Research Initiative FDIR

Finance durable & investissement responsable

2024 Activity Report

Toulouse School of Economics

École Polytechnique

Institut Polytechnique de Paris

Institut Louis Bachelier

AFG

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I. Introduction

A collaborative project

The Research Initiative FDIR was launched in 2007, at the initiative of the French Asset Management Association AFG, Christian Gollier from Toulouse School of Economics and Jean-Pierre Ponssard from Ecole Polytechnique.

Now co-directed by Catherine Casamatta and Sébastien Pouget from Toulouse School of Economics and Patricia Crifo from the Economics Department at Ecole Polytechnique, FDIR has been running for eighteen years with about twenty internationally renowned scholars and has produced numerous scientific contributions to help our understanding of responsible finance.

Scientific Orientation Committee

Projects undertaken in the context of the Research Initiative FDIR are supervised by a scientific orientation committee chaired by Guillaume Lasserre (President of the Association FDIR), and composed of internationally-renowned researchers, including Rob Bauer (University of Maastricht), Marcel Boyer (Université de Montréal), Caroline Flammer (Columbia University), Jean-Pascal Gond (Cass Business School, City University, London) and Bouchra M'Zali (ESG-Université du Québec à Montréal), representatives of the SRI industry, Claude Jouven (ex-chairman of the Fondation HEC) and Isabelle Laudier (Institut CDC pour la Recherche), as well as representatives of the partners of FDIR.

The insights and guidance of the members of the scientific orientation committee is gratefully acknowledged.

Corporate sponsors

The Research Initiative FDIR was made possible for 2024 thanks to the financial support of the following 9 asset management companies, institutional investors and consulting firms:

ABN-AMRO Investment Solutions
Amundi AM
Caisse des Dépôts
CANDRIAM Institute for Sustainable Development
Edmond de Rothschild AM
Fonds de Réserve pour les Retraites (FRR)
HSBC Global AM (France)
La Banque Postale AM
Square Management - Square Research Center

Key figures & results of the Research Initiative FDIR since 2007

FDIR in a few numbers

- Started in 2007
- 20+ researchers
- 4 institutional partners : Toulouse School of Economics, Ecole Polytechnique, Association Française de la Gestion financière (AFG) and Institut Louis Bachelier (ILB)
- 9 current partners: ABN-AMRO Investment Solutions, Amundi AM, Caisse des Dépôts, CANDRIAM Institute for Sustainable Development, Edmond de Rothschild Asset

Management, Fonds de Réserve pour les Retraites (FRR), HSBC Global Asset Management (France), LBP AM, Square Management - Square Research Center.

Research since 2007

- 3 fields of practical implications for the design, management, and marketing of SRI funds
  - Long-term risk valuation
  - Governance, CSR and financial performance
  - Engagement and dialogue
- 64+ academic workshops with partners
- 10+ bilateral scientific meetings with partners
- 150+ scientific studies published
- 150+ presentations in scientific conferences
- 7 books on responsible finance
- 12+ scientific conferences organized

Teaching

- 9 PhD students in 2024
- 10+ courses every year on responsible finance topics (Master Level)
- 2024 FIR-PRI "Best Pedagogical Initiative" Prize for a team of TSE researchers including Catherine Casamatta, Ulrich Hege, Sophie Moinas, Sébastien Pouget, and Silvia Rossetto

Visibility since 2007

- 150+ articles in non-specialized press (Le Monde, Les Echos, La Tribune, Libération, Financial Times, L'Opinion, Le Figaro, Challenges, L'Usine Nouvelle, …)
- 5 Best PhD Thesis awards from FIR-PRI
- 1 Nobel prize in Economic Science for Jean Tirole (TSE)
- 5 Cahiers de l'Institut Louis Bachelier dedicated to FDIR

The main objectives of FDIR are to:

- Contribute to the development and dissemination of theory and practice in the field of responsible investment, both through research and training programs;
- Facilitate direct contact between the academic partners and the members of the initiative, to their mutual benefit.
- Increase and consolidate the level of excellence of the academic partners and members by organizing an activity of reflection, training and research of international dimension around a theme of general interest.

To achieve these objectives, FDIR carries out research around three main topics:

- Long-term ESG performance and risk evaluation,
- Corporate Governance,
- Shareholder engagement.

For the period 2022-2025, the General Assembly meeting of FDIR, the researchers involved in the Initiative, in conjunction with the sponsors, have defined six high-priority research projects that pertain the three main topics of FDIR. The achievements on these six high-priority projects for the final year (2025) are detailed below.

II. Research team for 2024

- Ingela Alger, IAST & CNRS & Toulouse School of Economics
- Stefan Ambec, Toulouse School of Economics
- Geoffrey Barrows, Ecole polytechnique
- Milo Bianchi, Toulouse School of Economics
- Catherine Casamatta, Toulouse School of Economics
- Sandra Cavaco, University Paris 2 Panthéon Sorbonne & Lemma
- Patricia Crifo, Ecole polytechnique & Université Paris Nanterre
- Christian Gollier, Toulouse School of Economics
- Alexander Guembel Toulouse School of Economics
- Guy Meunier, INRAE Paris & Ecole polytechnique
- Sophie Moinas, Toulouse School of Economics
- Jean-Pierre Ponssard, CNRS & Ecole polytechnique
- Sylvaine Poret, INRAE Paris & Ecole polytechnique
- Sébastien Pouget, Toulouse School of Economics
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- Arnaud Reynaud, Toulouse School of Economics
- Jean-Charles Rochet, University of Geneva & Toulouse School of Economics
- Silvia Rossetto, Toulouse School of Economics
- Benoît Schmutz, Ecole polytechnique
- Jean Tirole, Toulouse School of Economics
- Nicolas Treich, INRAE Toulouse & Toulouse School of Economics

Doctoral and post-doctoral students

- Esteban Muñoz (IAST-TSE)
- Pau Juan Bartroli (IAST-TSE)
- Enrico Mattia Salonia (IAST-TSE)
- Xinyue Wen (TSE)
- Johanne Trotin (Ecole Polytechnique)
- Amadéo Zorzi (TSE)
- Konrad Dierks (TSE)
- Ruichen Wang (TSE and TSM)
- Murad Nuriyev (Amundi & TSE)

III. Main research activity

A. The six high priority research projects

The following section presents the achievements of the six high priority projects defined for the period 2022-2025. The achievements of these high priority projects are presented at workshops with sponsors and discussed in the FDIR final reports. A dedicated research journal, written in collaboration with Institut Louis Bachelier, provides an overview of the main results of these projects that is accessible to a wide audience (see VI. B).

1. Social performance indicators, by Patricia Crifo (Polytechnique)

Context and objectives

Despite predictions that traditional employment would be replaced by independent and gig work, employment relations remain dominant. In OECD countries, self-employment represents only 10–15% of the workforce. Understanding labor still requires a focus on employment relations, which historically involved an exchange: workers gained protection and rights in return for subordination to employer directives. This system aligned with liberal democracy, where employees had no role in company decision-making.

However, two transformations have reshaped this dynamic. First, the nature of work evolved, emphasizing employee engagement, autonomy, and creativity, moving away from strict hierarchical control. Second, corporate social responsibility gained prominence, with firms facing increased pressure to account for their environmental and social impact. These shifts have driven discussions on employee participation in corporate decision-making.

This research examines the relationship between employee involvement in decision-making (in particular codetermination) and corporate social responsibility, i.e. extra-financial or environmental, social and governance (ESG) performance. The originality of our approach is to propose a review of the literature on the determinants and impact of employee participation in light of concerns and reflections on the nature and responsibility of firms, particularly about the ecological and environmental crisis that contributed to shifting the challenges to less operational and more strategic considerations. We thus question how the participation of employees in the decision-making process tends to delineate a democracy that is no longer merely liberal but also "social". We examine, conceptually and empirically, the various forms that the participation of employees may take and their impact on firm performance.

Methodology

We propose an extensive literature review based on synthesis of existing knowledge, bringing together and summarizing published work on the relationship between codetermination and CSR; identification of potential gaps in the literature, highlighting what has been little studied in the field; assessment of the quality, relevance and limitations of existing studies and following citation standards to acknowledge the work of other researchers.

