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Martina Cioni
Maria Alessandra Rossi

Whither pluralism in economics education? New empirical evidence

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Martina Cioni
Department of Political Economy and Statistics, University of Siena
Maria Alessandra Rossi
Department of Economics, University of Chieti-Pescara

Abstract

In the past two decades, dissatisfaction for the state of introductory economics teaching and standard textbooks has grown among economists, students and employers alike. The collective project under the acronym "CORE" – Curriculum Open-access Resources in Economics – has proposed a prominent alternative, fiercely criticized mostly by heterodox economists, which broadens the range of topics featured in the textbook, but presents them without emphasizing controversy and disagreement within the discipline (an approach their proponents have described as "pluralism by integration"). This paper provides preliminary empirical evidence on the question whether this approach leads to "indoctrination effects" similar to those the literature has highlighted for standard introductory economics courses. It finds evidence of these effects and identifies some students' features associated with them. Overall, the results point to the need for a variant of pedagogical pluralism that places greater emphasis on the comparison of alternative perspectives without falling prey to "paradigm tournament".

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JEL classification: A22, B41, B50

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1. Introduction

In the past decades, introductory economics teaching has been largely based on an approach, condensed in the most widely diffused economic textbooks, whereby a single view of economics and the economy is presented, without emphasizing any disagreement within the discipline (Allgood et al., 2015). In particular, most economic textbooks include the following features: (a) a focus on self-regarding preferences and utility maximization (*homo economicus*); (b) lack of attention for institutional aspects and complex interdependence among economic phenomena; and (c) disregard for distributional, inequality, and fairness aspects of the working of economic systems. This approach has been the subject of vocal criticism by student groups since the early 2000s. Particularly in the aftermath of the latest financial crisis, it has also been more broadly challenged from within the profession, with debates on the reform of economics (e.g. Hodgson, 2009) and of economic education (e.g. Coyle, 2012) stemming from the acknowledgement of the purported inability of economists to foresee and address the most pressing economic issues.

The two debates, on the reform of economics and on the reform of economic education, are fundamentally intertwined, as those believing economics doesn't need radical makeovers haven't advocated any major change to economics teaching, while those more unsatisfied with the present state of the economic discipline have advocated a complete overhaul of textbooks and pedagogical methods. Those that associate themselves to the "orthodox" or "mainstream" perspective of economic inquiry mostly tend to belong to the first camp, while "heterodox" economists tend to belong to the second.

As explained by Bowles and Carlin (2020), a third ground has also emerged, made up by those believing that "*there is nothing fundamentally wrong with the economics that research economists regularly use and that would be familiar to many graduate students; but there is indeed something fundamentally wrong with what we are teaching our first-year students*". This is the stance taken by the collective project that goes under the acronym of CORE – Curriculum Open-access Resources in Economics – an attempt to innovate economics teaching both in terms of content and in terms of delivery method.

The CORE position is connected to two main beliefs. The first is that a "core" of economic concepts that make up the discipline can indeed be identified. The second is that it is possible/useful to introduce a nuanced or "pluralistic" representation of the subject in the first (and sometimes only) economic course of the curriculum. The first belief affects the second, as it entails that pluralism can be introduced without emphasizing substantial disagreement within the discipline. The ensuing approach has been defined by its proposers as "pluralism by integration" (Bowles and Carlin, 2020).

The CORE approach has attracted significant media and institutional attention (see, e.g., Financial Times, 2015; Economist, 2017) and has gained traction in terms of diffusion. By the end of September 2019, there were 271 universities from 53 countries around the world officially using CORE, while over 92,000 users and over 8,500 teachers from 206 countries had registered on the CORE website (CORE-ECON, 2019). At the same time, it has been opposed, sometimes very fiercely, by heterodox economists convinced that there is a need for greater pluralism in both economics and economic education (Andreoni et al., 2016; Thornton, 2016; Mearman et al., 2018).

The relevance of this debate goes well beyond disciplinary boundaries for at least two reasons: a very high number of students of any discipline takes at least an economics course (40% of all US students, according to Siegfried and Walstad, 2014); and higher education institutions where economics is taught are key to human capital development, not least because many decision-makers are economists themselves or are influenced by economic thinking when taking decisions.

