



What do economists teach about climate change? An analysis of introductory economics textbooks

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ABSTRACT

Is the training of economists keeping pace with the growing research on climate change? Is climate change considered a central or a specialized economic topic? This study documents the attention given to climate change in economics by conducting a comprehensive analysis of fifty-seven introductory textbooks. The findings reveal a notable divergence in perspectives across countries and between the domains of Microeconomics and Macroeconomics. These divergences persist irrespective of individual academic standing, underscoring a pronounced schism within the profession regarding the emphasis placed on climate change in economic discourse.

1. Introduction

A systematic analyses of how introductory economics textbooks cover climate change enables us to address two questions. First, it will inform, in general, about whether climate change is treated as a mainstream topic within the economics profession and, more specifically, how much it is considered a basic, central economic problem versus a field topic for those specializing in environmental economics, or for the advanced students in an eligible class of the master program. There is a wide difference between these views. The former regards climate change as a generational challenge that will involve a substantial portion of citizens and decision makers, and its ubiquity requires a widespread awareness in order to face the inevitable economic challenges of mitigation and adaptation that lie ahead. The latter still considers climate change relevant for economists but views it as one of the many important applications of economic reasoning and policy, which will be eventually taken care of by a restricted group of experts designated to tackle the problem. It is, in a sense, orthogonal to the other economic problems, and not instead requiring a substantial re-alignment for most aspects of the society and the economy. Simply bringing up the question has the potential to shape the beliefs of current economics students – who may become future policy-makers and researchers – about the centrality of climate change. While uncovering the causes of climate change has been the domain of natural sciences, tackling the problem

requires the social sciences to get fully involved. An appropriate introduction to the issue will make the upcoming generation of economic and political leaders address it more effectively.

The second question is about the interplay between academic research and teaching on a fast-moving problem such as climate change. The number of scientific papers mentioning climate change in all sciences has steadily increased in the last fifty years, both in absolute and in relative terms (Fig. 1). The attention to climate research has steadily increased also in economics, consider for instance the landmark publication of the *Stern Review* (2006). However, top economics journals have scarcely cover it. Between 1982 and 2019 only 29 documents (= articles, notes, or other types) have been published on climate change in the top-five journals of the profession. In particular, over this period of 38 years, the American Economic Review published 22 documents, with almost a quarter of them authored by William Nordhaus, who received the 2018 Nobel Prize in Economic Sciences (The Nobel Prize 2018). Four documents appeared in the Journal of Political Economy, two in the Review of Economic Studies, and one in Econometrica (Gaeta et al., 2021).

The appearance of climate change science in the agenda of policy makers is conventionally assigned to the US Congress deposition of NASA scientist James Hansen in 1988. Events then happened both in the policy arena starting with the 1992 Kyoto Protocol and the 2015 Paris Agreement, as well as in scientific progress with the intergovernmental

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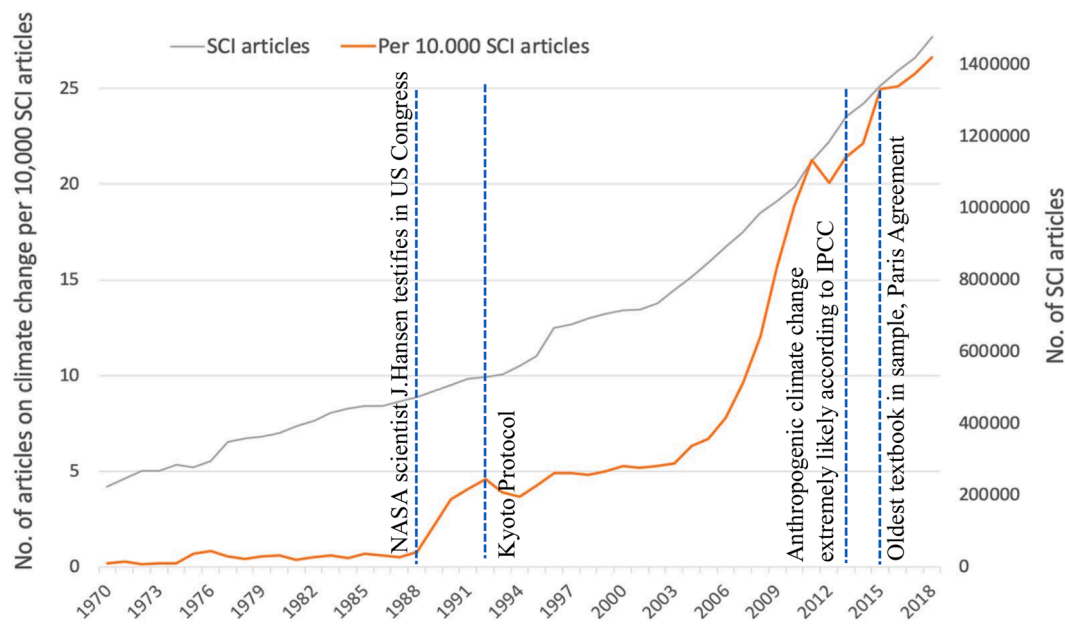


Fig. 1. Trends of research on climate change, 1970–2018.

Notes: Number of all indexed SCI articles (Science Citation Index of Web of Science) from 178 disciplines and number of articles on climate change per 10,000 SCI articles. Source, Klingelhöfer et al. (2020).

panel on climate change (IPCC) providing the state of the art in its reports (McCarthy, 2001). Here we assess how much of these increased attention in science and in policy has percolated into introductory economics textbooks.

We have found three previous attempts to evaluate economics textbooks according to their coverage of climate change. The present paper is not simply an exercise to provide an update of the textbook situation, but it offers a substantial contribution because (a) all previous attempts restrict attention to the US, while we additionally cover France and India, a country from the Global South; (b) the numerosity of our sample is much higher than previous studies; (c) the method of analysis is deeper and more systematic than previous attempts.

Green (2012) analysed fourteen introductory economics textbooks regarding sustainability, not specifically climate change and reports that textbooks devote on average a very limited space to address environment-economy linkages or sustainability (3.2 % of total text). Liu and Szasz (2019) analysed twenty-seven textbooks first published between 2013 and 2018, focusing explicitly on climate change. Their approach is mostly qualitative and relies on the citation of specific passages taken from textbooks to showcase the coverage of climate change. They examine topics such as GDP growth, global inequalities, and Pigouvian taxes, and subsequently investigate whether climate change is mentioned within these sections. Finally, Yoram Bauman in his standupeconomist.com website has assigned grades on a F to A+ scale to textbooks based on their content on climate change. The assessment covers eighteen textbooks, and the methodology is qualitative. Bauman has also tracked the evolution of the rating over time by evaluating textbooks in the years 2010, 2014, 2017, and 2020 (Bauman, 2010, 2014, 2017, 2020).

To sum up, while previous studies have made notable contributions to the understanding of climate change coverage in economics textbooks, our study is innovative in terms of conducting a comprehensive analysis of a larger sample of textbooks, considering multiple countries, employing a quantitative analysis, focusing strictly on climate change topics, and examining the most recent editions.

The paper is organized as follows. In Section 2, we introduce our methodology while in Section 3 we present our results, both in term of space devoted to climate change topics and in terms of content. We conclude in Section 5.

2. Methodology

This section describes the criteria for textbook selection and the methodology employed to compare them. We have analysed 57 textbooks that are widely adopted in introductory courses in undergraduate economics programs (Table 1B in Appendix). We consider university entry-level textbooks for bachelor's degrees that were either introductory or intermediate but excluded those that are advanced. We included roughly the same number of microeconomics and macroeconomics textbooks (28 vs. 24, with 5 covering both).

