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Mandatory ESG Disclosure and its Effect on Firm Performance

Bachelor Thesis 15 hp

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Abstract

With the intention to reach a more sustainable future, the EU implemented Directive 2014/95/EU in 2014, mandating large and public firms to start disclosing ESG information. The resulting changes are however first noticeable in the annual reports for 2017. As there is ambiguity of whether there are costs associated with mandated ESG disclosure, this thesis explores whether the implemented mandate has affected the concerned European firms' financial performance, measured by ROA, ROE and Tobin's Q.

The research is conducted on a sample from 2014 to 2019, consisting of treatment firms from the EU and benchmark firms from the US. A difference-in-difference research design is utilized on a propensity score matched sample consisting of firms with available ESG-scores for the full time period, i.e. firms which are already disclosing prior to the directive.

The results show negative and significant coefficients for firm performance, meaning that firm performance is indeed affected by the implementation of the directive. It is found that even though the concerned firms previously disclosed ESG information, firm performance is still negatively affected by the mandated disclosure. Thus showcasing that the negative impact is not unique to previously non-disclosing firms as found by earlier research.

Keywords: Financial Firm Performance, Firm Performance, ESG, Non-Financial Information, NFI, CSR, Directive 2014/95/EU, Difference-in-Difference.

Acknowledgement

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1. Introduction

In the first chapter background information, problem description and the purpose of the thesis are all introduced. To conclude the section, a short description of the set limitations are presented.

1.1 Background

Sustainability in aspects such as the environment, social responsibility and corporate governance (ESG)[1] has gradually become more important for firms to uphold.[2] Increasing amounts of shareholders take ESG-related scores into consideration before investing and hence, news concerning misbehaving in ESG-areas can be devastating for firms in acquiring stakeholders.[3] Yet all companies do not report such ESG information in their released statements, perhaps because of fear of exposement of dissatisfactory actions in these areas.[4]

The EU has recognized the importance of firm behaviour in order to be able to reach certain environmental goals such as The United Nations' 17 Sustainable Development Goals and the Paris Climate Agreement. As an attempt to bring more of the ESG-related business of firms into the light and to improve the sustainability of Europe, the EU implemented the Directive 2014/95/EU in 2014, mandating large and public firms to disclose ESG information.[5]

To clarify what is implied with *ESG information*, a definition follows of what the Directive 2014/95/EU demands to be reported. The disclosure should contain enough information to understand "*...the undertaking's development, performance, position and impact of its activity, relating to, as a minimum, environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters, including:*

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[1] Environmental, Social and Corporate Governance (ESG), Corporate Social Responsibility (CSR) and non-financial reporting/information (NFI) are all closely related concepts describing non-financial aspects related to sustainable conduct of firms. The notions are often used interchangeably in papers, and although they are not fully equal, ESG will hereafter be used as a proxy for all three notions throughout the text in order to be consistent.

[2] Kiron, D. (2012), *"Sustainability nears a tipping point",* Strategic Direction, 28(7).

[3] BlackRock (2020) *Sustainable Investing,* BlackRock. [Accessed May 10, 2021]

[4] CSR Europe & GRI (2017). *Member State Implementation of Directive 2014/95/EU. A comprehensive overview of how Member States are implementing the EU Directive of Non-financial and Diversity Information.* Brussels, 1-36; Yelistratova, A., Altenborg, U. & Lu, X. (2010). *Legitimacy in practice - Legitimacy perspective in sustainability reporting of the Swedish property and construction market* (Master thesis) Karlskrona, BTH School of Management, 23-24.

[5] CSR Europe & GRI (2017), 1-36.

(a) *a brief description of the undertaking's business model;*

(b) *a description of the policies pursued by the undertaking in relation to those matters, including due diligence processes implemented;*

(c) *the outcome of those policies;*

(d) *the principal risks related to those matters linked to the undertaking's operations including, where relevant and proportionate, its business relationships, products or services which are likely to cause adverse impacts in those areas, and how the undertaking manages those risks;*

(e) *non-financial key performance indicators relevant to the particular business.". [6]*

Union members were ordered to transpose the Directive 2014/95/EU into their national law by 2016, and companies were expected to comply with the newly formed laws from 2018. As for today, all of the 27 EU member countries, as well as the former member Great Britain, and the two additional countries Norway and Iceland from the European Economic Area (EEA), have implemented the Directive 2014/95/EU. As described, the directive orders large and public companies to, in addition to financial information, also disclose information related to ESG. The member countries had some freedom to define what large companies implies, i.e. the required amounts for balance sheet total, net turnover and average number of employees. However, most countries chose to agree with the EU's suggestion for the definitions of a large company. The directive uses a comply or explain strategy, which means that companies that do not disclose ESG information must have an explanation for the discompliance. If the explanation is not satisfactory, it is up to the member country to decide whether the firm should face repercussions. [7]

The EU's hope of the implementation of the directive is to increase firms' transparency and accountability for environmental as well as social issues. The practise of reporting additional information beside the financial one will make sure that companies which earlier merely complied with existing legal obligations, now can vigorously improve their responsible business conduct and thereby lay grounds for a more sustainable future. Hence, firms' ESG scores are expected to improve. [8]

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[6] The European Parliament and of the Council, Directive 2014/95/EU of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups.
[7] CSR Europe & GRI (2017), 1-36.
[8] ibid.

However, sustainability reporting has been common in the largest firms for years. Consequently, the implementation of the Directive 2014/95/EU and its mandatory ESG reporting is not new practise for everyone. This is because many believe that the opportunity of integrating sustainability with their business will lead to efficiency benefits rather than burdensome disadvantages or costs. The reports from CSR Europe and Global Reporting Initiative (GRI) explain that some of the benefits include: increasing the stakeholder trust in the company, the ethic of being transparent and the continuous improvements regarding social and environmental impacts that can be made. However, they mean that for others, specifically those not used to this kind of information disclosure, the benefits of ESG reporting are more vague. These firms might question these changes and see them rather as a negative implementation resulting in unnecessary costs, partly because of the lack of knowledge of how this kind of reporting can lead to efficiency. [9] Most importantly, mandatory disclosure can lead to an increase in ESG-management costs as companies may not want to disclose poor ESG information to the public, causing less resources to be available for other investments. Details of potential effects are discussed in the literature review later in the thesis. [10] This leads to the issue of the implementation of the Directive 2014/95/EU, which is what this paper will address.

1.2 Problem Description

The main reason behind the Directive 2014/95/EU is to contribute to making European firms more sustainable in the long run. Demanding reporting of ESG information is an attempt on a possible solution for how to reach certain global environmental goals. The directive may aid the sustainability of the EU by bringing more of large firms' ESG-related activities into the light, which could pressure the firms into improving these activities. [11]

However, the acts undertaken in order to improve the ESG-aspects does not come without issues, or more specifically, costs. Additional resources invested on ESG-activities may prevent more profitable investments from being undertaken, leading to a decrease in firms' financial performance. [12] In contrast, it is also possible that the increased sustainability of the

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[9] ibid.
[10] Chen, Y. C., Hung, M. & Wang, Y. (2017). The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. *Journal Of Accounting And Economics,* 65(1): 169-190.
[11] CSR Europe & GRI (2017), 1-36.
[12] Chen et al. (2017), 169-190.

firms can lead to increased performance by improved public reputation, and through that, potentially a lower cost of capital.[13] It is therefore of interest to research what effects the directive ultimately has led to on the concerned firms and if there exists a trade-off between mandated disclosure of ESG and performance.

Earlier research in other countries shows that similar mandates undertaken in other continents led to a decrease in firm performance for firms that did not previously disclose ESG related information. This thesis therefore investigates whether already disclosing European firms concerned by the directive suffer comparable consequences.

1.3 Purpose of the Thesis

The purpose of this thesis is to examine if the mandatory ESG disclosure directive, introduced by EU year 2014, has affected the concerned EU firms' financial performance. There has been a lot of research on the relationship between ESG disclosure on the financial performance of firms. The works of Chen et al. (2017), Wang et al. (2020), Ren et al. (2020), Pham and Tran (2020), as well as Aswani et al. (2021) are just some of them and are the ones that will be discussed in more detail later on in *Chapter 2*. There is also a body of research, although smaller, on the effect of voluntary ESG disclosure on firm performance where one of the earlier works used in this thesis fits in; the one from Pham and Tran (2020). However, research on the effect of mandatory reporting of ESG information is fractional and mostly focused on the chinese market and legislation, as the works of Chen et al. (2017), Wang et al. (2020) and Ren et al. (2020). Thus, in order to contribute to the existing research this essay explores a different market (being EU-companies), as well as a different regulation in comparison to earlier works.

1.4 Research Question

As the purpose of this thesis is to investigate whether the concerned EU firms' financial performance has been affected by the mandatory ESG disclosure directive, the following research question will be addressed:

- Does the implementation of the Directive 2014/95/EU affect the concerned firms' financial performance?

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[13] Richardson, A. J. & Welker, M. (2001). Social disclosure, financial disclosure, and the cost of equity capital. *Accounting, Organizations and Society*, 26(7-8): 597-616.

1.5 Limitations

By consequence of the time frame of the paper, difficulty level and accessibility to information, limitations are set. The time frame does not allow for the authors of this thesis to go through each firm in the sample to conclude whether the firm is disclosing ESG information or not. Therefore, as an identification strategy, ESG scores from Refinitiv Eikon will be used as an analogy for ESG information. The database gathers information of the firms from annual reports, websites, news etc., and if the firm has an available ESG score in the database, it is interpreted as a verification that the firm is disclosing ESG information.

Further, all data is exclusively obtained from Refnitiv Eikon. Thus firms and data are limited to what exists in this database. Additionally a balanced dataset is used, meaning that only firms that have available ESG scores for all the years between 2014-2019 are included in the study. This also means that all the firms in the sample are, according to the set assumptions and limitations, reporting ESG before and after the implementation of the directive. Hence the effect on previously non-disclosing firms is not captured. However, it is not possible to determine whether this reporting during the years of 2014-2019 is mandatory or voluntary for the benchmark firms. This can neither be determined for the years of 2014-2016 for the treatment firms. What can be assumed is only that the ESG disclosure of the treatment firms *after* the year of 2016 are mandated, following the directive.