This is particularly important in light of the fact that a consistent literature has shown that studying economics may exert an "indoctrination effect" (see, e.g., Ifcher and Zarghamee, 2018), where "indoctrination" has been described in multiple ways. Training in economics has been associated to more selfish beliefs and behaviour in real or experimental contexts (e.g., Marwell and Ames, 1981; Frank et al. 1993; Rubinstein 2006; Bauman and Rose, 2011; Allgood et al., 2012). Other studies have highlighted the effects of introductory economics courses on students' attitudes towards markets/state intervention, emphasizing that students tend to increase their perception of the fairness of the market after taking an introductory economics course and thus to support the kind of acritical "pro-market" attitude that has certainly played a role in the unravelling of the financial crisis (Frey et al., 1993; Cipriani et al., 2009; Haucap and Just, 2010).

The very concrete impacts of economics education make it worth exploring the effects of the new approach to introductory economics that has been most widely debated so far. In particular, in this paper, we make a first attempt at understanding whether exposure to an economic textbook that integrates a number of economic ideas absent or only marginally addressed in standard mainstream economic textbooks (such as other-regarding preferences, the role of institutions and fairness issues), without however stressing the existence of fundamental disagreements within the discipline, exerts a similar "indoctrination effect" to that uncovered for standard textbooks.

Thus, the paper aims to provide empirical evidence on the impact of the introduction of an approach based on what has been called "pluralism by integration", and therefore some new insights on a debate that has mainly been theoretical. In particular, we aim at uncovering whether exposure to a framework inspired by "pluralism by integration" does exert an "indoctrination effect" similarly to exposure to standard mainstream economic textbooks. It is a matter of contention whether that will be the case. On one side, the approach emphasizes the existence of a reliable "core" and thus should be able to convey it effectively (as controversies are presented in most cases as substantially solved). The "core" covers a broader and different set of topics with respect to those normally associated to "indoctrination" phenomena, which suggests "indoctrination" should be unlikely to occur. On the other side, this approach doesn't have the persuasive simplicity of the monist standard and it purposefully refrains from critically contrasting alternative explanations. These features may leave scope for "indoctrination effects", as standard neoclassical concepts may prevail over the other more articulated and nuanced concepts included in the "core". To gain a deeper understanding of the issue, we also consider the extent of students' appreciation for the approach and whether specific student characteristics influence the occurrence of "learning" and "indoctrination" effects.

The paper addresses these questions on the basis of a multinomial logistic analysis of survey results before/after a semester-long introductory economics course taught at the University of Siena, where the CORE textbook (*The Economy*) has been introduced early on. Our empirical strategy allows us to provide a rather nuanced view of the effects of an introductory economics course, as we consider both changes of views occurring in a direction coherent with the main contents of the book ("learning") and changes of views in a direction not coherent ("indoctrination")[1].

We find that, although students report to appreciate the approach, for all of the concepts considered a majority of them does not change view upon studying the textbook and, of those who change view, at least half exhibit "indoctrination" effects, i.e. a shift of students' views towards more "neoclassical" or "liberal-oriented" views. The extent of the effect is different for different economic concepts, being more relevant for some concepts (inequality/pollution and

[1] It should be noted that, for reasons that will be better explained in section 2, we use "learning" and "indoctrination" as two separate concepts, while in the relevant literature they are often conflated (e.g., Frey et al., 1993).

complexity/institutions) than for the concept of other-regarding preferences. Different student characteristics tend to influence the propensity of students to change their mind in a direction coherent with the contents of the course for the different concepts. In particular, we find that the features of the environment in which students were raised as well as students' personal interests (e.g., propensity to be up to date with current events) play a role in mediating the assimilation of the articulated set of concepts presented in the CORE textbook. Also, and interestingly for our research question, we find that previous study of economics (typically on a conventional textbook) reduces the probability of indoctrination with respect to the baseline of "no change of views". We interpret these results as suggesting that, in addition to broadening the set of topics included in the introductory economics course, more should be done to find a balanced way of presenting students with disagreement and controversy within the discipline, without incurring in the drawbacks of "paradigm tournament".

2. The (un)intended effects of introductory economics teaching…

Introductory economics textbooks have shown through time a remarkable tendency towards uniformity and stability of content and methodology (Lopus and Paringer, 2012). The range of economic issues addressed by the most widely diffused textbooks is extremely narrow, notwithstanding attempts to incorporate by stratification the fashionable economic topics of the day. The methodology adopted is normally strictly monist, as a coherent set of economic truths and solutions to economic problems is generally presented without much nuance or controversy. This is made very explicit in the introduction to one of the most popular textbooks: '*an economic textbook should remove the "ifs and buts" and teach the "rule rather than the exception"*' (Mankiw, Gans and King 2009, p. xxviii).

