# Closing the SDG finance gap: does regulatory transparency for institutional investors increase the sustainability of their portfolio allocations?

"The fight against climate change [...] is not only a human and technological challenge, but also, and perhaps above all, a financial one: it is not a question of finding new financial resources but of redirecting existing flows" (Forum Pour L'Investissement Responsible, 2016: 6).



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#### Abstract

This research assesses the ability of Environmental, Social and Governance based regulatory transparency for institutional investor to cause an improvement in their sustainability performance. Sustainability performance has been operationalized and quantified at the portfolio-level, thereby providing a valid and precise measure of institutional investor sustainability performance. Consecutively a Difference-in-Difference research design was employed to make causal inferences on the treatment effect of transparency regulation on the sustainability performance of French domiciled pension and insurance funds. Scientific literature on regulatory drivers of the sustainability performance of institutional investors is severely limited and to my knowledge there is no research that evaluates the effectiveness of these regulatory drivers by using the portfolio-level sustainability performance as the outcome variable. The results indicate that ESG transparency regulation is a weak instrument to promote institutional investor sustainability performance.

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### I. Introduction

#### 1.1 Climate change - a rising global issue

Human induced global environmental change and mass extinctions have led to the formal recognition of the beginning of a new geological epoch known as the Anthropocene (Smith & Zeder, 2013). The magnitude and growth-rate of the human impact on Earth have been accelerating at an alarming rate since 1950 and onwards (Steffen et al., 2015). If this trend is to continue, resulting water and food shortages, extreme weather, ecosystem and biodiversity loss, ocean acidification, and sea level rise are most likely to trigger a global humanitarian crisis (Griggs et al., 2013). Sustainable development aims to neutralize the negative human impact on Earth and can be defined as "Development that meets the need of the present while safeguarding Earth's life-support system, on which the welfare of current and future generations depend" (Griggs. et al., 2013, p. 305).

#### 1.2 The ability of institutional investors to promote sustainable development

Governments and international institutions are increasingly recognizing the necessity of private sector money in financing sustainable development, combating climate change and decarbonizing the economy, and more specifically in closing the Sustainable Development Goals (SDG) financing gap, as this requires large sums of private capital (Kaminker & Steward, 2012; Both Ends; 2017). Due to the sheer amount of assets institutional investors own, they are perceived as a key potential source in mobilizing said required amount of private capital.

Besides the obvious need for finance in furthering the SDGs, the ability of institutional investors to promote sustainable development can be described in more detail as follows. Institutional investors (e.g. mutual funds, hedge funds, pension funds and insurance companies) pool investments of individual investors and use these pooled investments to purchase investment assets, including large share quantities. This enables institutional investors to exert pressure on firms to contribute to sustainable development via (1) shareholder activism and (2) investment decisions. Firstly, shareholder activism entails the exertion of pressure on firms via the use of voting rights attached to ordinary shares and engagement in informal dialogues with corporate executives (Sparkes & Cowtown, 2004). Secondly, if institutional investors decide to incorporate the sustainability performance of a firm into their investment decision, this performance will have an impact on the ease of access to finance for a firm (Gillan & Stark,

2003; Wen, 2009). Firms that are more sustainable will have more access to finance relative to those that are less sustainable, and consequently will experience both a larger inflow of finance, thereby increasing their expansion power as well as lower their cost of capital. This will additionally provide an incentive to firms that are less sustainable to make improvements. These practices are also known as Socially Responsible Investment (SRI), which is defined as taking Environmental, Social and Governance (ESG) criteria into account throughout the investment process in the pursuit of long-term portfolio returns (Guyatt, 2015).

Given the inherent positive relation between amount of assets and the impact of asset allocation, the potential of SRI and the overall ability of institutional investors to close the SDG finance gap is greatly strengthened by the size of institutional investors. Assets under management have reached an estimated global amount of 85 trillion US dollars in 2016, with a forecasted increase to 145 trillion US dollar in 2025 (PriceWaterhouseCoopers, 2017). Thereby, institutional investors own the largest part of the world's equity capital and the accompanying voting rights (Dyck et al., 2018), making both shareholder activism and investment decisions significant mechanisms in the promotion of sustainable business performance. However, as will be discussed in the next section, the question remains on how to mobilize this key source and optimally harness the potential of institutional investors in the quest for sustainable development.

#### 1.3 Problem analysis - the tragedy of the horizon

Although SRI practices amongst institutional investors have been increasing (Sparkes & Cowton, 2004; Asset Owner Disclosure Project, 2018; Eurosif, 2018), too little capital is allocated to sustainable development and too much is allocated to a carbon-intensive, resource-inefficient, polluting economy (World Investment Forum, 2014). For example, the International Energy Agency (2014) has found the current investment path to be unable to obtain the Paris Agreement 2 degree climate stabilization goals, with an estimated shortcoming of \$53 trillion of cumulative investments in energy supply and efficiency over the period 2015 to 2035. Furthermore, a report published by the Asset Owners Disclosure Project (2018: 5) shows that in 2017, 42% of the 5% calculate the carbon emissions of their portfolio. These findings are in line with a survey of 223 institutional investors around the world conducted by Aanon (2018), which shows that in 2018, 68% deem SRI as at least "somewhat" important to their organization and 40% have an SRI policy in place. Please note that such an SRI policy can be severely limited, such as only excluding investments in weapons.

The inability of the financial sector, and specifically institutional investors, to allocate capital to sustainable business practices and steer away from a carbon intensive economy, and the consecutive misalignment between climate goals and financial flows, is referred to by Mark Carney, the governor of the Bank of England, as the tragedy of the horizon (Carney, 2015). The tragedy of the horizon describes the problem that impacts of climate change are felt beyond the traditional (investment) horizons of financial actors whilst the costs are born now, leading to the absence of a direct incentive to incorporate it in decision-making and the absence of the pricing of the related risks (Carney, 2015: 4). This problem of short-sightedness is academically commonly referred to as short-termism, and is given as one of the root causes for the misalignment between climate goals and financial flows, and an impediment to SRI (Guyatt, 2005).

According to the University of Cambridge Institute for Sustainable Leadership (UCISL) (2016), there are some additional structural (institutional) problems inherent to the investment industry that form major obstacles to sustainable capital allocation. Firstly, investment beliefs, defined as "assertions about investments and the way the investment world works, which when developed and shared, help with investment decision-making" (UCISL: 15), are currently based on short-termism and see investing more as trading than investing. This belief materializes in a relative high portfolio turn-over rate (i.e. stocks are held in portfolios for a relative short time period, such as less than a year). This renders the long-term value of stocks irrelevant and doesn't allow for the capture of returns derived from ESG factors. Additionally, a high turnover ratio doesn't allow for an active ownership position (i.e. shareholder activism), as the stocks are most likely sold before voting occurs. Secondly, asset managers invest in a large amount of companies in order to diversify risk. Therefore the critical mass of an amount of stock of a firm needed to engage in shareholder activism is difficult to obtain. Thirdly, the performance of an institutional investor is evaluated regularly and over a short time-horizon, thereby incentivizing asset managers to focus on investments that are profitable in the short-term. Even for institutional investors with relatively long investment horizons, such as pension funds, the assessment of the performance of a fund manager and the returns of a portfolio is still evaluated over a short-time frame

#### 1.4 The necessity of public policy interventions

Thus, due to short-termism and structural (institutional) characteristics of the investment industry, financial institutions are expected to be unable to effectively incorporate long-term

sustainability concerns without public policy interventions and regulations (Goldstein, 2001). According to Weber et al. (2014) short-termism is indeed maintained due to the financial sector being relatively unregulated on social and environmental issues. Despite the expected positive contribution of SRI regulations to mitigate short-termism and institutional investor sustainability performance enhancement, it is only recently that this type of regulation is being employed (PRI, 2016). A report published by UNEP (2016) shows that many governments still do not have an SRI regulation in place, or limit the scope to pension funds or banning specific areas of investment such as cluster munitions. As a result, the current regulatory setting is insufficient to obtain the 2 degree target as stated in the Paris Agreement (McDaniels & Robins, 2017) and many are found to have no impact on the sustainability/CSR performance of firms, and are perceived by investors as ineffective due to weaknesses in design and monitoring failures (PRI, 2016).

#### 1.5 Regulatory transparency as the public policy response

Amongst the possible SRI regulations (e.g. transparency regulation/information disclosure, normative standards, green investment tax concessions and corporate governance reforms to facilitate shareholder advocacy and environmental liability on lenders), transparency regulation is gaining momentum (MSCI, 2016). By means of transparency policy, which makes use of disclosure instruments that require certain actors to publicly disclose certain information, governments aim to create incentives that advance policy objectives. In the context of SRI, a transparency regulation typically involves the mandating financial institutions to disclose their SRI policies, investment methodology and implementation efforts (Richardson, 2009). This is expected to force financial institutions to consider the social and environmental impact of their portfolios and make known to their clients how they do so, thereby increasing the likelihood that financial institutions will increase their SRI activities.

#### 1.6 The French Energy Transition for Green Growth Act

France is the first country to introduce mandatory ESG-information disclosure for all institutional investors, has the most detailed policy in place and is perceived as the best in class (Rust, 2016). It adopted article 173-VI of the Grenelle II law in 2015, making it mandatory for institutional investors to disclose the way they incorporate Environmental, Social and Governance (ESG) criteria into their investment policies, the method used to analyse the ESG criteria, the justification for this method, and the results, and if not why they refrain from doing

so (FIR, 2016). It aims thereby to align financial institutions with the 2 degree objective and to mitigate climate change by reducing Greenhouse Gas (GHG) emissions.

#### 1.7 Research aim & question

This research aims to assess the ability/effectiveness of Environmental, Social and Governance based regulatory transparency for institutional investor to improve their portfolio-level sustainability performance, by employing a by Article 173-VI of the Energy Transition for Green Growth Act enabled quasi-experimental Difference-in-Difference research design.

Whereas the following question is focal to the achievement of this aim:

"What is the effect of transparency regulation on the sustainability performance of institutional investors?"

#### 1.8 Relevance & knowledge gap

The main body of literature on SRI focuses on its link with financial performance, thus whether an SRI strategy, or socially responsible fund, outperforms or underperforms a traditional fund (Capelle-Blancard and Monjon, 2012). Literature on drivers of SRI is relatively limited and mainly focuses on the emergence and form of SRI. Scholtens & Sievänen (2013) have found economic openness, the size of the pension industry and cultural values to be drivers of SRI at the national level. Williams (2007) has found investor characteristics as consumers and their general attitude towards the social aims of firms have an impact on SRI. The body of literature on regulatory drivers of SRI is even more limited. Capelle-Blancard and Monjon (2012) have conducted research on literature trends in SRI, and found that what scarce research do focuses on regulatory drivers, is limited to regulations aimed at pension funds. Of course, this is most likely the case because there hasn't been much regulation on SRI, and France is the first one to apply such regulation on all its institutional investors. Bengtsson (2008) has found governmental priorities and legal reasons to be determinants for the adoption of SRI practices by public pension funds, which in turn manifested in SRI practices on a national level due to mimetic isomorphism. However, this is a relatively indirect effect and the regulation itself was also limited to only public pension funds.

