

COMMENT

The Lack of Interest in Economics for the Challenge of the Century

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Abstract – The publication of a thematic section on the environment gives us an opportunity to assess the position of environmental issues within economics. On one level, vacancies for economists published by the American Economic Association (the Job Openings for Economists (JOE) Network) suggest that the net increase in vacancies for positions related to the environment comes from establishments that are not central to the academic economy and that such vacancies specifically labelled as relating to the “environment” tend to decrease in number when looking solely at departments of economics. The proportion of articles published in *Economie et Statistique / Economics and Statistics* dedicated to the environment is fairly similar to the low rates seen in terms of vacancies. It is hoped that these new publications will reverse these trends. The three articles published provide important insights into the main areas that applied research in economics must address to be of use in guiding public policies; however, there remains a considerable amount of research work to be carried out.

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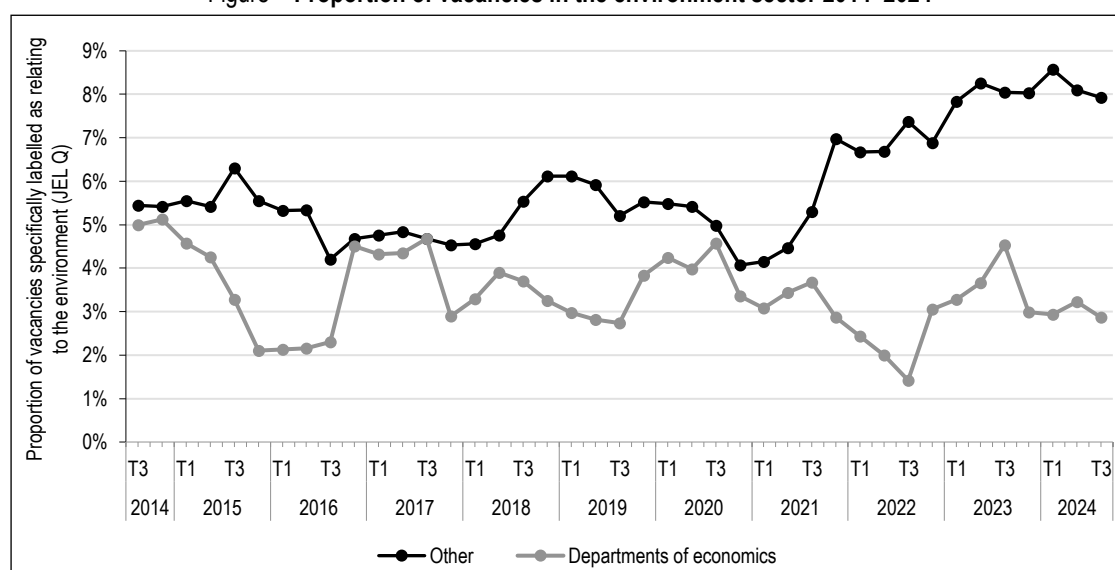
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Is the Environment Overlooked by Economists?

Environmental economics has long been considered a peripheral discipline of economics. This is one of the many symptoms of the trend in economics (Heckman & Moktan, 2020) which, through the pressure to “publish or perish”, guides research, especially research by young researchers, towards what is most profitable in terms of their careers and not in terms of scientific interest. In addition to this pressure on individuals through misguided incentives, there are institutional choices and, through a certain conservative outlook, departments of economics around the world have been slow to address environmental issues. One can only agree with the judgment of Polasky *et al.* (2019), in whose opinion environmental economics is not a core economic discipline. Until recently, there have been few publications in the main economic journals with the keyword “environment” (JEL Q code) and it is those journals that determine careers. Major departments of economics often overlook this issue and advertise few vacancies specifically labelled as relating to environmental issues. It is instead schools of public affairs, departments of agriculture and institutes dedicated to the environment that actually take on the economists, pushing environmental research to the periphery of economics.

The figure shows the proportion of vacancies in the field of environmental economics on the JOE Network, which is now the central repository for most of the vacancies in the academic world for economists, over the last ten years. This graph makes a distinction between, on the one hand, departments of economics (identified in a manner that can lead to some being overlooked, meaning false negatives, however this has a minor impact on the proportions) and, on the other hand, other institutions, whether departments or schools of public affairs, departments of agriculture, environmental institutes (such as the Grantham Research Institute at LSE) or international institutions (e.g. the World Bank, the IMF or the OECD). On the basis of this definition, departments of economics account for just over a quarter of vacancies. No distinction is made based on the nature of the position (assistant professor, post-doctoral, thesis or other), nor its duration. The date chosen for the graph is the date on which the position became vacant, rather than the date on which the vacancy was published. We simply quantify the content of the positions through the JEL codes associated with them without trying to better describe the nature of these vacancies. In addition, some vacancies could be for jobs in the environment sector, even though the JEL Q code is not included (such as an econometrician role in an institute dedicated to the environment, for example). A great deal could undoubtedly be learnt from more in-depth work but, in a preliminary manner, this analysis