Finally, a limitation is also set in regards to what is meant with *firm performance*. In this thesis the focus is on *financial* performance when this is mentioned, and this is measured by ROA, ROE and Tobin's Q. Throughout the text expressions as *performance*, *financial performance* or *firm performance* are hence used interchangeably.

2. Review of Previous Literature and Theoretical Models

In the second chapter a summarizing review of earlier research and their results are presented, as well as two theoretical models relevant for the topic of this thesis. Lastly, in section 2.3 a hypothesis is developed based on what the earlier literature and the theoretical models predict.

2.1 Review of Previous Literature

There is a growing body of literature investigating the effects of ESG disclosure on firm performance with an additional environmental aspect to it as well. Both mandatory and voluntary disclosure have been investigated, and most results have been pointing in the same direction. [14] However, there are also some conflicting findings. Hereunder, a discussion of the previous result and its relation to this paper is explored.

Firstly, the article *"The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China."* is the one closest related to this thesis. Chen et al. (2017) explores the effects on firm performance of a mandate implemented in 2008 in China, requiring mandatory ESG reporting for certain firms. The paper concludes that the mandate resulted in a decreased profitability for the concerned firms. One substantial difference between the paper of Chen et al. and this study is that this paper does not exclude already voluntarily disclosing firms, while Chen et al. specifically studies previously non-disclosing firms. [15]

In contrast, Wang et al. (2020) reach another conclusion. They delve into the relationship between environmental information disclosure and financial performance. Hence, they are not differentiating between mandatory and voluntary disclosures, but instead focuses on the general act of disclosing. The research is also conducted on chinese firms and concludes that

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[14] Chen et al. (2017), 169-190.
[15] ibid.

environmental disclosure overall positively impacts firm performance through mediation of visibility and liquidity. [16]

Mandated ESG disclosing is by Chen et al. (2017) and Ren et al. (2020) thought to increase the ESG-management costs for the concerned firms.[17] Further, Aswani et al. (2021) examines the impact of the Indian Companies Act 2013, which requires large and profitable Indian companies to spend resources on ESG activities, on firm value. The conclusion is that overall mandatory ESG-spending contributes negatively to firm value, especially for firms not voluntarily spending resources on ESG activities. [18] Although Aswani et al. researches mandatory ESG-spending, the increase in ESG-management costs observed by Chen et al. is indirectly mandated and may therefore also lead to negative effects for the concerned firms. However, Aswani et al. also observes a possibility of positive impact on firm value for those previously voluntarily spending resources on ESG-management. [19]

In contrast to the other papers, Pham and Tran (2020) observe a positive relationship between ESG disclosure and firm performance. The positivity is found to be linked to an increase in firm reputation which then lowers the cost of capital, which in turn has a positive impact on firm performance. However, Pham and Tran does not make a distinction between voluntary and mandatory disclosure, meaning that it is possible that the positive relationship is mostly attributed to voluntary disclosing firms. [20]

Lastly, Ren et al. (2020) conducted a similar research to Chen et al. (2017), and found similar results, being that mandatory environmental information disclosure in China led to a significant negative effect on firm performance. This strengthens the argument that similar policy changes result in a decrease in firm performance. It is however important to note that both Chen et al. and Ren et al. observe a greater impact on state owned firms. Thus

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[16] Wang, S., Wang, H., Wang, J. & Yang, F. (2020). Does environmental information disclosure contribute to improve firm financial performance? An examination of the underlying mechanism. *Science Of The Total Environment,* 714: 1-11.

[17] Chen et al. (2017), 169-190; Ren, S., Wei, W., Sun, H., Xu, Q., Hu, Y. & Chen, X. (2020). Can mandatory environmental information disclosure achieva a win-win for a firm's environmental and economic performance? *Journal Of Cleaner Production,* 250: 1-10.

[18] Aswani, J., Chidambaran, N.K. & Hasan, I. (2021). Who benefits from mandatory CSR? Evidence from the Indian Companies Act 2013. *Emerging Market Review,* 46: 1-15.

[19] Chen et al. (2017), 169-190; Aswani et al. (2021), 1-15.

[20] Thi Pham, H. S. & Thi Tran, H. (2020). CSR disclosure and firm performance: The mediating role of corporate reputation and moderating role of CEO integrity. *Journal Of Business Research,* 120: 127-136.

resembling policies may not have an equally significant effect in geographical areas where state owned firms are not as prevalent. [21]

2.2 Theoretical Models

2.2.1 Legitimacy Theory

There exist plenty of definitions of 'legitimacy' but most commonly used is the one by Suchman:

" Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.".[22]

Legitimacy theory is generally accepted as a positive theory since it is not seen as a prescription of what management should or ought to do. Instead, it is used by researchers who seek to explain or even predict certain actions undertaken by firm managements, for example disclosing ESG information. [23] Organizations often act in certain ways in order to avoid sanctions, and instead obtain approval from the public. The underlying assumption of legitimacy theory is that because firms are allowed to operate in our society, they feel obliged to give back to their surroundings by creating additional value for the public. Hence, firms need to disclose this ESG information in reports in order for these values to be available to the public. [24]

Legitimacy theory can be connected to this paper and the research question as in general, firms with good ESG practises get a better reputation by appearing more legitimate to the public and their stakeholders, in contrast to the ones with bad ESG practices. Further, the stakeholders indeed have the ability to affect the economic outcome of a company. Therefore it would be expected that before the implementation of the directive firms would only disclose information that could contribute positively to the reputation of the firm. When the mandatory disclosure then is transposed there is a risk that more information, which the firms earlier preferred to keep private, is exposed to the public. From the perspective of legitimacy

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[21] Chen et al. (2017), 169-190; Ren et al. (2020), 1-10.

[22] Suchman, M. (1995), "*Managing legitimacy: strategic and institutional approaches*", Academy of Management Review, 20(3): 574.

[23] Deegan, C. (2014). An overview of legitimacy theory as applied within the social and environmental accounting literature. In: Bebbington, J., Unerman, J. & O'Dwyer, B., ed., *Sustainability accounting and accountability,* 2dn ed. Routledge, 248-249.

[24] Yelistratova, Altenborg, & Lu (2010), 23-24.

theory the expectations are consequently that firm reputation might decrease as this previously hidden information is now available to the public and is not up to par with the socially constructed norms. To keep the firm reputation from decreasing, the firms are expected to increase ESG-management costs, hence also affecting firm performance negatively. [25]

2.2.2 Signaling Theory and Information Asymmetry

Signaling theory is used to describe situations in which asymmetric information is available to the two parties in question (firms or individuals) and how it affects the behaviour of the parties. Often, one party will need to communicate (signal) information to the other party and can choose how, and whether at all, to do this. The other party will then choose to interpret the information in a certain way. This implies that one party might have more information than the other, and also that even in situations where information is shared, it might be interpreted in a different way than it was intended by the counterpart. In other words, signaling theory is related to the problem of asymmetric information, and is indeed concerned with trying to reduce these. Furthermore, researchers have also used signaling theory when trying to explain how the concept of information asymmetry affects decision-making processes in firms which in turn can affect performance. [26]

This theory is relevant for this study as the whole intention of ESG reporting is to minimize the asymmetric information, and in a clear way signal this information to the society. As the Directive 2014/95/EU is transposed by member countries, more information will have to be disclosed by firms. Before the directive, the firms could choose to keep certain information private, leading to asymmetric information. Now however, the amount of publicly disclosed information increases as there are rules for what the minimal disclosure should cover, causing the information asymmetry to decrease. Through the hypothesized increase in ESG-management costs that legitimacy theory explained, the firms signal to the public that it values sustainable conduct. Hence, it is expected that firm reputation might increase as the information asymmetry between the company and its shareholders (and the rest of the public) decreases. On the other hand, if the firms chose not to increase ESG-management, they risk signaling the opposite message. Thus, signaling theory predicts that the reputation of the

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[25] Deegan (2014) 248-249; Yelistratova, Altenborg, & Lu (2010), 23-24; Pham & Tran (2020), 127-136.
[26] Connelly, B. L., Certo, S. T., Ireland, R. D. & Reutzel, C. R. (2010). Signaling Theory: A Review and Assessment, *Sage Journals*, 37(1): 40-42.

concerned firms will be affected by how the firms signal their response to the mandate. Which in turn may affect firm performance. [27]

2.3 Hypothesis

The hypothesis is developed primarily using the empirical results from previous research, and the relevant theories described above. In line with legitimacy theory and the results of the work of Chen et al., it is expected that following mandatory disclosure of ESG information, companies will spend more money on ESG-related activities in order to signal sustainable conduct to the public. This can uphold or (in line with Pham and Tran's paper) increase the firm's reputation.[28] Further, based on Aswani et al's paper, it is predicted that the concerned firms that are not already voluntarily disclosing ESG information will not economically benefit from the increase in environmental and social spending.[29] This thesis does not differentiate between firms that have already voluntarily disclosed and firms which have not, hence the effect on firms which have already voluntarily disclosed also has to be explained. In line with legitimacy theory it is hypothesised that the disclosure of these firms only contains information that the firm believes will contribute positive effects for the company, and that mandatory disclosing will force these firms to disclose information they otherwise would not.[30] However, these previously voluntarily disclosing firms can alternatively experience positive effects as observed in Pham and Tran's paper. If there is a positive effect, it is hypothesized to be through a reduction in information asymmetry, leading to an increase in firm reputation which in turn can lower the cost of capital, increasing the overall firm performance. [31] In contrast, the paper of Chen et al. is the one closest related to this paper and their results found that the mandated ESG disclosure led to a decrease in firm performance.[32] This would mean that the mandate led to increasing firm costs while not contributing with enough positive effects to cover these costs. Altogether, the findings from previous research agree on mandated disclosure of ESG affecting firm performance, but they do not agree on the direction of the effect.

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[27] Pham & Tran (2020), 127-136; Richardson & Welker (2001), 597-616.
[28] Deegan (2014) 248-249; Yelistratova, Altenborg, & Lu (2010), 23-24; Pham & Tran (2020), 127-136; Richardson & Welker (2001), 597-616; Chen et al. (2017), 169-190.
[29] Aswani et al. (2021), 1-15.
[30] Deegan (2014) 248-249; Yelistratova, Altenborg, & Lu (2010), 23-24.
[31] Pham & Tran (2020), 127-136.
[32] Chen et al. (2017), 169-190.