Therefore, this research will contribute to the current body of literature on SRI by evaluating to what extent a transparency regulation can act as a driver for SRI and its ability to overcome short-termism and align financial flows with sustainability goals. This will feed back in the current body of literature by filling the knowledge gap on regulatory drivers of SRI, and more

specifically by providing knowledge on the effectiveness of transparency regulation for institutional investors to stimulate SRI activities and overcome short-termism.

## II. The Theory of Transparency Regulation

Regulatory transparency can be defined as: "mandatory disclosure of structured factual information by private or public institutions in order to advance a clear regulatory goal" (Weil et al., 2006: 4). The justification for governments to intervene is based on the disclosure of information by organizations being able to create economic and political objectives that further public objectives. This will be the case when information asymmetries in market processes inhibit progress in achieving these objectives. In the case of the French Energy Transition Act, regulatory transparency induced by the French government seeks to introduce ESG information regarding the investment process of financial institutions and asset managers into the existing decision-making processes of buyers of fund shares and units. The action cycle characterizing this process involves information users and information disclosers. As such, a transparency policy requires information to be embedded in this action cycle in order for it to be effective, as this will lead to the integration of the information in decision-making routines of users and disclosers.

In 2010 there was still little evidence for significant effects of government imposed transparency and research indicated that such transparency does not obviate the need for regulation, especially in the context of considerable complexity of information (Etzioni, 2010). Etzioni (2010) suggests that regulatory transparency in itself will often not lead to the obtainment of the desired goals (even in the case of modestly complex information), because of the limited processing capacity and systematic cognitive biases inherent to human cognition. behavioural economics has identified numerous cognitive biases and has demonstrated that due to these biases, humans in most cases are unable to properly process even rather simple information. As transparency needs information users that properly process the disclosed information, transparency regulation might be ineffective.

Given this need of properly processing the disclosed information by information users, and the inhibiting effect of cognitive shortcomings, Etzioni (2010) suggest that effective transparency regulation requires auxiliary regulation that improves digestibility, and adds concerns regarding veracity and enforcement as well. Firstly, digestibility refers to the target group being able to

understand the disclosed information. Thus, governments need to mandate disclosure in a way that secures its digestibility, as it would otherwise not be transparent despite of the availability of information. Secondly, veracity refers to the absence of manipulation of the information by the discloser. As information is often easily manipulated, this warrants for additional regulation. Lastly, effective transparency regulation necessitates enforcement, as regulation without compliance has no effect.

That being said, Etzioni's (2010) main critique on the effectiveness of regulatory transparency revolves foremost around the behavioural economic founded argument that the public is unable to properly process information. However, traditional corporate audited statements are beyond any doubt imbedded in the action cycle of financial market participants and integrated in the decision-making routines of users and disclosers. As such, it can be postulated that corporate financial information disclosure related transparency policy is highly successful. Obviously there are imperfections and errors in the processing of financial information and there are severe cognitive biases at play in this process as well, which can be observed for example by overly leveraged corporations and resulting fire sales, asset bubbles, and bank runs, but regardless, overall, it can be said that it does lead to reasonable action to some extent. A company reporting large losses in its annual publication will lead financial market participants to alter their behaviour accordingly. As the by the French Energy transition Act mandated ESG information disclosure will be published next to the corporate annual report, and this information will be (although susceptible to discussion) less complicated, it can be argued that the addition of ESG information in this process would be picked up fairly well by the information users as well and analogously will be successful to some extent.

## III. The Energy Transition for Green Growth Act

The energy transition for green growth act (Loi relative à la transition énergétique pour la croissance verte – LCTEV), also known as the Grenelle II law, is a French climate framework law incorporating matters of climate mitigation, general policy pathways that aim to facilitate the transition to a low-carbon economy and a comprehensive list of targets and measures (e.g. reducing GHG emissions, energy consumption, fossil fuel use, total energy output from nuclear power and increasing the share of energy from renewable resources) (Hölscher & Jensterie, 2018). The provisions of this law range from compliance and reporting mechanisms, to governance methods, green innovation incentives and subsidies. Article 224 and 173-VI are

two of such compliance and reporting mechanisms and are the focal point of this research. This chapter will discuss these articles and their content as identified in legislative texts, followed by the theory of change underlying article 173-VI.

#### 3.1 Article 224 & 173-VI of the Energy Transition for Green Growth Act

On 12 July 2010 France adopted article 224 of the French Energy Transition Act, officially Law Number 2010-788, which introduced governmental regulated disclosure obligations of ESG information for management companies and the UCITS they manage in their annual report and in documents intended to inform clients/subscribers. Following article L533-22-1 of the Monetary and Financial Code, management companies need to make information on the way in which they take ESG criteria into account in their investment policy, the nature of these criteria and how these are applied available to the subscribers of their UCITS funds (Legifrance). Also, they need to disclose how they exercise the voting rights attached to financial instruments. The disclosure obligation starts applying on 1 January 2012 and has to be published before 2 July 2012. It is important to note that the disclosure obligation applies both at the management company level and individual fund level.

Article 173-VI is an extension of the provisions given in article 224, has a similar structure, and was adopted in July 2015. This article introduced mandatory climate disclosure requirements for all its institutional investors, whereas article 224 was limited to management companies and their UCITS funds (Legifrance, 2015). In general terms, this law and its implementation decree demand each institutional investor and certain asset management companies to publish in their annual report in what way they integrate environmental, social and governance criteria into their investment policy and the management of their assets, and how this relates to climate change objectives. According to Novethic (2018) this applies to 840 financial institutions/asset owners, of which 60 that have a consolidates balance sheet worth more than €500 million have additional climate related reporting requirements (i.e. climatechange related risk and their contribution to the financing of the green economy). Also, 430 asset managers are subjected to this law, but they already had ESG reporting obligations under article 224. By lack of a precise definition of institutional investors and asset managers it gives a list of the categorizes subjected to the law, this list is given in appendix A. Disclosure obligation starts for the financial year 2016, has to be published on the website and in the annual report before 30 June 2017, and needs to be updated annually.

#### 3.1.1 Content of article 224

Implementation decree D533-16-1 (2012-132 du 30 Janvier 2012) supporting article L.533.22.1 states that the ESG information has to be reported in the following manner (see table 2 for an overview). At the level of the management company: (1) the general way in which the management company takes ESG information into account in its investment policy, (2) the content, frequency and means by which they provide this information to investors, and (3) which of their managed funds take ESG criteria into account and the share and percentage of these funds compared to the total amount of outstanding OPCVMs managed by the management company. This information needs to be disclosed in an easily identifiable manner on the website of the management company at the latest at 1 July 2012

At the level of the individual UCITS funds that take ESG information into account: (1) membership to a charter, code or label related to ESG criteria, (2) a description of the main criteria related to ESG objectives, (3) the information used in the ESG criteria analysis performed on issuers, extra financial ratings, and internal and external analysis related to social and environmental consequences of its activities and societal commitments to sustainable development, (4) description of the methodology of the ESG criteria analysis, (5) the manner in which the results of the ESG objectives criteria analysis are integrated in the investment and divestment process, and (6) the OPCVM funds that do not take ESG criteria into account. This information needs to be disclosed on the website of the management company per UCITS fund or category of UCITS fund and in the annual report of each managed UCITS. Real estate investment funds and venture capital funds are exempted from disclosure obligations. This information has to be disclosed on the website of the management company at the latest on 1 July 2012 and in the annual report of UCITS relating to the financial year beginning on 1 January 2012 (or later). Table 1 gives an overview of this information.

#### **Panel A: information on the management company**

Asset management companies are obliged to disclose:

- 1. The general approach on how ESG criteria are incorporated in the investment policy.
- 2. Content, frequency and the means used to inform investors about the ESG criteria considered in the investment portfolio.
- 3. A list of the managed OPCVMs that simultaneously take ESG criteria into account and the share and percentage of these OPCVMs that do simultaneously take ESG criteria into account, and the amount and percentage of these funds in relation to the total amount of assets managed by the management company.

Publication method:

This information needs to be disclosed on the website of the entity in an easily identifiable manner.

#### Panel B: Information on the UCITS

Managed UCITS funds are obliged to disclose:

- 1. Membership to an ESG related charter, code or label.
- 2. The ESG criteria taken into account.
- 3. The information that is used in the analysis of issuers on these criteria.
- 4. The methodology of the ESG criteria analysis
- 5. A description of the manner in which the ESG criteria are integrated into the investment and divestment process
- 6. The UCITS funds that do not take ESG criteria into account

This information needs to be disclosed on the website of the management company and in the annual report of each UCITS fund.

This table gives an overview of the content asset management companies are obliged to disclose and the publication method as stated in the implementation decree (decree 2012-132 du 30 janvier 2012) supporting Article L.533-22-1 of the Energy Transition for Green Growth Act (Legifrance, 2015).

#### 3.1.2 Content of article 173-VI

Table 3 shows the content of the disclosure obligation under the Grenelle II law as stated in implementation Decree 2015-1850 of 29 December 2015 (Legifrance, 2015). Panel A applies to all institutional investors and asset managers, where asset management companies have the added obligation to disclosure which of its funds that take ESG criteria into account in the investment policy and the percentage of these funds in relation to the total amount of assets under management. Additionally, panel B and C apply only to institutional investors and asset managers that have a balance sheet or fund under management with a value of more than  $\notin$ 500 million.

#### **Panel A: information on the investor**

Institutional investors and asset management companies are obliged to disclose:

- 1. The general approach on how ESG criteria/objectives are incorporated in the investment policy, and when applicable in the risk policy.
- 2. Content, frequency and means by which clients are informed on criteria related to the ESG objectives incorporated into the investment policy.
- 3. Membership of the entity or fund in a chart, code, initiative or an acquired label related to taking ESG criteria into account in the investment policy, as well as a brief description of the charter, code initiative or label.
- 4. When implemented, a description of the procedures used to identify and manage ESG related risks, the business's exposure to these risks and a description of these risks.

Additionally, asset management companies are obliged to disclose:

1. The managed investment funds that do simultaneously take ESG criteria into account, and the amount and percentage of these funds in relation to the total amount of assets managed by the management company.

Publication method:

This information needs to be disclosed on the website of the entity in an easily identifiable manner and updated annually, no later than 30 June 2017.

#### **Panel B: Information on the investment**

Applies to institutional investors with a (consolidated) balance sheet larger than  $\notin$ 500 million and asset management companies with a fund larger than  $\notin$ 500 million.