Thus, the majority of students has for long been taught a behavioural model that places emphasis on self-regarding preferences and utility maximization (*homo economicus*), omitting to mention the possibility of other-regarding preferences and the implications of the latter for positive and normative analysis. The outcomes of self-interested behaviour have coherently been presented as completely separable from issues of distribution, inequality, and fairness, which in any case have found very limited space in the description of the working of economic systems. Historical and institutional details of the economic environment, as well as the inherent complexity of the interdependence among economic phenomena, have normally been given very limited weight, if at all.

This narrowness of content and methods may be due to forces endogenous to the profession, such as the monopolistic competition nature of the market for textbooks, and the associated market failures limiting radical innovation (Stiglitz, 1988) or a combination of orthodox economists' explicit concern for preserving Kuhnian "normal science" by perpetuating the prevailing paradigm (Thornton, 2016, p. 88) and heterodox economists' limited propensity to engage in effective textbook writing (King and Millmow, 2003). Alternatively, it may be understood as the outcome of external constraints, imposed by publishers of economics textbooks applying the well-known "rule of thumb" that a maximum of 15% of the content can deviate from the "standard" principles text and internalized by textbook writers (Colander, 2003).

Whatever the correct explanation, dissatisfaction for the state of introductory economics teaching has grown among economists, students and employers alike, all pointing to important limitations and unintended consequences of the current curriculum.

The first unintended consequence of economic instruction highlighted by economists is, to some extent, paradoxical. As mentioned, the model of human behaviour most widely taught by the profession predicts the pursuit of rational self-interest. Yet, quite significant attention has been devoted to uncovering whether economic students learn more than students of other

disciplines to behave according to the self-interest that the economic theory that is being taught predicts. Thus, a number of economists have, explicitly or implicitly, expressed concern for the possibility that economic students behave as conventional economic textbooks predict anyone would behave.

Since the seminal work of Marwell and Ames (1981), a number of studies has devised experiments to explore whether training in economics is associated to more selfish behaviour. Marwell and Ames (1981) found that economics students were more likely to be free riders in the context of a public good game. Carter and Irons (1991) have found further evidence of selfish behaviour in an ultimatum game and Frank et al. (1993) in a prisoners' dilemma game.

Other studies have looked at behaviour in real settings, considering whether economics students are less prone to charitable giving (Frank et al., 1993; Frey and Meier, 2003; Bauman and Rose, 2011) or more prone to dishonesty (Frank et al., 1993; Frank and Schulze, 2000).

Finally, the effects of exposure to economic concepts has also been explored in terms of the propensity to change one's view towards more liberal-oriented beliefs. Rubinstein (2006), for example, finds that studying economics, particularly when mathematical methods are emphasized, leads students to lean more towards privileging profit maximization at the expense of ethical concerns. Allgood et al. (2012) investigate the relationship between the number of economics courses taken and the propensity to develop a liberal-oriented opinion on public policy issues, finding a positive association for the large majority of issues considered.

Most of these studies suffer from an inability to clearly distinguish between a "selection effect", i.e. a tendency of more selfish or more liberal-oriented individuals to choose the study of economics, and an "indoctrination effect" and/or "learning effect", i.e. a true change induced by exposure to economic concepts[2]. Of the available studies, some are unable to trace a distinction (Allgood et al., 2012); some highlight a selection effect (e.g., Frey et al., 1993) and others an indoctrination effect (e.g., Haucap and Just, 2003). Cipriani et al. (2009) attempt to disentangle the two effects through careful research design and by using a particularly wide sample, finding evidence for both effects. Ifcher and Zargamee (2018) tackle the problem by crafting an experiment in which students are exposed to a single self-contained neoclassical economics lecture and demonstrate that even this brief exposure measurably moves behaviour toward self-interest. While the overall evidence may not be fully conclusive, it is still indicative of the very concrete effects that the dominant variant of economic education may have.

Another major unintended effect of economics teaching is that its narrow focus and methods may be preventing students from developing the critical thinking tools indispensable to confront the most pressing economic issues. Indeed, as Robinson argued, '*the purpose of studying economics is not to acquire a set of ready-made answers to economic questions, but to learn how to avoid being deceived by economists*' (Robinson 1955, p. 3).