Findings

Codetermination: A Model for Employee Participation

Germany pioneered codetermination, instituting employee representation in corporate governance as early as the Weimar Republic. Today, it is widespread across Europe, with varying degrees of influence. Codetermination grants employees voting rights on supervisory boards, distinguishing it from weaker forms of workplace participation like consultation or bargaining. This "shared governance" approach enables employees to influence strategic decisions without being shareholders.

Research on codetermination's impact on financial performance is mixed. Some studies suggest it strengthens employee engagement, leading to better oversight and long-term performance. Others indicate potential downsides, such as conflicts within governance structures. However, its influence on extra-financial performance—such as corporate responsibility and social indicators—has received less attention.

Impact on Wages, Job Satisfaction, and Employment Stability
Codetermination appears to positively impact wages. While some studies show no effect or even a negative impact following economic shocks, a significant body of research links codetermination with higher wages, lower turnover, and increased profitability. This is particularly evident in Germany and France, where firms with labor board representation offer higher wages and greater job security.
Regarding employment management, codetermination fosters better worker relations, improved conditions, and higher job satisfaction. German works councils, for instance, reduce worker dissatisfaction and improve treatment of women and minority employees. In the event of economic downturns, codetermined firms tend to protect jobs more effectively than others, offering greater stability for skilled workers.
While codetermination does not necessarily reduce voluntary turnover, it is often associated with lower layoff rates. Studies from Germany and Scandinavia indicate that companies with strong employee representation reduce employment more cautiously during crises, balancing financial sustainability with job security.

Conclusion
Employees, as key stakeholders, have the legitimacy to influence not just operational aspects but also financial and strategic decisions. Employee representation at the board level is the most advanced form of participation, contributing to long-term value creation. However, it must be complemented by coherent governance mechanisms involving both employees and management. A well-implemented participation framework ensures alignment between governance, corporate responsibility, and sustainable business practices.

Reference
Crifo P., Rebérioux A. 2024. Employee participation as a new frontier in corporate social responsibility: a review of the literature. Journal of Participation and Employee Ownership. 7(3), 241-254. https://www.emerald.com/insight/content/doi/10.1108/jpeo-04-2022-0006/full/html

2. *The Value of Green Innovation: Evidence from Climate-Related Patents, by Ulrich Hege, Sébastien Pouget, and Yifei Zhang (TSE)*

Objective
This study explores the impact of climate patents on financial markets. Climate innovation plays a crucial role in addressing climate change, yet its financial implications remain underexplored. With increasing global need for sustainability, understanding whether and how financial markets reward climate-related innovation is essential. Investors, policymakers, and firms need to assess whether climate patents provide economic benefits beyond their technological contributions. This study aims to fill that gap by investigating whether climate patents generate positive market reactions and drive incentives for innovation.

Methodology
This study uses a quasi-experimental approach to analyze how receiving climate-related patents affects a firm's stock returns, cost of capital, investor behavior, and environmental ratings. To establish causality, the study employs an instrumental variable strategy based on patent examiner leniency. Patent examiners vary in their strictness when reviewing applications, and since firms are assigned examiners in a quasi-random manner, differences in leniency provide an exogenous

variation in patent approvals. By comparing firms with similar patent application behavior but different outcomes due to examiner assignment, the study isolates the impact of climate patent grants on financial markets.

The methodology leverages data from the United States Patent and Trademark Office (USPTO) and from financial markets to construct a comprehensive dataset of climate patent applications and of their consequences. By tracking the stock market reactions of firms that receive climate patents versus those whose applications are rejected, the study identifies trends in abnormal returns, investor behavior, and changes in ESG ratings. Additionally, it examines investor composition shifts, particularly the role of institutional investors who prioritize sustainability. The use of an instrumental variable ensures that the observed effects are not driven by reverse causality, for example coming from the fact that firms that expect a higher future valuation (and a lower cost of capital) may be more willing to invest in green innovation.

Results
Firms that receive climate patents experience a significant increase in their stock prices, with a cumulative abnormal return of 10% over the following 12 months, translating to approximately 2% per climate patent, on average. This positive effect is not observed for other types of patents, including general green patents. Additionally, companies granted climate patents see a reduction in their implied cost of capital by 0.9% over the same period, suggesting that investors view these firms as less risky or more valuable. The study also highlights a six percent increase in institutional investor holdings within a year of receiving a climate patent, particularly among investors focused on environmental, social, and governance factors. Furthermore, firms benefiting from climate patents experience improved environmental scores from ESG rating agencies, which indicates that climate patents affect financial markets' perception.

The market's reaction to climate patents is found to be stronger during periods of heightened public attention to climate issues, as measured by the Media Coverage of Climate Change (MCCC) index. Additionally, companies with greater exposure to climate-related risks see a more pronounced positive effect compared to those with lower exposure. Another notable finding is that firms new to climate innovation receive the highest stock price gains when they are granted their first few climate patents. This suggests that financial markets' reaction is driven by a signaling effect of climate-related innovation.

Further analysis suggests that the financial market response to climate patents is not simply a reflection of general investor enthusiasm for innovation, but rather a targeted response to climate-specific technological advancements. Unlike other green patents that may focus on pollution control or water conservation, climate patents directly address climate change mitigation, making them particularly valuable in the eyes of investors who are attuned to environmental, social, and governance considerations. This distinction highlights the importance of climate change as a factor in investment decisions and corporate valuation.

Discussion
The findings of this study suggest that financial markets value climate patents not only for their potential economic returns but also as a credible signal of corporate commitment to sustainability. Investors and policymakers can encourage climate innovation by recognizing and rewarding firms engaged in the development of new climate technologies. While the immediate operational impact of climate patents may be limited, firms that successfully implement climate-related innovations show improved operational efficiency and reduced carbon emissions over time. Future research could further explore the long-term economic benefits of climate patents and examine how regulatory changes influence market perceptions of climate innovation.

Reference
Climate Patents and Financial Markets, Ulrich Hege, Sébastien Pouget and Yifei Zhang, TSE Working Paper 23-1400 (revised December 2024)
https://www.tse-fr.eu/fr/publications/climate-patents-and-financial-markets

3. *Economics of Biodiversity project, managed by Nicolas Treich (TSE)*

Objective
Biodiversity loss is considered a major environmental threat. The global food system is the main cause of this trend. For instance, deforestation -which is a major driver of biodiversity loss- is mostly due to the development of animal agriculture and in turn to the demand for meat. This project aims at identifying which public policy instruments can help reduce the environmental and social impact of food systems. Also, when evaluating the benefit of biodiversity conservation, economics often adopts an anthropocentric perspective, attributing moral value exclusively to humans while considering other species only in terms of their instrumental value for humans. This project will also shed light on how the economics of biodiversity could be broadened to incorporate the intrinsic value of biodiversity. More precisely, this research project has developed around three questions:

- How can a tax on meat help reduce the negative impact of meat consumption on the environment and public health?
- Can innovation in meat production help reduce farmed meat consumption?
- Should animal welfare have a weight in public intervention, in addition to traditional measures of social welfare?

1) A first research project explores the potential use of consumption taxes on meat in high-income countries to address the negative environmental and health-related externalities of meat. A main reason for focusing on meat is that livestock farming is considered the single largest driver of greenhouse gas (GHG) emissions, nutrient pollution, and ecosystem loss in the agricultural sector.

Methodology
To assess the desirability of a tax on meat, the project first estimates the social cost of meat, ie, the social cost of the environmental damage and public health issues provoked by meat consumption. To this end, we combine the valuation of the social cost of carbon induced by livestock for a range of meat types, together with the social cost of nutrient pollution (acidification and eutrophication). Next, to evaluate the health cost of meat, we quantify the value that society places on human life, using the value of statistical life (VSL) measure that elicits the willingness to pay for mortality risk reduction.
Since livestock farming and meat consumption also contribute to other externalities, a tax on meat could affect several -imperfectly regulated- markets. For example, agricultural land use is a significant driver of deforestation and biodiversity loss. This means that increasing or decreasing meat consumption will have a general equilibrium effect on global land markets, which will increase or decrease pressure on other forms of land use (e.g., arable farming for human consumption). The second part of the project therefore reviews the main economic distortions that livestock farming and meat consumption create and discuss to what extent a tax on meat would interact with these other economic distortions, and what drivers should affect the level of the tax rate.