Information related to the integration of ESG criteria in the investment policy:

- 1. The criteria that are taken into account and why.
- 2. The information that is used in the analysis of issuers on these criteria.
- 3. The methodology and the results of the analysis, including the exposure of their portfolio to climate risks and the GHG emissions associated with the issuers included in the portfolio.
- 4. In what way the results of the analysis and exposure to climate risk are integrated into the investment policy and which changes are made in the investment policy and engagement strategy with issuers and asset managers.

Publication method:

This information needs to be disclosed on the website with an annual update and in the annual report, no later than 30 June.

#### Panel C: climate criteria

#### Applies to:

Institutional investors with a (consolidated) balance sheet larger than  $\notin$  500 million and asset management companies with AUM largen than  $\notin$  500. a fund larger than  $\notin$  500 million.

Information related to global warming limitation and energy and ecological transition goals:

1. For environmental criteria that are taken into account, an indication whether it relates to climate change risks (i.e. physical risks and transitional risks).

- 2. The applied analysis method, the underlying assumptions and their compatibility with the objective of limiting global warming.
- 3. Related to the assets and activities:
  - Consequences of climate change and extreme weather events.
  - Changes in the price and availability of natural resources, and whether their exploitation is in coherence with climate and ecological objectives.
  - Coherence of the investments of issuers with a low-carbon strategy.
- 4. Measures of outstanding investments in thematic funds, in financial securities or infrastructure assets contributing to the energy and ecological transition, in collective investment schemes with a label, chart, or an initiative that contributes to international goals of limiting global warming and the energy and ecological transition.
- 5. Any other element that enables the assessment of the exposure of the entity to risks associated with climate change and its contribution to meeting the international goal of limiting global warming and achieving energy and ecological transition goals.

This table gives an overview of the content institutional investors are obliged to disclose and the publication method as stated in the implementation decree (decree 2015-1850 of 29 December 2015) supporting Article 173-VI of the Energy Transition for Green Growth Act (Legifrance, 2015).

Figure 1 displays an overview of the dates of adoption, entry into force and deadlines of the disclosure obligations as mandated by article 224 and 173-VI.

<b>Asset managers:</b>		Asset managers:		Asset owners:		
(and the UCITS		(and the UCITS +		(pension funds &		
Time funds they manage)		funds they manage)		insurance companies)		
12/06/2010:	1/01/2012:	01/01/2012	01/07/2012:	01/072015:	01/01/2016:	30/06/2017:
Adoption	Article 224	Deadline disclosure	Deadline disclosure	Adoption article	Article 173-VI	Deadline disclosure
article 224	into force	obligation annual report	obligation website	173-VI	into force	obligation

Figure 1: Timeline article 224 & 173-VI.

#### **3.2 Theory of Change**

A Theory of Change is defined as a representation of how an initiative is expected to achieve results and an identification of the underlying assumptions, and typically consists of a sequence of inputs the policy will use, the activities enabled by these inputs, the outputs resulting from these activities, the expected outcomes (i.e. behavioral changes of target groups attributable to the outputs), and expected impacts resulting from the outcome (Morra-Imas & Rist, 2009). Although it is conventionally used for the purpose of evaluating policy, its purpose here will be to aid in understanding in what manner and by what mechanisms article 173-VI is expected to achieve the goal of aligning institutional investors with sustainability goals and improve their sustainable capital allocations. So whereas this is already discussed in a theoretical setting in chapter 2, it will now be viewed from a purely practical orientation. This subchapter will now

discuss the actors related to article 173-VI and their main activities, the policy objective, and how this all connects to the SDGs, upon which the ToC is presented in figure 2.

#### 4.2.1 Actors and main activities

Table 3 gives an overview of the actors and their main activities as deduced from the legislative content of article 173-VI and the general characteristics of the asset management industry and the French fund market.

Actor	Main activities			
French national government	The French government provides the legal framework which mandates asset managers and institutional investors to follow an ESG transparency policy. In order to aid institutional investors with the implementation of the transparency law, the French government has set up a working group that provides investors best practices, carbon footprint measurement methodologies and dialogues with shareholders on environmental issues.			
Institutional	Information disclosure related activities as required by Article 173-VI:			
Investors	<ul> <li>Disclose the approach by which ESG criteria are integrated in the investment policy in an easy identifiable way on the website (&lt;500).</li> <li>Disclose which ESG criteria are taken into account in the investment policy, the method by which the criteria are analyzed, the results of this analysis, and how these results are integrated into the investment policy including changes to issuer and asset manager engagement strategies.</li> <li>Exposure of the portfolio to climate risks.</li> <li>GHG emissions associated with the issuers in the portfolio.</li> <li>The contribution of the portfolio to international objectives related to climate change and the ecological and energy transition.</li> </ul>			
	Delegate portfolio monogoment to asset monogoment companies			
	<ul> <li>Delegate portiono management to asset management companies.</li> <li>Delegate the exertion of voting rights attached to shares to management companies.</li> </ul>			
Stakeholders	Stakeholders evaluate, by using the increased transparency regarding non- financial information of institutional investors, by evaluating the ESG performance of institutional investors. In turn, the results of this evaluation are used to put pressure on institutional investors to improve this performance.			
Asset management companies	Asset management companies are seen here only as third party asset managers that act under a mandate provided for by institutional investors. Hence their sole activities in this model is to manage the portfolio and exert voting rights in			

Table 3: Actors and main activities

coherence with the financial and sustainability demands of institutional investors.

Non-financial As institutional investors are pressurized to improve the ESG performance of their portfolio, the access to capital becomes more sensitive to the ESG performance of non-financial firms. Firms will use this access to capital to expand, and consequently the expansion force of firms will become higher for firms with a higher sustainability performance. Additionally, the higher sensitivity of access to capital to the sustainability performance of a firm, combined with the exertion of voting rights by asset managers in favor of sustainability, will provide for an incentive for firms to increase CSR activities.

#### 3.2.2 Policy objectives

Given that the matter of the transition to a low carbon economy is one of redirecting financial flows (and hence of reallocating capital), it is of great importance to push the financial sector more broadly into the perspective of a low carbon strategy. Article 173-VI aims to do just that (Forum Pour L'Investissement Responsible, 2016). Following The Ministry of the Ecological Transition and Solidarity (2018), the policy goal can be further demarcated as: enabling stakeholders (e.g. public authorities, NGOs, think thanks, civil society, savers and potential clients) to evaluate and put pressure on institutional investors to mobilize themselves for the ecological transition, by enhancing transparency of institutional investors regarding the way they integrate ESG criteria in their investment policy, the climate action they take, and the results. Additionally, the by law recommended consideration of ESG criteria should increase the awareness of investors on the emissions generated as a result of their investments and the associated risk, and consequently align their portfolio with the 2 degree climate objective and increntivize them to finance the energy and ecological transition (FIR, 2016).

#### 3.2.3 Connection with the Sustainable Development Goals

The United Nations Sustainable Development Goals (SDGs) are the blueprint to achieve a sustainable future for all, and acts to converge countries worldwide towards tackling sustainability targets. As such, I deem it as important that my research has a connection with these SDGs in some way and aids in understanding how to stimulate their progression, which is the reason the connection of this research with the SDGs will now be briefly elaborated upon.

Given the almost unlimited possibilities enabled through finance, numerous SDGs can potentially be furthered by means of Article 173-VI. After all, institutional investors shape capital markets and, through investment decisions, determine the direction of the economy to a significant extent. For example, if the pressure institutional investors experience as a result of the regulatory transparency will lead them to focus to a greater extent on investing in organizations that are involved in reducing their carbon footprint, supporting the energy transition and combating climate change, this will simultaneously further SDG 7 on affordable and clean energy, SDG 13 on climate action, SDG 14 about life on land, and SDG 15 about life below water. However, as the discussion on which SDGs can potentially be affected by Article 173-VI is beyond the scope of this research, the ones that can obviously be furthered through the economy and non-financial firms in general are included in the ToC.

#### 3.2.4 Theory of Change behind Article 173-VI

The content of the disclosure obligation, main activities of those concerned by the law, policy objectives and the French fund market as described in chapter 4 have been used to construct the ToC as presented in figure 2. There is a clear positive effect of the intervention on the sustainability performance of institutional investor (the green box in the figure), as well as a trickledown effect to an increase of the sustainability performance of non-financial firms. The causal mechanism behind this effect is mainly that of pressure on institutional investors. This pressure comes from stakeholders (e.g. clients of institutional investors, Non-Governmental Organizations (NGOs) and governmental/legislative actors) enabled by the enhanced transparency and takes an ex-post as well as an ex-ante form regarding the actual publication of the required ESG information. Ex-post meaning the pressure on investors by stakeholders after they have evaluated their ESG performance and the way in which they integrate ESG criteria in their investment policy. Ex-ante meaning that investors feel pressurized in anticipation on pressure by stakeholders. This has been both mentioned and confirmed as being an highly important and significant driver in an open interview with the SRI director of AG2R La Mondiale Gestion D'Actifs, which are one of the largest French institutional investors.



Figure 2: Theory of Change behind Article 173-VI of the Energy Transition Act, the green box indicates the outcome variable.

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### IV. The French fund market

Two of the most important actors in fund markets are asset managers and asset owners. This chapter will, within the French context, discuss asset managers, the types of funds they employ to manage assets, asset owners and the differences and similarities between investment, pension and insurance funds.

#### 4.1 The French asset management industry

The (French) asset management industry's main activity is the professional management of collective investments. These asset management companies can perform their business activities on a proprietary basis, meaning that they seek to earn returns over their own assets and manage their own portfolio, and on behalf of third parties. In the case of third party management, individual or institutional investors delegate the management of their savings or capital to an asset manager, which will in return receive a compensatory fee (afg, 2017). This can take two forms: (1) individual management by means of a discretionary mandate and (2) collective management by means of a collective investment scheme (also known as an investment fund). A discretionary mandate involves tailored management of the investor's assets to its preferences, needs and demands. In contrast, a collective investment scheme involves multiple investors buying shares or units of a fund, after which they share in the investment returns. By doing so, they benefit from professional management, risk sharing, economies of scale and other advantages. Asset managers typically receive only discretionary mandates from institutional investors, whereas retail investors are offered investment funds.

Thus, investment funds are collective investment vehicles employed by asset management companies to manage the assets of investors. They are, therein, not an investor nor an owner of assets. The legal owners in the context of an investment fund are the investors that have subscribed to the fund (i.e. have purchased a share or unit of the fund), as they are thereby owner of the undivided interest of the assets underlying the fund (BlackRock, 2014).