Economic students have called into question the nature and content of economic education in an organized form ever since the beginning of the 2000s, when the "Post-Autistic Economics Movement" was established in France, showing that antibodies against "indoctrination" certainly exist. Numerous student groups have been founded ever since around the world, particularly in the wake of the global financial crisis (e.g., Rethinking Economics, the Cambridge Society for Economic Pluralism, the Manchester Post Crash Society). The main concerns of these student groups are summarized in an Open Letter diffused in 2014 by the International Student Initiative for Pluralism in Economics (ISIPE), to which they jointly participate. In the letter, students criticized the scope of economics teaching because it included too narrow a set of issues, leaving out aspects that are key to the understanding of the real world. In addition,

[2] It is interesting to note that the terms "learning" and "indoctrination" are used interchangeably in this literature (Cipriani et al., 2009). This may be taken to be a signal of the paradoxes arising from the prevalence of textbooks with narrow orthodox contents. To some, effective acquisition of that content shows learning. To others, it indicates a loss of nuance in confronting reality and is therefore a source of concern.

students advocated greater pluralism at the theoretical, methodological and interdisciplinary level, for the purpose of acquiring the skills, knowledge and abilities indispensable to confront the real world. These abilities are also those required by employers and presently found to be lacking.

3. …and what to do about them: is more pluralism needed?

The economic profession has responded to the shortcomings identified in the previous paragraph by unanimously advocating an expansion of the content of the economic curriculum in general and of introductory economic courses in particular. The position that the range of issues addressed should be expanded does not appear to be the object of controversy, although the scope of the expansion that should be considered indispensable is still a matter of contention.

Where positions diverge is in the assessment of whether the expansion of content satisfies *per se* the need for greater pluralism. The CORE project, and the associated free online textbook, represents the most articulated answer in the positive to this question. A more varied group of economists, mostly heterodox ones, has expressed negative answers (e.g., Sheehan et al., 2015; Andreoni et al., 2016; Thornton, 2016; Mearman et al., 2018).

The scope of the content that finds a place in the CORE textbook is much broader than it normally is the case in first-year undergraduate textbooks. Social motivations behind human action, incomplete information and incomplete contracts, rent extraction and existence of disequilibrium, as well as the role of institutions and technological change, also in a historical long-run economic development perspective, are presented along with the concepts of markets and equilibrium. CORE also clearly points students to the rationale and implications of different criteria to evaluate outcomes, particularly efficiency and fairness, and emphasizes the joint occurrence of mutual gains and conflicts of interest in economic interactions. Finally, and perhaps most importantly, the book has a red thread in the treatment of the issue of inequality: by emphasizing that distributional issues depend also on institutional and political factors, rather than being univocally determined by 'the market' or 'competition', the book aims to provide a set of economic reasoning tools to address also highly contested issues, whose consideration is normally influenced by beliefs and value judgements[3].

Bowles and Carlin (2020) provide an empirical measure of the substantial dissimilarity of topic coverage in CORE and two particularly successful conventional textbooks – Mankiw's *Principles of Economics* and Krugman and Wells's *Economics* – and argue that the topics prioritized in the CORE textbook are those required to address the key issues deserving attention, that are also most salient to students: economic disparities, climate change, the future of work, and financial instability.

The two authors also explain the key methodological underpinnings of the project by describing it as characterized by "pluralism by integration", i.e. by the objective of integrating the expanded range of concepts and tools into a coherent whole. This reflects the position that, by broadening the range of topics addressed and changing the emphasis attributed to the different topics (for instance, by considering perfectly competitive markets as a special case of market

[3] In this section, we focus on CORE's attitude towards pluralism. However, there are other noteworthy pedagogical features of the CORE project. In addition to adopting an inductive approach that leverages on students' natural inquisitiveness to stimulate learning, CORE is also based on a modular approach: rather than providing wide coverage of foundational concepts, it aims to provide selectively the tools needed to explain the highlighted phenomena (Carlin and Birdi, 2016). The modular approach translates into the introduction of separate modules for more advanced topics ("Einsteins") and for the mathematical tools underlying the graphs and models presented in the text ("Leibnizes"). Finally, CORE aims at being innovative also as regards the technology of delivery of content (free ebook, interactive diagrams, class experiments, videos, MCQs with feedback), in line with a pedagogical approach to learning as production, rather than learning as consumption.

competition), the need to contrast a conventional "mainstream" benchmark to alternative economic perspectives fades away. More than that, according to CORE proponents, contrasting alternatives would be pedagogically counterproductive as it would generate confusion ("paradigm tournament") and prevent the development of a core set of skills indispensable to "*do economics rather than simply to talk about it.*" (Bowles and Carlin, 2020, p.208). The rejection of the pedagogical value of contrasting alternative explanations ("pluralism by juxtaposition") is thus something CORE shares with the author of one of the most successful conventional textbooks, who has advocated the virtues of clarity over nuance (Mankiw, 2016).