We focused on textbooks written for US, French and Indian students. A textbook is considered US, French, or Indian if it was specifically written for that country. This means that the authors are affiliated with academic institutions in their respective countries, initially published their textbooks in the original language of that country or devoted some years as instructors in that country. Our book selection samples three different continents, and focuses on countries that are either large, or with textbooks that have a broad outreach beyond their national borders, or both. For instance, US textbooks have been translated into many languages and are used in several countries outside the US. French textbooks can potentially be accessed by 321 million French speakers as thirty-two states recognize French as an official language (Ministère de l'Europe et des Affaires étrangères, 2022). Finally, India is the most populous country on the planet and its textbooks are widely distributed also in South and Southeast Asia.¹

In order to select the most adopted textbooks, we have looked at the best sellers on Amazon given its market leadership in online bookselling

¹ Most of the foreign students come from Nepal, Afghanistan, Bangladesh, Bhutan and Malaysia. Notice that for India, we considered English textbooks only and not those written in Hindi. A textbook is considered US, French, or Indian if it was specifically written for that country. This means that the authors are affiliated with academic institutions in their respective countries, initially published their textbooks in the original language of that country, or devoted some years as instructors in that country. For instance, a textbook sold both in the US and India, which is a top seller book in India, is not included in our list for India if the author is a US citizen working for a US academic institution. For France, we did not consider the translation of American textbooks to avoid duplicates but rather focused on books published firstly in French.

(Amazon Annual Report, 2022, p.10).² Separate rankings for microeconomics and macroeconomics were considered and the time frame are the years 2015–2024, in terms of year of publication or of last revision. We were unable to obtain some of the textbooks, especially those available only in the Indian market. We also added to the list the Team CORE and Neva Goodwin, Jonathan M. Harris, Julie A. Nelson et al.

We performed both quantitative analysis and content analysis on each textbook. For these analyses, only content strictly related to climate change mattered. Indeed, many general economic concepts and tools – such as externalities, future discounting, or the cap-and-trade system – may be useful to study climate change. However, if not directly linked to climate change, these parts are not taken into account in our analysis. For instance, many books discuss, in reference to sulphur oxides, the externalities of pollution, the biodiversity loss due to the alteration of habitats or the cap-and-trade system. Although these issues represent great environmental challenges, they will not be considered as we would like to specifically focus on the biggest environmental challenge that is climate change, a global problem requiring global solutions. For this reason, we will also abstract from content related to local pollution.

We measured the space devoted specifically to climate change issues in three different ways: number of pages, keywords count, and position of the material within the book. Regarding the number of pages, we count in absolute terms or as in percentage of all pages in the book, pages that specifically covered climate change either as main topic, as application of a general concept, or simply as passing mention. We also identified the frequency with which seven keywords are mentioned: Climate, Carbon, GHG, Greenhouse, Global warming, Atmospher*, and temperature.³ Finally, we considered the order of presentation of climate-related material within the book, in terms of median position: a textbook front-loaded with climate change content is different than one that relegates everything to a final chapter or to an appendix with extra material.

More in detail, to calculate the number of pages devoted to climate change we first have identified and sorted the textbook material according to the following three categories depending on how the material has been presented in the textbooks:

A. Parts centring on a climate change issue without linking it other concepts; usually found when talking about the science of climate change. In addition, parts about using climate-related issues as an illustration of a broader issue; typically, carbon pricing shows up when

Table 1
Grid for the content analyses.

Economics of climate change	Climate science
E1: Mitigation as a social dilemma	S1: Greenhouse effect
E2: Carbon pricing	S3: Future scenarios of temperature increases
E3: Discounting in reference to climate change	S4: Impacts on Earth's systems
E4: Inequality in reference to climate change	S5: Impacts on economic and social systems
E5: Social Cost of Carbon and IAMs	
E6: Persistency & irreversibility in reference to climate change	
E7: Climate decision-making under uncertainty	
E8: Climate policies	
E9: Behavioral issues in reference to climate change	
E10: Adaptation and geoengineering	

introducing externalities, or climate mitigation when presenting social dilemmas.

B. A brief passage, usually limited to a keyword or a line, which mostly refers to passing mentions of “climate change” or “global warming”; the simple presence of a keyword would not suffice. In addition, a mention of climate change topics in a section title, in a question or in an exercise at the end of a chapter.

C. A table, box or graph with content about climate change.

The next step has been to calculate a weighted sum of all components, as follow: *Number of pages devoted to climate change* = $A + 0.1 * B + 0.5 * C$.⁴

Following the identification of the parts covering climate change, we proceeded with a rigorous and systematic analysis of the content of each book. We have built a list of 15 topics that capture different aspects of climate change and checked whether each of this topic is present in the textbooks (See Appendix A). As listed in Table 1, the topics are divided into two clusters, one about natural sciences (coded from S1 to S5) and the other about impact on humans (E1-E10).

3. Results

In this section, we first look at how much space textbooks in our sample devote to climate change topics and we then provide a content analysis by exploring what is covered and in which way it is done.

3.1. Space devoted to climate change

We start our analysis by looking at how much space textbooks in our sample devote to climate change topics in terms of number of pages, percentage of the book material, order of presentation and frequency of keywords mentioned. We will then highlight three main patterns.

On average, a textbook devotes 2.68 pages to climate change topics ($N = 57$).⁵ The variability across books, though, is considerable with a range between 0 and 21.7 pages. We can break down the sample as follow: about 33 % (19/57) devote zero pages, about 25 % (14) one page or less, about 23 % (13) between one and five pages, and 19 % (11) more than five pages.

Given an average book length of 485 pages, the result indicates that in the average textbook 0.55 % of the material concerns climate issues.

² The website has an inbuilt “best sellers” tool that allows us to segment our search based on the category of books we are looking for. We went on Amazon’s websites for each country namely amazon.com for the United States, amazon.fr for France and amazon.in for India. Although the architecture of the website is similar, some differences are to point out in the best- seller tool. For the United States, the path to gather our books was the following: *Books > Textbooks > Business and finance > Economics > Microeconomics. > Best Sellers*. We repeated the same search with macroeconomics as the last criterion. The books were gathered on 14/01/2023 and on 29/01/2023. For France, no “textbooks” criterion appeared, thus making the search broader. The path was the following : *Meilleures ventes > Livres > Entreprise et bourse > Économie > Micro-économie*. We repeated the same search with *macro-économie* as the last criterion. The books were gathered on 20/01/2023. Since the best sellers selection on amazon.fr did not include enough macroeconomics books, we added two more books namely *Macroéconomie en pratique* by Moïse Sidiropoulos, Aristomène Varoudakis and *Fondamentaux - Économie politique 3 - Macro-économie (9e édition)* by Jacques Généreux. These books were selected according to a book search on Amazon on 20/01/2023 using the keywords “*macro économie licence*”. Finally, for India, the path was similar to the one of the United States: *Best Sellers > Books > Higher Education Textbooks > Business and Finance > Economics > Microeconomics*. We repeated the same search with macroeconomics as the last criterion. The books were gathered on 29/01/2023.

³ In French textbooks: Climat* (if not in expression “... climatique”), Carbone/CO2, GES, réchauffement climatique/changement climatique/dérèglement climatique/crise climatique/climate change/global warming, Atmosph*, Température.

⁴ The weights of 0.1 and 0.5 are subjective and have been set beforehand with the aim to approximate the space and attention that those elements capture in comparison to one page of text. The 0.1 weight overvalues the content with respect to the number of words but, especially for a section title, we find it justified in terms of readers’ attention. Similarly for the 0.5 weight: a graph takes usually less than half a page but it draws more attention than the equivalent in text.

⁵ $A + 0.1 * B + 0.5 * C = 1.75 + 0.1 * 4.11 + 0.5 * 1.04$.