#### 4.2 French investment fund categories

European law distinguishes between two types of collective investment vehicles: Undertakings for Collective Investments and Transferable Securities (UCITS) and Alternative Investment Funds (AIF). A UCITS fund, most commonly known as a mutual fund, and known in France as an 'Organisme de Placement Collectif en Valeurs Mobilières' (OPCVM), is an open-ended collective investment undertaking, managed by a management company, that invests its capital

in liquid financial assets (e.g. equity, bonds and fixed income products) under the application of the principle of risk sharing, and that acquires funds to be invested from the public (DnB, 2013). Open-end indicates that the fund sells and buys back its shares on demand without any limit on the number of shares they offer to investors. Asset management via an UCITS fund differs from proprietary asset management and management under mandate in that an UCITS fund invests on behalf of third parties, not its own assets, and invests in collective funds and not restricts itself to one investor. AIFs are all investment funds not classified as an UCITS (DnB, 2013).

#### 4.3 Asset owners

Asset owners include all institutional investors except investment funds (e.g. pension funds, insurance companies, banks, foundations and endowments) and individual investors (i.e. wealthy individuals and retail investors) (BlackRock, 2014). They can either manage their assets directly, outsource it to an asset management company or a combination of both. As the name implies, asset owners distinguish themselves from asset managers in that they are the legal owners of assets, whereas asset managers are not. Thus, the owners of an investment fund are all the individual investors that have purchased a share or unit of the fund, not the manager itself, whereas the pension or insurance fund still belongs to the pension or insurance company, not to their clients.

The concept of ownership inherently implies the full control asset owners have over the (re)allocation of their assets. Within the context of investment funds, this refers to their ability to subscribe to a fund or redeem from a fund (i.e. selling their fund shares or units and buying new ones from other funds). Thus they can allocate their assets to the fund whose investment policy and strategy and portfolio holdings best match their preferences. In this form of outsourced management, asset owners have no direct control over the choice of the holdings that make up the portfolio of the fund. This is control entitled to asset managers, albeit that this control needs to be exerted in adherence to the investment management agreement and the investment guidelines/constituent documents of the fund. Thus, they do have this control in an indirect manner. In the case of outsourced management in the form of an investment mandate, control over assets is retained by asset owners as well, as the mandate is tailored to their specific preferences and can be terminated if this doesn't match. As for the direct control over the choice of the holdings, this has been delegated to the asset manager. In the case of direct management, naturally, all control over assets and the holdings in the portfolio is retained by the asset owners.

#### 4.4 Investment, pension & insurance funds – differences & similarities

As has been already identified, that although investment, pension and insurance funds are all institutional investors and, be it direct or indirect, invest in the same universe of risky assets, they differ in that investment funds are asset management vehicles and pension and insurance funds are asset owners. Other notable differences are related to their services, investment objectives, clients and liabilities. Firstly, pension funds and investment funds both deliver portfolio management services, whereas insurance funds deliver financial protection against certain losses (Guercio & Tkac, 2002). However, certain types of life insurance allow for the policyholders to share in the investment profits of the insurance company, thereby inherently providing a portfolio management service to the policy holders. Given this characteristic, this type of life fund bears a lot of similarities with an investment fund. In turn, pension funds and life insurance funds are similar in that they both are important annuity providers (Broeders et al., 2009). When looking at their main (investment) objective, there are some notable differences as well. Insurance funds aim to earn a spread on the return on assets on one hand and the costs related to funding and underwriting insurance risks on the other (Broeders et al., 019). The main concern of a pension fund is to maximize the welfare of the pensioner (Wang, 2001), or at least to meet the retirement income objectives of the fund (OECD, 2006). Investment funds' main objective can be described in the most generalized way as to earn riskadjusted returns above the cost of capital. So whilst all funds aim to maximize investment returns, they differ in their obligations and liabilities. See table 4 for an overview of the similarities and differences.

	Insurance fund	Pension fund	Investment fund
Manager/owner	Asset owner	Asset owner	Asset manager
Control over asset allocation <sup>1</sup>	Full control	Full control	No ownership of assets
Control over holdings selection	Full control/indirect control	Full control/indirect control	Full control
Service	- Risk protection - Annuity provider	<ul> <li>Portfolio</li> <li>management</li> <li>Annuity provider</li> </ul>	- Portfolio management

Table 4: Overview differences & similarities insurance, pension and investment funds

#### - (Portfolio Management)

Main (investment)	Earning a spread on assets and costs	Meeting retirement income objectives .	Earning risk- adjusted return
objective	related to funding and underwriting.	5	above the cost of capital.

This table gives a brief overview of some notable differences and similarities between insurance, pension and investment funds. The information for the parameters under insurance funds between brackets relate only to life insurance funds.

#### 4.5 Relationships between asset owners and managers

At the end of 2016, the French asset management industry was characterized by a total of 630 asset management companies (AFG, 2017b). These management companies had €3761 billion Assets under Management (AuM), of which €1,977 billion is managed in the form of a discretionary mandate, and €1,784 billion in the form of undertakings for collective investment under French law. Of these undertakings for collective investment, 7,800 were AIFs and 3,164 were UCITS, with €988 billion and €796 billion AuM respectively. UCITS funds can be further divided into equity, diversified, bond, monetary and formula, of which equity funds amounted €211 billion. Of the discretionary mandates, approximately 82% were given to asset managers by institutional investors, and 12% by retail investors (EFAMA, 2018). As for investment funds, approximately 60% of their clients are institutional investors and 40% are retail investors.

In the asset owner group, alternative investment funds are mostly held by institutional investors and high-net-worth individuals due to their complex nature, lack of regulation and high risk. Mandates are typically only available to high-net-worth individual investors. This is mainly due to the typically high minimum investment amount that an investment mandate requires, and the high level of sophistication with which an investment mandate can be tailored to the specific needs of the investor, needs that mostly institutional investors possess. The financial assets of insurance companies amounted to  $\notin$ 2,522 billion at the end of 2016 (Banque du Franc, 2017), and that of private pension funds to  $\notin$ 230 billion (OECD, n.d.). Figure 3 schematically presents this information.



*Figure 3.* Overview of the French asset management industry at the end of 2016, numbers are in billion  $\in$ .

## V. Research methodology

In brief, the study involved a difference-in-difference design, with one intervention group (i.e. pension and insurance funds domiciled in France) and two control groups (i.e. UCITS investment funds domiciled in France and pension and insurance funds domiciled in Luxembourg), based on a random effects regression. The pre-test period runs from 1 January 2014 till 31 December 2015 and the post-test series runs from 1 January 2016 till 31 December 2017, with the sampling running on a quarterly frequency. The design is focused on the effect of ESG transparency regulation for institutional investors on their sustainability performance. This chapter will not discuss the research design in more depth, followed by the operationalization of the sustainability performance of institutional investors, and data and sampling.

#### 5.1 Research design

In its core the design of this research needs to enable the measurement of the causal effect of ESG transparency regulation (the intervention) on the sustainability performance of institutional investors (the outcome variable). In general, the causal effect of an intervention on an outcome variable can be measured by comparing the observed outcome (i.e. the factual) with what the outcome would have been in absence of the treatment (i.e. the counterfactual), which is known as the treatment effect. Obviously, a subject cannot be observed whilst both experience and not experience an intervention, hence the counterfactual is estimated. As will now be discussed, this design aims to provide a valid estimate of the counterfactual by using a difference-in-difference method.

#### 5.1.1 Difference-in-difference design

A Difference-in-Difference (DiD) design, also known as a Controlled Before-After design, estimates the counterfactual by calculating the change in outcome of a control group (Gertler et al., 2016). Consecutively, the change in outcome of the control group is compared to the change in outcome of the treatment group to measure the treatment effect. In other words, it takes the difference between the post-intervention outcome and the pre-intervention outcome for the treatment group (the first difference) as well as the difference between the post-intervention outcome for a control group (the second difference), and then proceeds to take the difference between these two differences (Somers et al., 2013).

Thus a DiD employs both a before-after comparison as well as an intervention-control comparison to estimate the counterfactual. The before-after comparison for the treatment group (the first difference), by comparing the same group with itself, effectively controls for factors constant over time in that group (Gertler et al., 2016). However, in itself this will not be a valid counterfactual as this does not account for which are factors that affect the outcome variable over time but are not accounted for (Lopez Bernal et al., 2018). In the light of this research such a factor could be the financial engineering of innovative financial instruments and the development of novel investment strategies based on sustainable investments, thereby increasing the returns or lower the risk of sustainable investments and hence increase their desirability. Another factor could be a shift in retail investor preference towards sustainable investment funds. As such they can lead to an over- or under-estimation of the treatment effect, up to the point that an effect is observed that does not exist, or that the results indicate the absence of an effect whilst there in reality is one. By adding an intervention-control comparison (second difference), an DiD design includes these time-varying confounding factors, thereby controlling for them. That is, if the control group is similar to the treatment group on timevarying factors that affect the outcome. Consecutively, by taking the first difference and subtracting the second difference, the effects of these time-varying factors are effectively eliminated, and the treatment effect remains.

#### 5.1.2 Time of intervention, treatment & control group selection

The start of the intervention is selected as of 1 January 2016. This date has been selected because although the deadline of the information disclosure obligation is on 30 June 2017, investors will need to disclose information about the year starting on 1 January 2016. As the ToC shows, they will anticipate on this transparency and expected pressure by stakeholders. Thereby effectively already experiencing the effect of the intervention. This has been confirmed in an open-interview with AG2R La Mondiale, one of the largest French institutional investors.

The treatment group in this design are French domiciled pension and insurance funds, as they are exposed to ESG reporting obligation by Article 173-VI. In the selection of the control group, it is pivotal to base the selection on similarity with the treatment group on all variables/factors that might interfere with the outcome variable of the intervention (i.e. sustainability performance of institutional investors), as this safeguards internal validity and the robustness of the design and protects against confounding variables. Or in other words, select a control group that provides a valid estimate of the mean counterfactual outcome of the treatment group

(Somers et al., 2013). As will now be explained, two control groups will be used: (1) France domiciled UCITS investment funds and (2) Luxembourg domiciled pension and insurance funds. The main reason for selecting two control groups is that they both are nonequivalent to the treatment group on some characteristics and have different strengths and weaknesses in respect of these dissimilarities. By comparing the treatment group to both these control groups I aim to make the results more robust.

The selection of UCITS investment funds as a control group has been enabled by the implementation of article 173-VI of the Energy Transition Act , as this article extents the reporting obligations under article 224 to include French domiciled pension and insurance funds as well, whereas previously only asset managers and their French domiciled UCITS investment funds were targeted. UCITS funds are expected to be an appropriate control group because they are institutional investors, just as pension and insurance funds are, and thereby share a large amount of characteristics that affect the outcome variable. They all invest in the same universe of risky assets, all engage in portfolio management activities, control holdings selection and aim to earn yield in the same financial environment.