The setting this paper researches differs from the settings of previous literature on a few different aspects. The majority of papers in the subject, including the named papers, explore the effects in China, an emerging market, in contrast to this paper that examines EU-firms, which primarily consists of different kinds of markets. Additional differences take shape in the form of different mandates and legislation with different repercussions, different methodology, different samples and in some cases different variables. Although there are several differences, the result of this study is expected to be similar to the ones reached in the earlier research. The results from previous studies are clearly conflicting, as some found increased firm performance resulting from ESG disclosure, while others found it decreasing. What is common in all studies however, is that even though the direction or magnitude of the results differ they all point out that firm performance is indeed affected. The hypothesis is thus developed as follows:

H: *Firm performance is affected by the implementation of the Directive 2014/95/EU.*

3. Method and Method Selection

In the third chapter the method that this thesis will take on is described in detail. Partly the difference-in-difference research design is described, but also the assumptions of the model. Additionally, the likelihood of the parallel trend assumption holding is explored in 3.1.1. The process of propensity score matching is then touched upon, before the final regression model is presented. Variable descriptions are also found in this chapter.

This is a quantitative study based on the difference-in-difference (DiD) research design, where the change in firm performance from the EU firms covered by the mandatory disclosure (treatment group) is compared with the change among similar US firms not covered by the mandatory disclosure (benchmark group). More details will be provided under *4.1 The Sample*. The research method of this thesis closely follows the one of Chen et al. (2017), meaning that the method selection is mainly based upon this work although having some inspiration from the rest of the mentioned studies as well.

The difference-in-difference research design is a statistical technique used in econometrics and quantitative research. The DiD-technique uses panel data applied to a set of groups. In the first period none of the two groups are exposed to any treatment. In the second period however, one group, called the treatment group, is exposed to a specific treatment or intervention while the other, the benchmark group, is not exposed to this treatment. To account for the treatment or intervention one assigns a specific variable to it. Then comparisons of outcome over time are made between the groups, in order to determine if the treatment had an effect. This type of research based on exposing a group for a treatment is well-suited for policy changes, changes in economic environment etc. and is why it is a good fit for this thesis. [33]

For this study, data from the time period of 2014-12-31 until 2019-12-31 will be used. This choice is based on the grounds that the Directive 2014/95/EU had its deadline for transposal of the 28 member countries in 2016. However, they were expected to comply with the new laws by 2018 at latest, i.e. the change will be noticeable first in the annual reports for the year of 2017. [34] Hence, data from 2017 to 2019 can be used in order to observe the impact of

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[33] Department of Epidemiology at Columbia University's Mailman School of Public Health, Difference-in-Difference Estimation, last modified May 7, 2021. [Accessed March 25, 2021]
[34] CSR Europe & GRI (2017), 1-36.

implementing the directive, i.e. the post-period, while the years of 2014 to 2016 will allow a comparison of equally many years before the change, i.e. the pre-period. The choice of only including data of 2019 and not 2020 is due to the Covid-19 circumstances. If 2020 would be included the likelihood of biased results would increase, since it would be hard to tell whether certain results are due to the mandatory disclosures or due to Covid-19 and its worldwide consequences. Since the data is of time series nature, robust standard errors are used to mitigate potential heteroscedasticity.[35] Additionally, the standard error is clustered on a firm level to account for autocorrelation amongst individual firms. Clustering is advised when there is a risk of observations being statistically dependent, and as the same individual firms are observed in several time periods, it is likely that the observations inhibits correlation.[36] This, in combination with that clustering on a firm level is the standard for related research, makes it relevant for this thesis to also utilize the procedure.[37]

3.1 Assumptions

Firstly, making accurate inferences about the treatment effect requires the treated firms to comply with the directive.[38] As there is no formal way of determining whether the obtained ESG-scores are the results of compliance, an assumption is made that if a firm in the treatment group has ESG-scores after the implementation, the firm is complying. Further, as firms without available ESG-scores for all of the years 2014-2019 are excluded, the interpretation of the identification process used implies that all firms disclose some kind of ESG information during both the pre- and post-period. However, to be able to measure the effect of the implementation of the directive, it must be assumed that this disclosed information differs in some way (e.g. in the amount or the type) before and after the implementation.

Next, the DiD-regression introduces additional assumptions to the OLS-regression model.[39] The parallel trend is the most crucial of the assumptions, but also the most difficult to fulfill.

[35] Bertrand, M., Duflo, E. & Mullainathan, S. (2004). How Much Should We Trust Difference-In-Difference Estimates? *The Quarterly Journal of Economics*, 119(1): 249-275.
[36] Thompson, S. B. (2011). Simple formulas for standard errors that cluster by both firm and time. *Journal of Financial Economics*, 99(1): 1-10.
[37] Chen et al. (2017), 169-190.
[38] Ritchie, T. D., West, S. G., Sagarin, B. J., Hansen, E. J., Ratnikov, A. & Homan, W. K. (2014). Treatment Noncompliance in Randomized Experiments: Statistical Approaches and Design Issues. *Psychological Methods*, 19(3): 317-333.
[39] Abadie, A. & Cattaneo, M. D. (2018). Econometric Methods for Program Evaluation. *Annual Review of Economics*, 10: 465-503.

Parallel trend assumes that without the treatment the difference between the control and treated firms would be constant over time. [40] If this assumption is violated, the results are biased. If the difference is not constant over time disregarding the treatment, then the inference of the DiD-regression can not reliably be attributed to the treatment. The likelihood of this assumption is tested under *3.1.1 Test of Parallel Trend-Assumption*.

Next assumption that is made is that there exists no pre-treatment effect.[41] In this particular case, it means that it is assumed that the firms concerned by the directive do not adjust their behaviour before the actual implementation of the directive in 2017. A violation of this assumption would for example be if firms when they first heard about the directive in 2014 adjusted their behaviour accordingly in the years 2014-2016. Since it is hypothesized that the firms would already disclose information if they thought it would lead to something positive, it is further deduced that the firms do not disclose such information before they are obligated to. Thus, the no pre-treatment effect assumption most likely holds.

Lastly, no spillover effect is also assumed.[42] In this case, it means that the mandate of ESG disclosure concerning the EU firms, does not indirectly influence the US firms' disclosure. A violation of this assumption would require the US firms to feel pressured by the directive implemented in the EU to disclose information they would not voluntarily disclose. This is deemed unlikely, hence this assumption is likely to hold.

3.1.1 Tests of Parallel Trend-Assumptions

To evaluate the validity of the parallel trend assumption, a test is performed and inspected. The assumption is visually presented in Graph 1, where time is displayed on the horizontal axis, and average level of ROA on the vertical axis. For the assumption to hold, the lines for treated and control firms respectively does not have to be the same, but the difference between them needs to be constant for the pre-period (2014-2016), i.e. the trend has to be parallel.[43] As can be seen in the graph, the lines are not exactly parallel in the pre-period, but the difference in between is fairly similar for the pre-period. In the post-period (2017-2019) it is noticed that the difference is considerably larger, and it is this increase of the difference

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[40] ibid.
[41] ibid.
[42] ibid.
[43] Department of Epidemiology at Columbia University's Mailman School of Public Health, Difference-in-Difference Estimation, last modified May 7, 2021. [Accessed March 25, 2021]

that is, by this paper, attributed to the directive. Although the parallel trend assumption is not perfectly fulfilled based on Graph 1, there is not a substantial violation, thus the assumption is determined likely to hold. Further tests are possible to conduct in order to comment more extensively on the likelihood of the parallel trend assumption to hold. However, there are only a few years observed, which makes it difficult to draw reliable conclusions about trends. Hence, no further tests are performed.

Graph 1

The graph shows the average ROA-level of the treated firms (blue line) and the control firms (red line) over the pre- and post-period years.
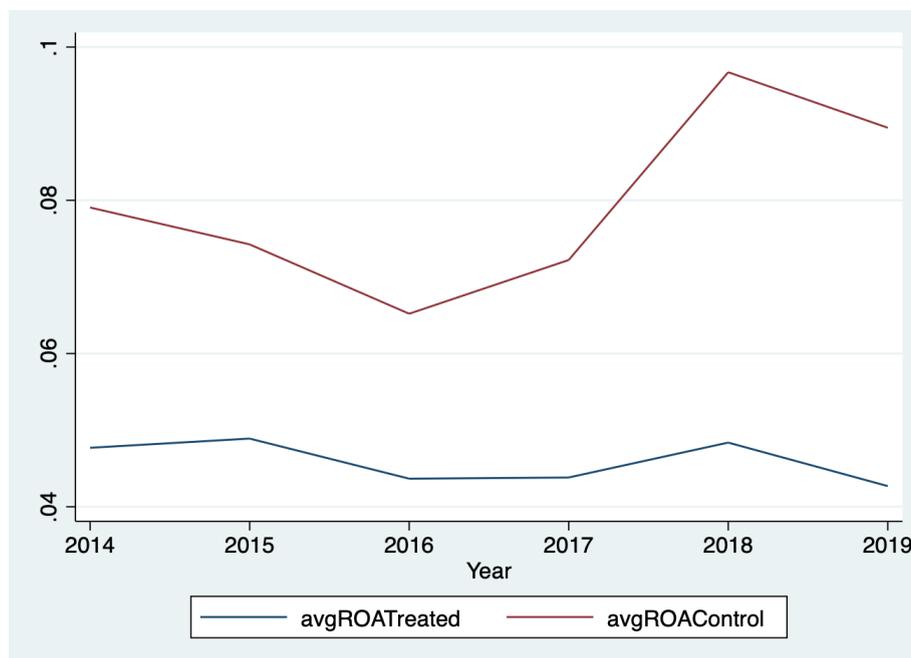
3.2 Propensity Score Matching

In order to control for observable differences between the control and treatment group, and instead make them less variant and more comparable, propensity score matching is conducted before the DiD-regression. A probit regression is run with a list of variables (described below) to estimate the likelihood of every company being treated and to reduce differences in covariates between the treated and the control firms.[44] The propensity score matching model is as follows:

$$ROA = \beta_0 + \beta_1(LEV) + \beta_2(lgFCF) + \beta_3(Size) + \beta_4(lgAVEMP) + \beta_5(lgTR) + \beta_6(Year) + \beta_7(Industry) + \varepsilon$$

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[44] Details about the estimation results of the probit regression are found in Appendix B.