Results
A first result of the project is that meat is currently significantly underpriced, with the external costs of beef due to its impacts on climate change and nutrient pollution adding up to on average US \$5.75–US\$9.17 per kilogram. Accounting for biodiversity loss and diet-related health impacts would further increase costs substantially.

Second, the project points out several key elements that motivate regulatory efforts to tax meat: (1) the interaction of multiple environmental externalities, (2) "alternative protein" technologies, (3) the adverse effects of meat consumption on one's own health (health internality), (4) animal welfare, and (5) distributional effects.
Regarding (1), we highlight that livestock farming entails indirect land-use and water-use effects. Since these resource markets are suboptimally regulated, taking these externalities into account should lead to increase further the level of the tax rate on meat.
Regarding (2), if there are uncorrected innovation-related market failures for alternative protein technologies, a higher tax on meat should be beneficial and accelerate innovation in alternative protein technologies.
Regarding (3), the fact that consumers display behavioral failures in food choices calls for increasing the tax rate, while the concern that consumers may react to higher meat prices by substituting toward other unhealthy products should have a negative impact on the tax rate.
Last, while animal welfare considerations (4) generally call for a higher tax rate, the optimal tax should also consider distributional effects, and particularly the effect on poorer households. On that point, the effect of a meat tax is ambiguous, as on the one hand, the tax incidence falls disproportionately on poorer households (suggesting therefore to reduce the tax rate), while on the other hand, the health benefits from taxing meat fall on poor households (suggesting to increase the tax rate).

Discussion
While at this time, we cannot precisely estimate what should be the optimal second-best tax rate for meat products, our results can help to inform future economic modeling studies as well as regulators. The design of an optimal meat tax depends on normative concerns such as animal welfare and distributional impacts. Last, our study explores the political economy of taxing meat and highlights several avenues for governments to implement a socially acceptable tax on meat.

2) A second project focuses on eliciting consumers' willingness to pay for novel products. Knowing the demand for novel products at a pre-market stage is central to the development of greener technologies. Indeed, since the success of novel products ultimately depends on their adoption by consumers, public and private investors seek to invest in green technologies that have the potential to be widely demanded. To study how food innovations could significantly reduce the environmental footprint of the food sector, we focus on cultured meat. Indeed, many food experts consider that cultured meat may well revolutionize the future market of animal products, by lowering its environmental impact (eg, by reducing GHG emissions, air and water pollution, or water use) and eliminating the risk of infectious diseases associated with conventional meat. A necessary condition for the successful development of cultured meat is consumer acceptance, which we try to assess in this project.

Methodology
As cultured meat products are not available on food markets, consumer acceptance typically relies on hypothetical questionnaires about the willingness to try or buy the new product, or on experiments in which the same conventional meat is labelled conventional or cultured to elicit consumers' willingness to taste and buy the new product. We depart from that literature by offering a novel experimental procedure that allows us to elicit a subject's non-hypothetical WTP for a novel product, even though this product cannot be delivered to the subjects. The central idea is to use the subjects' imperfect knowledge about the possibility that the new product will be delivered, and to make them decide under a veil of ignorance.
More precisely, in the experimental instructions we present two scenarios to the subjects: either the product is available (scenario 1) and can be delivered, or it is not and cannot be delivered (scenario 2). We inform the subjects that the scenario to be implemented was determined before the experiment (in a non-random way), but the result of this decision is not transmitted to the participants, and participants are aware of it. Unlike previous work on non-marketed products we

do not make false statements and explicitly tell participants that only one scenario is real and the other is not.
We apply this new experimental procedure to elicit the WTP for cultured meat. Importantly, we selected a real cultured foie-gras product. This product is obtained from the culture of liver cells extracted from a duck egg and is developed by Gourmey, one of two startups currently working in cultured meat in France, where the experiment was run.

Results
The experiment was carried with a sample of 158 students. Our main results are the following. About 18% of subjects do not want to buy/try the product, even when it is free. The average WTP is about 3 Euros per 100g, and only one out of seven participants is willing to buy 100g for about 5-6 Euros (the average price for 100g of duck-farm foie gras). Flexitarians, as well as subjects with more positive perceptions of conventional foie gras, have a higher WTP, suggesting the emergence of a new market segmentation once the product is on the market. We also find a high price elasticity, emphasizing the importance of the market price on top of acceptance issues. As in previous hypothetical work, neophobia, disgust and lower academic performance reduce the WTP. More positive perceptions of the positive attributes of both products (such as healthiness, naturalness and tastiness) increase the WTP for cultured meat. Also, we find that simple participation in the experiment, in which subjects are exposed to this new product, reduces subjects' pro-meat justifications.

3) Our third project aims at shedding light on which weight should be given to animal welfare in the determination and evaluation of public intervention. Decision making deals with diverging interests, which necessitates clear rules about how to arbitrate the associated trade-offs. Our research objective is to examine citizens' fairness judgments about animals in public decisions. We follow here the pioneer work of Johansson-Stenman (2018) which is, to our knowledge, the first and only empirical paper in economics on the topic. In doing so, we address two significant gaps in the literature. First, we introduce animals into the empirical social choice literature (Gaertner and Schokkaert, 2012). Second, we contribute to the animal ethics literature, which has been theoretical, not empirical (Persson and Shaw, 2015).

Methodology
We examine the fairness judgments of citizens about animal welfare through an online questionnaire administrated to a representative sample of the French population (N=1,526). Our survey consists of eight questions that cover several of the most salient normative questions in animal welfare economics. We start by assessing French citizens' views about the consideration of animal welfare in public decision as well as other citizens' fairness concerns for animals. We explore the variations of fairness judgments across species (i.e., chicken vs. cow), across contexts (i.e., captive vs. wild animals), and in case of inequalities (i.e., redistribution among unequal individuals). Importantly, we also analyze people's views on two of the most salient issues in animal population ethics (i.e., repugnant conclusion, procreation asymmetry). For each of these dimensions, we investigate whether the fairness judgments are specific to some socio-demographic groups by conducting multiverse analyses on standard socio-demographic attributes.

Results
We show that 93% of French citizens support some form of direct inclusion of animal suffering, and most of the surveyed individuals demand at least equal consideration of human and animal interests, which is similar to the results of Johansson-Stenman (2018) for Sweden. Conditional on taking animal welfare into account, most respondents (82.8%) further support the inclusion of humans' altruistic concerns for animals in public decisions, which supports some form of double-counting usually criticized in economics.
Regarding fairness judgments, we find that the large majority citizens support equal consideration of equal interests across species (88.2%) and across contexts (79.6%). Interestingly, we do not

detect strong preferences for redistribution when animals experience unequal welfare situations: about half of our respondents find an inequality-reducing (and total-welfare increasing) policy neither desirable nor undesirable (49%), while only four in ten respondents find it desirable (37.8%).
Our survey documents to which extent citizens' fairness judgments could lead to two of the most salient issues in population ethics. First, we find that only a minority of citizens (23.5%) adhere to a set of principles that would lead to the repugnant conclusion (i.e., a situation in which one would prefer a society with a large number of individuals with lives barely worth living over a less numerous society with higher average welfare). Second, we also see limited support for a set of views that would induce procreation asymmetry (i.e., a larger support to avoid the creation of lives with negative welfare than to actively create lives made of positive welfare of similar magnitude in absolute terms). This result is due to a symmetry in the aggregate support for the creation of positive lives (81.3%) and the aggregate support for the avoidance of negative lives (77.4%) of similar welfare magnitude.
Last, we explore whether the heterogeneity in the fairness judgments expressed by the respondents originates from distinct normative frameworks. To do so, we run a cluster analysis, which identifies two main groups of respondents, who disagree mainly on questions related to life creation. Respondents in the first group (80.5% of the sample) think that it is socially desirable to bring into existence an animal with very good living conditions and to avoid the creation of an animal life with very poor living conditions. On the contrary, respondents in the second group oppose the view that it is socially desirable to bring into existence an animal with very good living conditions and to avoid creating the negative-equivalent life.