The CORE project may perhaps be interpreted to reflect the belief that "mainstream pluralism" (Davis, 2006), i.e. the coexistence of a varied and interdisciplinary range of research approaches, all deviating from the neoclassical benchmark, allows for the identification of a "core" of the discipline, that is here to stay and that can be successfully taught to students. This is in line with the view, expressed by Cedrini and Fontana (2009), that "mainstream pluralism" reflects a long-term trend of increasing specialization rather than a transient phase towards a new non-pluralist paradigm.

The CORE experiment has attracted significant criticism by those believing that an accurate depiction of the present state of economic knowledge necessarily requires engaging with a broader set of approaches than those associated to "mainstream pluralism" or, in other words, that both economics education and economic research are in need of an explicit concern for critically contrasting alternative explanations. While no simple association orthodoxy/monism and heterodoxy/pluralism is possible (de Langhe, 2010), this position has been held particularly by professional economists of heterodox inspiration (e.g., Gruzska et al. 2017; Mearman et al., 2018). Student groups such as Rethinking Economics also belong to this camp.

Leaving aside the broader issue of pluralism in economics research, for the purposes of the present paper it is relevant to point to the heterodox arguments in favour of a variant of pluralism as a pedagogical tool that teaches students to critically engage with different explanations for real-world phenomena (or, more dismissively, "pluralism by juxtaposition"). Pluralism interpreted as a pedagogical approach that emphasizes controversy and disagreement within the discipline can be seen as a way of promoting students' critical thinking, which in turn leads to deeper understanding (Freeman, 2009). In particular, a pluralist pedagogy has been argued to enable students to engage more effectively with complex problems that do not have a predetermined solution (Nelson, 2009) because it trains them to handle disagreement and competing interpretations of reality. This makes a pluralist education also vocationally useful, to the extent that most of the skills employers require are strengthened by the analytical and rhetorical powers developed through understanding economic debates and controversies (Denis, 2009). This variant of pluralism in economics education has also been shown to improve students' understanding of conventional economics (Mearman et al., 2011). Proponents of this view do not ignore the possible drawbacks of emphasizing disagreement within the discipline, as for instance the possibility that "cognitive dissonance" prevents effective learning (Earl, 2000 and 2002), but believe they can be overcome by devising careful economics teaching methods (Garnett, 2009).

These contrasting views on pluralism in economics education highlight important trade-offs. Broadening the set of topics in the introductory economics course by presenting a synthesis whereby controversies are presented as mostly solved may facilitate learning of the new concepts, by reducing students' "cognitive dissonance" and confusion. At the same time, this approach may not allow students to fully engage with the controversial issues presented (e.g., whether other-regarding preferences play a role in economic behaviour) and it may involve less critical thinking. Whether this also leads to "indoctrination", because the persuasive simplicity of some powerful mainstream ideas dominates over any more nuanced additional topic is a matter for empirical investigation.

To our knowledge, while some evidence on the effects of "pluralism by juxtaposition" is available from heterodox authors who have experimented with variants of pluralist teaching (e.g. Mearman et al., 2011), no evidence exists at present on the effects of "pluralism by integration" on students. It is to this type of evidence that we now turn.

4. How does "pluralism by integration" work with students?

4.1. Data and Methods

The data used in our analysis come from a survey (organised in two sub-surveys) administered, in 2016, to students attending the introductory economics course taught at the University of Siena, where the CORE textbook (The Economy) has been adopted since 2014 both in English and in the Italian translation. In particular, the survey was administered to students of 3 courses in Italian and one course in English before (March 2016) and after (June-July 2016) the semester-long introductory economics course. The first survey was carried out through a questionnaire in paper form on the very first day of lecture, before providing students with any information on the course. The second survey was conducted partly in paper form and partly online, in order to reach the broadest possible population of students exposed to the content of the CORE textbook, irrespective of whether they have attended lectures or not[4].