Propensity scores are estimated and accordingly nearest neighbor matching (with replacement) is performed to match control and treatment firms with analogous characteristics. The reason for matching with replacement is to avoid a larger number of observations being dropped, as the sample is of limited amounts of firms.

Hereunder, follows a motivation of choice and a description of the variables used for the propensity score matching. For exact definitions of how each variable is defined, view Appendix A. The variables that are not described as a ratio or percentage are transformed into their natural logarithm form. This is done to reduce skewness and to accomplish an approximated normal distribution.[45]

- *LEV* - Leverage is used in the matching procedure in a similar study and assists in matching firms with similar amounts of borrowed money with each other. As the level of leverage can affect the profitability of a firm it is appropriate to match on the variable. [46] Leverage is also used in the main regression and a further explanation of its potential effect on firm performance can be found in *3.3.3 Control Variables.*

- *lgFCF* - The natural logarithm of free cash flow is used as a measure of a firm's profitability and its remaining cash available for investments or dividend payouts.[47] Matching the firms on lgFCF results in pairs of firms with similar profitability and similar levels of available resources to potentially spend on ESG related investments. Chen et al. also match on a type of performance measure (ROE), but it is determined that FCF is appropriate for this paper since it also includes a cash aspect.[48]

- *Size, lgAVEMP and lgTR* - The natural logarithm of both total assets (Size), average employees and total revenue are matched on partly to compare firms of equal size. This is because it is common practise among earlier research, as for example Ren et al. includes a variable for Size in their matching regression. [49] However, these variables are also chosen for matching in order to take on a similar approach to that of Chen et al. In their paper they include several variables that determine the probability of the firms being treated, which in their case means that the firms are listed on the SSE or SSZE indices.[50] The profitability of a firm being treated in this thesis however,

[45] Bland, J. M. & Altman, D. G. (1996), Statistics Notes: transforming data, *The BJM*, 312: 770.
[46] Ren et al. (2020), 1-10.
[47] Fernando, J. (2020), *Free Cash Flow (FCF),* Investopedia. [Accessed: May 13, 2021]
[48] Chen et al. (2017), 169-190.
[49] Ren et al. (2020), 1-10.
[50] Chen et al. (2017), 169-190.

depends on if a firm is considered large and hence concerned by the Directive 2014/95/EU. This is determined specifically by Size, lgAVEMP and lgTR, and is the reason for these variables being chosen for the matching.[51]

- *Year* and ***Industry*** - These variables are also included in order to match optimally both with respect to time and to industry.

Table 1 - Propensity score matching (PSM) using nearest neighbor matching (with replacement).

Panel A reports the differences in the means of the treatment and control firms on ROA before and after matching. It also shows the number of treated and untreated (control) firms. Panel B displays an analysis of the significance of the matching. *** indicates significance at 1% level (two-tailed test).

Panel A: Differences in the means of the treatment and control firms on ROA before and after PSM. Number of treated and untreated (control) firms after PSM.

ROA	Treated	Controls	Difference	Standard error	Total
Unmatched	0.077	0.087	-0.011	0.003	
ATT	0.077	0.068	0.009	0.004	
N (firm-years)	1 447	747			2 194

Panel B: Analysis of the significance of the PSM.

Variable	Unmatched (U) Matched (M)	Mean Treated	Mean Control	%bias	t-test t	p > | t |
LEV	U	0.584	0.619	-15.9	-3.61	0.000***
	M	0.584	0.587	-1.3	-0.36	0.719
lgFCF	U	5.075	5.697	-40.0	-8.79	0.000***
	M	5.075	5.109	-2.2	-0.59	0.553
Size	U	8.615	8.849	-16.0	-3.47	0.001***
	M	8.615	8.641	-1.8	-0.49	0.624
lgAVEMP	U	9.182	9.628	-26.7	-5.69	0.000***
	M	9.182	9.219	-2.2	-0.61	0.545
lgTR	U	8.097	8.635	-37.1	-8.02	0.000***
	M	8.097	8.119	-1.5	-0.42	0.675

Panel A in Table 1 above showcases the differences in the means of control and treatment firms on ROA before and after matching. Although the difference is only slightly decreased after the matching, it is the matching of the covariates that is of interest.

Table 1 Panel B, displays the effectiveness of the matching procedure. P-values indicate whether the means of the covariates are significantly different between the treated and the benchmark groups. It is observed that pre-matching, the sample means were significantly different at a 1% level for all the covariates, indicating existing differences between the

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[51] CSR Europe & GRI (2017), 1-36.

treated and benchmark firms. However, post-matching all the variables are found to no longer be significantly different. The reduction in differences between the groups is uniform for all variables, and the observed percentage bias pre-match fell within a range of -40.0 to 15.9, but decreased substantially post-match and fell within the narrower range of -2.2 and -1.3. Thus, the groups are more comparable after the matching procedure, and the matching is therefore successful.

After the propensity score matching, firm-year observations that do not have a propensity score similar enough to another firm are excluded. 747 number of control firm-year observations and 1447 number of treatment firm-year observations remains.

3.3 The Difference-in-Difference Regression Model

After having done the propensity score matching, the DID-regressions with robust clustered standard errors are run in Stata in order to test the hypothesis. The regression is run on multiple variables in order to ensure robustness. The dependent variables that are tested for in the regression, representing firm performance, are ROA, ROE and Tobin's Q. To account for reasons other than the directive that can affect financial performance, a list of control variables are included in the regression (see descriptions below). The regression model is as follows:

$Firm\ performance\ = β_0 + β_1(Post) + β_2(Treated) + β_3(Post * Treated) +$
$+\ β_j(Control\ variables_j) + ε^{52}$

Hereunder, follows a motivation of choice and a description of the variables used in the difference-in-difference regression. The variables are sorted into three categories: dependent variables, the variable of interest and the control variables. For exact definitions of how each variable is defined, view Appendix A.

3.3.1 Dependent Variables

- **ROA** - is used as the main dependent variable for the regression. It is a staple proxy for financial performance and widely used in related research. ROA measures the

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[52] Where the control variables are: LEV, Size, Cash and the fixed effect for year, industry and country. For full definitions of the variables, view Appendix A.

firm's ability to use its assets in order to generate net income. Ren et al., Wang et al., Chen et al., and Pham and Tran all use this variable in their corresponding research. [53]

- ***ROE*** - is related to ROA and the difference is that ROE demonstrates the ability of a firm to use its equity in order to generate net income, instead of focusing on assets as ROA. ROE does in contrast to ROA not include the level of debts, hence ROE can be inflated by the amounts of debt a company has. ROE is also commonly used as a measure of financial performance, which is demonstrated by the use in Chen et al. and Ren et al.s papers. In this thesis, ROE is used as an alternative dependent variable as a robustness check. [54]

- ***Tobin's Q*** - is not as commonly used in related research as measures such as ROA and ROE, however, it contributes with an additional aspect of financial performance by including the market valuation of the firm in relation to its assets. Ren et al. uses Tobin's Q as a variable for economic performance, while Chen et al. uses it as an alternative variable for this as well, and in combination with the fact that it contributes with another aspect of firm performance, it is included in this thesis. [55]

3.3.2 Variable of Interest

- ***Post*** - What differs a DiD-regression from a usual regression is two specific dummy variables, and their interaction.[56] The first dummy variable is *Post* which indicates if the observation takes place in the pre-period (0) or the post-period (1). In this thesis 2014-2016 is the pre-period and 2017-2019 is the post-period.

- ***Treated*** - The second dummy variable specific to the DiD-regression is the *Treated* variable. The dummy takes the value 0 if the observation is a control firm (US-firm) and 1 if the firm is a treatment firm (EU-firm concerned by the directive).

- ***Post*Treated*** - The variable *Post*Treated* is the variable of interest, and represents the interaction between the two variables *Post* and *Treated*. Hence, the variable takes the value 1 if the observation is both in the post-period and is a treated firm. The coefficient for *Post*Treated* displays the difference in firm performance for the

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[53] Chen et al. (2017), 169-190; Ren et al. (2020), 1-10; Wang et al. (2020), 1-11; Pham & Tran (2020), 127-136.
[54] Chen et al. (2017), 169-190; Ren et al. (2020), 1-10.
[55] ibid.
[56] Stuart E. A, Huskamp H. A, Duckworth K., Simmonson, J., Song, Z., Chernew, M. & Barry, C. L. (2014) Using propensity scores in difference-in-differences models to estimate the effects of a policy change. *Health Services & Outcomes Research Methodology*. 14(4): 166-182.

treated firms in relation to the benchmark firms following the implementation of the mandate. [57]

3.3.3 Control Variables

- ***LEV -*** Leverage is prevalent as a variable possibly influencing firm performance, and it is generally expected to have a negative impact as interest may be a substantial cost for a firm with a high debt ratio. Leverage is used in both the paper of Chen et al. as well as Ren et al., hence used also in this thesis. [58] However, it is actually expected that leverage has a positive effect on ROE since the denominator (equity) does not account for the level of debt, but the nominator (net income) can be increased by accruing more debt and utilizing it to increase net income. Hence it is expected to find leverage having a negative coefficient for ROA, but a positive one for ROE. [59]

- ***Size -*** Size is frequently used as a control variable for firm performance in econometric models since firms of larger size usually have the opportunity to invest relatively larger amounts of resources, hence having a better opportunity to reach higher levels of firm performance.[60] Thus, it is expected that Size has a positive effect on firm performance. The variable is transformed into its natural logarithmic form to reduce skewness and to become more normally distributed.[61]

- ***Cash -*** Cash (to assets) was previously used by Chen et al. The reasoning behind Cash as a control variable is that if a company has a high cash ratio, the company has quick access to resources that could be used to invest and hence possibly increasing firm performance.[62] Therefore, the expectations are to find a positive effect of Cash on firm performance.