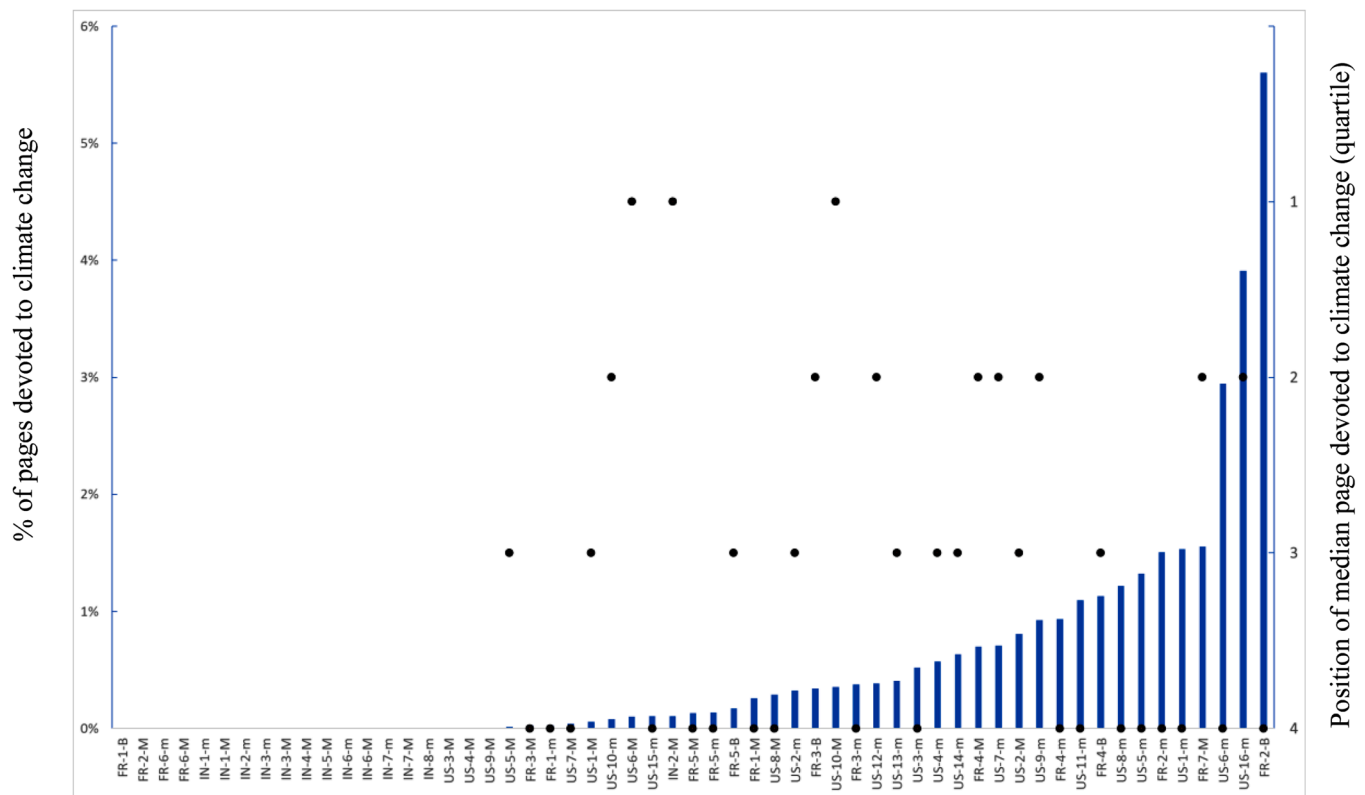


Fig. 2. Climate change coverage in introductory economics textbooks.

Notes: For each textbook ($N = 57$) two statistics are reported. Bars illustrate the % of pages devoted to climate change, ordered from low to high. Dots illustrate the position of the median page devoted to climate change within each textbook, clustered in quartiles. Each book is identified through a code, where: “US” stands for the United States, “FR” for France, and “IN” for India; the last letter is either “M” for Macroeconomics, “m” for Microeconomics, or “B” for coverage of both.

Appendix B provides the data for all textbooks (Table 2B). Longer books devote slightly more space to climate change, on average. This correlation between the number of pages devoted to climate change and the total number of pages of the books is 0.16, which is not statistically significant at a five percent level (Spearman, p -value=0.0972, $N = 57$). In terms of share of pages, longer books devoted relatively lower space to climate change than shorter ones, with a correlation of -0.10 , which is also not statistically significant (Spearman, p -value=0.3539, $N = 57$). For a robustness check, we use as a secondary measure the correlation between book length and the number of keywords mentioned,⁶ although it is a noisy proxy of the number of pages, which has a correlation of 0.21 and statistically significant (Spearman, p -value=0.0058, $N = 57$).

We also coded where the material related to climate change is located within the textbooks. We find that the median page devoted to climate change issues is on average located in the third quartile ($N = 38$). More precisely, for 8 % of books the median page is in the first quartile of the volume and for 47 % of them it is in the last quartile (Fig. 2). We did not expect the median page to be found in the first quartile, as understanding the economics of climate change requires covering some of the standard material. Yet, relegating the material at the end of the textbook, maybe in a special chapter or in a lengthy appendix, may lower the probability to cover it in class because of the limited command of attention with respect to both instructors and students, unless some clear mentioning or graphical illustrations at the opening of the textbook can point toward climate change as a central economic problem. Consider that most current economic instructors

have likely received no training at all about climate change from their introductory classes and may follow the same template, unless the textbook makes the topic initially visible. Raising questions in the early part of the textbook can be an effective strategy even when the answers will be spread throughout the whole book.

After this overview of the results, we report three empirical patterns, starting from the substantial difference between Microeconomics vs. Macroeconomics textbooks.⁷

Finding 1. Microeconomics textbooks devote more than four times more space to climate change topics than Macroeconomics textbooks.

The number of pages devoted to climate change topics were 4.03 in Microeconomics vs. 0.85 in Macroeconomics (Fig. 3). The difference is statistically significant (Mann-Whitney test, p -value=0.0067, $N = 28$, 24). As a share of the total number of pages in a textbook, the percentages are 0.70% vs. 0.18 % and this difference is statistically significant as well. (Mann-Whitney test, p -value=0.0080, $N = 28$, 24). In terms of number of keywords, the average frequencies are 53 and 11, respectively.⁸

⁷ On a different dimension, there exists no systematic correlation between the date of first edition of the book (or revision) and the attention to climate change topics. This may be coming from the short time span considered (2015–2023). In general, more recent books devote slightly less pages to climate change issues, but the correlation of -0.20 is not statistically significant (Spearman, p -value=0.0629, $N = 57$). A similar result emerges when considering the share of pages instead of the absolute number (corr= -0.22 , Spearman, p -value=0.0674, $N = 57$), or the number of keywords (corr= -0.15 Spearman, p -value=0.0767, $N = 57$).

⁸ There is also a category of books with both micro and macro topics ($N = 5$), which has on average 3.88 pages (1.4%).

⁶ In our analysis, we exclude “temperature” from the list of keywords as it appears in too many contexts that are unrelated to climate change. The correlation between the count of five keywords and the number of pages on climate change is 0.9412.

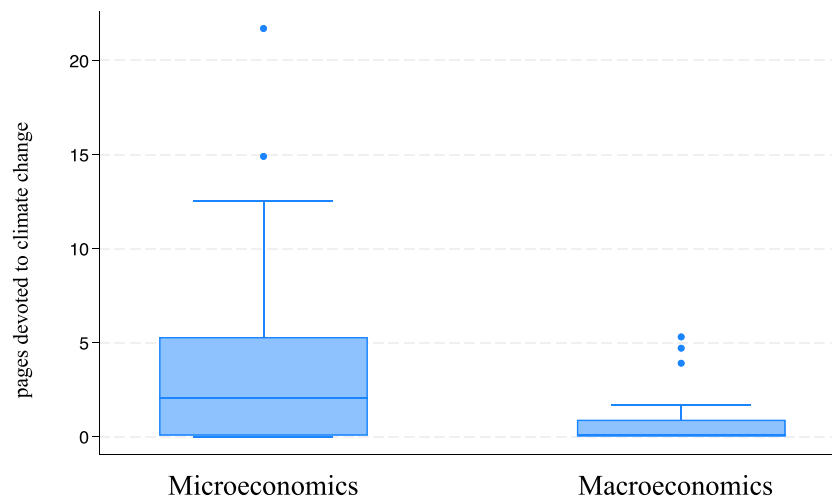


Fig. 3. Climate change coverage: Microeconomics vs. Macroeconomics textbooks.

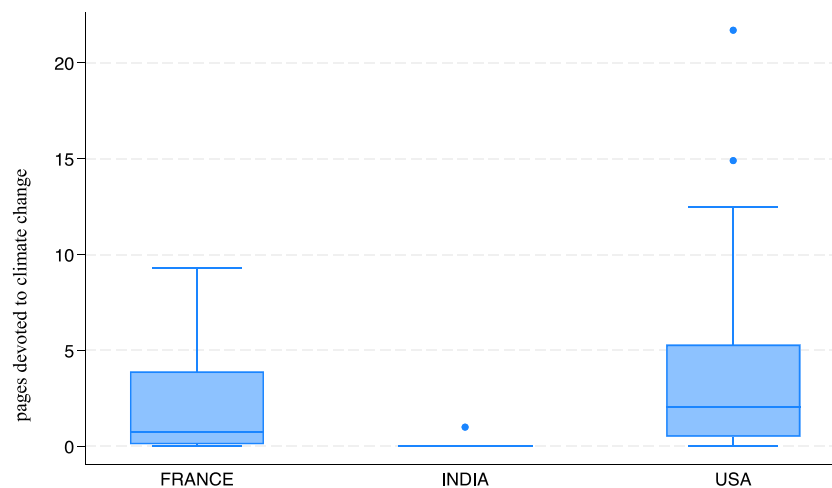


Fig. 4. Climate change coverage by country.