References

Toward Optimal Meat Pricing: Is It Time to Tax Meat Consumption?, Franziska Funke, Linus Mattauch, Inge van den Bijgaart, H. Charles J. Godfray, Cameron Hepburn, David Klenert, Marco Springmann, and Nicolas Treich, Review of Environmental Economics and Policy 16, Summer 2022 https://www.journals.uchicago.edu/doi/10.1086/721078

Eliciting Non-hypothetical Willingness-to-pay for Novel Products: An Application to Cultured Meat, Romain Espinosa and Nicolas Treich, Environmental and Resource Economics 85, 2023 https://link.springer.com/article/10.1007/s10640-023-00780-8

Fairness Judgments About Animals, Romain Espinosa and Nicolas Treich, Journal of Economic Inequality, 2025, forthcoming.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5001412

4. *Labels and pro-environmental attitudes, by Patricia Crifo (Polytechnique)*

Context and objective

Although there is broad consensus regarding humanity's responsibility for climate change, a significant gap persists between individuals' pro-environmental attitudes and their actual behaviors. Understanding how to bridge this attitude-behavior gap and the motivations behind pro-environmental behavior (PEB) remains a crucial yet complex challenge, as these motivations are shaped by ideology, beliefs and knowledge about climate change, and an individual's social, psychological and economic characteristics. In particular, the relationship between risk attitudes and pro-environmental behavior is nontrivial due to the influence of nonlinear perception of risk and thresholds effects, the economic factors and diminishing marginal returns to PEB, the social dynamics of early vs late adoption, and individual discounting.
A major difficulty in the interrelation between risk and pro-environmental preferences is the potential inconsistency of such preferences. Indeed, both can be really context dependent which results in potentially as many preference levels as measurement methods. Regarding attitudes toward PEB, one can fear climate change, or agree that protecting the environment is a major issue

without being willing to undertake changes in one's own habits. Inconsistency between attitudes, intentions and action is documented as the Intention Behavior Gap (IBG).

This research aims at characterizing the nature and consistency of risk preferences in pro-environmental behavior in a laboratory setting using experimental evidence.

Methodology
We conducted two experimental sessions, for a total of 150 participants between dec 2021 and May 2022. The experiment followed a within subject design to measure individual attitudes toward pro-environmental behavior, as well as individual-level risk aversion using two different elicitation methods commonly employed in social science experiments: (1) a single-choice list as in Binswanger (1978), and (2) an investment task, as in Gneezy and Potters (1997).

Results
We observe a positive relationship between risk aversion as measured in the Gneezy and Potters method and pro-environmental attitudes. The Bramoulle and Treich (2009) model provides a possible explanation for this relationship: attitudes toward PEB stem from reactions to climate risk, with increased PEB perceived as a mitigation strategy.
To our knowledge, very few experimental studies on risk preferences connect instability of risk preferences and actual field behavior, and even fewer with pro-environmental preferences
In our research, the individuals with the most consistent risk preferences were more likely to be the ones with the lowest IBG, regardless of the sense of the gap (i.e. regardless of the highest score between "action" and "belief").
Overall, these results reinforce previous findings on the positive relationship between risk aversion and pro-environmental attitudes. Consequently, they contribute to understanding the underlying motivations behind pro-environmental behavior. Additionally, they highlight the partial stability of risk aversion measurement methods and their implications beyond the laboratory.

Reference
Bousselmi, W., Crifo P., Trotin, J. 2025. Risk behavior and pro-environmental behaviors. Submitted

5. *Are We Becoming Greener? Life-time Experiences and Responsible Investment, by Milo Bianchi (TSE)*

Objective
This project aims at studying how individual investors' characteristics shape their ESG investment behavior and trading over time. We are particularly interested in studying how investors' pro-social attitudes affect ESG demand, and whether these attitudes are shaped by economic and non-economic life-time experiences, such as growing up in a region with more pro-social values, being exposed to an increased level of pollution or to a natural disaster.

Methodology
To answer the above questions, we rely on account-level data from the Shanghai Stock Exchange, reporting complete trading records for individual investors over nine years. A distinctive feature of these data is that all orders can be associated to the investor who has initiated them, thereby providing an exhaustive picture of the investor's stock trading over time. Moreover, for each individual investor, we can obtain information about her gender, age, education, place of birth and of residence. This information is key for our analysis. We study the determinants of individual demand for ESG stocks over time and relate this demand not only to demographic and portfolio characteristics, but also to life-time experiences along both economic and noneconomic dimensions. Precisely, we first exploit a discontinuity induced by the so-called Huai River policy, which provides heavily subsidized coal for indoor heating to residents to the north, and not to the

south, of the Huai River. Previous studies have shown that the policy leads to a significant increase in pollution in cities just north relative to those just south of the river. Using the same regression discontinuity design as in those studies, we show that investors living just north of the river display a significantly larger demand for ESG. We also investigate the role of pro-social attitudes by considering the so-called Rice-Theory of cultural differences. For instance, individuals who grow up in rice-growing areas have significantly more pro-social attitudes than those in wheat-growing areas, which can be explained by the fact that growing rice requires much more public investment (for irrigation) and social interactions (for sharing labor). We show that investors living in rice-growing cities have significantly larger exposure to ESG stocks than those in wheat-growing cities, supporting the view that pro-social attitudes can be an important determinant of ESG demand.

Results

A first set of results indicates that recent experiences tend to matter more than ancient ones to shape investors' demand for ESG stocks. This suggests that, even for the same investor, the propensity to invest in ESG stocks can evolve considerably over her trading life, possibly in response to accumulated experiences. We also show that economic experiences tend to be more persistent. Non-economic experiences, instead, tend to have more volatile effects on the demand for ESG stocks. A second key finding is that both economic and non-economic life-experiences affect the propensity to invest in ESG stocks. Living through favorable stock market conditions, for example, positively affects ESG investing. At the same time, living in polluted areas or being exposed to corporate scandals also increases ESG demand. According to our estimates, economic experiences tend to be important to explain between-investors variations in ESG investing, while non-economic experiences matter more for within-investor differences.

These findings support the view that pro-social attitudes are an important determinant of ESG investing and shed light on how these attitudes evolve as investors are exposed to various life experiences. As we show, these experiences affect ESG demand over and beyond any time-invariant investor characteristic and any attitude that an investor may have acquired before entering the stock market.

Reference

Are We Becoming Greener? Life-time Experiences and Responsible Investment, Milo Bianchi, Zhengkai Liu and Gang Wang, TSE working paper 2022-1382. https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/wp/2022/wp_tse_1382.pdf

6. Asset management and regulatory framework of long-term investment, by Olivier Gossner (Polytechnique)

Context and objective

While there is no doubt that the banking sector must contribute to financing the environmental transition, the insurance sector, with its substantial assets under management, €8.82 trillion in assets with €1.985 trillion in French life insurance alone, also has a role to play in this area in Europe. However, while well-positioned to fund long-term environmental projects, insurers mostly invest in low-cost, low-risk government and corporate bonds. Investments in unlisted or long-term assets involve higher management costs and complexity, discouraging participation. As a result, current asset allocations are not Pareto-optimal, missing potential benefits for policyholders, entrepreneurs, and insurers.

Methodology

This project focuses on the management and allocation of risky assets for long-term investments. It starts with intuitive economic reasoning, asserting that the value of an asset corresponds to its incoming cash flows minus its management costs. Then a theoretical approach is developed based on general equilibrium, risk-neutral probabilities, and uncertainty to analyze how management fees are reflected in the market price of an asset. The originality and added complexity of this work lie in the fact that management costs can vary between economic agents. To address this, the research thoroughly examines the balance sheets of insurance companies, identifying the management costs of their various assets before estimating the extent of doublecounted costs.