Figure – Proportion of vacancies in the environment sector 2014–2024



Notes: The date used for vacancies is the date on which the position became vacant. The percentage is calculated as the number of vacancies tagged with a JEL Q code out of the total number of vacancies as a rolling average over four quarters. Departments of economics are identified by the fields `jp_division` and `jp_department`, which equate to “Department of Economics” or “Economics”. Of 18,500 vacancies published between the third quarter of 2014 and mid-August 2024, 4,700 are in departments of economics, on the basis of this definition, equating to 25.4%.

Sources: JOE (Job Openings for Economists) Network, American Economic Association, www.aeaweb.org.

focused solely on the data published by the American Economic Association sheds light on some trends.

Between 2014 and 2024, vacancies in the environment sector represented just over 5.5% of all vacancies, but this proportion was 3.5% in departments of economics. After 2020, vacancies in the environment sector increase sharply, but not in departments of economics where, if there is any trend, it is one of a very slight decrease, with the proportion reaching just over 2% for 2024.

This is not to say that the environment has not been covered by economists. From the most prestigious forerunners such as Arrow, Costanza, Nordhaus, Ostrom, Weitzman, Stern, Dasgupta, Heal, Stiglitz, Tobin, Daily, Daly, Porter, Kuznet, Georgescu-Rosen, Hardin, Pigou and Hotelling to name but a few (Costanza *et al.*, 2016), to the Sveriges Riksbank Prize (also known as the Nobel Prize) in Economic Sciences awarded to Elinor Ostrom in 2009 or to William Nordhaus in 2018, the economic literature is not silent on the subject. If we were to go into the details of the publications, it would be possible to conclude that this lack of focus afforded to the environment results in a bias that prevents us from fully investigating the disruptions that would be entailed in respecting planetary boundaries (Richardson *et al.*, 2023; Rockström *et al.*, 2009b; Steffen *et al.*, 2015). This is the theory put forth by Antonin Pottier (Pottier, 2016), which associates the lack of focus on environmental issues with implicit censorship that leads to underestimating the issues, or even exacerbating them. Thus, the challenge of the century is not filling the shelves of university libraries and the impetus provided by the IPCC for almost 40 years is struggling to stimulate economic research. However, allocating the planet's finite resources to, in the words of the Brundtland Report (Visser & Brundtland, 1987), meet the needs of the present without compromising the ability of future generations to meet their own needs is a crucial challenge. It is a case of resolving both the tragedy of the commons and the tragedy of the horizons and bewilderment is the only appropriate response to the lack of engagement on the part of the scientific community with these issues.

As far as *Economie et Statistique / Economics and Statistics* is concerned, the record is mixed (Table). The publication of a special issue dedicated to the environment in 1992, just two years after the first IPCC report, was remarkable as the

subject seemed far from public policy priorities at the time. The environment was a subject of public policy, but such policy was often limited to the management of finite resources, air pollution, the value of landscapes or the nuisances of modernity, which is a long way off the systemic question formalised by Rockström *et al.* (2009a). Yet that special issue already went further than previous environmental concerns. It was followed in 2013 by a thematic section on the micro-assessment of the environment, accompanying the, at that time, recent empirical turning point in environmental studies (Castro e Silva & Teixeira, 2011).

However, the proportion of articles dedicated to the environment in *Economie et Statistique / Economics and Statistics* since 1992 is “only” 3.3% (falling to 2.6% since 2014), according to our count. This is the same order of magnitude as the vacancies in departments of economics alone over the last ten years (3.5% since 2014) – though the comparison is not directly relevant – but less than the profession as a whole (5.5% since 2014), with this figure remaining stable in recent years. Notable facts: 1. In the 50th anniversary issue of *Economie et Statistique / Economics and Statistics*, in 2019 (Djiriguian & Sémécurbe, 2019), the word “environment” does not appear in the word clouds taken from the abstracts; 2. In the highly informative special issue of *Economie et Statistique* devoted to modelling in 2012 (No 451-453), the environment is not mentioned (Laffargue *et al.*, 2012).