However, following the brief disquisition in chapter 4 (table 4) on the differences between UCITS funds and pension and insurance funds, the most profound differences are that of ownership of assets, the service they provide and the main investment objective. The difference in ownership is expected to lead to some difference of control over asset allocations, as investment funds are not owners of the assets and therefore cannot be reallocated to another fund the same way as asset owners. However, in the case that an investment fund invests in other investment funds such asset reallocation practices can be performed by investment funds, as they can change their portfolio holding in line with the fund guidelines. Regardless, this difference in control is expected to refrain to interfere with the effect of transparency regulation on the choice of portfolio holdings, as pension and insurance funds are capable to reallocate their assets or terminate the mandate if the investment fund or the mandate doesn't adhere to their (sustainability) preferences. In the case that an institutional investor does manages its assets directly there is no differences in control over portfolio holdings at all. Secondly, the pension, insurance and investment funds slightly differ in the services they provide with some overlap as well. Insurance funds provide risk protection, annuity and portfolio management, pension funds provide annuity and portfolio management, and investment funds solely provide portfolio management services. Thirdly, their investment objectives differ also, in that insurance funds aim to earn a spread on assets and costs related to funding and underwriting,

pension funds mainly aim to meet retirement income objectives and besides like to aim a spread as well, and investment funds mainly aim to earn an spread as large as possible without any other aims (or in other words ear as high risk-adjusted return as possible). This is likely to interfere to some extent with the effect of transparency regulation on their sustainability performance, as for example pension funds are more risk averse due to their service of providing annuity and having to meet retirement objectives. This could lead to an aversion to change their investment strategy and portfolio allocation towards more sustainable investments. Thus UCITS funds as a control group and pension and insurance funds as a treatment group might not be a perfect match.

In order to alleviate this shortcoming and make causal inferences more robust and rigid, I include Luxembourg domiciled pension and insurance funds as a control group. This control group will thus consist of pension and insurance funds, which means they match on all factors that are endogenous to pension and insurance funds given their characteristics and nature. However, the main weakness of this control group, is that there are differences between the treatment group and control group stemming from their geographical location, as pension and insurance funds in the treatment group are domiciled in France and pension and insurance funds in the control group are domiciled in Luxembourg. This will result in differences in cultural, political legislative and economic factors, that all might interfere with the outcome variable.

#### 5.1.3 Difference-in-difference regression model

The average treatment effect was estimated by the following regression model:

$$Sust_{jt} = \beta_0 + \beta_1 Post_t + \beta_2 Intervention_j + \beta_3 (Post_t * Interventiont_j) + \varepsilon_{jt}, \quad (5.1)$$

where:

 $Sust_{jt}$  = the sustainability performance of institutional investor *j* at time *t*,

- $Treat_j$  = an indicator variable indicating whether institutional investor *j* belongs to the intervention group (value of 1) or to the control group (value of 0),
- $Post_t$  = a dummy variable indicating whether time *t* is in the post-intervention period (value of 1) or in the pre-intervention period (value of 0).

The coefficients can be interpreted as follows:

- $\beta_0$  = the intercept, which gives the constant difference in the outcome,
- $\beta_1$  = the time trend in the control group,

- $\beta_2$  = the difference between the two groups before the intervention,
- $\beta_3$  = the difference of the difference (i.e. the treatment effect).

The error term  $(\epsilon_{jt})$  captures the difference between the predicted outcome variable and the actual outcome variable.

Thus, referring back to the first difference, the second difference, and the difference of these differences,  $\beta_3$  (the treatment effect) is estimated in the following manner



where Sust, Intervention and Post are the variables as mentioned in the regression model.

#### 5.1.3 Strengths & weaknesses of the design

As already discussed, the strength of a DiD design is its ability to control for within group factors constant over time and time-varying factors that are similar for the control and treatment group. Thus, what it won't be able to control for is a difference in time varying factors in these two groups (i.e. a difference in factors that occurs during the sample period and that affects the outcome variable for the treatment group and not the control group and vice versa) (Gertler, 2016). A lack of such a control will not harm the internal validity if the parallel trend assumption is met, which is the assumption that in absence of the intervention the outcome for the treatment group would have been the same as that of the intervention group. This assumption is met when the trend in the outcome variable over the time before the intervention is the same for the treatment and the control group. Testing whether this assumption is met is not possible in a DiD design, as it uses average changes in the level of the outcome, not the trend over time and this would require the inclusion of a time series analysis. It can, however, be visually tested by plotting the trends of the outcome variables of both groups over time, although obviously this will not allow for a test of statistical significance.

#### **5.2 Operationalization**

The sustainability performance of institutional investors will be measured largely similar to the measurement method developed by Brandon and Krüger (2018), whose method consists of the quantification of the ESG performance at the institutional investor stock portfolio-level. As the sustainability of an investment portfolio depends on the sustainability of its investments this score is calculated as an aggregated score based on the ESG scores of all the stocks an institutional investor holds in a certain fund portfolio. Also the amount invested in each stock that is held in the portfolio greatly differs per stock (i.e. the value-weight differs). In order to calculate a portfolio-level sustainability score that is representative for the whole portfolio without being biased due to differences in stock holding values, the ESG score of the stock holdings are value-weighted. This is simply done by multiplying the value weight the stock holding has in the whole portfolio by the ESG score of that same stock holding. Whereas the value weight of each stock holding is calculated by dividing the stock value by the total value of the portfolio in which it is held.

In more formal terms, the portfolio-level sustainability and pillar scores are calculated by means of the formula 5.2:

$$Sust\_fund_{jt} = \sum_{i=1}^{N_{jt}} vw_{ijt} \times ESG\_score_{it},$$
(5.2)

where:

Sust_fund <sub>jt</sub>	= the sustainability score of fund $j$ in time $t$ ,
VWijt	= the value weight of stock $i$ in institutional investor's portfolio $j$ at time,
ESG_score <sub>ijt</sub>	= ESG score of stock $i$ in at time $t$ ,
$N_{jt}$	= the amount of stocks that institutional investor $j$ holds at time $t$ for
	which ESG scores are available.

#### Box 1: Exemplification portfolio-level sustainability equation

Thus, what this formula shows in formal terms and what the previous paragraph briefly explained is that the fund portfolio-level sustainability score is calculated by multiplying the ESG score of a certain stock holding by its value weight in relation to the total portfolio value, which is iterated for all the stocks in the portfolio for which ESG data is available. So if for example fund portfolio A holds stock X, Y and Z at time 2014Q1, the formula is filled in as

$$ESG_fund_{A,2010Q1} = \sum_{i=1}^{3} vw_{XYZ,A,2010Q1} \times ESG\_score_{XYZ,2010Q1},$$

which is the same as

 $ESG_fund_{A,2010Q1} = vw_{X,A,2010Q1} \times ESG\_score_{X,2010Q1} + vw_{X,2010Q1} \times ESG\_score_{Y,2010Q1} + vw_{Z,2010Q1} \times ESG\_score_{Z,2010}.$ 

To further exemplify, if fund A holds stock X,Y and Z, with an value amount of  $\notin 100.000$ ,  $\notin 250.000$ , and  $\notin 150,000$  respectively, and a stock-level ESG score of 50, 40 and 60 respectively, the portfolio-level sustainability is calculated as follows. The value weights of the stock holdings are 100.000/500,000 = 0.2, 250.000/500,000 = 0.5 and 150,000/500,000 = 0.3 respectively. The portfolio-level sustainability score then is 0.2\*50 + 0.5\*40 + 0.3\*60 = 48.

The environmental, social and governance scores are calculated analogously by using the environmental, social and governance components of the stock-level ESG score, i.e.  $Env_fund_{jt} = \sum_{i=1}^{N_{jt}} vw_{ijt} \times Environmental\_score_{it}$  and  $Soc_fund_{jt} = \sum_{i=1}^{N_{jt}} vw_{ijt} \times Social\_score_{it}$  and  $Gov_fund_{jt} = \sum_{i=1}^{N_{jt}} vw_{ijt} \times Governance\_score_{it}$ .

As equation 5.2 indicates, the portfolio-level sustainability score will only include holdings for which a stock-level ESG score is available, excluding those for which there isn't. This means that if for a certain fund's portfolio only 10 percentage of its stock holdings an ESG score is available, the fund-level sustainability score will only say something about 10% of that fund and it is not very likely that this score reflects the sustainability score of the whole portfolio of the fund. Therefore, there are some inherent external validity issues to this operationalization method. Just as the sample of funds needs to be representative of the whole population of funds, the sample of holdings need to be representative of the whole portfolio. In order to test this external validity the variable coverage is generated, which measures the percentage of the value of fund *j*'s portfolio at year-quarter *t* for which stock-level ESG data is available. Equation 5.3,

used for the coverage variable, is denoted as

$$Coverage_{jt} = \frac{\sum_{i=1}^{N_{jt}} holding\_value_{ijt} \ [ESG\_score_{it} \neq missing]}{\sum_{i=1}^{N_{jt}} holding\_value_{ijt}},$$
(5.3)

where:

*holding\_value*<sub>ijt</sub> = the value of stock *i* in investor *j*'s portfolio at year-quarter *t*.

In the dividend part of this equation the inversion brackets simply state the condition that the holding values of stock *i* in fund *j*'s portfolio at year-quarter *t* only will be included in the summation when the ESG score for that same stock *i* and year-quarter *t* is not missing.  $N_{jt}$  denotes the total number of stocks fund *j* holds in its portfolio at year-quarter *t*. The divisor part of this equation is the total portfolio value, calculated by summing up the value of all stocks *i* in portfolio *j*, and is explained in more depth in chapter 5.3.2.

#### **Box 4: Exemplification coverage variable**

To give an example for the coverage variable, if fund A has holds stock X, Y and Z in its portfolio, with a value of  $\notin 100.000$ ,  $\notin 250.000$  and  $\notin 150.000$  respectively, whereas only stock X has an ESG score, the coverage percentage is  $\notin 100.000/\notin 500.000 = 0.20 = 20\%$ .

#### 5.3 Data & sample selection

Thus, the portfolio-level sustainability score requires two things: (1) the ESG score of stocks, ideally all stocks in the investible universe, and (2) the stocks that are held in the portfolios of institutional investors (also referred to as holdings).

#### 5.3.1 Stock-level sustainability score

I use the Thomson Reuters ESG score (henceforth referred to as TR ESG score) for this purpose, as this score covers 7,000 companies worldwide and includes over 400 ESG metrics, measured by over 150 professional content research analysts specifically trained to collect ESG data (Thomson Reuters, 2017). The data input for these metrics are corporate public reports (e.g.

annual reports, CSR reports and company websites) and global media. It is thereby one of the ESG score databases with the most comprehensive coverage in the world.

I have retrieved the ESG score whole universe of firms for which Thomson Reuters has measured and calculated an ESG score, with the sample period running from 1 January 2014 till 31 December 2017 on a quarterly frequency. Furthermore, the holistic TR ESG score comprises 10 broad ESG category scores. Of these categories, three are environmental based (i.e. emissions, environmental innovation and resource use), four are social based (workforce, human rights, product responsibility and community) and three are governance based (shareholders, managements and CSR strategy). I have retrieved these category scores as well as this can improve the insights derived from the analysis.

