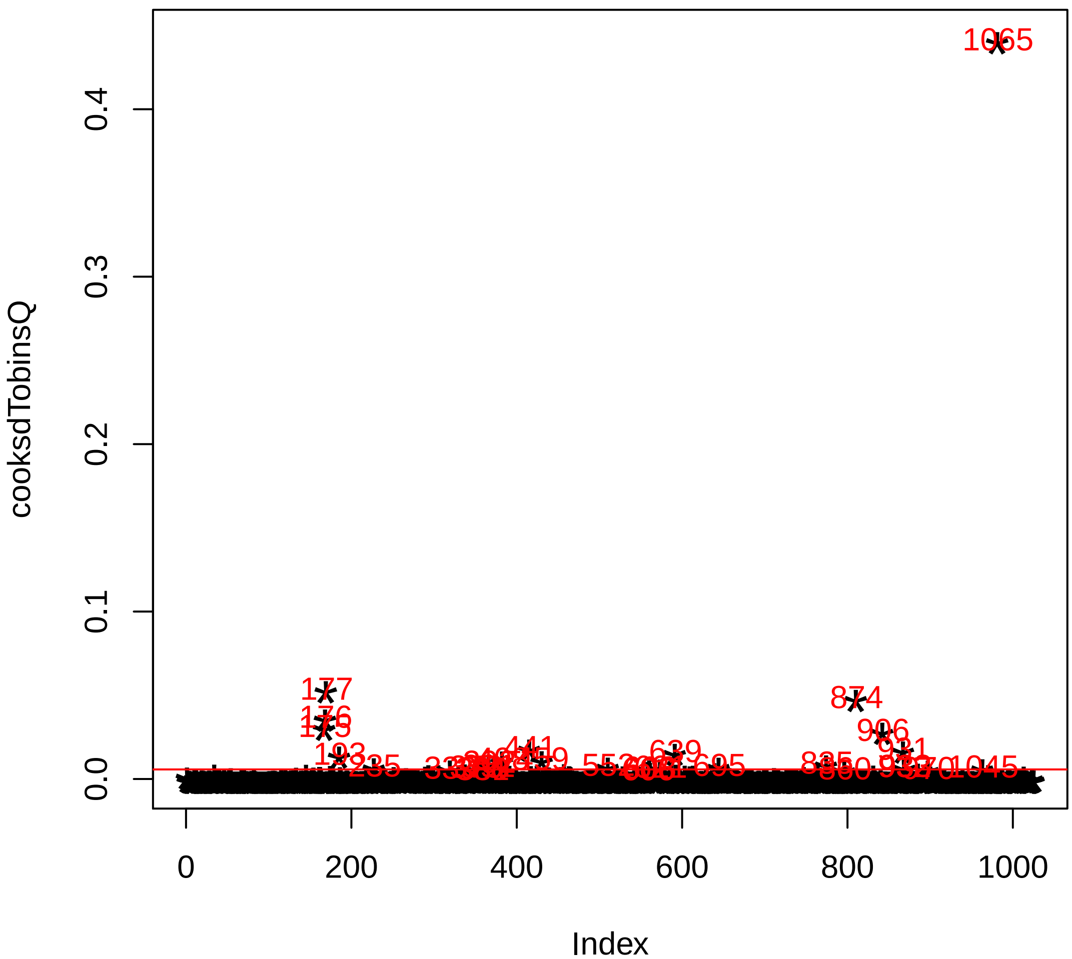

Figure 6.3: Observations considered as outliers in model 1 (i.e. Roe)