This is why the publication of three additional articles in *Economie et Statistique / Economics and Statistics* is an important step, which, while it will not reverse the statistics mentioned,¹ provides important insights on a fundamental subject. Because the subject has barely been explored, public policies that are (or will be) implemented on a large scale are created with insufficient knowledge and guidance, which runs the risk of policies that are poorly calibrated, poorly conducted, ineffective and ultimately abandoned because they are too expensive, too brutal or too unfair – there are many examples of this, ranging from carbon taxes to energy performance assessments and social leasing.

1. It should also be noted that almost 50% of the articles on this subject since 2014 and some of the articles from the call for papers on environmental issues of March 2023 (https://www.insee.fr/fr/statistiques/fichier/3897066/ES_appel_environnement_2023_FR-EN.pdf) have not been published yet.

Table – 39 Articles on the environment published in *Economie et Statistique / Economics and Statistics* since 1992

| Title | Authors | Years | N° | Pages |
|--|---|-------|-------------|---------|
| Beyond GDP: A Welfare-Based Estimate of Growth for 14 European Countries and the USA Over Past Decades | Germain, Jean-Marc | 2023 | 539 | 3–25 |
| Impact of COVID-19 Activity Restrictions on Air Pollution: Methodological Considerations in the Economic Valuation of the Long-Term Effects on Mortality | Chanel, Olivier | 2022 | 534-35 | 103–118 |
| Building Indicators for Inclusive Growth and its Sustainability: What Can the National Accounts Offer and How Can They Be Supplemented? | Blanchet, Didier ; Fleurbaey, Marc | 2020 | 517-518-519 | 9–24 |
| The Social Cost of Global Warming and Sustainability Indicators: Lessons from an Application to France | Germain, Jean-Marc ; Lellouch, Thomas | | | 81–102 |
| Price Elasticity of Electricity Demand in France | Auray, Stéphane ; Caponi, Vincenzo ; Ravel, Benoît | 2019 | 513 | 91–103 |
| What Value Do We Attach to Climate Action? | Quinet, Alain | | 510-511-512 | 165–179 |
| Accessibility, Local Pollution and Housing Prices. Evidence from Nantes Métropole, France | Brécard, Dorothée ; Le Boennec, Rémy ; Salladaré, Frédéric | 2018 | 500-501-502 | 97–115 |
| <i>Introduction. The Economic Evaluation of Environmental Services or Damage, Twenty Years Later</i> | <i>Bureau, Dominique ; Point, Patrick</i> | | | 71–77 |
| Industrial Hazards and the Price of Housing | Gislain-Letrémy, Céline ; Katossky, Arthur | | | 79–106 |
| How Do Individuals Put A Value On Deaths Associated With Atmospheric Pollution? A Comparison of Three Hypothetical Scenarios | Ami, Dominique ; Aprahamian, Frédéric ; Chanel, Olivier ; Luchini, Stéphane | 2013 | 460-461 | 107–128 |
| Identification and Analysis of Lexicographic Preferences in Economic Assessment | Rulleau, Bénédicte ; Dachary-Bernard, Jeanne | | | 129–144 |
| Assessing Urban Amenities By The Hedonic Price Method: An Application Using The Example of The Town of Angers | Travers, Muriel ; Appere, Gildas ; Larue, Solène | | | 145–163 |
| <i>General Introduction</i> | <i>Hubert, Jean-Paul</i> | | | 3–11 |
| Recent Growth in CO ₂ Emissions Caused by the Mobility of the French People: Analysis of the Dynamics at Work via the National Transport Surveys of 1994 and 2008 | Nicolas, Jean-Pierre ; Verry, Damien ; Longuar, Zahia | 2012 | 457-458 | 161–183 |
| Assessing the Effects of Environmental Zoning on Urban Growth and Farming | Geniaux, Ghislain ; Napoléone, Claude | 2011 | 444-445 | 181–199 |
| Greenhouse-Gas Emissions Due to Agriculture and Land Use in France: A Spatial Analysis | Chakir, Raja ; De Cara, Stéphane ; Vermont, Bruno | | | 201–221 |
| A Multidimensional Approach to the Economic Value of Nature-Based Recreation | Rulleau, Bénédicte ; Dehez, Jeffrey ; Point, Patrick | 2009 | 421 | 29–46 |
| Towards a Still-Fragile Revival of Stated-Preference Methods – Commentary About “A Multidimensional Approach to the Economic Value of Nature-Based Recreation” | Ami, Dominique ; Chanel, Olivier | | | 47–51 |
| Is the ISO 14001 Standard Effective? An Econometric Study of French Industry | Riedinger, Nicolas ; Thévenot, Céline | 2008 | 411 | 3–19 |
| <i>Comment: The Environmental Effectiveness of Iso 14001 Standard: A Concept With Multiple Dimensions</i> | <i>Grolleau, Gilles ; Mzoughi, Naoufel</i> | | | 21–23 |
| An Economic Evaluation of the Landscape | Dachary-Bernard, Jeanne | 2004 | 373 | 57–74 |
| <i>Comment on 'An Economic Evaluation of the Landscape', An Innovative Method to Develop, Results Still Fragile</i> | <i>Cavallhès, Jean</i> | | | 75–80 |
| The Singularity of the Contingent Valuation Method | Luchini, Stéphane | | | 141–152 |
| The Loss of Recreational Forest Use Following the 1999 Storms: The Case of Fontainebleau Forest | Scherrer, Sylvie | 2002 | 357 | 153–172 |
| Evaluation of the Damage Caused by Oil Slicks: An Illustration Based on the Case of Erika and the Residents' Loss of Amenities | Bonnieux, François ; Rainelli, Pierre | | | 173–187 |
| Advantages and Limits of the Benefit Transfer Method | Rozan, Anne ; Stenger, Anne | 2000 | 336 | 69–78 |
| An Economie Assessment of Atmospheric Pollution | Lescure, Roland ; Nogier, Antoine ; Tourjansky-Cabart, Laure | 1997 | 307 | 3-20 |