- ***Fixed effects: Industry, Year, Country -*** As there is a possibility for omitted variables being correlated, three fixed effects are included when performing our DiD-regression in order to mitigate the problems that otherwise might occur. The fixed effects used are; Industry, Year and Country. [63]

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[57] ibid.
[58] Chen et al. (2017), 169-190; Ren et al. (2020), 1-10.
[59] McClure B. (2020), *How ROA and ROE Give a Clear Picture of Corporate Health,* Investopedia. [Accessed: May 13, 2021]
[60] Ren et al. (2020), 1-10.
[61] Bland, J. M. & Altman, D. G. (1996), 770.
[62] Chen et al. (2017), 169-190.
[63] Chen et al. (2017), 169-190.

4. Data

In the fourth chapter the data and its concerned details are explained. The process of gathering and winsorizing the sample is described before some descriptive statistics are presented.

4.1 The Sample

The sample consists of two groups of firms. A treated group, being EU firms, and a control group, being US firms. The United Kingdom is also included in the treated group since they were part of the EU when the directive came out, and implemented it into national law just like the EU-countries. Further, Norway and Iceland, which are members of the European Economic Area, have also implemented the directive and are hence part of the treatment group. The choice of including companies from all over Europe is in order to broaden the research, make it more interesting and unique as well as catching the effect of the directive on concerned firms regarding the country it operates in.

The EU-firms are chosen by sorting on all the public firms with EU headquarters in addition to accessible reports of ESG scores for 2014-2019. Further companies that neither count as a large entity or are considered of public interest in accordance with each country's own specifications are excluded.[64] Next to all public EU-firms are inside the perimeter of the directive, meaning that there are not enough untreated companies to control against. The US does not have a corresponding directive mandating reporting of ESG, and has an economy of similar size to Europe.[65] Therefore, US firms are chosen to act as the control group. US firms are chosen on the same basis as the EU firms, first by sorting on firms with headquarters in the US and then on ESG scores. Further, if firms do not have available ESG scores for all the years 2014-2019, they are excluded in order to make the dataset balanced. This exclusion is made as Refintiv's ESG scores are used to represent ESG information (as explained under *1.5 Limitations*), and is a vital part of the firm identification process. Hence it is deemed reasonable to only examine firms with data on this measure for all the years.

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[64] For more information regarding the country specific requirements for which firms are covered by the directive, take a look at the previously mentioned reference: CSR Europe & GRI (2017), 1-36.
[65] Eurostat (2020) *The 2017 results of the International Comparison Program China, US and EU are the largest economies in the world*. [Accessed May 10, 2021]*:* Silk, D. & Lu, C. (2020). *USA: Environmental, Social & Governance Law 2021*. [Accessed: June 3, 2021]

The full data sample used in this thesis was obtained from Refinitiv Eikon (by sorting as described above) and consists of multiple financial measures of the, altogether, 546 companies, of which 375 are from the EU and 171 are from the US. Data for the time period of 2014-12-31 to 2019-12-31 was then gathered for the finished sample in order to examine an equal number of years for the post- (2017-2019) and pre-period (2014-2016). In order for the data to be comparable, all was collected in Euro. Apart from collecting information on *Company, Country* and *Industry,* the following measures were gathered: *ESG, Total Revenue, Average Employees, Total Assets, Total Liabilities, Total Liabilities + Shareholders Equity, Debt, Cash + Short Term Investments, Net Income, Market Capitalization*, *Return on Assets, Current Ratio, Capital Expenditures, Annual Stock Return and Free Cash Flow.* Then *Equity* and *Leverage* were calculated as ratios of the collected data. Finally, *Return on Equity* and *Tobin's Q* was calculated using the collected data as well, as these were not found directly in Refinitiv Eikon.[66] In regards to the different categories of industries and countries in the sample distribution, limitations are set to only include the industry which have twenty observations or more, and to only include the countries which have five observations or more (in *total* of the *full* sample). This allows keeping most of the observations, while still removing the categories with too few observations to make inferences with.

4.2 Winsorizing

Winsorizing was performed on the control variables for the regression as well as on the dependent variables. This thesis follows the methodology of Chen et al., and although replacing outliers with the lowest/highest value of their corresponding percentile was performed for the control variables in that paper, the same practice was not done on the dependent variables.[67] However, extreme outliers in ROA and ROE were found to produce substantial skewness in the data which led to implausible results, such as a next to non-existent correlation between ROA and ROE, hence winsorizing was deemed reasonable. As the dependent variable for firm performance consists not only of ROA and ROE, but also of Tobin's Q, winsorizing was conducted on this variable as well in order to treat the variables equally. The command *winsor2 variable, replace cuts(1 99)* was used in stata in order for the values lower than the 1th percentile and values larger than the 99th percentile to be replaced by the 1th and 99th percentile respectively. The use of (1 99) is standard in

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[66] View Appendix A to find a full list of all of the variables and their definitions.
[67] Chen et al. (2017), 169-190.

previous research, as well as considered by the authors of previous research to sufficiently reduce skewness caused by the extreme outliers.[68]

4.3 Descriptive Statistics

Table 2 - Descriptive statistics and correlation coefficients.
Firm-level descriptive statistics on both the treatment and benchmark group are reported before (Panel A) and after (Panel B) matching. Panel C reports the Pearson correlation coefficients for the variables used in the difference-in-difference regression. * indicates significance at 5% level (two-tailed test).

Panel A: Descriptive statistics on firm-level variables, before matching

	Full sample treatment firms				Full sample benchmark firm			
	N (firm-year observations)	Mean	Median	Std. dev.	N (firm-years observations)	Mean	Median	Std. dev.
ROA	2 290	0.048	0.043	0.080	1 020	0.057	0.056	0.089
ROE	2 308	0.109	0.118	0.409	1 026	0.179	0.144	0.611
Tobin's Q	2 294	1.200	0.791	1.397	1 013	1.887	1.343	1.832
LEV	2 308	0.635	0.630	0.228	1 026	0.646	0.628	0.252
Size	2 308	8.777	8.654	1.780	1 026	8.887	8.861	1.484
Cash	2 107	0.106	0.081	0.097	954	0.151	0.098	0.156

Panel B: Descriptive statistics on firm-level variables, after matching

	PSM treatment firms				PSM benchmark firm			
	N (firm-year observations)	Mean	Median	Std. dev.	N (firm-years observations)	Mean	Median	Std. dev.
ROA	1 447	0.077	0.061	0.065	747	0.068	0.057	0.061
ROE	1 447	0.193	0.147	0.316	747	0.158	0.132	0.340
Tobin's Q	1 445	1.496	1.021	1.515	739	1.846	1.409	1.711
LEV	1 447	0.584	0.581	0.202	747	0.587	0.600	0.225
Size	1 447	8.615	8.557	1.560	747	8.641	8.452	1.320
Cash	1 414	0.107	0.082	0.101	730	0.150	0.107	0.152

Panel C: Pearson correlation coefficient

		(1)	(2)	(3)	(4)	(5)	(6)
(1)	ROA	1					
(2)	ROE	0.345*	1				
(3)	Tobin's Q	0.498*	0.182*	1			
(4)	LEV	-0.291*	0.010	-0.286*	1		
(5)	Size	-0.085*	0.048*	-0.292*	0.295*	1	
(6)	Cash	0.142*	0.025	0.415*	-0.147*	-0.115*	1

Panel A and B in Table 2 displays descriptive statistics in the form of the mean, median and standard deviation of all the variables used in both the matching and the DiD-regression.

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[68] Chen et al. (2017), 169-190.

Panel A showcases the numbers before the matching, and Panel B after the matching has been conducted.

The main variable of interest is ROA, which is seen in Panel A to be on average 4.8% for the treated firms (EU) and 5.7% for the benchmark firms (US), before matching. The mean for ROE, one of the alternative dependent variables, is observed to be 10.9% for the EU firms and 17.9% for the US firms. However, the standard deviation for ROE is high, indicating that even though the variable is winsorized at the first and last percentile, there still exists considerable variation. After matching, the standard deviation is still high, as can be observed in Panel B, but considerably lower than pre-matching. Apart from the standard deviation of ROE, nothing else in the panels are considered abnormal.

Panel C shows significance and correlation of the variables used in the DiD-regression. ROA, ROE and Tobin's Q are all used as different measures of firm performance, and it can be observed in Panel C that they are significantly correlated. However, the correlation between ROA and ROE is weak in comparison to Chen et al. paper, possibly because of more appearances of extreme values of ROE in this thesis.[69] The main takeaway from Panel C is that there is no extreme correlation between the control variables, indicating that multicollinearity is not likely prevalent in the model.[70]

Table 3 - Sample distribution.

Panel A reports the sample distribution by year, with 2014-2016 being the pre-period and 2017-2019 being the post-period. Panel B reports the sample distribution by industry. Panel C reports the sample distribution by country. The data is reported both by frequency and in percentage (rounded to the nearest percent), and N is the amount of firm-year observations.[71]

Panel A: The distribution of treatment and benchmark firms by year												
	Full sample						PSM sample					
	Total		Treatment		Benchmark		Total		Treatment		Benchmark	
Year	N	*%*	N	*%*	N	*%*	N	*%*	N	*%*	N	*%*
2014	556	*17%*	385	*17%*	171	*17%*	366	*17%*	237	*16%*	129	*17%*
2015	556	*17%*	385	*17%*	171	*17%*	351	*16%*	231	*16%*	120	*16%*
2016	556	*17%*	385	*17%*	171	*17%*	367	*17%*	241	*17%*	126	*17%*
2017	556	*17%*	385	*17%*	171	*17%*	364	*17%*	239	*17%*	125	*17%*

[69] Chen et al. (2017), 169-190.
[70] Slinker, B. K. & Glantz S. A. (1985). Multiple regression for physiological data analysis: the problem of multicollinearity. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*, 249(1): 1-12.
[71] To be able to fit all of the data into the panels in Table 3, the numbers 1-11 were used to represent each industry in Panel B and abbreviations were used to represent each country in Panel C. See Appendix C to find the full definitions of these numbers and abbreviations.