Finding 2. In Indian textbooks, climate change topics are practically absent.

Out of 13 Indian books, only one mentions climate change topics. In other words, there is a clear pattern by country in how much economics textbooks cover climate change: India devotes on average 0.1 pages ($N = 13$), France 2.2 pages ($N = 18$), and the United States 4.31 pages ($N = 26$) (Fig. 4). The corresponding figures in terms of share of the book are 0.01 %, 0.72 %, and 0.71 %, respectively. French textbooks seem to be typically shorter than US textbooks but with a similar share of pages devoted to climate change.⁹ The differences between India and the other countries are statistically significant both in absolute (Mann-Whitney test, p -value=0.0000, $N = 13, 44$) and in relative terms (Mann-Whitney test, p -value=0.0000, $N = 13, 44$). In terms of frequency of keywords per textbook, the average counts are about 2, 20, and 64, respectively. Recall that our classification by country does not properly reflect the state of introductory economics education in that country because typically books originally written for the US are also adopted in France and India.

Finding 3. 45 % of textbooks do not cover the economics of

climate change, while 22 % cover only the topics of carbon pricing, mitigation as social dilemma, or both. About 33 % of textbooks go beyond those climate topics.

We measure academic prestige of textbook authors in two ways, either having on board an author who published at least one article in the top five most regarded economics journals or based on the average ranking of the institution of affiliation of the authors. In general, the relation between academic prestige and space devoted to climate topics is weak.

Finding 4. No clear correlation emerges between the academic prestige of the authors and the space devoted to climate change in a textbook.

In our sample 21 out of 57 textbooks have at least one author that published in a top-five journal.¹⁰ These textbooks dedicate on average 3.77 pages to climate change issues versus 2.04 pages of the remaining ones. This difference is statistically significant (Mann-Whitney test, p -value=0.0272, $N = 21, 36$). Yet, when put into context this global comparison appears weak. First, the share of pages is similar and not statistically significantly different (0.6% vs. 0.5 %, Mann-Whitney test,

⁹ The length of Indian textbooks is not statistically significantly different than in other countries (Mann-Whitney test, p -value=0.5896, $N = 13, 44$). Instead, French books are shorter than US ones. (Mann-Whitney test, p -value=0.0000, $N = 18, 26$).

¹⁰ Journal of Political Economy, Econometrica, American Economic Review, Quarterly Journal of Economics, Review of Economic Studies. The total comprises 9 Macroeconomics textbooks, 12 Microeconomics textbooks, 0 covering both.

p-value=0.0855, $N = 21, 36$). Second, the wide country differences illustrated in Finding 2 calls for a country-by-country comparison given that only two authors out of 31 textbooks outside the US have top-five publications. When we restrict our analysis to the US sample, the comparison flips in sign as the pages devoted to climate change are 3.92 for top-five authors vs. 5.39 pages for non-top five authors. This difference is not statistically significant (Mann-Whitney test, p-value=0.5436, $N = 19, 7$).¹¹

An alternative measure of prestige is the average academic ranking of the institution of affiliation of all authors. We took the current affiliation of the authors and coded it according to the 2022 Shanghai ranking (Shanghai Ranking 2022). In this ranking the best university is number one. Universities that we could not be found in the ranking were arbitrarily assigned a value of 400, which is the lowest present in the list.¹²

In our sample 25 % (14/57) of textbooks have an average ranking of the author affiliations among the top 50 universities worldwide, while 30 % (17) are coded as ranking 400, with the others in-between. Overall, there is a negative correlation between the institutional ranking and the pages devoted to climate change (-0.22) and this is statistically significant (Spearman, p-value=0.0029, $N = 57$). This means that authors from low prestige institutions pay less attention to climate change. This result, however, appears as a consequence of Finding 2: it is driven by the Indian sample, which has, with one exception, authors with institutional ranking at 400 and extremely low climate change coverage. When restricting to the US, the correlation is 0.002, which is positive although not statistically significant (Spearman, p-value=0.8723, $N = 26$).

3.2. Content analysis

In addition to a quantitative analysis of how much space textbooks dedicate to climate change topics, we provide a content analysis by exploring what is covered and in which way it is done. This empirical assessment considers separately topics related to climate science and topics properly dealing with the economics of climate change (see Table 3B in Appendix B for details).

Finding 5. Regarding climate science, 58 % of textbooks do not report any statement (33/57). Some textbooks emphasize and amplify the uncertainties about climate science.

Many textbooks supply as background information a description of what is climate change by reporting natural science statements (about

42 %).¹³ Some authors may have chosen to skip these aspects and focus instead on their core mission and limit themselves to statements strictly within the economic discipline. The analysis of the textbooks suggests that the lack of statements about climate science is generally associated with lack of attention to the climate change topic tout court, rather than being a specific choice to avoid coverage of aspects that are outside the economic discipline. Note that the textbooks that cover the *economics* of climate change but not the *science* of climate change (9 in total) devote on average 0.33 pages overall to the topic of climate change, compared to the 5.73 pages of those textbooks who also mention climate science.

We also analysed the actual wording of scientific statements about climate science. Among climate natural scientists there exists an extremely high level of consensus on the fact that (i) the warming of the global climate is unequivocal, (ii) the mechanism behind it is the greenhouse effect, and (iii) the dominant cause of warming is human activities, in particular because of the burning of fossil fuels (Powell, 2019; Sills, 2010). Hence, ambiguous statements in a textbook do not reflect the current state of scientific knowledge and they are particularly damaging in university textbooks because they lend credibility to misconceptions regarding climate change, which will predictably shape the views of future leaders and policy makers. What is the position of economics textbooks in this respect? We benchmark the textbooks by relying on the IPCC reports – which summarize the position of the scientific community in agreement with the governments of the United Nation Framework Convention on Climate Change – taking into account that all textbooks have been selected because they are either relatively new or have been recently revised. In each of its periodic reports, the IPCC has made an assessment about where the scientific frontier stands regarding the anthropogenic origin of climate change (Stocker et al., 2014). Its assessments have become more and more certain over time. While the 2001 report considers it “likely,” which indicates a probability between 66 % and 100 %, the 2013 report considers it “extremely likely”, which formally corresponds to a probability above 95 %. All textbooks in our sample have been published or revised two years or more after that IPCC report.

Among the 24 textbooks that mention climate science, we single out 3 that emphasize or amplify uncertainties about climate change. One is Macroeconomics by Mankiw (US-1-M), which is worth noting given that it is the most widely adopted textbook in the US. The book has an extremely limited coverage of climate change. It never discusses climate change properly but rather mentions it three times,¹⁴ and every time it is in order to downplay it or to amplify uncertainties:

“Several centuries ago, astronomers debated whether the earth or the sun was at the centre of the solar system. More recently, climatologists have debated whether the earth is experiencing global warming and, if so, why. Science is an ongoing search to understand the world around us. It is not surprising that as the search continues, scientists sometimes disagree about the direction in which truth lies.” (P.30 in US-1-M and p.29 in US-12-m)

“But there are also studies claiming that humans have not contributed to climate change, and that supply-side economics did not contribute to massive budget deficits.” (P.306 in US-1-M and p.120 in

¹¹ For the US, the shares are 0.5% vs. 1.1% pages, respectively, and the difference is not statistically significant (Mann-Whitney test, p-value=0.5059, $N = 19, 7$). In terms of keywords, globally the value is highest for top-five journal publishers, 54 vs. 26, with a statistically significant difference (Mann-Whitney test, p-value=0.0039, $N = 21, 36$); for the US, we have 58 vs. 83 and no statistically significant difference (Mann-Whitney test, p-value=0.6856, $N = 19, 7$).