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Table – (contd.)

| Title | Authors | Years | N° | Pages |
|--|--|-------|---------|---------|
| Household Packaging Waste: An Economic Analysis of the German and French Policies | Defeuilleux, Christophe ; Quirion, Philippe | 1995 | 290 | 69–79 |
| The Waste Policy in the United Kingdom | Litvan, David | | | 81–90 |
| <i>General Presentation</i> | <i>Henry, Claude ; Bureau, Dominique</i> | | | 3–7 |
| The Services Provided by our Natural Heritage | Point, Patrick | | | 11–18 |
| An Evaluation Based on Economic Principles | | | | |
| The French and the Environment: From Intentions to Action | Dufour, Ariane | | | 19–25 |
| Environmental Policy Instruments | Delache, Xavier ; Gastaldo, Sylviane | | | 27–34 |
| "Marketable Emission Permits" in the United States | Gastaldo, Sylviane | | | 35–41 |
| The Greenhouse Effect: Why Use a Pricing Approach? | Gastaldo, Sylviane | | | 45–54 |
| The Greenhouse Effect and North-South Relations: Opportunities for and Threats to a Global Agreement | Burniaux, Jean-Marc ; Oliveira Martins, Joaquim | | | 55–68 |
| The Environment and Growth: A False Dilemma for Developing Countries | Kenigswald, Laurent | 1992 | 258-259 | 69–75 |
| Protecting the Environment in Developed Countries | Avérous, Christian | | | 77–85 |
| The Clean Car | Brunel, Philippe ; Perillo, Thierry | | | 89–94 |
| The Water Situation in France | Paoli, Dominique ; Rieu, Thierry | | | 95–104 |
| Including the Environment in Agricultural Policies | Amand-Madelin, Virginie | | | 105–112 |
| Protecting Species: What Do the Economists Have to Say? | Angel, Martin ; Glachant, Matthieu ; Lévêque, François | | | 113–119 |
| Transport and the Environment: How to Improve and Control External Effects? | Bonnafeous, Alain | | | 121–128 |
| Solid Waste: Scrap or Resources? | Bertolini, Gérard | | | 129–134 |

Notes: The selection by the author and Dominique Goux is necessarily somewhat subjective. In addition to the 39 articles, the table includes, in italics, the introductions to and comments on articles on the environment.
Sources: www.insee.fr, www.persee.fr.

The Challenges of the Challenge of the Century

Bretschger & Pittel (2020) list 20 challenges for economics.² Three main areas of focus can be identified for the design and conduct of policies for the environmental transformation of societies:

1. Making forecasts and anticipating and quantifying the consequences of climate change and of transition and adaptation policies. This involves identifying exposures to climate change and to environmental policies. Complex and expensive choices will have to be made regarding the granularity of the analyses: the multiplication of dimensions, from geography to social categories, from types of climatic events to the sectoral dimension, requires an effort to compile data that has never been carried out;
2. Developing public policies for “net zero carbon emissions”, meaning policies for radical transformation of the productive system, from energy production to energy use, consumption patterns, conversion of installed

capital or innovation and directed innovation. And this will be achieved by adding new activities such as recycling, repairing ecosystems or managing carbon sinks;

3. Understanding the change underway by compiling data and, therefore, by rebuilding official statistics and adapting the concepts of public accounting to not only understand well-being – to allow societies to be reflexive – but also to reflect the redistributive, conflicting and uncertain aspects of the evolution of well-being during the transition. Tools to allow understanding may seem secondary to the “doing” in point 2, but they are one of the necessary conditions