	556	17%	385	17%	171	17%	390	18%	260	18%	130	17%
2018	556	17%	385	17%	171	17%	390	18%	260	18%	130	17%
2019	556	17%	385	17%	171	17%	356	16%	239	17%	117	16%
Total	**3 336**	*100%*	**2 310**	*100%*	**1 026**	*100%*	**2 194**	*100%*	**1 447**	*100%*	**747**	*100%*

Panel B: The distribution of treatment and benchmark firms by industry

	Full sample						PSM sample					
	Total		Treatment		Benchmark		Total		Treatment		Benchmark	
Industry	N	*%*	N	*%*	N	*%*	N	*%*	N	*%*	N	*%*
(1)	24	*1%*	0	*0%*	24	*2%*	15	*1%*	0	*0%*	15	*2%*
(2)	270	*8%*	216	*9%*	54	*5%*	178	*8%*	140	*10%*	38	*5%*
(3)	606	*18%*	354	*15%*	252	*25%*	464	*21%*	242	*17%*	222	*30%*
(4)	270	*8%*	192	*8%*	78	*8%*	204	*9%*	132	*9%*	72	*10%*
(5)	168	*5%*	138	*6%*	30	*3%*	74	*3%*	68	*5%*	6	*1%*
(6)	414	*12%*	300	*13%*	114	*11%*	140	*6%*	99	*7%*	41	*5%*
(7)	300	*9%*	186	*8%*	114	*11%*	224	*10%*	133	*9%*	91	*12%*
(8)	576	*17%*	456	*20%*	120	*12%*	420	*19%*	326	*23%*	94	*13%*
(9)	126	*4%*	96	*4%*	30	*3%*	83	*4%*	68	*5%*	15	*2%*
(10)	462	*14%*	258	*11%*	204	*20%*	341	*16%*	188	*13%*	153	*20%*
(11)	120	*4%*	114	*5%*	6	*1%*	51	*2%*	51	*4%*	0	*0%*
Total	**3 336**	*100%*	**2 310**	*100%*	**1 026**	*100%*	**2 194**	*100%*	**1 447**	*100%*	**747**	*100%*

Panel C: The distribution of treatment and benchmark firms by country

	Full sample						PSM sample					
	Total		Treatment		Benchmark		Total		Treatment		Benchmark	
Country	N	*%*	N	*%*	N	*%*	N	*%*	N	*%*	N	*%*
AT	54	*2%*	54	*2%*	0	*0%*	22	*1%*	22	*2%*	0	*0%*
BE	48	*1%*	48	*2%*	0	*0%*	30	*1%*	30	*2%*	0	*0%*
CY	6	*0%*	6	*0%*	0	*0%*	3	*0%*	3	*0%*	0	*0%*
DK	84	*3%*	84	*4%*	0	*0%*	62	*3%*	62	*4%*	0	*0%*
FI	72	*2%*	72	*3%*	0	*0%*	50	*2%*	50	*3%*	0	*0%*
FR	246	*7%*	246	*11%*	0	*0%*	179	*8%*	179	*12%*	0	*0%*
DE	216	*6%*	216	*9%*	0	*0%*	129	*6%*	129	*9%*	0	*0%*
GR	60	*2%*	60	*3%*	0	*0%*	24	*1%*	24	*2%*	0	*0%*
HU	12	*0%*	12	*1%*	0	*0%*	9	*0%*	9	*1%*	0	*0%*
IE	84	*3%*	84	*4%*	0	*0%*	61	*3%*	61	*4%*	0	*0%*
IT	60	*2%*	60	*3%*	0	*0%*	27	*1%*	27	*2%*	0	*0%*
LU	30	*1%*	30	*1%*	0	*0%*	15	*1%*	15	*1%*	0	*0%*
MT	6	*0%*	6	*0%*	0	*0%*	0	*0%*	0	*0%*	0	*0%*
NL	72	*2%*	72	*3%*	0	*0%*	49	*2%*	49	*4%*	0	*0%*
NO	48	*1%*	48	*2%*	0	*0%*	21	*1%*	21	*1%*	0	*0%*
PL	66	*2%*	66	*3%*	0	*0%*	22	*1%*	22	*2%*	0	*0%*
PT	36	*1%*	36	*2%*	0	*0%*	7	*0%*	7	*0%*	0	*0%*
ES	144	*4%*	144	*6%*	0	*0%*	82	*4%*	82	*6%*	0	*0%*
SE	108	*3%*	108	*5%*	0	*0%*	74	*3%*	74	*5%*	0	*0%*
UK	858	*26%*	858	*37%*	0	*0%*	581	*26%*	581	*41%*	0	*0%*
US	1 026	*31%*	0	*0%*	1 026	*100%*	747	*34%*	0	*0%*	747	*100%*
Total	**3 336**	*100%*	**2 310**	*100%*	**1 026**	*100%*	**2 194**	*100%*	**1 447**	*100%*	**747**	*100%*

Table 3 above reports the overall sample distribution. Panel A presents the distribution of the full and PSM sample respectively, both treatment and benchmark, by year. Panel B reports the sample distribution of treatment and benchmark sorted by the 11 industries. Visibly it is the groups of Consumer Cyclicals (3), Industrials (8) and Technology (10) that are represented the most, both in the full and in the PSM-sample. On the other hand, Academic & Educational Services (1) is the least represented industry. Lastly, Panel C reports the sample distribution of treatment and benchmark firms sorted by country. First thing to notice is that, as explained earlier, the benchmark consists only of US firms. Second thing noticed about the sample distribution is that the UK is overrepresented with a large portion of the sample, 37% of the treatment group in the full sample and 41% of the PSM treatment group. For the rest of the countries, larger economies such as France and Germany take a slightly larger share, while smaller ones are close to 0%. However, overall the rest of the distribution is relatively even and ranges between 2 to 4 percent.

5. Results

In this section the results of the study will be provided, by exploring the effect of the directive on firm performance through a regression.

ROA is the main dependent variable, and is regressed against *Post, Treated* and *Post*Treated* as well as a set of control variables that are considered likely to correlate with financial performance. First the results of the variable of interest are presented and then the controls are mentioned briefly as well. The regression model is as follows:

$$Firm\ performance\ =\ \beta_0 + \beta_1(Post) + \beta_2(Treated) + \beta_3(Post * Treated) +$$
$$+\ \beta_j(Control\ variables_j) + \varepsilon$$

Table 4 - The impact of mandatory ESG reporting on firm performance, *balanced data.*

Panel A reports the final regression results of mandatory ESG reporting on ROA, ROE and Tobin's Q (for easy comparison) when all controls and fixed effects are taken into account. Robust clustered standard errors are reported in parentheses. *, **, *** indicates significance at 10%, 5% and 1% levels (two-tailed test), respectively.

Panel A: Final regression results, PSM sample			
Dep. var. =	ROA	ROE	Tobin's Q
	(1)	(2)	(3)
Post	0.017**	0.060**	0.265
	(0.007)	(0.029)	(0.187)
Treated	0.037***	0.165***	0.123
	(0.008)	(0.053)	(0.202)
Post*Treated	**-0.018**	**-0.080**	**-0.339**
	(0.007)	**(0.038)**	**(0.171)**
LEV	-0.030	0.134	-0.940**
	(0.018)	(0.145)	(0.444)
Size	-0.008***	-0.001	-0.222***
	(0.003)	(0.017)	(0.065)
Cash	0.129***	0.342***	4.347***
	(0.026)	(0.101)	(0.952)
Fixed Effects	Year, Industry, Country	Year, Industry, Country	Year, Industry, Country
N (firm-year observations)	2 800	2 800	2 786
R²	0.231	0.057	0.314

The regressions results with the balanced PSM sample, all control variables and all fixed effects included, are disclosed in Table 4, Panel A. Column (1) shows a significant *(at 5% level)* positive coefficient for *Post (0.017)* which shows that the US-firms experience an increase in ROA after the directive implementation. The coefficient for *Treated (0.037)* is also

positive and significant *(at 1% level)*, indicating that the ROA of EU-firms and US-firms are significantly different before the directive, with the EU-firms having on average higher ROA than the US-firms. The variable of interest, Post*Treated *(-0.018)*, is significant *(at 5% level)* and negative, which means that in relation to the US firms, the treated EU-firms experience a decrease in ROA after the implementation of the directive.

To check for robustness, ROA is replaced by ROE and Tobin's Q as the dependent variable, and the same regression is run again. Column (2) and (3) in Table 4, Panel A presents these results. Column (2) displays similar results as (1) when it comes to the significance and signs of the coefficients of the three variables discussed. The *Post*Treated* variable *(-0.080)* shows that the reduction in firm performance is also significant *(at 5% level)* and inferable using ROE as dependent variable, however, the magnitude is different, and ROE seems to be affected more than ROA. Column (3) with Tobin's Q as dependent variable displays a positive coefficient for *Post (0.265)* and for *Treated (0.123)*. These results are in line with previous columns, although both are insignificant. The variable of interest, *Post*Treated (-0.339)* is however significant *(at 5% level)* and negative, hence in line with the results attained using ROA and ROE. This demonstrates that firm performance, represented as Tobin's Q, has also decreased for the treated EU-firms in relation to the US firms, after the implementation of the directive.

Table 5 - The impact of mandatory ESG reporting on firm performance, *balanced data.*
Panel A, B and C report the results of the regression on ROA, ROE and Tobin's Q, respectively, step by step adding controls and one fixed effect after another. Robust clustered standard errors are reported in parentheses. *, **, *** indicates significance at 10%, 5% and 1% levels (two-tailed test), respectively.