However, as presenting 10 additional category scores deleteriously affects the digestibility of the results and I do not intend to conduct inductive research, I prefer to merge these scores into an environmental social and governance pillar score. As DataStream does not provide these pillar scores, I have calculated these pillar scores myself. Because the weight each category score has in the TR ESG score differs, it is pivotal to do so in a way that does not compromise the ratios of these category scores. This calculation is done by: (1) adding up the weights of the category scores belonging to a certain pillar, (2) then dividing the category score by its total pillar weight to get its ratio, (3) after which I have multiplied this ratio with the category score (this process was iterated for each category score), and lastly (4) summed up the new category scores belonging to the same pillar. The weights of the category scores in relation to the TR ESG score are provided by Thomson Reuters (2019) and are included in appendix B.

Taking the governance score as an example, the equation is denoted as

$$= management_{it} \times \left(\frac{management \ weight}{total \ pillar \ weight}\right)$$

$$+ shareholders_{it} \times \left(\frac{shareholders \ weight}{total \ pillar \ weight}\right)$$

$$+ CSR\_strategy_{it} \times \left(\frac{CSR\_strategy \ weight}{total \ pillar \ weight}\right),$$
(5.4)

where:

goverance_score <sub>it</sub>	= the governance pillar score for stock $i$ at year-quarter $t$ ,
management <sub>it</sub>	= the management category score for stock $i$ at year-quarter $t$ ,

shareholders <sub>it</sub>	= the shareholders category score for stock $i$ at year-quarter $t$ ,
$CSR\_strategy_{it}$	= the CSR strategy category score for stock $i$ in year-quarter $t$ .

Thus, each category is multiplied by the weight it has been assigned to by Thomson Reuters in relation to the overall ESG score, divided by the sum of the weights of each environmental category.

#### Box 1: Exemplification ESG pillar scores

To further exemplify, the TR ESG score has a weight of 100% and consists of three governance category scores. The weight these scores have in the total TR ESG score are 19%, 7% and 4.5% respectively, making the total weight of the governance pillar 30.5%. If I want to calculate the governance score for a certain stock based on these categories without compromising the ratios of the category scores, I will need to weight them accordingly and that's where the formula comes in. So if stock X has a management score of 50, a shareholder score of 40 and a CSR strategy score of 60, the governance score of stock x is calculates as 50 \* (19/30.5) + 40 \* (7/30.5) + 60\*(4.5/30.5).

#### 5.3.2 Institutional investor portfolio holdings

Step two in the portfolio-level sustainability score measurement process consists of retrieving the portfolio holdings of the institutional investors, for which I use Morningstar. Morningstar contains data on 4044 France domiciled pension and insurance funds, of which 2267 have survived and 1024 are equity funds. For each of these Funds the ISIN identification code is retrieved, after which the holdings of these funds have been retrieved by running the Morningstar excel-add in formula MSHOLDING on these ISIN codes. Of these 1024 fund ID codes, a certain amount resulted in the exact same portfolio holdings including the values, leading me to conclude that the ISIN code does not uniquely identify funds. Therefore, I have deleted each duplicate portfolio. Furthermore, a large amount of these ID codes led to either no results at all or to results that did not match the required sample period and frequency. This has led eventually to a sample of holdings for 313 French domiciled SICAV funds, which showed a total of 1202 surviving SIVAV funds being included in the Morningstar database, of which 413 are

equity funds and 57 meet the required sample characteristics (i.e. no duplicates and date for the full range of the sample period and frequency).

In this dataset the total portfolio value variable is generated, which is calculated as:

$$Portfolio\_value_{jt} = \sum_{i=1}^{N_{jt}} holding\_value_{ijt},$$
(5.5)

where:

*holding\_value*<sub>*ijt*</sub> = the value of stock *i* in investor *j*'s portfolio at year-quarter *t*,  $N_{jt}$  = the total number of stocks investor *j* holds in year-quarter *t*.

This variable measures the total amount of equity capital held in fund j's portfolio at yearquarter t. Thus the total portfolio value is the value of all the stocks that a certain fund holds in its portfolio at a certain point in time. In order to calculate this, I simply add up the value for each stock i that fund j has in its portfolio at time t.

#### Box 2: Exemplification portfolio value equation

In the example of fund portfolio A, that holds stock X, Y and Z at time 2010Q1, the equation is filled in as:

$$Portfolio_value_{A,2010Q1} = \sum_{i=1}^{3} holding_value_{XYZ,A,2010Q1}.$$

This is the same as:

 $\begin{aligned} Portfolio\_value_{A,2010Q1} \\ &= holding\_value_{X,A,2010Q1.} + holding\_value_{Y,A,2010Q1} \\ &+ holding\_value_{Z,A,2010Q1.} \end{aligned}$ 

So, what this basically does is adding up all the stock values of a fund portfolio at a given point in time. If portfolio A has holds100.000 in stock X, 250,000 in stock Y and 150,000 in stock Z, the total portfolio value is 500.000.

### VI. Results

This chapter shows the results, which is divided into two sections. The first section shows the results from the calculation of the portfolio-level sustainability score, beginning with a description of the stock-level ESG dataset and the holdings dataset, followed by the merged dataset. The second section shows the results of the DiD analysis.

#### 6. Institutional investor-level sustainability score

#### 6.1.1 Descriptive statistics stock-level ESG score

The stock-level ESG score coverage rises slowly throughout the sample period, with 4,529 firms in the first quarter of 2014, and 6,127 in the last quarter of 2017. Table 3 shows the summary statistics for the Thomson Reuters ESG score, and calculated ESG pillar scores.

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Variable	Ν	Mean	SD	Min	p25	p50	p75	Max
ESG score	89,228	50.19	17.89	0	36.05	49.16	64.16	95.79
Environmental	89,228	50.14	22.9	0	30.47	48.25	68.88	99.22
Social	89,228	44.51	19.73	0	29.40	44.22	59.46	98.76
Governance	89,228	48.46	21.59	0	31.31	48.35	65.61	99.37

Table 3: Stock-level ESG score summary statistics

This table shows the summary statistics for the ESG score variables at the firm level in the ESG score dataset. N stands for the amount of observations.

The average values of the ESG and environmental score are quite similar, with the governance score being slightly lower and the social score the lowest. The standard deviation and range of distribution is somewhat higher for the ESG pillar scores in comparison to the overall ESG score. Figure 4 shows the average ESG scores plotted over time. These values display high stability over the whole sample period, with (as expected) the overall ESG score and the environmental score being the highest for the firms in this dataset, followed by a slightly lower governance score and a significantly lower social score. See figure 1 in appendix C for the plotted distributions of the ESG scores.



*Figure 4*. This figure displays the development of the average ESG scores over the sample period for French pension and insurance funds.

#### 6.1.2 Descriptive statistics institutional investor holdings

Table 4 shows the summary statistics of the holding value and portfolio value variables. As this table shows. These statistics indicate a skewness in the holding and portfolio values, as is also seen in the plotted distribution of these variables displayed in figure 2 and 3 in appendix C.

Table 4.1: Holding	summary	statistics
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Panel A: French	domiciled	pension &	insurance	funds	(381	funds)
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Variable	Ν	Mean	SD	Min	p25	p50	p75	Max
Holding	444,233	3.57	16.22	-18	0.17	0.86	2,2	881.15
value								
Portfolio	444,233	284.57	897.35	2e-6	36.55	122.32	288.46	20,300.61
value								

Panel B: French domiciled UCITS funds (196 funds)

Variable	Ν	Mean	SD	Min	p25	p50	p75	Max
Holding	224,387	3.24	10.58	-1.45	0.211	0.73	2.60	445.94
value								
Portfolio	224,387	259.45	499.90	0.70	36.02	110.02	280.65	7,098.10
value								

Variable	N	Mean	SD	Min	P25	P50	P75	Max
Holding	195,646	69.05	591.27	0	0.44	3.21	11.05	25.45
value								
Portfolio	195,646	5,078.75	31,529.10	2e-3	132.16	360.65	1,100.77	429,499.80
value								

Panel C: Luxembourg domiciled pension & insurance funds (326 funds)

6.1.3 Descriptive statistics institutional investor-level sustainability score

Table 5 shows the statistics for the ESG and pillar scores and the coverage variable.

Table 5: Institutional investor-level sustainability score summary statistics

Variable	Ν	Mean	SD	Min	p25	p50	p75	Max
ESG fund	6,047	36.04	11.74	0.26	32.20	39.60	43.52	63.40
Env fund	6,047	38.95	13.15	0.33	34.13	42.55	47.75	71.72
Soc fund	6,047	30.05	9.88	0.22	26.68	32.60	36.20	57.52
Gov fund	6,047	33.85	11.02	0.22	30.32	36.89	40.85	66.63
Coverage	6,047	0.68	0.21	0.01	0.63	0.74	0.82	1.00

Panel A: French domiciled pension & insurance funds (380 funds)

Panel B: French domiciled U	UCITS funds	(195 <i>funds</i> )
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Variable	Ν	Mean	SD	Min	p25	p50	p75	Max
ESG fund	3,112	36.13	11.69	0.26	33.64	39.75	43.23	62.38
Env fund	3,112	38.88	12.96	0.27	35.41	42.67	47.08	68.73
Soc fund	3,112	30.16	9.85	0.22	27.60	32.72	36.23	57.52
Gov fund	3,112	34.05	11.11	0.12	31.23	37.28	40.93	66.63
Coverage	3,112	0.69	0.21	0.01	0.65	0.74	0.82	1.00

Panel C: Luxembourg domiciled UCITS funds (262)

				-				
Variable	Ν	Mean	SD	min	p25	p50	p75	Max
ESG fund	2,736	25.90	15.48	0.23	15.43	24.73	36.66	84.69
Env fund	2,736	25.66	16.07	0.13	14.95	23.56	36.30	96.55
Soc fund	2,736	23.36	14.76	0.18	13.56	22.02	31.78	83.81
Gov fund	2,736	24.96	16.46	0.14	14.20	22.25	34.43	98.23
Coverage	2,736	0.53	0.31	0.00	0.31	0.49	0.77	1.00

This table shows the summary statistics for the ESG and pillar scores at the fund level and the coverage variable. N stands for the amount of observations.

As this table shows, all funds score highest on the environmental score, followed by the overall ESG score and, compared to the environmental score, the governance score and the social score. he coverage variable has a mean value for French pension and insurance funds, French investment funds and Luxembourg domiciled investment funds are 0.68, 0.69 and 0.52 respectively, indicating that on average 68%, 69% and 52% of their portfolio is covered by the stock-level ESG score. The distribution of the portfolio-level sustainability, environmental, social and governance scores are shown for the treatment and control groups in figure 4, 5, 6 and 7 respectively. As these figures show, there is a slight skewness to the left.