The first questionnaire included a range of personal questions meant to obtain information on: students' habits in terms of interest for current events (proxied by the frequency with which they read newspapers); whether they have previously studied economics; their main reason for choosing an economics degree; the career they plan to undertake; whether and how they expect economics to be relevant for them; what they deem to be the most appropriate definition of economics.

The last question was included also in the second questionnaire, in order to check whether students change their view after studying the CORE textbook. Most importantly, both surveys contained three questions related to students' beliefs with regard to key topics that are normally disregarded in standard economics textbooks and that find space, by contrast, in the CORE textbook: self/other-regarding preferences; fairness and inequality; and institutional complexity. In particular, we asked students to express their agreement/disagreement with the following statements: "*In taking their decisions individuals aim only to obtain the maximum material and individual welfare*" (statement on self-/other-regarding preferences); "*Economic inequality and environmental pollution are necessary and inevitable consequences of economic progress*" (statement on fairness and inequality); and "*Economic systems are independent systems that cannot be influenced by historical, political and institutional factors*" (statement on institutional complexity). Answers were measured on a five-point Likert scale (from +2 "strongly agree" to -2 "strongly disagree"). The stronger the disagreement with these statements, the greater the coherence of students' positions with the perspective put forward in *The Economy*, which emphasizes the relevance of other-regarding preferences, the possibility to avoid inequality and environmental pollution and institutional complexity.

The second form also included a set of questions meant to evaluate students' appreciation for CORE. In particular, the questions related to both content issues (e.g., usefulness of explaining economic concepts by reference to contemporary economic phenomena and to historical events; whether the book contents help to understand the real word) and methodological issues (e.g., usefulness of the inclusion of many graphs and tables, modularity).

Finally, we implemented the information from the two surveys with some administrative data on personal characteristics of the students such as their nationality, high school degree,

[4] The data from the second survey covers all the students who have taken the exam after the end of the course, given that students were required to show a proof of completion of the second survey in order to take the exam.

previous school performance and information related to their performance (final mark) at the exam.

The total number of students in our sample is 331, of which 156 answered questions on both surveys, 260 to the ex-ante questionnaire and 227 to the ex-post questionnaire. In our analysis, we focus both on the appreciation for the CORE textbook by using the ex-post questionnaire (227 students) and on learning and indoctrination effects by using data for respondents to both surveys who have expressed their position with respect to the three key statements (147 students). Table 1 provides the descriptive statistics for the entire sample and for the 147 students that participated in both surveys.

In order to test the learning and indoctrination effects – the focus of our analysis – we explored the effect of exposure to the CORE economic textbook in terms of students' change of views with respect to the three statements mentioned above. In particular, for each statement, we built a new categorical variable, to be used as dependent variable in multinomial logistic regressions, by defining a measure of variation that captures whether and how students changed their mind after taking the course. The new variables look at the direction and at the level of the change and have three categories, which correspond to the students' possible reactions after attending lectures and studying *The Economy*: (i) no change with respect to ex-ante beliefs; (ii) changes of view coherent with CORE's perspective; and (iii) changes of view not coherent with CORE's perspective.

Table 1. Descriptive statistics for the entire sample and for students participating in both surveys.

	Total respondents (331)		**Responding to both surveys (147)**	
	No.	**%**	**No.**	**%**
Gender				
Female	119	36.0	58	39.5
Male	212	64.0	89	60.5
Nationality				
Foreign	44	13.3	19	12.9
Italian	287	86.7	128	87.1
Place of high school degree				
Tuscany	139	42.0	56	38.1
Outside Tuscany	192	58.0	91	61.9
School type				
Classical or scientific high school (Liceo)	167	50.5	73	49.7
Technical high school	133	40.2	62	42.2
Other	31	9.4	12	8.2
Final mark at exam (out of 30)				
A (28-30)	48	14.5	32	21.8
B (25-27)	69	20.8	32	21.8
C (22-24)	48	14.5	20	13.6
D (18-21)	82	24.8	39	26.5
E (failed)	47	14.2	21	14.3
not taken	37	11.2	3	2.0
Studied economics in high school*				
Yes	106	40.8	63	24.2
No	154	59.2	84	32.3
Relevance of the study of economics*				
To understand the world around me	141	54.2	83	31.9
To acquire tools that may help me to improve the society I live in	55	21.2	30	11.5
For my career and job opportunities	64	24.6	34	13.1
Number of times reading news per week*				
Never or once	108	41.5	58	22.3
At least 2 times	152	58.5	89	34.2

Note: * only total respondents to ex-ante questionnaire (260).