2. 1) Deep decarbonisation and climate neutrality; 2) Dynamics of the economic-ecological system; 3) Risk, uncertainty and resilience; 4) Disruptive development and path dependencies; 5) Behavioural environmental economics; 6) Institutional analysis of environmental policy; 7) Equitable use of the environment; 8) Loss of biodiversity and natural capital; 9) Valuing and paying for ecosystem services; 10) Conflicts over natural resources; 11) Population development and use of the environment; 12) Land use and soil degradation; 13) Environmental migration; 14) Urbanisation as a key for environmental development; 15) Health and epidemiological environment; 16) Carbon exposure and green finance; 17) Energy system transformation; 18) Sustainability perspective on digitalisation; 19) Quantitative analysis of environmental use; 20) Structural assessment modelling and modelling transparency.

and a necessary condition for ensuring the acceptance of public policies.

These three areas of focus revolve around climate change and the goal of decarbonising societies. The work on biodiversity conservation is an essential element that is sometimes aligned with the objective of achieving net zero but sometimes conflicts with it. Knowledge on this subject is still patchy and inadequate for its complexity and moving forward requires a considerable effort to break down the data. While we know how to make linked climate and macroeconomics models with varying degrees of credibility, integrating ecosystems and the economy requires a level of granularity that is unattainable given the current state of not only information systems but also modelling capabilities. In just under four decades, the IPCC has advanced climate modelling. It is now close to being able to anticipate the main aspects³ of local impacts of climate change. The work of anticipating the evolution of ecosystems and their interaction with human societies is barely touched upon today.

These three focus areas are the topics addressed by Selma Mahfouz and Jean Pisani-Ferry's report entitled *The Economic Implications of Climate Action* (Pisani-Ferry & Mahfouz, 2023), which also takes biodiversity into consideration. By including many authors, particularly within the French government, the drafting of that report prompted summation work regarding the methodological, theoretical and empirical framework for the environmental transition and its consequences. The three articles published by *Economie et Statistique / Economics and Statistics* stem directly from these contributions and provide elements of answers for the three focus areas mentioned.

The article by **Didier Blanchet** and **Craig Pesme** (Blanchet & Pesme, 2024) develops an original, modelled framework that makes it possible to discuss the practical measurement of well-being and its evolution and is directly in line with the third focus area. The article excludes questions relating to redistribution by limiting itself to a representative individual. The difficulty raised in this simplified framework justifies the approximation, but one can only hope that such limitations will be removed in the near future. The first point made by Blanchet and Pesme is that the measurement for well-being proposed by the national and social accounts, namely disposable income deflated using a chained price index, may be relevant when prices are the lever used to achieve the transition trajectory. In

this case, with a few details relating to pathway dependence caused by the chained indices, it is possible to use disposable income as a proxy for the evolution of well-being and thus to continue to talk about the evolution of purchasing power. This does not take away from the many criticisms made in relation to this indicator, some of which are acute in the transition. For example, taking into account collective expenditure, individualisable non-monetary elements (health) or non-individualisable non-monetary elements (the state of nature) requires specific measures to build an expanded income, some of which are difficult to systematise for regular output. Another difficulty, one that is particularly acute when analysing profound changes, is that price indices are blind to the introduction of new goods. This problem is not new and is at the heart of the difficulty experienced in analysing innovation in national accounts (pointed out by many authors). Without new assumptions it is difficult to quantify the benefit of a new product. The environmental transition cannot avoid this difficulty, unless we take the view that the green goods that replace brown goods are highly similar or interchangeable and the price (of the green goods relative to the brown goods) represents the loss of utility for the consumer fairly well.³

However, the contribution made by Blanchet and Pesme's article is not a reiteration of these known aspects. If the transformation of society takes place through prohibitions or standards, rather than prices, the concept of a deflator loses its ability to measure well-being. There is a price equivalent to constraint, but quantifying that price requires a level of work that puts this equivalence beyond the reach of national accountants. An alternative is equivalent income, a concept developed over the last few decades by Marc Fleurbaey or Didier Blanchet (Blanchet & Fleurbaey, 2020, 2022; Fleurbaey, 2016; Fleurbaey & Blanchet, 2013). Using equivalent income makes it possible to simply address questions regarding constraint and to find equivalence between price and standard. However, a difficulty is becoming apparent: the radical transformation of society to respond to the climate emergency can be understood as a change in preferences. This change can be before the transition and be the driver of it, it can be after it, taking place after the fact and once the change of social values affected by the transformation

3. These main aspects include average temperatures over the year, the probability of extreme temperatures, the probability of extended periods of extreme temperatures, average precipitation and elements relating to precipitation distribution and extreme weather events (storms).

has been completed or it can evolve alongside the transformations. This change in preferences can come out of the blue or it can be driven by nudges, public policies or education. The change in preferences opens up dizzying prospects for the analysis of well-being, almost nullifying measurement attempts and casting doubt on any measurements that will be proposed. Equivalent income does not provide a miracle solution to changes in preferences, but it does make it possible to geometrically determine the consequences. Blanchet and Pesme's work does not provide a simple roadmap for economic and social accounting, but it does make it possible for the accounts to avoid stating inaccuracies during the transition.