#### 6.1.4 Preliminary results

Figure 6 displays the development of the average ESG and pillar scores at the fund level over time. The fund-level averages slightly increase at the beginning of the period and in in the first quarter of 2017 slightly start to decrease. The firm-level scores remain flat.



*Figure 6.* This figure displays the development of the average ESG and pillar scores over the sample period for French pension and insurance funds at the stock-level and the fund-level. .

#### 6.2 Difference-in-Difference estimation

Table 6 reports the results of the DiD regression estimation, using a random effects regression.

Table 6: OLS random effects Difference-in-Difference regression

 $Sust_{jt} = \beta_0 + \beta_1 Post_t + \beta_2 Intervention_j + \beta_3 (Post_t * Interventiont_j) + \varepsilon_{jt}$ 

Variable	Sust_fund	Environmental	Social	Governance
Post	3.93***	1.86**	3.34***	1.09
	(0.41)	(0.84)	(0.80)	(0.77)
Intervention	-0.08	0.49	0.48	-0.22
	(0.36)	0.73	(0.69)	(.67)
Post*Intervention	0.04	-0.52	-1.89*	0.02-e1
	(0.51)	(1.03)	(0.98)	(0.95)
Constant ( $\beta_0$ )	34.16***	54.35***	42.68***	48.97***
	(0.29)	(0.59)	(0.56)	(0.55)
Observations	9155	9155	9155	9155
R-squared	0.028	0.001	0.003	0.001

Panel A: Control group 1 (France domiciled investment funds )

Panel B: Control group 2 (Luxembourg domiciled pension & insurance funds)

Variable	Sust_fund	Environmental	Social	Governance
Post	3.92***	-1.52*	-0.67	-0.30
	(0.49)	(0.88)	(0.82)	(0.85)
Intervention	10.18***	3.90***	-3.3***	-0.18
	(0.42)	(0.76)	(0.71)	(0.71)
Post*Intervention	0.058	2.86***	2.16**	1.39
	(0.59)	(1.07)	(0.99)	(0.99)
Constant ( $\beta_0$ )	23.89***	50.94***	46.44	48.93***
	(0.35)	(0.63)	(0.59)	(0.59)
Observations	8779	8779	8779	8779
R-squared	0.136	0.012	(0.003)	0.00

Standard errors in parentheses

\*\*\* p <0.01, \*\* p < 0.05. \* p < 0.01

This table presents the results of the random effects regression performed to estimate the treatment effect of Article 173-VI on the sustainability performance of institutional investors.

The coefficient for the interaction term ( $\beta_3$ ) in panel A, where French investment funds are used as a control group, is only significant for the social score, which is estimated as -1.89 with a p value of 0.059. None of the estimated coefficients for the intervention/control group dummy variable ( $\beta_2$ ) are significant, regardless of the outcome variable. The estimated coefficient for the post-intervention dummy ( $\beta_1$ ) is statistically significant for the sustainability outcome variable with an estimated value of 3.93 (p 0.000), the environmental outcome variable with an estimated value of 1.86 (p 0.026), and the social outcome variable 3.34 (p 0.000).

As for Panel B, in which Luxembourg domiciled pension and insurance funds are used as a control group, interaction term coefficient is statistically significant when the environmental and governance score was used as the dependent variable, with an estimated value of 2.86 ( p 0.008) and 2.16 (p 0.030) respectively. The intervention group variable coefficient is significant for with the sustainability score, the environmental score and the social score as the dependent variable. Their estimated coefficients are 10.18 (p 0.000), 3.90 (p0.000) and -3.3 (p 000) respectively. The post-intervention variable has an significant estimated coefficient when predicting the sustainability score, as well as the environmental score, with respective values of 3.92(p0.000) and -1.52 (0.088).

### VII. Discussion

#### 7.1 Discussion of the results

#### 7.1.1 Descriptive statistics

It stands out from table 4 and figure 6 that the mean values of the TR ESG and environmental, social and governance fund-level scores are relatively low compared to the average of these scores at the stock-level. At the stock-level the average of these scores are all stable around 50 (except for the environmental score which is stable at 45), whereas at the fund-level these scores are, over the whole sample period, for French domiciled Funds approximately 36, 38, 30 and 34 respectively and for Luxembourg domiciled funds 26, 26. 24 and 25 respectively. This indicates that funds in both countries tend to invest in stocks (from the Thomson Reuters universe of investable stocks comprising over 6000 stocks worldwide) that have a lower than average ESG score and thus a lower than average sustainability performance. This might indicate that institutional investors indeed experience difficulties in committing to long-term

sustainability goals, and is in line with problem description of this study and the tragedy of the horizon postulate. However, this might also be a result from a lack in their ability to integrate ESG information into the financial analysis of stock investment options, instead of solely disincentives, or a combination of both.

As for the coverage variable in table 4, this is relatively high, with on average 68% of the total value of all the stocks held in the portfolios of French domiciled pension and insurance funds being covered by the TR ESG score, 69% of the portfolio holdings of France domiciled UCITS funds and somewhat lower for Luxembourg domiciled pension and insurance funds with 53%. This indicates that the external validity of the selection of stocks and accompanying ESG score is strong and the fund-level sustainability score is representative for the whole portfolio.

#### 7.1.2 Preliminary insight

Figure 6 allows both to test visually if the parallel trend assumption is met as required to test the internal validity of the DiD design, as well as deriving first expectations about the effect of the intervention. Firstly, as this figure shows the trends of the treatment group (yellow line) as the control groups (green and brown) are highly similar in the pre-intervention period, indicating that the parallel trend assumption is met. Additionally, as stated by Brandon and Krüger (2018), an improvement of the (average) fund level ESG score over time whilst the average firm-level ESG score remains flat, suggests that funds have increased their exposure to stocks with better ESG scores. In this sample, however, there is an observable increase up the first quarter of 2017, after which a decrease kicks in. This could be an indication that in 2017, France domiciled pension and insurance funds have invested in stocks less sustainable in relation to the period 2014-2016, which is incongruent to the expectations stemming from the ToC. This does not hold any statistical significance and should be perceived with caution.

#### 7.1.3 Difference-in-Difference analysis

The coefficient measuring the treatment variable when the counterfactual is based on French pension and insurance funds is only significant when predicting the social score, with an average treatment effect of -1.89. This indicates that the intervention has a negative effect on the social performance of the treatment group, which is highly unlikely. It is not expected that ESG transparency regulation will cause investors to lower the social performance of their portfolio. The other coefficients are not statistically significant.

When the counterfactual is based on Luxembourg domiciled pension and insurance funds there is an observable treatment effect on the environmental performance and social performance of French investment and pension funds, which is 2.86 and 2.16 respectively. Thus pension and insurance funds seem to have on average increased the level of environmental and social sustainability of their portfolio with 2.86 and 2.16 points in the TR ESG score as a direct causal result of transparency regulation. However, there is no measurable effect of the intervention on the overall sustainability and governance performance of the portfolios of French pension and insurance funds.

Thus the two models seem to be in contradiction, with Luxembourg based counterfactual indicating a positive treatment effect on environmental and social performance and French pension and insurance fund based counterfactual leading to a negative treatment effect on social performance. The question that remains is whether one of these counterfactuals, or both, are not a good approximation of the true counterfactual. It might be for example that there has been a contamination effect of article 224 on French pension and insurance funds, leading the intervention to have no or less effect. For example, it might be that UCITS funds have increased their sustainability performance due to increased transparency as required under article 224. As figure 2 shows 60% of the UCITS fund shares are sold to/hold by institutional investors. Therefore, it might be that this partially is reflected in the portfolio of institutional investors. However, this particular form of contagion is eliminated as the used dataset does not include holdings of shares or units in other funds. It is also possible that the differences in investment goals, objectives and service provision are interfering with the outcome variable. Therefore, it seems that the more plausible reason is that the counterfactual based on pension and insurance funds in Luxembourg better matches the characteristics with pension and insurance funds that affect the outcome variable. Also, the level of significance of the coefficients estimating the treatment effect on the environmental and social performance when using the Luxembourg domiciled pension and insurance funds as the counterfactual are considerably higher. Therefore these coefficients are more likely to be statistically different from zero.

In both cases, given the negative treatment effect in one case and the relatively small positive treatment effect in the other, ESG transparency regulation for institutional investors is unlikely to be the solution in closing the SDG financing gap and is not an effective policy instrument to improve the sustainability of institutional investors.

#### 7.2 Limitations & suggestions for improvements

#### 7.2.1 Controlled Interrupted Time Series design

A DiD design was used to measure the effect of ESG transparency regulation on the sustainability performance on institutional investors. A DiD compares the average preintervention and post-intervention outcome and proceeds to subtract this difference in outcome in the control group from this difference in outcome from the treatment group. By doing this comparison with averages, 'time ' is not incorporated in the model. This means that the counterfactual is based only on the control group whereby it assumes that the time trend in the control group is similar to the time trend in the treatment group (Lopez et al., 2019). A Controlled Interrupted Time Series (CITS) design CITS design takes the difference between the growth curve of the intervention group and the control group. To do so, multiple observations over time at the same frequency at the pre-intervention and post-intervention period are used and time is incorporated as a continuous variable in the regression equation, where a DiD design incorporates only a dummy variable for the pre-intervention and postintervention period. Therefore, CITS design is able to verify differences in trends between the control group and treatment group and testing the parallel trend assumption, which a DiD design cannot (Bernal, 2018). Given these characteristics a CITS is seen as a more powerful design (Lopez et al., 2019). This design requires continuous time series data without any missing outcomes for subjects at any point in time in order to provide a valid estimate. By cleaning the dataset (i.e. removing all subjects that have a missing observation on the outcome variable in time *t*), this is a feasible design in this study. However, due to time constraints this model was not included and in the future the results can be improved by making this inclusion.

#### 7.2.2 Control groups

As noted in chapter 5, one of the control groups consist of UCITS investment funds, which can serve as a control because they already were exposed to transparency regulation due to the in 2010 implemented article 224 of the French Energy Transition Act. Therefore, they can be perceived more as a surrogate control group in a sense that they have already been treated and hence per definition belong to the treatment group. However, for the estimation of the treatment effect this should not matter, because they still serve their purpose in controlling for confounding time-varying variables. That being said it would be very interesting to perform this design the other way around, that is, take article 225 as the intervention and use French domiciled pension and insurance funds as the control group and use UCITS investment funds

as the treatment group. If these findings point to the same direction as the findings in this study, this can strengthen the robustness of both results.

The second control group, pension and investment funds domiciled in Luxembourg were selected based on data availability in Morningstar. Expectedly, United Kingdom and Germany domiciled pension and insurance funds are more similar to the treatment group on confounding variables. Thus the study design can be improved by adding holdings data for these two groups as well, which might be available in Eikon or Factset. Additionally, due to time constraints, Luxembourg domiciled pension and insurance funds were not analysed in depth on their congruence with French domiciled pension and insurance funds. This deleteriously affects the validity of the design and by adding such an analysis the findings will become more robust.