Results

It is found that shifting investments toward assets with higher management fees led to a penalty under Solvency II, even though the risk profile remained unchanged. This contradicts core economic logic. The identified cause lies in the double counting of management fees: once on the asset side (included in market value) and again on the liability side (within technical provisions).This issue is illustrated by the example of a rental property. The gross yield includes both rent and management fees (for upkeep and operations), while the net yield subtracts those fees. However, the market value already reflects the net yield, meaning management fees are priced in. This applies to all asset types: management fees are typically embedded in market values, making the Solvency II treatment inconsistent.

A static estimate indicates that double-counting of management fees results in unjustified provisions of €100 billion across Europe, including €25 billion in France. These significant sums could instead be used to finance long-term projects, particularly those related to the environmental transition, while delivering higher returns to savers.

Based on these results, discussions with industry stakeholders have contributed to changes in practices. In Germany and France for instance, national regulators issued guidelines in 2022 and 2023 to clarify the issue of double-counting management fees and reduce this practice.

References

Florig, M., Gossner, O. (2024). Market equilibrium with management costs and implications for insurance accounting. Geneva Risk and Insurance Review.

Gossner O., Florig M. 2023. Double comptabilisation des frais de gestion sous Solvabilité II. Revue Risques.

B. Workshops with sponsors

The agenda of the workshops with the sponsors includes sessions in which researchers and sponsors confront the academic and practitioner views on a topic of practical interest. The idea of such workshops is to help sponsors identify relevant theoretical frameworks for their practices, and to help researchers identify relevant practical questions and obstacles to the development of Socially Responsible Investment. For the year 2024, 5 workshops with sponsors were organized.

1. *Climate scenarios and carbon neutrality: the investors/companies nexus, May 17th, 2024*

With Jeanne Mansoux, (Université Paris 1 & Fideas Capital)

Abstract:

This paper introduces a two-phase model formalizing the concept of alignment to a climate scenario within an economy of publicly traded companies and investors. During the first phase, companies must make a choice between announcing their commitment to low-carbon target, which compels them to abate their emissions, or refusing to make any announcement. Their decision is based on a required minimum level of abatement and on their ability to abate their greenhouse gas emissions. In the second phase, investors make heir portfolio allocation decisions based on the companies' announcements, which provide signals on the long-term climate risk exposure of stocks. We show that companies with the highest abilities always have profit opportunities to commit to low-carbon targets. We also identify a cost to announcing a low-carbon target. Finally, we show that the investors' climate preferences are essentiel to maximizing the number of companies committing to low-carbon targets.

Link: Paper
Link: Presentation

2. *Biodiversity Impact Measurements, Assets and Drawbacks, October 18, 2024*

With Anouch Missirian (TSE, INRAe) & Nicolas Treich (TSE, INRAe)

Link: Presentation

3. *Information Extraction on sustainability reports using Transformer-based models, December 3, 2024*

With Enora Petry (Polytechnique & MIT)

Abstract:
Sustainability reports have allowed companies to disclose information regarding environmental, social and governance (ESG) issues. These reports, along with other external data sources, allow rating companies to calculate sustainability scores for each firm. Sustainability reports are very diverse, mix pictures, graphics and text and are difficult to work with. We developed an extraction method that relies on Transformer-based model to evaluate each report on the most pressing key issues. For this project, 1,863 ESG reports were analyzed. This consists of 909 different firms over three years (2020, 2021, 2022). Large documents can be analyzed through a variety of text processing methods. For instance, main keywords can be extracted, relevant topics can be clustered or named entities can be located. Transformer-based models were retained as they have been trained on very large datasets and have proved to efficiently capture the semantic meaning of sentences. After classifying every paragraph of the report, we searched for an aggregation function that can transform the probability distribution of paragraphs into an overall disclosure score for the ESG report according to the industry's main key issues. This disclosure score, calculated for every topic, can be compared with ESG Scores (MSCI data).
The results are encouraging as the calculated scores shows some correlations with MSCI ESG scores. This illustrates the score's capability to grasp the quality and the quantity of disclosed information concerning the topic. The next steps for the project are to run the algorithm on a larger set of sustainability reports and distinguish paragraphs according the following criteria: risk, opportunities or management. This will add an extra layer of granularity when exploring the data.

Link: Presentation

4. *Double comptabilisation non intentionnelle des frais de gestion sous solvabilité 2, une réserve à 150 milliards libérable pour l'investissement vert et productif, January 23, 2025*

With Olivier Gossner & Michael Florig (Ecole Polytechnique)

Abstract:
We examine a general equilibrium investment model in which agents incur management costs for holding assets. We characterize the influence of these costs on equilibrium prices as a weighted average of these costs for market participants. We then propose a correction method for this influence in valuation procedures used under regulatory frameworks, such as Solvency II. For insurers subject to Solvency II, the accounting correction amounts to approximately €130 billion, the equivalent of 1.8% of investments or 14% of own funds. These results not only contribute to the

understanding of management costs in market equilibrium, but also highlight a distortion in current practices which discourages the holding of assets that are expensive to manage and typically inaccessible directly by policyholders.

5. La mesure des préférences morales des individus par les méthodes comportementales, March 5, 2025

With Jean-François Bonnefon (TSE)
Link: Paper JFE
Link: Paper Nature
Link: Presentation

IV. Publications

Researchers of FDIR have written some of these articles with researchers from other institutions based in France or abroad.

- Albarus, Ivonne, Thomas Lauvaux, Hervé Utard, Patricia Crifo, and Philippe Ciais, 2025, Unraveling Climate Targets Across the Paris Conurbation as a Gauge of City Ambitions, Nature - npj Urban Sustainability, forthcoming
- Alger, Ingela, and Boris Van Leeuwen, 2024, Estimating Social Preferences and Kantian Morality in Strategic Interactions, Journal of Political Economy Microeconomics, vol. 2, n. 4
- Alger, Ingela, Sergey Gavrilets, and Patrick Durkee, 2024, Proximate and ultimate drivers of norms and norm change, Current Opinion in Psychology, vol. 60, n. 101916
- Ambec, Stefan, and Yuting Yang, 2024, Climate policy with electricity trade, Resource and Energy Economics, vol. 76, n. 101422
- Ambec, Stefan, Federico Esposito, and Antonia Pacelli, 2024, The economics of carbon leakage mitigation policies, Journal of Environmental Economics and Management, vol. 125, n. 102973
- Andries, Marianne, Milo Bianchi, Karen Huynh, and Sébastien Pouget, 2025, Return Predictability, Expectations, and Investment: Experimental Evidence, The Review of Financial Studies, forthcoming
- Arjaliès, Diane-Laure, Vincent Bouchet, Patricia Crifo, and Nicolas Mottis, 2024, La mesure d'impact and l'Investissement Socialement Responsable (ISR): Un tour d'horizon, in Tchotourian E., Bres L. and Geelhand de Merxem L. (Eds.), Zone frontières et entreprise socialement responsable – Perspective multiple: droit, administration et éthique, Editions Thomson Reuters and Yvon Blais
- Bianchi, Milo and Marie Brière, 2024, Human-Robot Interactions in Investment Decisions, Management Science, forthcoming
- Brodback, Daniel, Nadia Guenster, Sébastien Pouget, and Ruichen Wang, 2025, Investor Valuation for Socially responsible Assets: A Willingness-to-Pay Experiment, Management Science, forthcoming
- Budolfson, Mark, Romain Espinosa, Bob Fische, and Nicolas Treich, 2024, Monetizing Animal Welfare Impacts for Benefit–Cost Analysis, Journal of Benefit-Cost Analysis
- Crifo, Patricia, and Hind Sami, 2025, Incentives for Accuracy in Analyst Research, Ethical Review of Social Sciences. 1(1), 25-35.
- Crifo, Patricia, and Antoine Rebérioux, 2024, Employee participation as a new frontier in corporate social responsibility
- Crifo, Patricia, 2024, Green human capital, innovation and growth. Environmental Modeling and Assessment. 29, 1-18