Panel A: Step by step regression results using PSM sample and balanced data, ROA					
Dep. var. =	ROA	ROA	ROA	ROA	ROA
	(1)	(2)	(3)	(4)	(5)
Post	0.012*	0.019***	0.016**	0.017**	0.017**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Treated	0.016**	0.022***	0.022***	0.022***	0.037***
	(0.007)	(0.006)	(0.006)	(0.007)	(0.008)
Post*Treated	**-0.013***	**-0.018****	**-0.018****	**-0.018****	**-0.018****
	(0.008)	**(0.008)**	**(0.007)**	**(0.007)**	**(0.007)**
LEV	-	-0.040**	-0.039**	-0.033*	-0.030
		(0.018)	(0.018)	(0.018)	(0.018)
Size	-	0.009***	-0.009***	-0.010***	-0.008***
		(0.002)	(0.002)	(0.002)	(0.003)
Cash	-	0.110***	0.110***	0.130***	0.129***
		(0.023)	(0.023)	(0.025)	(0.026)

Fixed Effects	-	-	Year	Year, Industry	Year, Industry, Country
N (firm-year observations)	2 894	2 800	2 800	2 800	2 800
R^2	0.010	0.161	0.166	0.192	0.231

Panel B: Step by step regression results using PSM sample and balanced data, ROE

Dep. var. =	ROE (1)	ROE (2)	ROE (3)	ROE (4)	ROE (5)
Post	0.055	0.066*	0.059**	0.064**	0.060**
	(0.034)	(0.034)	(0.028)	(0.029)	(0.029)
Treated	0.071*	0.085**	0.086**	0.083**	0.165***
	(0.037)	(0.040)	(0.040)	(0.041)	(0.053)
Post*Treated	**-0.070***	**-0.078****	**-0.078****	**-0.081****	**-0.080****
	(0.036)	**(0.038)**	**(0.038)**	**(0.039)**	**(0.038)**
LEV	-	0.113	0.116	0.128	0.134
		(0.136)	(0.134)	(0.143)	(0.145)
Size	-	-0.005	-0.004	-0.009	-0.001
		(0.015)	(0.015)	(0.017)	(0.017)
Cash	-	0.291***	0.290***	0.331***	0.342***
		(0.096)	(0.095)	(0.098)	(0.101)
Fixed Effects	-	-	Year	Year, Industry	Year, Industry, Country
N (firm-year observations)	2 894	2 800	2 800	2 800	2 800
R^2	0.007	0.021	0.023	0.034	0.057

Panel C: Step by step regression results using PSM sample and balanced data, Tobin's Q

Dep. var. =	Tobin's Q (1)	Tobin's Q (2)	Tobin's Q (3)	Tobin's Q (4)	Tobin's Q (5)
Post	0.089	0.299*	0.278	0.266	0.265
	(0.169)	(0.174)	(0.192)	(0.187)	(0.187)
Treated	-0.269	-0.050	-0.047	-0.003	0.123
	(0.166)	(0.155)	(0.156)	(0.166)	(0.202)
Post*Treated	**-0.156**	**-0.318***	**-0.333***	**-0.329***	**-0.339****
	(0.176)	**(0.178)**	**(0.176)**	**(0.172)**	**(0.171)**
LEV	-	-1.082**	-1.079**	-0.977**	-0.940**
		(0.429)	(0.429)	(0.437)	(0.444)
Size	-	-0.197***	-0.198***	-0.236***	-0.222***
		(0.062)	(0.062)	(0.063)	(0.065)
Cash	-	4.373***	4.400***	4.457***	4.347***
		(0.951)	(0.952)	(0.973)	(0.952)
Fixed Effects	-	-	Year	Year, Industry	Year, Industry, Country
N (firm-year observations)	2 880	2 786	2 786	2 786	2 786
R^2	0.012	0.238	0.240	0.280	0.314

Table 5 Panel A presents the results of the alternative regression models using ROA as the dependent variable. Column (1) demonstrates the output neither considering control variables nor any fixed effects. Column (2) adds the control variables, and column (3)-(5) in addition accounts for the fixed effects step by step. The corresponding results regarding the coefficients and significance are similar to Table 4, and by adding the control variables and fixed effects, the explanatory value of the variability in the models subsequently increases, (see R^2). It is further noticeable how the significance level of the variable of interest improves as controls and fixed effects are added. Although there are a few differences in the control variables, all the models show analogous output when it comes to the variables of interest.

The same procedure with ROE as the dependent variable is conducted in Table 5, Panel B. The results demonstrate a similar pattern as the previous models, both when it comes to significance and the signs of the coefficients. As in Table 4, when looking at the details it is noticed that the magnitude of the coefficients are slightly different and it seems as if overall ROE is more affected than ROA. However, the control variables *Size* and *LEV* are insignificant in most of the columns, which indicates that the model does not fit ROE as well as it does for ROA and Tobin's Q, leading to a lower R^2. In Panel C, an equivalent procedure is conducted, but with Tobin's Q as the dependent variable. This also showcases an output consistent with previous patterns, although with slightly more volatile and different magnitudes, as well as insignificant results for *Post* and *Treated*. All in all, the different panels display different models reaching the same results for the variable of interest, *Post*Treated*, contributing to robustness of the results.

Next a brief summary of the estimations of the control variables, from Table 4, Panel A, follows. Firstly, the coefficient for *LEV* is negative when using ROA *(-0.030)* and Tobin's Q *(-0.940)* as proxies for financial performance, and positive in the model using ROE *(0.134)*. However, in the ROA and ROE models, LEV is found to be insignificant. These results align with the earlier research and hence also the expectations that were made earlier based on these.[72] Secondly, the variable *Size* turns out to negatively affect firm performance according to the regression results (at 1% significance level for ROA and Tobin's Q, however insignificant for ROE), hence contradicting the expectations. Lastly, the regressions estimates

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[72] Chen et al. (2017), 169-190; Pham & Tran (2020), 127-136.

Cash to have a positive and significant *(at 1% level)* effect on firm performance for all three proxies, thus complying with the literature and the expectations.[73]

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[73] Chen et al. (2017), 169-190.

6. Discussion of Results

In this section the results are analysed further in a discussion related to earlier work and literature. First, under 6.1, the overall results of the regression, including the hypothesis, a deviating control variable, and the variable of interest, are discussed. Secondly, in section 6.2, a critical discussion is provided where the reliability and validity, as well as the weaknesses of the study are brought up. In addition, potential sources of error are mentioned.

6.1 The Hypothesis

The results of the different regression models are uniform in that they all showcase a decrease in different forms of firm performance for the treated firms after the disclosure shock. This is in line with the earlier predictions that the concerned firms' financial performance will be affected by the implementation of the Directive 2014/95/EU. Hence, the proposed hypothesis holds.

6.1.1 Discussion of Deviating Control Variable

Firstly, some comments will be provided on why one of the control variables, *Size*, turned out to have opposite effects on firm performance compared to what was expected.

It was expected to find that firm size has a positive impact on how much a firm can invest, meaning that larger companies often have a better opportunity to reach better firm performance.[74] However, the results were the opposite as the coefficients for all three measures of firm performance were found negative. An interpretation of the contradiction is that smaller firms reasonably have a higher chance of being in an earlier stage of the business life cycle, therefore having more potential to grow fast and hence potentially having a better firm performance.[75] However, another interpretation could be that larger firms indeed can invest relatively larger amounts of resources, and choose to invest these in their environmental performance instead of the economic one. Hence, as costs go up when they invest more in environmentally friendly actions, this is expected to lower the financial firm performance and would then explain the negative coefficient observed on *Size*. [76]

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[74] Ren et al. (2020), 1-10.
[75] Corporate Finance Institute, *Business Life Cycle: The 5 Stages of a business' life*. [Accessed: May 10, 2021]
[76] Ren et al. (2020), 1-10.

Further, comparing our findings of negative coefficients for *Size* with what other researchers have found, it is confirmed that the results indeed vary. For example, a positive relationship between Size and ROA is found by both Ren et al. (insignificant) and Chen et al. (significant), but a negative and significant result for Tobin's Q. Further, Chen et al. explores the effect on ROE and also finds a negative and significant result for this measure as well. [77]

6.1.2 Discussion of the Variable of Interest

Hereunder follows a discussion of the effect of the implementation of Directive 2014/95/EU on firm performance through interpretations of the variable of interest, *Post*Treated*.

Even though this thesis researches another economical environment, different samples and a different form of mandatory regulation, similar results on the variable of interest are attained as in the paper by Chen et al.[78] This indicates that the negative effects on firm performance are not only applicable to rapidly growing economies such as China, but also to the European countries with mixed economies.

Additionally, Chen et al. excludes firms which prior to the corresponding mandate, voluntarily disclosed, which this paper does not. The observed negative effects observed in this thesis, are therefore not necessarily unique to non-reporting firms (as found in earlier research)[79], but can also apply to previously disclosing firms. One interpretation is that these disclosing firms may, in line with legitimacy theory discussed earlier in the paper, only disclose information that is thought to contribute positively to the firm.[80] The mandate may therefore require firms to disclose aspects of ESG that the already disclosing firms did not previously share because they thought it could affect the company negatively, which is in line with legitimacy theory.[81] This interpretation also offers an explanation for the results of this thesis contradicting Wang et al.'s results of increased financial performance through visibility and liquidity by disclosing environmental information.[82]

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[77] Ren et al. (2020), 1-10; Chen et al. (2017), 169-190.
[78] Chen et al. (2017), 169-190.
[79] Chen et al. (2017), 169-190.
[80] Deegan (2014) 248-249; Yelistratova, Altenborg, & Lu, (2010), 23-24.
[81] Deegan (2014) 248-249; Yelistratova, Altenborg, & Lu (2010), 23-24.
[82] Wang et al. (2020), 1-11.

Although there has been no regressions checking specifically for increases in costs, or changes in other variables affecting the performance, the firm performance has been found to be reduced. How the reduction is embodied can therefore not be statistically established, but a likely explanation can be hypothesized by using previous literature. Ren et al. observed an increase in ESG-management costs for firms after an ESG mandate was implemented.[83] It is therefore likely that the EU-directive led to concerned firms increasing their ESG-management costs in order to signal to the public that they act in sustainable manners, in line with both legitimacy and signaling theory. [84] This possible cost increase, could mean that there are less resources left to use for other more profitable investments, consequently lowering the firms' financial performance. On the other hand, this increase in ESG-management cost could also potentially bring positive effects through an increase in firm reputation and a decrease in cost of capital. This positive effect could be the result of decreasing information asymmetry between stakeholders and the firm as explained by Pham and Tran as well as signaling theory.[85] However, since the regression results of this thesis observe negative effects on firm performance, the increase in ESG-costs seems to exceed any of the potential benefits brought up.

As the thesis is limited to the gathered data, it is not possible to determine exactly how the decrease in firm performance takes form, which opens up for alternative interpretations of the results. An alternative interpretation of the negative effect on firm performance is that firms, in contrast to previous studies, do not increase their ESG-management spending, hence signaling that they do not value sustainable conduct. Firms may perceive it as less profitable in comparison to other investments, hence not allocating more resources to improve ESG-activities. That could have led to a decrease in firm reputation, which further impacts the cost of capital in line with Pham and Trans argumentation.[86] In this interpretation, the decrease in firm performance takes the form of higher costs of capital.