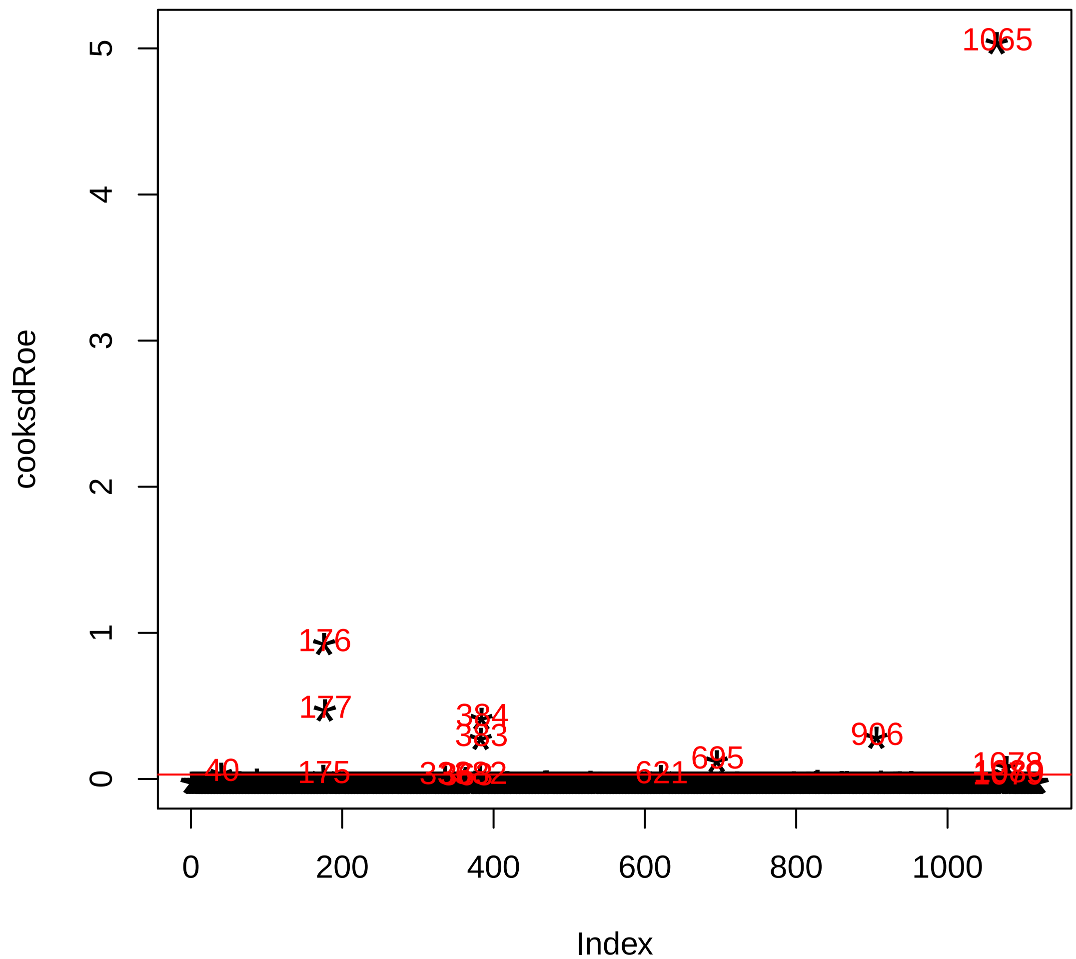

Figure 6.4: Observations considered as outliers in model 4 (i.e. Jensen's Alpha)

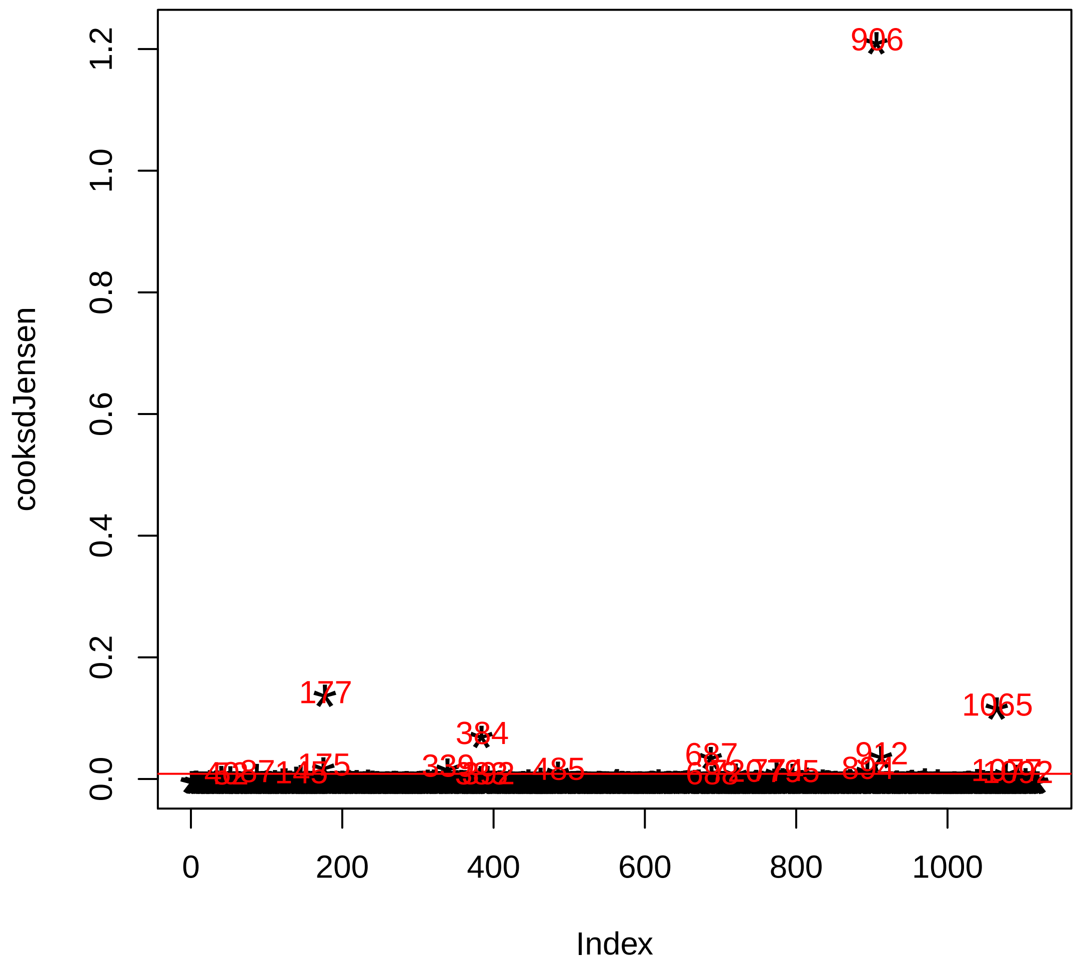

Figure 6.5: Observations considered as outliers in model 5 (i.e.Compounded Returns)