- Crifo, Patricia, 2024, Les chaires de finance verte et durable: un outil pour transformer la recherche et l'enseignement?, *Réalités industrielles des Annales et des Mines* series entitled "La finance durable"
- Crifo, Patricia, 2024. ESG Integration and Disclosure in Private Equity. In: Cumming, D., Hammer, B. (eds) The Palgrave Encyclopedia of Private Equity. Palgrave Macmillan, Cham
- Dewatripont, Mathias, and Jean Tirole, 2024, The Morality of Markets, Journal of Political Economy, vol. 132, n. 8, 2024, p. 2655-2694
- Drupp, M.A., M.C. Hansel, E.P. Fenichel, M. Freeman, C. Gollier, B. Groom, G.M. Heal, P.H. Howard, A. Millner, F.C. Moore, F. Nesje, F. Quaas, S. Smulders, T. Sterner, C. Traeger, and F. Venmans, "Accounting for the increasing benefits from scarce ecosystems", 2024, Science vol. 383,1062-1064
- Espinosa, Romain, and Nicolas Treich, 2024, Beyond Anthropocentrism in Agricultural and Resource Economics, Australian Journal of Agricultural and Resource Economics, volume 68, issue 3
- Espinosa, Romain, and Nicolas Treich, 2024, Animal welfare as a public good", Ecological Economics, Volume 216
- Espinosa, Romain, Sylvie Borau, and Nicolas Treich, 2024, Impact of NGOs' undercover videos on citizens' emotions and pro-social behaviors", Scientific Reports, vol. 14, n. 20584
- Gollier, Christian, Frederick van der Ploeg, and Jiakun Zheng, 2024, The discounting premium puzzle: Survey evidence from professional economists, Journal of Environmental Economics and Management 122
- Gollier, Christian, 2024, Evaluating sustainability actions under uncertainty: the role of improbable extreme scenarios, The Geneva Risk and Insurance Review, vol. 49, p. 59-74
- Gollier, Christian, 2024, The cost-efficiency carbon pricing puzzle, Journal of Environmental Economics and Management, vol. 128, n. 103062
- Hege, Ulrich, Sébastien Pouget, and Yifei Zhang, 2024, Climate Patents and Financial Markets, European Corporate Governance Institute – Finance Working Paper No. 961/2024
- Mechtenberg, Lydia, Grischa Perino, Nicolas Treich, Jean-Robert Tyran and Stephanie W. Wang, 2024, Self-signaling in voting, Journal of Public Economics, vol. 231, issue C
- Nguyen, Lan Anh, Manh-Hung Nguyen, Arnaud Reynaud, and Michel Simioni, 2024, A comparative study of residents and tourists' valuation for a heterogeneous environmental good: The case of coastal erosion, Marine Policy, vol. 161, n. 106038
- Rankin, Peter, Benoit Mayer, Eva van der Marel, Patricia Crifo and Laurent Besco, 2024, International Law as the foundation for the solution to climate change: an application to plastic waste, Proceedings of the ASIL annual meeting, Cambridge University Press
- Zhang, X-B. Fei, Y. Duan, H. Soytas, U. Crifo,P. Sterner T. 2025. Implicit discount rates and energy efficiency gap in air conditioning: Evidence from the Chinese market. Resource and Energy Economics. 101497.

V. Working papers

- Alger, Ingela, and Péter Bayer, "Norms and norm change - driven by social preferences and Kantian morality", TSE Working Paper, vol. 24-1605, December 2024.
- Alger, Ingela, and José Ignacio Rivero-Wildemauwe, "Doing the right thing (or not) in a lemons-like situation: on the role of social preferences and Kantian moral concerns", TSE Working Paper, vol. 24-1531, May, 2024.
- Ambec, Stefan, and Jessica Coria, "Environmental Regulation Informed by Biased Stakeholders", TSE Working Paper, vol. 24-1604, December, 2024.
- Bianchi, Milo, and Andrew Rhodes, "Digital Payments Interoperabillity with Naïve Consumers", TSE Working Paper, vol. 1559, August, 2024.

- Bouvard, Matthieu, and Catherine Casamatta, "Mobile money agent interoperability and liquidity management", TSE Working Paper, vol. 24-1568, September, 2024
- Espinosa, Romain, and Nicolas Treich, "The Animal-Welfare Levy", TSE Working Paper, vol. 24-1503, January, 2024.
- Espinosa, Romain, and Nicolas Treich, "Fairness judgments about animals" working paper November, 2024
- Florig, Michael, and Olivier Gossner, "Market equilibrium with management costs and implications for insurance accounting", working paper December, 2024
- Gollier, Christian, "Discounting", TSE Working Paper, vol. 24-1554, July, 2024.
- Gollier, Christian, "The welfare cost of ignoring the beta", TSE Working Paper, vol. 24-1556, July, 2024.
- Hege, Ulrich, and Yifei Zhang "Activism Waves and the Market for Corporate Control", June 2024.
- Kim, Daniel, and Sébastien Pouget, "Do carbon emissions affect the cost of capital? Primary versus secondary corporate bond markets", TSE Working Paper, n. 23-1472, September 2023.
- Reynaud, Arnaud, and Benjamin Ouvrard, "Re-calibrating beliefs about peers: Direct impacts and cross-learning effects in agriculture", TSE Working Paper, vol. 24-1517, March, 2024.

VI. Events, communication and awards

Additional objectives of FDIR are to maintain a fruitful dialogue between researchers and sponsors through dedicated workshops, as well as to disseminate results of academic research to the world of practice.

A. Workshops with sponsors

- *May 17th, 2024*: "Climate scenarios and carbon neutrality: the investors/companies nexus" with Jeanne Mansoux (Université Paris 1 & Fideas Capital)

- *October 18, 2024: "*Biodiversity Impact Measurements, Assets and Drawbacks" with Anouch Missirian (TSE, INRAe) & Nicolas Treich (TSE, INRAe)

- *December 3, 2024: "*Information Extraction on sustainability reports using Transformer-based models" with Enora Petry (Polytechnique & MIT)

- *January 23, 2025: "*Double comptabilisation non intentionnelle des frais de gestion sous solvabilité 2, une réserve à 150 milliards libérable pour l'investissement vert et productif" with Olivier Gossner & Michael Florig (Ecole Polytechnique)

- *March 5, 2025: "*La mesure des préférences morales des individus par les méthodes comportementales" with Jean-François Bonnefon (TSE)

The advances made by the researchers of FDIR have been presented to a wide audience including academic researchers, finance practitioners, and the general public, both in France and abroad. The Initiative has been instrumental in the creation of the knowledge communicated in the various events and documents described below.

B. Communication to finance practitioners

Researchers involved in the Research Initiative took part to events organized or co-organized by TSE or Ecole Polytechnique which contributed to disseminate their research results. Below are examples of these events.

1. Examples of conferences

- **Impact of climate risk and biodiversity loss on financial stability and monetary policy Conference,** May 22-23, 2024

Organized by Banque de France and TSE in Paris, the Climate & Biodiversity Conference on May 22-23 focused on the impact of environmental risk and ecological destruction on financial stability and monetary policy. Speakers from world-class research centers, central banks, regulatory bodies, finance institutions, non-profit institutions, and the industrial sector covered topics such as financing the green transition, the consideration of nature and climate in financial stability, macroeconomic modelling of climate change and green deflation, and nature modelling.

Link: summary of the roundtable discussion on Monetary Policy & Climate : "Policy for the planet: Finding a model for sustainable finance" with Christian Gollier.

- **Common Good Summit**, June 13 and 14, 2024

The 4th Common Good Summit, jointly organized by Challenges, Toulouse School of Economics, and Les Echos-Le Parisien Événements in 2024, brought together researchers, business leaders, and representatives of civil society to address a pivotal question: "Who will pay for the common good?" This edition focused on essential themes such as Climate, Mobility, Food, Health & AI, as well as Trust and Consent. Indeed, this event addressed several themes related to FDIR. Two particularly relevant sessions can be highlighted: "Ensuring a fair climate transition" with Ingela Alger (who is a member of the FDIR Research Initiative) and "Finance in transition: adapting to a sustainable future" with Ulrich Hege (who is a member of the FDIR Research Initiative).
Website here.