¹² For France, the undergraduate system is different, and many professors are working in *classes préparatoires aux grandes écoles*, considered as undergraduate education but physically located in high schools. The ranking of the *classes préparatoires aux grandes écoles* (CPGE) are made based on the number of students admitted in prestigious Grandes Ecoles. In our case, we are only interested in high-level business schools (*Grandes écoles de commerces*) since entering one of them represents the main objectives of students studying economics in CPGE. Following the ranking of l'Etudiant (a French media group focusing on education), we could gather the ranking of the best CPGE (L'Etudiant 2023). For each of them, we divided 100 by the proportion of students accepted in the top three *grandes écoles de commerce*, thus giving us a ranking of each CPGE that we could integrate into the ranking of our universities. Again, for CPGE not in the ranking, we assigned them the value of 400. Finally, for all affiliation not linked to either university of CPGE, we assigned them a value of 400. Once having the ranking of every author, we computed the average ranking of the authors who wrote the same book in order to obtain the institutional level of each book.

¹³ This result is amplified by India: when excluding Indian textbooks, the percentages of textbooks with statements about climate science is 55% (24/44).

¹⁴ Mankiw's Microeconomic textbooks US-12-m devotes more space to climate change but still puts an emphasis on uncertainties, as in the following passage: “Cars cause smog. Moreover, the burning of fossil fuels such as gasoline is widely believed to be the primary cause of global climate change. Experts disagree about how dangerous this threat is, but there is no doubt that the gas tax reduces the threat by discouraging the use of gasoline. (Mankiw Micro US-12-m, p.196). The statement that the burning of fossil fuels is the primary cause of global climate change is not a belief, but a scientific fact that has been proven better than most, if not all, of the empirical statements about economic phenomena of introductory economics textbooks.

US-12-m)

“Environmentalists are condemning the deal too [the Trans-Pacific Partnership], mostly because it doesn’t crack down on climate change. But this is, after all, a trade deal; talks on global warming are already underway.” (p.372–3 in US-1-M)

The first passage is under the subsection title of “Differences in Scientific Judgments” but touches uncertainties that have already been resolved. Everybody knows that uncertainties have been resolved about the centre of the solar system but not everybody among our economics students knows that about climate change. One reason is because of the fast progress that climate science has made in the last decades. Another reason is because of the disinformation campaigns organized by fossil fuel interests (Supran et al., 2023). The passage about “scientists sometimes disagree” will have a predictable effect: keeping alive the false belief about uncertainties or scientific debates going on about anthropogenic climate change. This same passage is present also in the Microeconomics textbook of Mankiw (p.29 in US-12-m).

The second textbook that we want to single out is McEachern, Microeconomics (US-1-m). It offers an extensive discussion of climate change, mostly within the context of market-based solutions. The very first mention of climate change, though, is a statement that « the science is not yet fully resolved »:

“Though the science is not yet fully resolved, fossil fuel used to power the likes of automobiles and electricity generators produces carbon dioxide, which mixes with other greenhouse gases that could contribute to climate change.” (McEachern micro, US-1-m, p.287)

The fact that burning fossil fuel produces carbon dioxide, which in turn contributes to climate change is not any more up to scientific debate. In this instance, a single expression can compromise the credibility of everything that is written thereafter.

Finally, the Microeconomic textbook of Hubbard (US-7-m) devotes to climate change a number of pages above the average in our sample but does so with an insistence on uncertainties, as if that should be the main message the students of economics should acquire. This is achieved through a subtle but systematic use of language that downgrades the scientific status of climate claims and policies.¹⁵

Some general considerations are in order. First, our assessment is based on the subjective reading of very few expressions and sentences and, in some cases, misinterpretations are possible. One should consider, though, that the average economics textbook devotes little space to climate change, so there is not much more material to ground our assessment. Second, while the scientific debate about the anthropogenic origin of climate change is settled, there is an active political controversy going on in society about it. Students most likely come to the classroom having had exposure to the non-scientific debates in the media and will look for clarity and direction. These textbook statements should be read

¹⁵ Quotes from US-7-m with words in italics not in the original textbook. “The burning of fossil fuels like oil and coal generates carbon dioxide, CO₂, a greenhouse gas that most scientists *believe* contributes to global warming. (p.147) (...) Nevertheless, *most* scientists are *convinced* that the recent warming trend is not part of the natural fluctuations in temperature but is primarily a result of the burning of fossil fuels, such as coal, natural gas, and petroleum. (p.164) (...) If greenhouse gases continue to accumulate in the atmosphere, according to some estimates, global temperatures could increase by 3 degrees Fahrenheit or more during the next 100 years. Such an increase in temperature *could* lead to significant changes in climate, which *might* result in more hurricanes and other violent weather conditions, disrupt farming in many parts of the world, and lead to increases in sea levels, which *could* result in flooding in coastal areas. (p.164) (...) First, there are *disagreements* about how rapidly global warming is likely to occur and what the economic cost will be.” (p.164)

in such perspective.¹⁶ Third, granted that we want to interpret the content of academic textbooks as scientific statements and not as political statements, it is puzzling that some academic authors feel the need to single out the scientific status of climate change statements because as economists we should be aware that the scientific status of essentially all empirical statements about economic phenomena is lower than that of the (i), (ii), (iii) statements reported above about climate change.

To place Finding 4 into context, one must recall the massive ongoing effort of special interests in the last decades to influence public opinion and to delay mitigation actions through the capturing of the media, policy makers, and academics.¹⁷ A prominent strategy of fossil fuel interests has been to move the attention away from climate change. Amplifying uncertainties has been another one together with personal attacking climate scientists (Sills, 2010: «We are deeply disturbed by the recent escalation of political assaults on scientists»). Half-statements and ambiguous statements on climate science by economists are not in line with the current status of science and do nothing to help students and policy makers who are exposed to the disinformation campaigns from vested interests.

Overall, we coded textbook on ten different topics E1-E10 in the economics of climate change (see Section 2).¹⁸ The most frequent topics in Microeconomics are carbon taxes (E2, 75 % of all Microeconomics textbooks) and social dilemmas (E1, 43 %). Topics are slightly different in Macroeconomics, which favour inequalities in reference to climate change (E4, 17 %), mitigation policies (E8, 17 %), as well as social dilemmas (E1, 17 %).

In the textbooks, the interplay between economic research and teaching about climate change can happen at various levels. The most basic is to leverage the standard introductory toolkit of economics to illustrate climate change, with no need for the instructor to open a new ad-hoc chapter detached from the usual curriculum. At this level, climate change fits in as an application after presenting economic concepts, such as externalities or the prisoner’s dilemma. Instructors may also do the reverse and employ climate change to motivate to students some basic economic concepts.

Another level is to present introductory concepts in dialogue with the research frontier. A set of textbooks covers for instance discounting (E3, 14 %) and uncertainty (E7, 7 %) in reference to climate change. Those are well-known, introductory topics that can be applied transversally to a variety of economics situations. Presenting them in the context of climate change, though, offers the opportunity to discuss applications to aspects such as very long-term discounting across generations, or decisions under limited knowledge about probability distributions. This may stimulate updating textbooks with state-of-the-art research in areas where recent advances have been made, or to discuss how to adapt the basic approach of economics in order to frame the climate problem.

Less frequently, we also observe a level of interplay between economic research and teaching about concepts that usually do not find their ways into the syllabus of introductory economic classes but are key to understand the climate challenge and could also be of general interest for many other economic phenomena. One example is the persistency of greenhouse gas pollution (E6, 7 %). Persistency over time transforms a

¹⁶ In this respect, Olivier Blanchard and Daniel Cohen provide an example of clarity and direction: «The combined increase in CO₂ emissions and global temperature is an undeniable fact that only eccentrics (unfortunately, they exist) dispute. This global warming poses a major problem and we need to reduce CO₂ emissions to limit it [translated from French]» (p. 309, FR-4-M)

¹⁷ Oddly enough, one textbook contains a box with a long interview to oil company high-ranking staff, Gérard Moutet, Vice-president of the climate energy, sustainable development, and environment at Total (Johanna Etner et al., Microéconomie, FR-3-m, p. 313).

¹⁸ When excluding Indian textbooks, the percentages of Finding 5 are (N = 42): 33% of textbooks do not cover any topic, while 26% only carbon pricing, mitigation as social dilemma, or both; in 41% other topics are also covered.