#### 7.2.3 External validity

The external validity of the design is difficult to assess. The holdings data was purely selected based on their availability in Morningstar, for which all the available stock holdings were retrieved of French and Luxembourg domiciled funds. Thus the representativeness of the sample and the external validity depends on whether the Morningstar universe of funds is representative for the whole population of funds. If this is not representative there might be a selection bias at play. Due to time constraints it also not possible to do in depth research on this selection bias, as well as calculating the power of the sample. There are 3,164 French UCITS funds, whereas the sample contains 196 funds, thus 6% of the population is included in the sample. I was not able to find the population amount of French and Luxembourg domiciled pension and insurance funds. This requires further investigation and can significantly contribute to generalize to the whole population of funds.

#### 7.2.4 Data cleaning process

The amount of funds differs in table 4 and table 5. As will now be explained, this is the result of the datasets on which they are based and cleaning the final dataset. Table 4 is based on data in the dataset containing only holding data, whereas table 5 is based on data in the dataset that merged this holding dataset with stock-level ESG score dataset. The total amount of observations in this final dataset is 864,266, obviously there are no missing values for the holdings variable in this dataset. However, there are 351,942 missing values for the stock-level ESG score variable. This is a result of the merge, which matches the TR ESG to the corresponding stock holding based on a stock identification code. See figure 2 in appendix D for an small part of this dataset. This final dataset is cleaned by removing all subjects (i.e.

stocks/firms) in a certain yearly quarter (as the data is shaped long) for which there is no match between the stock holding and the stock ESG score. This means that funds will only be removed from the dataset when none of their stock holdings matches the TR ESG score, for each quarter in each year of the time period under study. It is very unlikely to have occurred in such a high number as for Luxembourg.

In addition, the final dataset was not cleaned of subjects/portfolio's that have a low score on the coverage variable. This has not been done because this variable scores well on average. However, the external validity of the sustainability score at the fund-level can be enhanced by cleaning the dataset of subjects that score for example lower than 0.3, as this would indicate that less than 30% of the total value of the stocks held in their portfolio has an ESG score.

### VIII. Conclusion

The problem of the horizon postulates that institutional investors are unable to allocate their capital to sustainable business practices and steer away from a carbon intensive economy, and the resulting misalignment between climate goals and financial flows, is the result of the problem that impacts of climate change are felt beyond the traditional investment horizons. Whilst their private capital is pivotal to furthering the SDGs. The current investment path is unable to obtain the Paris Agreement 2 degree climate stabilization goals, which requires an additional investment of private capital of \$53 trillion of cumulative investments between 2015 and 2035. Governments are increasingly aware of the necessity for policy interventions that mitigate the effects of the tragedy of the horizon and creates incentives for institutional investors to incorporate long-term sustainability objectives into their investment policy. France is the first country to introduce ESG transparency regulation for all institutional investors as a means to align institutional investors with climate objectives and improve their sustainably performance. assess the ability/effectiveness of Environmental, Social and Governance based regulatory transparency for institutional investor to improve their portfolio-level sustainability performance, by employing a by Article 173-VI of the Energy Transition for Green Growth Act enabled quasi-experimental Difference-in-Difference research design. The question central to in this study is formulated as:

"What is the effect of transparency regulation on the sustainability performance of institutional investors?"

The design that is employed to obtain an answer to this question is a difference-in-difference design, with one intervention group (i.e. pension and insurance funds domiciled in France) and two control groups (i.e. UCITS investment funds domiciled in France and pension and insurance funds domiciled in Luxembourg), based on a random effects regression. The pre-test period runs from 1 January 2014 till 31 December 2015 and the post-test series runs from 1 January 2016 till 31 December 2017, with the sampling running on a quarterly frequency. The design is focused on the effect of ESG transparency regulation for institutional investors on their sustainability performance.

The answer is not straightforward. The estimated coefficient of the treatment effect when French domiciled UCITS funds are used to estimate the counterfactual is only statistically significant on the social performance of French pension and insurance funds, which an effect of -1.89 (p 0.059). However, when Luxembourg domiciled pension and insurance funds are used to estimate the counterfactual, the estimated coefficient of the treatment effect is statistically significant for both the environmental performance of funds as well as the social performance, with an effect of 2.86 (p 0.008) and 2.16 (p 0.030) respectively. Given the odd nature of a negative effect of transparency regulation on social performance, and considerable higher statistical significance of the estimated treatment coefficients when using Luxembourg domiciled pension and insurance funds, this latter one is expected approximate more closely the true counterfactual. However, this needs to be viewed with great caution. In both cases however, due to the negative treatment effect on social performance in the first case and the relatively low positive treatment effect on environmental and social performance in the second, ESG transparency regulation seems to be an ineffective policy instrument to improve the sustainability performance of institutional investor.

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# Appendix A

	Panel A: institution	al investors under the scope of the law				
- Ir	surance and reinsurance	ce companies				
- N	- Mutuals or Unions					
- O	pen-end mutual funds	(UCITS)				
- T	he deposits and consig	nment fund				
- P	ension funds					
	Panel B: managemen	t companies under the scope of the law				
	(companies that man	age one or more of the following funds)				
OPCVM (UCITS						
		General purpose investment fund				
		(Fonds d'investissement à vocation générale)				
		Investment capital fund				
		(fonds de capital investissement)				
	Funds open to non-	FCPR, FCPI, FIP				
	professional	Hedge funds				
	investors					
		General purpose professional fund (Specialized				
		professional funds				
		(Fonds professionnels specializes)				
		Specialized professional funds				
		(Fonds professionnels specializes)				
		Professional private equity funds				
	Funds open to	(Fonds professionnels de capital investissement)				
FIA (AIF)	professional	Free partnership company				
	investors	(Société de libre partenariat)				
	Employee savings	Corporate mutual funds (Fonds communs de				
	funds	placement d'entreprise)				
		investment companies with variable capital with				
		employee share ownership (investment companies				
		with variable capital with employee share				
		ownership)				

## Table 1: Actors concerned by Article 173-VI

## Appendix B

Category	Indicators in Rating	Weights	Pillar Weights
Resource Use	19	11%	
Emissions	22	12%	(11%+12%+11%)
Innovation	20	11%	
Workforce	29	16%	
Human Rights	8	4.50%	(160/ + / E0/ + 00/ + 70/ )
Community	14	8%	(1070+4.370+070+770)
Product Responsibility	12	7%	
Management	34	19%	
Shareholders	12	7%	(19%+7%+4.5%)
CSR Strategy	8	4.50%	
	178	100%	

*Figure 1*:Thomson Reuters weight of category scores in overall ESG score. Reprinted from *Thomson Reuters ESG scores*, by Thomson Reuters, February 2019, retrieved from: <a href="https://www.refinitiv.com/content/dam/marketing/en\_us/documents/methodology/esg-scores-methodology.pdf">https://www.refinitiv.com/content/dam/marketing/en\_us/documents/methodology/esg-scores-methodology.pdf</a>

## Appendix C: Descriptive statistics



*Figure 1*. This figure displays the distribution of the overall ESG, environmental, social and governance scores at the firm level.



*Figure 2.* This figure displays the distribution of the holding values for pension & insurance and SICAV funds.



*Figure 3.* This figure displays the distribution of the portfolio values for pension & insurance and SICAV funds.



*Figure 4*. This figure displays the distribution of the institutional investor level-sustainability score.



*Figure 5.* This figure displays the distribution of the institutional investor-level environmental score.



Figure 6. This figure displays the distribution of the institutional-investor level social score.



*Figure 7*. This figure displays the distribution of the institutional-investor level governance scoer.

## Appendix D

Fund	isin_numeric	qdate	holding_va~e	esg_numeric	environmen∼r	social_pil~r	governance≁r
F0000000KJ	DE0007236101	2014q1	2931000	50.26	45.463	61.993	26.0836
F0000000KJ	DE0007236101	2014q2	2893500	50.26	45.463	61.993	26.0836
F0000000KJ	DE0007236101	2014q3	2831100	51.33	55.04075	54.5997	28.0802
F0000000KJ	DE0007236101	2014q4	2812500	51.33	55.04075	54.5997	28.0802
F0000000KJ	DE0007236101	2015q1	3021000	51.33	55.04075	54.5997	28.0802
F0000000KJ	DE0007236101	2015q2	2710500	51.33	55.04075	54.5997	28.0802
F0000000KJ	DE0007236101	2015q3	2398200	50.32	52.5885	53.5053	30.1489
F0000000KJ	DE0007236101	2015q4	2696400	50.32	52.5885	53.5053	30.1489
F0000000KJ	DE0007236101	2016q1	1210950	50.32	52.5885	53.5053	30.1489
F0000000KJ	DE0007236101	2016q2	1193530	50.32	52.5885	53.5053	30.1489
F0000000KJ	DE0007236101	2016q3	1354600	59.31	63.7225	57.7182	41.7663
F0000000KJ	DE0007236101	2016q4	1518400	59.31	63.7225	57.7182	41.7663
F0000000KJ	DE0007236101	2017q1	1669200	59.31	63.7225	57.7182	41.7663
F0000000KJ	DE0007236101	2017q2	1564550	59.31	63.7225	57.7182	41.7663
F000000KJ	DE0007236101	2017q3	1549600	58.88	66.46025	57.4618	37.0871
F0000000KJ	DE0007236101	2017q4	846734	58.88	66.46025	57.4618	37.0871

*Figure 1.* This figure displays a small part of the merged TR ESG score and portfolio holdings dataset.

The *Fund* variable measures the unique fund identification code, *isin\_numeric* is an unique firm identification code, *qdate* the quarterly date, holding indicates the value of the holdings of the stock in the portfolio of the fund, *esg\_numeric* is the TR ESG score as retrieved from Datastream, *environment* is the environmental pillar score, social is the social pillar score and governance is the governance pillar score.

	qdate	Fund	isin_numeric	holding_va~e	esg_numeric
1	2014q1	F0000000KJ	CH0011075394	1515890	
2	2014q1	F0000000KJ	NL0011794037	1749600	
3	2014q1	F0000000KJ	SE0000108656	1929286	
4	2014q1	F0000000KJ	FR0000120271	2380000	77.65
5	2014q1	F0000000KJ	IT0003132476	1638900	
6	2014q1	F0000000KJ	DE0005785802	2532500	
7	2014q1	F0000000KJ	GB0006776081	1543002	
8	2014q1	F0000000KJ	GB0002374006	2251010	24.51
9	2014q1	F0000000KJ	SE0000112724	2131838	
10	2014q1	F0000000KJ	GB0002875804	1210353	

Figure 2. This figure displays a small part of the uncleaned merged dataset.

Isin-numeric indicates the ISIN stock identification code, holding the holding value of that stock and esg\_numeric the TR ESG score of that same stock.