6.2 Critical Discussion of the Results

The thesis is limited to Refinitiv Eikon in regards to the data collection. It is therefore possible that there is information on firms that are of interest to the study, but that Refinitiv

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[83] Ren et al. (2020), 1-10.
[84] Deegan (2014) 248-249; Richardson & Welker (2001), 597-616
[85] Pham & Tran (2020), 127-136; Richardson & Welker (2001), 597-616; Connelly et al. (2010), 40-42.
[86] Pham & Tran (2020), 127-136.

Eikon does not have access to the information which means that these firms are omitted from the study. The involuntary omitting of firms leads to a relatively small sample of firms which can potentially affect the results, thus weakening the reliability. Further related to the data, the occurrences of extreme values, especially when it comes to the ROE variable, can skew the results. Even though ROE is winsorized at the first and last percentile a substantial standard deviation of 0.316 (treated) and 0.340 (benchmark) respectively for the PSM sample is observed in Table 2 Panel B, indicating high variation in comparison to previous literature. The winsorizing itself can also be considered a shortcoming since it is an alteration of the data, hence not as realistic as using the raw data. However, since the raw data contained even more extreme values, it is argued that the results using winsorized data are more reliable than the results would have been using the raw data.

The study is conducted close to the implementation of the directive, forcing the study to use a limited amount of years in the pre- and post-periods. Although the time frame is acceptable if compared with related papers, the short time frame means that the results may be altered in the following years. For example, if a research is conducted in a few years, using a larger sample of years, concerned firms could have adapted better to the mandate and possibly increase their firm reputation and enjoy positive effects on firm performance. In that case, re-doing this study would result in the opposite findings. This study is therefore advised to be seen as an early work, showcasing the short term effects on the firms' performances.

The choice of using firms with headquarters in the US as the benchmark group can possibly introduce vulnerabilities. Having other EU-firms which are not concerned by the directive would have been optimal. However, there were too few of said firms to reach an acceptable sample size, hence using US firms is considered sensible. The shortcomings that can come from having US firms as the control group is that the trend in financial performance growth can differ between the US and the EU because of national differences in legislation and economic situations for example. Such inconsistency violates the necessary assumptions for a DiD-research design to yield robust and reliable results.

Moreover, US firms are used as the benchmark in this study but as stated under *1.5 Limitations*, it can not be determined whether the reported ESG information from these firms are mandatory or voluntary. If the US would have its own mandated disclosure of ESG, it

would bias the results of this paper as the intentions are to compare the mandated EU firms with a benchmark not covered by similar regulations. However, currently it seems as if there exists no such regulation in the US[87], so it is assumed that this kind of bias is not present.

There is also a risk of non-compliance affecting the results. As mentioned in *1.5 Limitations*, there is no feasible methodology to examine if all the firms in the sample complies with the transposed directive. Therefore, the assumption is made that firms with available ESG-scores in the post-period are complying, but if this assumption fails to hold, then the problem of non-compliance is prevalent. In this case, the results would be biased by capturing the effect on firms which have not received the treatment. On the other hand, one could argue that this is part of the directive's effect, as non-compliance can cause repercussions depending on which country the company is located in.

Another note is that the R² for the ROE regression is small in comparison to the one of ROA and Tobin's Q. This means that the model does not explain a lot of the variance of ROE[88], and that the control variables might not be as suitable for estimation of this measurement of performance. However, as the R² for ROA and Tobin's Q are higher, and around the same value as Chen et al. reported in their work[89], the results are still considered reliable.

Lastly, important to mention is the possibility of the occurrence of omitted variable bias as a source for endogeneity. Omitted variable bias occurs when a statistical model leaves out one or more relevant variables that are correlated with at least one of the regressors (the control variables) and which also have an effect on the dependent variable.[90] In this study the dependent variable is firm performance. The choice of control variables in this thesis came down to three core measures which have been motivated in *Chapter 3* to be determinants of firm performance. These variables are; *LEV, Size* and *Cash*.[91] However, as can easily be understood, there are an infinite number of variables that could influence the financial performance of a firm. It is clear that it is impossible to include all of these variables in one regression model. Hence, it is important to mention that there is a possibility that omitted

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[87] Silk, D. & Lu, C. (2020). [Accessed: June 3, 2021]
[88] Corporate Finance Institute, *R-Squared: A statistical measure that determines the proportion of variance in the dependent variable that can be explained by the independent variable*. [Accessed June 3, 2021]
[89] Chen et al. (2017), 169-190.
[90] Hanck, C., Arnold, M., Gerber, A. & Schmelzer, M. (2020). "6.1 Omitted variable bias" in *Introduction to Econometrics with R*, University of Duisburg-Essen, Essen.
[91] View Appendix A for full definitions of the variables.

variable bias occurs in this study. At the same time however, when having a dependent variable that has such a large number of possible determinants, it is essentially impossible to avoid this completely.

7. Conclusion

This paper examines the effect of the 2014/95/EU Directive on the concerned firms' financial performance. The directive mandates large firms and firms of public interest to disclose ESG related information in an attempt to increase the sustainability of Europe. It is therefore of interest to research how the mandate affects the concerned firms. It is found in previous research that mandated disclosure of ESG information has led to positive effects on the environmental aspect, but negative effects on firms performance, hence illuminating a trade-off between environmental well-being and economic well-being.

The thesis contributes to the existing body of papers by providing results observing the effects in a geographical environment (Europe), as well as a new directive which to our knowledge is not widely examined in previous studies. The mandatory disclosure directive is found to have caused a decrease in firm performance for the concerned firms, and is consistent with the hypothesis and with most earlier research. While this thesis does not differentiate between voluntary and non-voluntarily disclosing firms, the results showcase a negative effect overall on the firms' financial performance. Thus, the effects may not be unique to previously non-disclosing firms (as found by earlier research), but that it can apply to firms disclosing ESG prior to the implementation of the directive as well. In relation to the geographical location, it is shown that the negative effects are not particular for emerging economies, such as China, and that it is also prevalent in European countries.

Using a short time period when measuring the effects of similar mandates is not something that is unique for this thesis, hence it would be interesting to conduct further research using a longer time period. In this way, one could examine if the long term impact on firm performance is different from the short term effects. Perhaps companies adapt to the mandate and can turn it around into something positive for the firm. Additionally, most related research examines the effect on public companies, probably because of easier data collection, therefore it would be compelling for future research to contribute by considering private firms. Lastly, this paper examines the effect the directive has only on firm performance, but since the directive was implemented to promote sustainability, it would be interesting to evaluate what effects the directive have had on the concerned firms' emissions. That could be combined with this paper in order to assess the overall effectiveness of the implemented directive.

Through examining firms in the perimeter of the Directive 2014/95/EU, this thesis concludes that the answer to the research question is yes, mandatory ESG disclosure does affect firm performance and the results hence comply with the hypothesis. The findings are that the performance is affected negatively, and therefore illuminates a potential trade-off between financial performance and ESG reporting.

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Appendix

Appendix A. Variable Definitions

Variable of interest

Time: A dummy variable equal to 1 if a firm-year observation is in the post-period (i.e., 2017-2019), and equal to 0 otherwise.

Treated: A dummy variable equal to 1 if a firm is covered by the Directive 2014/95/EU and 0 otherwise.

DiD: The variable represents the interaction between the Time and Treated variables, i.e. time*treated. Hence, the variable takes the value 1 if the observation is both in the post-period and is a treated firm, and takes 0 otherwise.

Firm-level dependent variables

ROA: Net income divided by total assets in year t. Expressed as ratio.

ROE: Net income divided by equity in year t. Expressed as ratio.

Tobin's Q: Market capitalization divided by total assets in year t.

Firm-level control variables for the DiD-regression and PSM

Cash: (Cash + Short Term Investments) divided by total assets in year t.

LEV: Total liabilities divided by total assets in year t.

Size: The natural logarithm of total assets in year t.

lgFCF: The natural logarithm of free cash flow. Free cash flow is the difference between cash from operations and capital expenditures.

lgAVEMP: The natural logarithm of average employees (see below).

lgTR: The natural logarithm of the total revenue (see below).

Fixed effects

Year fixed effects: Indicator variables for years.

Industry fixed effects: Indicator variables for industries.

Country fixed effects: Indicator variable for countries.

Others

ESG: Measure of performance within *Environmental, Social & Corporate Governance*.

Total Revenue: The sum of a company's gross sales less its returns, allowances, and discounts

Average Employees: The average number of employees at the beginning of year t and at the end of year t.

Appendix B. The Process of Creating the Propensity-Score-Matched Sample

This table describes the procedure of the propensity score matching. First an estimation of a probit regression was made to model the probability of a treatment firm using the pre-period (2014-2016) data. Then the treatment firms were matched to the control firms by using the technique of nearest neighbor matching (with replacement). The estimation results of the probit regression is reported in Panel A. Robust standard errors are reported in parentheses. *, **, *** indicates significance at 10%, 5% and 1% levels (two-tailed test), respectively.

Panel A: The probit regression used to find propensity scores	
Variable	Dependent variable = ROA
LEV	-0.456***
	(0.142)
lgFCF	-0.239***
	(0.028)
Size	0.423***
	(0.044)
lgAVEMP	0.154***
	(0.035)
lgTR	-0.476***
	(0.061)
Year	0.031*
	(0.017)
Industry	0.009
	(0.011)
N (firm-year observations)	2 194
Pseudo R²	0.071

Appendix C. List of Abbreviations

Abbreviations for Industries (used in Table 3, Panel B)
(1)   Academic & Educational Services
(2)   Basic Materials
(3)   Consumer Cyclicals
(4)   Consumer Non-Cyclicals
(5)   Energy
(6)   Financials
(7)   Healthcare
(8)   Industrials
(9)   Real Estate
(10) Technology
(11) Utilities

Abbreviations for country (used in Table 3, Panel C)
AT - Austria
BE - Belgium
CY - Cyprus
DK - Denmark
FI - Finland
FR - France
DE - Germany
GR - Greece
HU - Hungary
IE - Republic of Ireland
IT - Italy
LU - Luxembourg
MT - Malta
NL - The Netherlands
NO - Norway
PL - Poland
PT - Portugal
ES - Spain
SE - Sweden
UK - United Kingdom
US - United States