Patrick Villieu	FR-1-B
Moise Sidiropoulos, Aristomène Varoudakis	FR-2-M
Jacques Gagnéux	FR-6-m
Jacques Gagnéux	FR-6-M
Pradeep Kumar Mehta and Meena Singh	IN-1-m
D.N Dwivedi	IN-1-M
Sujatra Bhattacharya	IN-2-m
H.L Ahuja	IN-3-m
Dr. M.L.Seth	IN-3-M
Soumyen Sikdar	IN-4-M
T.R Jain and V.K Ohri	IN-5-M
T.R Jain	IN-6-m
Sunayini Parchure	IN-6-M
Rakesh V. Vohra	IN-7-m
Dr. Deepashree	IN-7-M
D.N Dwivedi	IN-8-m
Stephen D. Williamson	US-3-M
Lee Coppock, Dirk Mateer	US-4-M
Andrew Abel, Ben Bernanke, Dean Croushore	US-9-M
François Etner	FR-1-m
Marc Montoussé et al.	FR-3-M
R. Glenn Hubbard, Anthony Patrick O'Brien	US-5-M
Tyler Cowen, Alex Tabarrok	US-7-M
Marc Montoussé et al.	FR-5-m
Lee Coppock, Dirk Mateer	US-10-m
Cyriac Guillaumin	FR-5-M
Charles I. Jones	US-6-M
Claude-Danièle Échaudemaison et al.	FR-3-B
Goolsbee, Levitt, Syverson	US-15-m
Eric Berr	FR-1-M
Françoise Vasselín	FR-5-B
H.L Ahuja	IN-2-M
N. Gregory Mankiw	US-1-M
R. Glenn Hubbard, Anthony Patrick O'Brien	US-7-m
William A. McEachern	US-1-m
Karl Case, Ray Fair, Sharon Oster	US-8-M
Johanna Etner, Meglena Jeleva	FR-3-m
Daron Acemoglu, David Laibson, John List	US-2-m
Campbell McConnell, Stanley Brue, Sean Flynn	US-10-M
N. Gregory Mankiw	US-12-m
Campbell McConnell, Stanley Brue, Sean Flynn	US-13-m
Emmanuel Buisson-Fenet, Marion Navarro	FR-4-m
Jeffrey Perloff	US-3-m
Louis-Samuel Pilcer, M. Ruimy, J. Smadja	FR-7-M
Olivier Blanchard et Daniel Cohen	FR-4-M
Hal.R Varian	US-14-m
Tyler Cowen, Alex Tabarrok	US-9-m
Karl Case, Ray Fair, Sharon Oster	US-11-m
Paul Krugman, Robin Wells	US-2-M
Nicolas Eber	FR-2-m
Christine Dollo et al.	FR-4-B
Paul Krugman, Robin Wells	US-4-m
Hervé Charmettant et al.	FR-2-B
Robert S. Pindyck, Daniel L. Rubinfeld	US-5-m
Eric Chiang	US-8-m
Neva Goodwin et al.	US-6-m
The Core Econ Team	US-16-m

ABSENT
any reference to climate change

LIP SERVICE
to climate change

AMPLIFY UNCERTAINTIES
about climate change

Climate change coverage is
PRESENT

FAIR OR GOOD
coverage of climate change

Fig. 5. How economics textbooks cover climate change.

Notes: Within each category books are ordered by number of pages devoted to climate change. Categories have been subjectively defined by: number of pages devoted to climate change (0, <=1, any, between 1 and 4, above 4). Each book is identified through a code, where: "US" stands for the United States, "FR" for France, and "IN" for India; the last letter is either "M" for Macroeconomics, "m" for Microeconomics, or "B" for coverage of both. $N = 57$.

situation from static to dynamic: "the atmosphere can be viewed as a bathtub with a very, very slow leak. As long as we keep adding more water (i.e., greenhouse gases) beyond a slight trickle to the bathtub, its level will continue to rise." (P.426 in US-6-m). Robert Pindyck and Daniel Rubinfeld provide an accessible and exhaustive explanation of this dynamic by modelling pollution as a stock:

"Let's focus on pollution to see how the stock of a pollutant changes over time. With ongoing emissions, the stock will accumulate, but some fraction of the stock, d , will dissipate each year. (...) The impact of pollution results from the accumulating stock. Initially, when the stock

is small, the economic impact is small; but the impact grows as the stock grows. With global warming, for example, higher temperatures result from higher concentrations of GHGs: thus the concern that if GHG emissions continue at current rates, the atmospheric stock of GHGs will eventually become large enough to cause substantial temperature increases—(...) it may make sense for governments to adopt policies that would reduce emissions now, rather than waiting for the atmospheric stock of GHGs to become much larger." (P.694–5 in US-5-m)

Finally, few textbooks bring in behavioural issues in reference to climate change (E9, 9 %), mostly in the form of green nudges (p.731 in

US-5-m for instance).¹⁹

4. Conclusions

The motivation for this study has revolved around the question of whether economists teach about climate change in introductory economic classes. Overall, climate change is a marginal presence in all but a few textbooks. What Christine Lagard in her capacity of managing director of the International Monetary Fund called “the greatest economic challenge of the twenty-first century” (Lagard, 2013) obtains on average 0.55 % of space in a sample of 57 introductory textbooks that we have analysed from US, French, and Indian authors, with the majority of our best-selling sample devoting to climate change an average of one page or less out of 485 total pages.

Fig. 5 illustrates the wide variety of approaches to climate change taken in our sample of introductory textbooks. A dividing line that emerges in the profession is between Microeconomics and Macroeconomics, with the latter devoting much less attention to climate change. One unexpected pattern comes from the Indian textbooks, which – with the exception of one author – devote no space at all to climate change. This finding is particularly noteworthy because India is a major polluter and will be hit hard by climate change in the coming decades. Its future ruling class would greatly benefit from having a solid conceptual framework to reason about the climate change and evaluate potential solutions but training about this issue will apparently not come from its

introductory economics textbooks.

CRedit authorship contribution statement

Hugo Charmetant: Writing – review & editing, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Marco Casari:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Methodology, Formal analysis, Conceptualization. **Maria Arvaniti:** Writing – review & editing, Writing – original draft.

Data Availability

Data will be made available on request.

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APPENDIX A: Taxonomy for content analysis

CLIMATE SCIENCE

S1: Greenhouse effect: Any statement linking greenhouse gas emissions and the warming of the planet will be recorded in this section.

S2: Anthropogenic cause: Any statement on human activities as the primary cause of climate change will be recorded in this section. We will also take into account the mention of climate change denial.

S3: Future scenarios of temperature increases: Any statement that temperatures are likely to increase will be recorded in this section.

S4: Impacts on Earth's systems: Any statement about the climate change impacts on the earth's natural system will be recorded under this section. We will not take into account the mention of tipping points as it will be included in section E3.

S5: Impacts on economic and social systems: Any statement linking climate to impacts on human societies and economies will be recorded under this section.

ECONOMICS OF CLIMATE CHANGE

E1: Mitigation as a social dilemma: Any statement mentioning mitigation as a social dilemma will be recorded under this section. This comprehends climate clubs, free-riding and social dilemmas related to climate change. We will also take into account mentions of the Kyoto Protocol and the Paris Agreement.

E2: Carbon pricing: Any statement on carbon taxes or on cap-and-trade systems related to climate change will be recorded under this section.

E3: Discounting in reference to climate change: Any mentions of the Ramsey formula, of the various interpretations of the discount rate for climate change by economists or of a generational conflict due to climate change will be recorded under this section.

E4: Inequality in reference to climate change: Any statement about inequality related to GHG emissions or vulnerability and damage will be recorded under this section.

E5: Social Cost of Carbon and IAMs: Any statement on the Social Cost of Carbon and IAMs will be recorded under this section. We will also include mentions of abatement costs from a cost-benefit analysis point of view.

E6: Persistency & irreversibility in reference to climate change: Any mention of the key terms persistence, delay, irreversibility or more generally stock externality linked with climate change will be recorded under this section.

E7: Climate decision-making under uncertainty: Any statement on risks, ambiguities and deep uncertainties linked to climate impacts, or approaches to reduce the potential damage of uncertainty will be recorded under this section. It is important to note that we are not including climate denial which is covered in S2.

E8: Climate policies: Any statement on policies designed to mitigate climate change will be recorded under this section. We will also take into account the debate on whether or not mitigation is politically viable. It should be noted that the mention of carbon pricing will not be included in this, but in E2. With this criterion, we focus on the policies of mitigation and do not include behavioural policies (covered in E9), or adaptation and geoengineering policies (covered in E10).