The article by **Miquel Oliu-Barton, Aude Pommeret, Alice Robinet, Katheline Schubert** and **Mathilde Viennot** specifically explores the question of changes in preferences and the public policy levers that can bring them about. While Blanchet and Pesme attempt to incorporate the change in preferences into the framework for the quantification of variations in well-being, the aim of Oliu-Barton *et al.* (2024) is completely in line with the second focus area. The abstract notion of changes in preferences is reduced to the more operational notion of sufficiency, which is identified as one of the major tools of the transition (Saheb, 2021). Using the four types of sufficiency defined by the French association négaWatt (structural, dimensional, usage and cooperative sufficiency), the authors focus on identifying the existing literature to find the basis for a change in preferences and identify how to bring it about through public policies.

The subject is off the beaten track of mainstream economics, in which preferences are an unobserved concept that relates to the sovereign free will of individuals. Behaviours are observed and it is possible to associate them with preferences from which those behaviours logically follow. The real assumption made by economists is, in fact, in the consistency of these preferences, at least locally, which allows for empirical identification and behaviour predictions. This view has, of course, been widely criticised, both inside and outside the field of economics. Reducing rationality to a constrained maximisation of preferences and imposing an unambiguous axiom on preferences is a convoluted and weak way of addressing the rationality of social individuals. Imagining the change in preferences is a roundabout way of bringing these stronger concepts of rationality into the field of economics.

Alternatively, following the work of Richard Thaler and Cass Sunstein (Thaler & Sunstein, 2009), it can be postulated that the decisions taken are not a direct reflection of preferences but that cognitive biases divert the actual decision away from the optimal decision. This does not reverse epistemological tautology but it allows a more direct formal representation of the ability of nudges to change people's choices and bring them closer to rationality (what is sometimes called paternalistic liberalism). Simple models of these cognitive biases have been proposed, with the advantage of being able to retain the usual models and introduce the public policies altering cognitive biases (generally in the sense of reducing the extent of the bias).

In either case, we are far from being able to "quantify" these changes in preferences and thus fully justify the use of this approach of relying on preferences – increased by their dynamics – in a modelled framework. The work of Oliu-Barton *et al.* is in line with this perspective and, starting from a reference model, shows what sufficiency policies bring to the public policy toolbox. One of the arguments advanced in the article is that it is not necessary to levy a tax, and possibly redistribute it afterwards, in order to change behaviour. It is therefore a way of circumventing resistance to tax policies, for which it is very difficult to provide transparency and ensure that they are accepted and sustainable over time. In addition to the fact that sufficiency does not mean decline – avoided consumption is transferred to other areas and sufficiency allows for more efficient consumption in terms of greenhouse gas emissions – one of the important findings of the article is the equivalence between a redistributed tax and a change in preferences. This finding raises an immediate issue: taxation and redistribution of the tax collected pose three distributive problems (exposure to the tax, construction of the tax base and the redistribution base). Introducing the heterogeneity of agents into the model and producing empirical identifications of these "dynamics of preferences" is undoubtedly an achievable goal. This would make it possible to answer the question "is it possible, through the use of sufficiency policies, to ask questions around sharing the burden in a different manner?".

The article by **Florian Jacquetin** and **Gaël Callonnec** (Jacquetin & Callonnec, 2024) follows this line of thinking. They seek to assess climate damage using a macro-sectoral method and by compiling different estimates taken from the literature in each sector – using a combination of highly diverse methods.

Nevertheless, the authors strive to produce a coherent and comprehensive diagnosis. They diverge from damage assessments such as that produced by the JRC (Joint Research Centre of the European Commission, Feyen *et al.*, 2020). They do not seek to estimate well-being, from a cost-benefit analysis perspective, but they construct a macroeconomic scenario, providing information on, among other things, the trajectory of GDP, using its usual definition, as well as on the trajectories of public finances or the labour market. The exercise is one of a different nature, performed from an applied perspective and seeking to inform public policy. This work thus joins that of the Network for Greening the Financial System (NGFS), for which forward planning is essential for assessing the stability of the financial system in the future.