- **Futurapolis**, 6-7 December, 2024

TSE had been participating in Futurapolis for many years, with the involvement of faculty researchers in the debates. From the FDIR research team, Stefan Ambec, Christian Gollier and Nicolas Treich took part in the debates. But this year, TSE, alongside Sciences Po Toulouse and the University of Toulouse Capitole, co-organized the event with the magazine Le Point.
This event, dedicated to technological innovation, ecological transition, science, and research, began with the inaugural evening at Sciences Po Toulouse on Thursday, December 5, and was followed by two days of engaging debates at TSE on Friday, December 6, and Saturday, December 7.
Website here.

- **December 2024 "Les Entretiens de la Finance Durable", NEOMA Paris campus**

Patricia Crifo gave the inaugural keynote speech 5/12/24

- **UNFCCC COP29, November 2024:**

Patricia Crifo participated in the side event U7+ Climate and higher education 18/11/2024

2. New issue of the "Research Journal of the Research Initiative FDIR"

At the end of 2024, researchers prepared a "Cahier de recherche" that presented academic work developed within the 2022-2025 FDIR research initiative in a simplified and accessible way. This document was released in March 2025.

C. Communication to academic researchers

The researchers of FDIR have been invited to share their work and ideas in various academic conferences and workshops. The support of FDIR is gratefully acknowledged whenever relevant.

3. Examples of academic conferences

- Ingela Alger presented her work on social preferences at various conferences in 2024, in plenary/semi plenary talks: Cognition, Behavior, and Evolution Network (CBEN) conference, Maastricht, European Meeting of the Economic Science Association (ESA), Helsinki, 7th World Congress of the Game Theory Society, (GAMES), Beijing, Learning, Evolution, and Games (LEG) conference, Brisbane, Foundations of Utility and Risk (FUR) conference, Brisbane; Public Economic Theory (PET) conference, Lyon

- Stefan Ambec (Toulouse School of Economics, INRAE) and Mathias Reynaert (Toulouse School of Economics), 14th Toulouse Conference on the Economics of Energy and Climate, 6-7 June, 2024

- Geoffrey Barrows (Ecole Polytechnique), "Equilibrium Effects of Carbon Policy", 14th Toulouse Conference on the Economics of Energy and Climate, 6-7 June, 2024.

- Milo Bianchi gave the 2024 Jiang Xuemo Economics Lecture at Fudan University (Shanghai) on Social Preferences and Sustainable Investment

- Ulrich Hege presented papers related to FDIR in various events in 2024: Western Finance Association, European Finance Association, China International Conference in Finance, Eurofidai-ESSEC Paris December Finance, Skema Business School, U Montpellier.

- Sébastien Pouget, "Investor Valuation for Socially Responsible Assets : A Willingness-To-Pay Experiment", Conference on SRI in Nijmegen, 25 April, 2024

- Patricia Crifo presented in the following conferences: HEC inclusive day March 2025, CESS 2024 Conference of european statistics stakeholders, Tianjin University keynote on climate risk, April 2024

4. *Examples of workshops and seminars*

- Ingela Alger, 2024, Philosophy and Economics Workshop, Bath UK, Barcelona School of Economics Summer Forum, Workshop on Choice and Morality, Frontiers of Economics and Philosophy, Paris School of Economics

- Stefan Ambec, "Environmental regulation informed by biased experts", Environmental Economics Seminar, TSE, Toulouse, 3 June, 2024

- Milo Bianchi, "Are We Becoming Greener? Life-time Experiences and Responsible Investment": Foster School of Business - University of Washington (Seattle); City University of Hong Kong; Peking University HSBC Business School (Shenzhen).

- Sébastien Pouget, "Atelier Philosophie et Economie", TSE 22-23 May 2024.

- Sébastien Pouget, "Investor Valuation for Socially Responsible Assets : A Willingness-To-Pay Experiment", seminar at UC Louvain, 17 May, 2024

- Sébastien Pouget, "Do carbon emissions affect the cost of capital? Primary versus secondary corporate bond markets", HEC seminar, 13 June, 2024

D. General audience reports and communications

1. *Book*

- Nicolas Treich - Commentary of the book "Faut-il sauver l'ours blanc ?" de Thomas Lepeltier. Revue des Questions Scientifiques 194, n°1-2, pp. 1-4, Autumn 2023.
- Christian Gollier, "Discounting", dans Handbook of the Economics of Climate Change, sous la direction de Lint Barrage et Solomon Hsiang, Décembre, 2024, chap. 3, p. 113-142.

2. *Tribunes*

- « Nous soutenons la distribution d'un "versement climat" pour chaque ménage français », Christian Gollier, Le Monde, January 2024
- Promouvoir l'écologie et non le populisme, Christian Gollier, Les Echos, February 2024
- La politique climatique, victime de notre chaos sociétal, Christian Gollier, L'Opinion, June 2024
- Le retour de la pensée à somme nulle Christian Gollier, Challenges, October 17, 2024
- La guerre de l'eau ne fait que commencer. Crifo P. Elkington M. Les echos 06/02/2024

3. *Press articles and interviews*

- 25 books for 25 years in Europe,Christian Gollier, Princeton University Press, January 12
- Compte carbone individuel : le serpent vert refait surface, Christian Gollier, L'Opinion, January 18
- Planification écologique : plus d'efforts demandés aux plus riches?, Christian Gollier, L'Opinion, January 22
- Colère des agriculteurs : "Une exemption de la taxe sur le GNR ne serait pas une bonne idée", Christian Gollier, L'Express, January 26

- Le mythe des 110 km/h démonté : ce que révèle une étude récente, Christian Gollier, Auto Plus, February 21
- «Prix plancher» : ce que l'on sait de cette mesure, voulue par l'exécutif, qui fait polémique, Christian Gollier, Le Figaro, February 25
- A big boost to Europe's climate change goals, Christian Gollier, Knowable magazine, February 28
- La fatigue climatique fait le jeu du Rassemblement national, Christian Gollier, Challenges, April 2
- Climat : le marché européen des quotas carbone va-t-il droit dans le mur?, Christian Gollier, L'Express, April 13
- Climat : des dépenses publiques coûteuses et peu efficaces, Christian Gollier, L'Opinion, April 24
- Décarboner les territoires : 3 questions à Anne Fraisse et Christian Gollier, Christian Gollier, Agence d'urbanisme et d'aménagement Toulouse, June 6
- Croître sans périr, limite de la décroissance : quel virage politique pour sauver le climat ? Christian Gollier, Challenges, June 18
- Programme économique : le NFP et le RN pris au piège d'une mentalité de jeu à somme nulle, Christian Gollier, Atlantico, June 23
- Vers la fin du marché carbone dans l'UE? Pourquoi c'est loin d'être une bonne idée, Christian Gollier, L'Express, July 12
- Le climat aura-t-il la peau de nos règles budgétaires? Les prévisions des économistes, Christian Gollier, La Tribune, July 16
- Pour la première fois, les Français vont pouvoir investir dans les quotas-carbone, Christian Gollier, La Tribune, September 14
- Et au fait, la dette écologique, comment la réduit-on ?,Christian Gollier, L'Opinion , September 23
- Voitures électriques : le calendrier de tous les dangers, par Eric Chol, Christian Gollier, L'Express, September 26
- Le retour de la pensée à somme nulle, Christian Gollier, Challenges, October 17
- "Les citoyens doivent comprendre que chaque fois qu'ils émettent une tonne de CO2, ils sont responsables de plusieurs milliers d'euros de dommages", dit un économiste, Christian Gollier, France Info, November 11
- « Le gel de la taxe carbone décidée en France après le mouvement populiste des Gilets jaunes est un désastre », Christian Gollier, L'Opinion, November 20
- « Nous demandons la mise en place d'un "revenu carbone" en France », Christian Gollier, Le Monde, November 20
- Transition écologique : « On va devoir accepter de payer cher, parfois beaucoup plus cher », Christian Gollier, Ouest France, November 22
- Et si on remplaçait les chèques énergie par un revenu carbone ?, Christian Gollier, L'Opinion, December 11
- Crifo P. 2025. Ingénieurs et transition écologique : adapter les formations aux enjeux de demain, ID l'info durable
- Crifo P. 2024 Interview IP Paris COP 29 : Enhancing climate solutions with higher education
- Crifo P. Li Dai Glangeaud 2024 COP29: What does the future hold for energy storage and decentralised networks? Polytechnique insghts
- Crifo P. Mizuno Rocha Leung 2024 COP29: crucial decisions to protect small island states. Polytechnique insghts