E9: Behavioural issues in reference to climate change: Any statement on policies designed to shape individuals' preferences and behaviours will be recorded under this section.

E10: Adaptation and geoengineering: Any statement mentioning adaptation or geoengineering as a way to tackle climate change issues will be recorded under this section.

¹⁹ Only one textbook mentions an economic experiment about climate change, Milinski et al. 2006 (p.306 in FR-2-m).

APPENDIX B: Tables

Table B1

List of economics textbooks analysed.

Code	Authors	Year	Ed.	Publisher
US-1-m	William A. McEachern	2018	6	Cengage Learning
US-2-m	Daron Acemoglu, David Laibson, John List	2019	2*	Pearson
US-3-m	Jeffrey Perloff	2018	8*	Pearson
US-4-m	Paul Krugman, Robin Wells	2018	5	Worth Publishers
US-5-m	Robert S. Pindyck, Daniel L. Rubinfeld	2017	9*	Pearson
US-6-m	Neva Goodwin, Jonathan M. Harris, Julie A. Nelson et al.	2018	4	Routledge
US-7-m	R. Glenn Hubbard, Anthony Patrick O'Brien	2019	7#	Pearson
US-8-m	Eric Chiang	2019	5*	Worth Publishers
US-9-m	Tyler Cowen, Alex Tabarrok	2020	5	Cengage
US-10-m	Lee Coppock, Dirk Mateer	2020	3	W.W. Norton & Co.
US-11-m	Karl Case, Ray Fair, Sharon Oster	2020	13*	Pearson
US-12-m	N. Gregory Mankiw	2021	9	Cengage Learning
US-13-m	Campbell McConnell, Stanley Brue, Sean Flynn	2020	22*	McGraw Hill
US-14-m	Hal R. Varian	2019	9*	W. W. Norton & Co.
US-15-m	A. Goolsbee, S. Levitt, C. Syverson	2019	3	Worth Publishers
US-16-m	The CORE Econ team	2024	2*	Coreecon
US-1-M	N. Gregory Mankiw	2017	8	Cengage Learning
US-2-M	Paul Krugman, Robin Wells	2018	5	Worth Publishers
US-3-M	Stephen D. Williamson	2017	6	Pearson
US-4-M	Lee Coppock, Dirk Mateer	2018	2	W.W. Norton & Co.
US-5-M	R. Glenn Hubbard, Anthony Patrick O'Brien	2018	7	Pearson
US-6-M	Charles I. Jones	2020	5	W.W. Norton & Co.
US-7-M	Tyler Cowen, Alex Tabarrok	2020	5	Worth Publishers
US-8-M	Karl Case, Ray Fair, Sharon Oster	2019	13*	Pearson
US-9-M	Andrew Abel, Ben Bernanke, Dean Croushore	2021	10*	Pearson
US-10-M	Campbell McConnell, Stanley Brue, Sean Flynn	2020	22*	McGraw Hill
FR-1-m	François Etner	2015	4	Dunod
FR-2-m	Nicolas Eber	2016		De Boeck Sup
FR-3-m	Johanna Etner, Meglena Jeleva	2018	3	Dunod
FR-4-m	Emmanuel Buisson-Fenet, Marion Navarro	2018		Armand Colin
FR-5-m	Marc Montoussé, F. Aprahamian, A. Bertrand et al.	2019	3	BREAL
FR-6-m	Jacques Généreux	2021	9	Hachette Education
FR-1-M	Eric Berr	2019		Dunod
FR-2-M	Moise Sidiropoulos, Aristomène Varoudakis	2019		Dunod
FR-3-M	Marc Montoussé, J.-L. Bailly, G. Caire et al.	2019	3	BREAL
FR-4-M	Olivier Blanchard et Daniel Cohen	2020	8	Pearson
FR-5-M	Cyriac Guillaumin	2020		Dunod
FR-6-M	Jacques Généreux	2021	9	Hachette Education
FR-7-M	Louis-Samuel Pilcer, Michel Ruimy, Jérémie Smadja	2022		Ellipses
FR-1-B	Patrick Villieu	2015		Economica
FR-2-B	Hervé Charmettant, Georges Sébastien, G. Vallet et al.	2017		De Boeck Sup
FR-3-B	C.-D. Échaudemaïson, Michel Bernard, R. Chartoire et al.	2017		Nathan
FR-4-B	Christine Dollo, Laurent Braquet, Delphine Dolce et al.	2021	7	Sirey
FR-5-B	Françoise Vasselin	2021	8	ESKA
IN-1-m	Pradeep Kumar Mehta, Meena Singh	2017	2	TaxMann Pub.
IN-2-m	Sujatra Bhattacharya	2019		Oxford University Pr.
IN-3-m	H.L. Ahuja	2019	22	S. Chand Publishing
IN-6-m	T.R. Jain	2020		VK Global Pub. Pvt
IN-7-m	Rakesh V. Vohra	2020		S chand Publishing
IN-8-m	D.N Dwivedi	2023	4	Vikas Publishing
IN-1-M	D.N Dwivedi	2019	5	Mc Graw Hill Educ.
IN-2-M	H.L. Ahuja	2019		Cambridge Univ. Pr.
IN-3-M	M.L.Seth	2021	3	Lakshmi NarainAgarwal
IN-4-M	Soumyen Sikdar	2020	3	OUP India
IN-5-M	T.R. Jain and V.K. Ohri	2021		VK Global Pub. Pvt
IN-6-M	Sunayini Parchure	2021		PHI Learning
IN-7-M	Deepashree	2020	3	Scholar Tech Press

Notes: Each book is identified through a code, where: "US" stands for the United States, "FR" for France, and "IN" for India; the last letter is either "M" for Macroeconomics, "m" for Microeconomics, or "B" for coverage of both. When the edition cell is empty, either the edition was not specified in the textbook or the book was in its first edition. (*) We analysed the international edition. (.) We initially analysed the The CORE Econ Team (2017) The Economy 1.0 (excluding the Capstone chapters), Open access e-text <https://core-econ.org/the-economy/v1/book/text/0-3-contents.html>. We now replace it with the new e-book: The CORE Econ Team (2024) The Economy 2.0: Microeconomics Open access e-text <https://core-econ.org/the-economy/>. # the 9th edition is in press, but we did not manage to obtain it before submitting the article.

Table B2

Space devoted to climate change.