Forward planning is unsatisfactory for several reasons that the work of Jacquetin and Callonnec is unable to avoid:

a. Extrapolation based on the past, especially outside the intervals observed in the past, is blind to phenomena that are unfortunately highly probable. The acceleration of trends through positive feedback loops leads to underestimating changes, whereas negative feedback loops lead to exaggeration. The combination of the two errors can lead the economic system to states that are difficult to accept and far removed from what extrapolation produces. The simple construction of a trend scenario thus assumes that the distribution of errors is sufficiently “normal” (does not conform to the Cauchy distribution, for example) and that the expectation of state variables can be calculated, or that the system is sufficiently deterministic for a trend to have a meaning. The decision by Jacquetin and Callonnec not to take into account transition or adaptation policies illustrates the direction and limits that can be attributed to an extrapolated trajectory: extrapolation is not a trivial exercise because the system under consideration has many state variables that needed to be chosen, but the extrapolated trajectory is not a probable future. It serves only as a reference for establishing answers that will change the future of the system;

b. Modelling error, that is to say forgetting, during the construction of the scenario, dimensions that are nevertheless key factors in determining the dynamics of the system, leads to overlooking certain phenomena and state variables that are not observed. The anticipated

trajectory is thus constrained to one plane, while it develops in a three-dimensional space. The decision by Jacquetin and Callonnec to carry out a sectoral analysis is an input, compared to a more aggregated analysis such as the one carried out in Nordhaus’ DICE model (Nordhaus, 2019). This input allows the incorporation of sector-specific assessments using specific data and analyses of trends and mechanisms specific to each sector. Tourism does not respond to the same determining factors as agriculture and involves radically different approaches, from taking into account the impact of the climate to macroeconomic consequences. By escaping the need for a unified framework, the analysis can be refined and made more credible. However, choosing the sectoral dimension results in overlooking the geographical dimension; yet by making areas less attractive or even unliveable, climate change can induce internal migration and spatially differentiated changes in prices. In turn, this change in spatial structure can be a decisive factor for the macroeconomic trajectory and may require specific public policies. One can dream of combining the two dimensions and of being able to link their dynamics with the global dynamics, thus revealing transmission and feedback channels that are not very intuitive but are significant – it is the purpose of modelling to produce such analyses. However, this dream is costly in terms of computing capacity and information acquisition, to the point that it is inaccessible at present. If the work of Jacquetin and Callonnec tells us anything, it is that we need theoretical guides to enable us to allocate our limited applied modelling resources to the phenomena and dimensions that are critical in anticipating the consequences of climate change.

Informing Public Choices

Economie et Statistique / Economics and Statistics is aimed at contributing to the economic and social debate by providing analyses (...) accessible to readers not necessarily specialists on the topics or methods implemented in articles. Undeniably, the publication of these three articles is a useful and welcome contribution to inform public choices during the transition. The topics addressed by the Pisani-Ferry Mahfouz report are reflected in a more rigorous and yet accessible manner here. However, the field is far from exhausted and one can only hope that each issue to come will succeed in contributing at least as much as this one to the challenge of the century. □

BIBLIOGRAPHY

Articles of the thematic section

Blanchet, D. & Pesme, C. (2024). Costs and Co-Benefits of Climate Transition Policies: How Accurately Will They Be Measured by Standard of Living and Well-Being Indicators? *Economie et Statistique / Economics and Statistics*, 543, 3–20 (this issue).

Jacquetin, F. & Callonnec, G. (2024). Macroeconomic Impact of Climate Damage in France. *Economie et Statistique / Economics and Statistics*, 543, 39–64 (this issue).

Oliu-Barton, M., Pommeret, A., Robinet, A., Schubert, K. & Viennot, M. (2024). Chosen Energy Sufficiency: Preference Shocks and Behavioural Biases. *Economie et Statistique / Economics and Statistics*, 543, 21–37 (this issue).

Other references

Blanchet, D. & Fleurbaey, M. (2020). Building Indicators for Inclusive Growth and its Sustainability: What Can the National Accounts Offer and How Can They Be Supplemented? *Economie et Statistique / Economics and Statistics*, 517-518-519, 9–24. <https://doi.org/10.24187/ecostat.2020.517t.2020>

Blanchet, D. & Fleurbaey, M. (2022). Values, Volumes, and Price-Volume Decompositions: On Some Issues Raised (Again) by the Health Crisis. *Economie et Statistique / Economics and Statistics*, 532-33, 71–88. <https://doi.org/10.24187/ecostat.2022.532.2072>