- Crifo P. Elkington M 2024. COP28: Water security takes centre stage in climate discussions Polytechnique insights
- Crifo P. Dall'Aglio S. 2024. COP28: a critical conference for small island states Polytechnique insights
- Crifo P. Dupre M. 2024. COP28: Why the world needs private investment in climate adaptation projects? Polytechnique insghts
- Crifo P. 2024. Inégalités et neutralité carbone : comment s'engager en faveur d'une transition juste ? Blog de la Caisse des dépôts et consignations

4. *General audience communications*

- Patricia Crifo, Salon talents for the planet, Paris Mars 2025
- Patricia Crifo, L'adaptation au changement climatique des acteurs privés et publics des territoires, Sénat nov 2024
- Patricia Crifo, Plan national de formation à la transition écologique pour 25 000 cadres de l'administration, janvier 2024, mai 2024, septembre 2024
- Patricia Crifo, Plan d'action national pour la transition environnementale du CNRS, novembre 2024
- Patricia Crifo, L'analyse économique des enjeux environnementaux, Cour des comptes, discours inaugural de 2023 à l'assemblée générale de la 1re chambre
- Patricia Crifo, BPI France le lab "gouvernance et transition écologique", 30/4/24

5. *TSE Reflect, newsletter of the TSE Sustainable Finance Center*

The sponsors of the Research Initiative FDIR, along with all the other partners of the TSE Sustainable Finance Center, have contributed to the development of initiatives aimed at increasing the visibility of the work of TSE researchers to a non-academic audience. The sponsors of the Initiative are among the recipients of this e-newsletter.

Latest issues on sustainable finance: February 2024 and November 2024
See all past issues: on sustainable finance.

6. *The FDIR website*

All information related to the research initiative are disseminated on the . This website is updated regularly. The support team at TSE ensures that the website provides information on events, research projects, members...

E. Awards and memberships

Researchers contributing to FDIR have multiple memberships in institutions aiming at promoting and developing socially responsible investment. Here are some examples:

Catherine Casamatta is

- member of the AMF Scientific Council (renewed in 2023)
- ILB fellow (since 2021)
- Jury member of the Gasperini Awards sponsored by the European Federation of Financial Analysts (since 2024) and the FIR-PRI Awards (since 2016)

- Member of the Ethics Committee of Actia group (since 2024)

Patricia Crifo is

- Deputy director of the interdisciplinary center Energy4Climate (E4C)
- Member of the scientific committee of Ecole Polytechnique climate action plan, CREST sustainability committee and listening unit
- Member of the French monitoring committee a "climate indicator" for non-financial companies by Banque de France, appointed by the Ministry of economics and finance, 2024
- Member of the Prudential Supervision and Resolution Authority (ACPR)'s supervisory college and Vice president of its Climate and Sustainable Finance Commission (renewed in 2025)
- Member of the Sustainable finance committee, appointed by the Ile de France Region (since 2022)
- Member of the Scientific Council of the GREC (Regional Group of Experts on Climate Change) since 2024
- ILB fellow, member of the ILB nomination committee and scientific advisory panel, and member of the PARC foundation expert commission, 2024
- Member of the ESG committee of Centre des Professions Financières

Christian Gollier is

- Member of the Académie des Technologies, 2024
- Member of the One Planet Lab Group of economists

Ulrich Hege is

- Member of the Commission Climat et Finance Durable at ACPR (since 2022)
- Member of the ESG Committee of Centre des Professions Financières

Sébastien Pouget is:

- Member of the Haut Comité Certificateur de Place at AMF
- Member of the AMF Scientific Council (since 2023)
- Co-director fo the Getlink-TSE initiative for Corporate Climate Action

Nicolas Treich is:

- Member of the TSE CSD and sustainable development committee
- Member of the Scientific Committee of Greener by default
- Member of the Conseil Economique pour le Développement Durable (CEDD) (2015-2024)

Awards 2024

- TSE researchers Catherine Casamatta, Ulrich Hege, Sophie Moinas, Sébastien Pouget, and Silvia Rossetto were awarded the 2024 FIR-PRI Best Pedagogical Initiative Award. These European prizes were created in 2005 by the FIR to reward excellence in academic research in the field of finance and sustainable development.
- Christian Gollier was awarded a third fellowship at the Institut Universitaire de France.
- The paper "Climate Patents and Financial Markets" by Ulrich Hege, Sébastien Pouget and Yifei Wang won the ESSEC-Eurofidai Paris December Finance Meeting Best Paper Award and the WRDS Best Paper in Empirical Finance Award at the Western Finance Association
- Patricia Crifo was awarded the X-RSE 2024 prize for engagement and partnership on climate change

VII. Education and training

FDIR is fostering the diffusion of knowledge on CSR and SRI within the young generations of finance practitioners and researchers. State-of-the-art techniques and ideas of CSR and SRI have been taught in various courses offered to Master's in Economics and Finance at the Ecole Polytechnique, at Toulouse School of Economics (TSE), and at Toulouse School of Management (TSM) of the University of Toulouse. Moreover, seven PhD students are currently working on issues related to FDIR.

A. Courses

- Milo Bianchi, Behavioral Finance - Module on 'Social Preferences and Sustainable Investment', PhD Course, TSE and TSM
- Catherine Casamatta, Module on Sustainable finance in the MSc in Finance at TSM and in the executive Master in Finance at HEC Paris
- Christian Gollier "Climate Economics", 30 hours in L3, TSE
- Ulrich Hege is Program Director for the Master in Economics of Global Risks (with a focus on Sustainable Development and Finance), and he is responsible for the seminars "Global risks for a living planet") and "Understanding Global risks", TSE
- Ulrich Hege, "Cost-Benefit Analysis" and supervisor for sustainable finance-oriented Empirical Projects, TSE
- Nicolas Treich, "Animal welfare economics", 10 hours, TSE
- Nicolas Treich, "Impacts environnementaux de l'alimentation" 2 hours, DU Alimentations végétariennes, Sorbonne
- Patricia Crifo: Program director of the MSc&T Economics for smart cities and climate policy, 3 Courses on ESG integration and impact (Ecole Polytechnique Bachelor 2024-25, AgrosParitesch Master EDDEE 2024-25 and Shanghai Normal University Bachelor sino french 2023-24), 2 courses on Evaluation of the Paris climate action plan (MSc&T 1&2 ESCLIP, 2024-25)

B. PhD Students & Interns

PhD students working on FDIR topics in 2024 include:

- Esteban Muñoz, theme: "morality, taxation, and charitable giving" (advisor: I. Alger, defended in July 2024)
- Pau Juan Bartroli, theme: "morality, norms, and recycling" (advisor: I. Alger)
- Enrico Mattia Salonia, theme: "morality and game theory" (advisor: I. Alger)
- Xinyue Wen, theme: "Sustainability Preferences of Individual Investors" (advisor: M. Bianchi)
- Johanne Trotin, theme: "Pro-environmental preferences" (advisors: P. Crifo & Ivaylo Petev)
- Amadéo Zorzi, theme: "employees' green activists. Is there a greenium on the labor market?" (advisor: C.Gollier)

- Konrad Dierks, theme: "The levelized cost of electricity when taking account of the intermittency of renewable energies" and "the impact of the media on the social and economic decision processes related to climate change". (advisor: C.Gollier)
- Ruichen Wang, theme: "Corporate Social Responsibility: valuation, tools and governance" (advisor: Sébastien Pouget)
- Murad Nuriyev, theme: "Green Innovation and Corporate Social Responsibility" (advisor: Sébastien Pouget)

Internships:
- Elizabeth Klages: M2 Environmental Economics and Policy – Ecology track (supervisor Nicolas Treich)
- Nicolas Loiseau : (supervisor Nicolas Treich)
- Enora Petry (supervisor Florian Berg)