Code	Authors	A	B	C	Pages on climate change	Book length	% of pages	Number of keywords
US-1-m	William A. McEachern	4	3	3	5.8	379	1.53	66
US-2-m	Daron Acemoglu, David Laibson, John List	0.5	9		1.4	435	0.32	28
US-3-m	Jeffrey Perloff	1.7	5	3	3.7	709	0.52	41
US-4-m	Paul Krugman, Robin Wells	6.5	7	3	8.7	688 ^	0.6	139
US-5-m	Robert S. Pindyck, Daniel L. Rubinfeld	8	4	2	9.4	710	1.32	91
US-6-m	N. Goodwin, J.M. Harris, J.A. Nelson et al.	12.2	27.8	4.6	17.2	625	2.8	251
US-7-m	R.G. Hubbard, A.P. O'Brien	2.5	10	2	4.5	635	0.71	114
US-8-m	Eric Chiang	8.5	25	3	12.5	496 ^	1.2	176
US-9-m	Tyler Cowen, Alex Tabarrok	4	5	1	5	540	0.93	88
US-10-m	Lee Coppock, Dirk Mateer	0.5			0.5	620	0.08	27
US-11-m	Karl Case, Ray Fair, Sharon Oster	2.5	11	3	5.1	466	1.09	102
US-12-m	N. Gregory Mankiw		8	2	1.8	466	0.39	43
US-13-m	C. McConnell, S. Brue, S. Flynn	1	3	2	2.3	569	0.40	33
US-14-m	Hal R. Varian	3.5	3	2	4.8	758	0.63	36
US-15-m	A. Goolsbee, S. Levitt, C. Syverson		2	1	0.7	654	0.11	36
US-16-m	The CORE Econ team	11	57	10	21.7	555	3.91	245
US-1-M	N. Gregory Mankiw		3		0.3	526	0.06	5
US-2-M	Paul Krugman, Robin Wells	3.6	2.4	0.8	4.2	656	0.6	72
US-3-M	Stephen D. Williamson				0	695	0.00	3
US-4-M	Lee Coppock, Dirk Mateer				0	667	0.00	8
US-5-M	R.G. Hubbard, A.P. O'Brien		1		0.1	702	0.01	9
US-6-M	Charles I. Jones		6		0.6	601	0.10	8
US-7-M	Tyler Cowen, Alex Tabarrok		2		0.2	519	0.04	7
US-8-M	Karl Case, Ray Fair, Sharon Oster	0.5	7		1.2	415	0.29	29
US-9-M	A. Abel, B. Bernanke, D. Croushore				0	634	0.00	1
US-10-M	C. McConnell, S. Brue, S. Flynn	1	2	1	1.7	479	0.35	18
FR-1-m	François Etner		1	0	0.1	384	0.03	2
FR-2-m	Nicolas Eber	3	5	4	5.5	365	1.51	65
FR-3-m	Johanna Etner, Meglena Jeleva	1	3		1.3	347	0.37	15
FR-4-m	Emmanuel Buisson-Fenet, Marion Navarro	2.5			2.5	268	0.93	26
FR-5-M	M. Montoussé, F. Aprahamian, A. Bertrand et al.		2	1	0.7	367	0.19	1
FR-6-m	Jacques Gagnéux				0	148	0.00	2
FR-1-M	Eric Berr	0.5	3		0.8	310	0.26	6
FR-2-M	Moise Sidiropoulos, A. Varoudakis				0	239	0.00	0
FR-3-M	Marc Montoussé, J.-L. Bailly, G. Caire et al.		1		0.1	401	0.02	1
FR-4-M	Olivier Blanchard et Daniel Cohen	3	2	3	4.7	673	0.70	36
FR-5-M	Cyriac Guillaumin		1	1	0.6	446	0.13	2
FR-6-M	Jacques Gagnéux				0	146	0.00	0
FR-7-M	L-S Pilcer, M. Ruimy, J. Smadja	3.5	4		3.9	251	1.55	38
FR-1-B	Patrick Villieu				0	432	0.00	1
FR-2-B	H. Charmettant, G. Sébastien, G. Vallet et al.	7.5	3	3	9.3	166	5.60	47
FR-3-B	C.-D. Échaudemaïson, M. Bernard, R. Chartoire et al.	0.5	2		0.7	206	0.34	13
FR-4-B	C. Dollo, L. Braquet, D. Dolce et al.	6.5	9	2	8.4	743	1.13	106
FR-5-B	Françoise Vasselin			2	1	587	0.17	0
IN-1-m	Pradeep Kumar Mehta, Meena Singh				0	419	0.00	0
IN-2-m	Sujatra Bhattacharya				0	214	0.00	0
IN-3-m	H.L. Ahuja				0	850	0.00	5
IN-6-m	T.R. Jain				0	284	0.00	1
IN-7-m	Rakesh V. Vohra				0	204	0.00	0
IN-8-m	D.N. Dwivedi				0	646	0.00	5
IN-1-M	D.N. Dwivedi				0	713	0.00	2
IN-2-M	H.L. Ahuja	1			1	933	0.11	12
IN-3-M	M.L. Seth				0	694	0.00	1
IN-4-M	Soumyen Sikdar				0	252	0.00	3
IN-5-M	T.R. Jain and V.K. Ohri				0	280	0.00	2
IN-6-M	Sunayini Parchure				0	302	0.00	0
IN-7-M	Deepashree				0	270	0.00	0
Median value		0	2	0	0.70	479	0.13	9
Mean value		1.6	3.9	1.0	2.48	484.6	0.54	36

Notes: A= pages on climate-related issues, B= occurrences of brief passages, mentions in a section title, questions, exercises, C= tables, boxes or graphs. Number of pages devoted to climate change = $A + 0.1*B + 0.5*C$. Out of the various versions of the CORE team textbooks we also analysed The Economy 1.0 (4.5 pages, 0.61 %, 82 keywords) but did not consider The Economy: A South Asian Perspective. (°) We accessed the online pdf version, which is longer (1026 pages for Chiang, 1513 for Krugman).

Table B3

Climate change topics covered.

Code	Authors	S1	S2	S3	S4	S5	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
US-1-m	William A. McEachern	✓	✓		✓		✓	✓								
US-2-m	D. Acemoglu et al.		✓		✓		✓	✓								
US-3-m	Jeffrey Perloff	✓	✓	✓	✓	✓	✓	✓	✓		✓					✓
US-4-m	Paul Krugman, Robin Wells	✓	✓		✓	✓	✓	✓		✓				✓		✓

(continued on next page)

Table B3 (continued)

Code	Authors	S1	S2	S3	S4	S5	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
US-5-m	R.S. Pindyck, D.L. Rubinfeld	✓	✓	✓	✓	✓		✓	✓			✓	✓		✓	
US-6-m	N. Goodwin et al.	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
US-7-m	R.G. Hubbard, A.P. O'Brien	✓	✓	✓	✓	✓	✓	✓					✓	✓		
US-8-m	Eric Chiang	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓				
US-9-m	Tyler Cowen, Alex Tabarrok	✓				✓	✓	✓								
US-10-m	Lee Coppock, Dirk Mateer	✓						✓		✓						
US-11-m	K. Case, R. Fair, S. Oster		✓	✓	✓		✓	✓			✓					
US-12-m	N. Gregory Mankiw	✓	✓		✓		✓	✓								
US-13-m	C. McConnell et al.							✓								
US-14-m	Hal R. Varian							✓								
US-15-m	Goolsbee, Levitt, Syverson		✓					✓								
US-16-m	The CORE team	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		
US-1-M	N. Gregory Mankiw		✓													
US-2-M	Paul Krugman, Robin Wells	✓	✓	✓	✓	✓	✓			✓				✓		
US-3-M	Stephen D. Williamson															
US-4-M	Lee Coppock, Dirk Mateer															
US-5-M	R.G. Hubbard, A.P. O'Brien															
US-6-M	Charles I. Jones															
US-7-M	Tyler Cowen, Alex Tabarrok															
US-8-M	K. Case, R. Fair, S. Oster						✓					✓				
US-9-M	A. Abel et al.															
US-10-M	C. McConnell et al.							✓								
FR-1-m	François Etner							✓								
FR-2-m	Nicolas Eber	✓			✓		✓	✓	✓			✓	✓		✓	
FR-3-m	J. Etner, M. Jeleva		✓					✓								
FR-4-m	E. Buisson-Fenet et al.	✓						✓								
FR-5-M	M. Montoussé et al.							✓								
FR-6-m	Jacques Généreux															
FR-1-M	Eric Berr		✓													
FR-2-M	M. Sidiropoulos et al.															
FR-3-M	M. Montoussé et al.															
FR-4-M	O. Blanchard, D. Cohen	✓	✓	✓	✓	✓	✓	✓	✓	✓						
FR-5-M	Cyriac Guillaumin														✓	
FR-6-M	Jacques Généreux															
FR-7-M	L-S Pilcer et al.	✓	✓	✓	✓	✓	✓	✓		✓	✓				✓	
FR-1-B	Patrick Villieu															
FR-2-B	H. Charmettant et al.	✓	✓	✓	✓	✓	✓	✓				✓		✓		
FR-3-B	C-D. Échaudemaïson et al.						✓	✓								
FR-4-B	C. Dollo et al.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	
FR-5-B	Françoise Vasselín															
IN-1-m	P.K. Mehta, M. Singh															
IN-2-m	Sujatra Bhattacharya															
IN-3-m	H.L. Ahuja															
IN-6-m	T.R. Jain															
IN-7-m	Rakesh V. Vohra															
IN-8-m	D.N. Dwivedi															
IN-1-M	D.N. Dwivedi															
IN-2-M	H.L. Ahuja	✓								✓					✓	
IN-3-M	M.L. Seth															
IN-4-M	Soumyen Sikdar															
IN-5-M	T.R. Jain and V.K. Ohri															
IN-6-M	Sunayini Parchure															
IN-7-M	Deepashree															
Textbooks that cover the topic		19	19	11	17	13	19	25	7	9	5	6	4	10	5	2

Notes: for category legends see Appendix A and main text Section 2. “✓” denotes that the topic is mentioned in the textbook.

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