Bretschger, L. & Pittel, K. (2020). Twenty Key Challenges in Environmental and Resource Economics. *Environmental & Resource Economics*, 77(4), 725–750. <https://doi.org/10.1007/s10640-020-00516-y>

Castro e Silva, M. & Teixeira, A. C. (2011). A bibliometric account of the evolution of EE in the last two decades: Is ecological economics (becoming) a post-normal science? *Ecological Economics*, 70(5), 849–862. <https://doi.org/10.1016/j.ecolecon.2010.11.016>

Costanza, R., Howarth, R. B., Kubiszewski, I., Liu, S., Ma, C., Plumecocq, G. & Stern, D. I. (2016). Influential publications in ecological economics revisited. *Ecological Economics*, 123, 68–76. <https://doi.org/10.1016/j.ecolecon.2016.01.007>

Djiriguian, J. & Sémécurbe, F. (2019). Fifty Years of Abstracts in the Journal *Economie et Statistique*. *Economie et Statistique / Economics and Statistics*, 510-511-512, 7–11. <https://doi.org/10.24187/ecostat.2019.510t.1999>

Fleurbaey, M. (2016). *Equivalent Income*. Matthew D. Adler & Marc Fleurbaey (dir.), Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199325818.013.15>

Fleurbaey, M. & Blanchet, D. (2013). *Beyond GDP: Measuring Welfare and Assessing Sustainability*. <https://doi.org/10.1093/acprof:oso/9780199767199.001.0001>

Heckman, J. J. & Moktan, S. (2020). Publishing and Promotion in Economics: The Tyranny of the Top Five. *Journal of Economic Literature*, 58(2), 419–470. <https://doi.org/10.1257/jel.20191574>

Feyen, L., Ciscar, J., Gosling, S., Ibarreta, D. & Soria, A. (2020). *Climate Change Impacts and Adaptation in Europe*. JRC Publications Repository, 13 may 2020. <https://doi.org/10.2760/171121>

Laffargue, J.-P., Malgrange, P. & Morin, P. (2012). Préface : La modélisation macroéconomique : continuités, tensions. *Economie et Statistique*, 451-453, 11–20. <https://doi.org/10.3406/estat.2012.9735>

Nordhaus, W. (2019). Climate Change: The Ultimate Challenge for Economics. *American Economic Review*, 109(6), 1991–2014. <https://doi.org/10.1257/aer.109.6.1991>

Pisani-Ferry, J. & Mahfouz, S. (2023). Les Incidences économiques de l'action pour le climat. France Stratégie, Rapport. <https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/2023-incidences-economiques-rapport-pisani-5juin.pdf>

Polasky, S., Kling, C. L., Levin, S. A., Carpenter, S. R., Daily, G. C., Ehrlich, P. R., Heal, G. M. & Lubchenco, J. (2019). Role of economics in analyzing the environment and sustainable development. *Proceedings of the National Academy of Sciences*, 116(12), 5233–5238. <https://doi.org/10.1073/pnas.1901616116>

Pottier, A. (2016). *Comment les économistes réchauffent la planète*. Seuil. <https://doi.org/10.3917/l.potti.2016.01>

Richardson, K., Steffen, W., Lucht, W., Bendtsen, J., Cornell, S. E., Donges, J. F., Drüke, M., Fetzer, I., Bala, G., Bloh, W. von, Feulner, G., ..., Weber, L. & Rockström, J. (2023). Earth beyond six of nine planetary boundaries. *Science Advances*, 9(37), eadh2458. <https://doi.org/10.1126/sciadv.adh2458>

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F.S.I., Lambin, E., Lenton, T., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., ..., Crutzen, P. & Foley, J. (2009a). Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society*, 14(2). <https://doi.org/10.5751/ES-03180-140232>

- Rockström, J., Steffen, W., Noone, K. & Persson, Å. (2009b).** A safe operating space for humanity. *Nature*, 461, 472–475. <http://www.nature.com/nature/journal/v461/n7263/full/461472a.html>
- Saheb, Y. (2021).** COP26: Sufficiency Should be First. <https://www.buildingsandcities.org/insights/commentaries/cop26-sufficiency.html>
- Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., Vries, W. de, Wit, C.A. de, Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B. & Sörlin, S. (2015).** Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223). <https://doi.org/10.1126/science.1259855>
- Thaler, R. H. & Sunstein, C. R. (2009).** *Nudge: Improving Decisions About Health, Wealth, and Happiness*. Penguin Publishing Group.
- Visser, W. & Brundtland, G. H. (1987).** *Our Common Future ('The Brundtland Report')*: World Commission on Environment and Development. In: Greenleaf Publishing Limited, 52–55. https://doi.org/10.9774/gleaf.978-1-907643-44-6_12
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