We consider that there has been "no change" if the level of the answer on the Likert scale is the same ex-ante and ex-post. This means students do not change their mind and express the same beliefs they held before attending the course, deriving from both their cultural background and previous studies. In this case, neither "learning" nor "indoctrination" can be said to occur. A "change coherent with CORE" occurs when a student changes her/his ex-ante opinion in a direction coherent with the main contents of the book[5]. In this second case, we can document that "learning" has taken place. Finally, a "change not coherent with CORE" occurs when a student changes her/his ex-ante opinion in a direction opposite to the perspective proposed by *The Economy*[6]. We interpret this case as an instance of "indoctrination effect": the student's opinion moves towards a position that can be described as more "neoclassical" or "liberal-oriented".

4.2. Results

Appreciation for the CORE textbook. A first set of results relates to students' appreciation for the CORE textbook and for particular aspects of it. Overall, we found a very high degree of appreciation, as close to 64% of respondents to the ex-post questionnaire (N=227) have declared to be "fully satisfied" and more than 25% to be "more satisfied than unsatisfied"[7].

Students' evaluations of specific aspects of the book are reported in Table 2. For four of the five features of the textbook for which a quantitative evaluation has been elicited, the next-to-highest evaluation ("enough") constitutes both the mode and the median category selected by students. For the feature "there is an extensive use of graphs and tables useful for understanding and fixing the concepts explained", the mode is given by the highest evaluation ("a lot"). All in all, more than 90% of the students appreciate "enough" or "a lot" all of the five features illustrated in the table. It is, however, worth highlighting that a material, albeit small, percentage of respondents (11,9%) reports a limited usefulness of the approach proposed by *The Economy* in understanding the real world.

Table 2. Students' appreciation for selected features of the CORE textbook

	not at all (%)	**a little (%)**	**enough (%)**	**a lot (%)**
The fact that economic concepts were explained by reference to contemporary economic phenomena	0	6.6	48.5	44.9
The fact that economic concepts were explained by reference to historical events	1.3	7.1	49.8	41.9
The fact that it helped me to understand the real world	0.9	11.0	49.8	38.3
The fact that economic concepts are presented independently from their mathematical interpretation, so that they can be understood without reading the mathematical modules	0.9	16.7	45.4	37
The fact that there are many graphs and tables that help to 'fix' concepts	1.3	8.8	38.3	51.5

[5] This occurs when the level of the variables changes in a direction coherent with CORE's conclusions (e.g. from -2 to -1 or 0, from 1 to 2, etc.).
[6] This occurs when the level of the variables changes in a direction opposite to CORE's conclusions (e.g. from 2 to 1 or 0, from 0 to -1, etc.).
[7] Responses are given on a 5-points Likert scale.

As can be seen from the above table, more than 82% of the students thinks that one of CORE's strengths is that the economic concepts are presented independently from their mathematical interpretation, so that they can be understood without reading the mathematical modules (so-called "Leibnitzes") and using a mathematical approach. However, somewhat in contrast with this finding, more than 50% of the students sees the lack of mathematical interpretation directly integrated in the text as a weakness of CORE[8]. Thus, the modular feature of the CORE approach is perceived by students as having both advantages and disadvantages. Indeed, most students have underlined, not only in the questionnaire, but also at greater length in direct communication with instructors, their difficulty to integrate and manage the different tools offered by CORE in a modular fashion. Finally, another perceived weakness of the text, for more than half of the students, is its length.

Learning and indoctrination effects. The above results suggest that any learning or indoctrination effect cannot be attributed to a lack of appreciation for *The Economy*. The following Table 3 illustrates the absolute proportions of students' reactions to exposure to the CORE textbook.

Table 3. Effects of studying the CORE textbook on students' change of view with respect to the three representative statements

	no change (%)	**change coherent with CORE/learning (%)**	**change not coherent with CORE/indoctrination (%)**
Self-/other- regarding preferences	48.3	26.5	25.2
Fairness and inequality	37.4	26.5	36.1
Institutional complexity	55.8	14.3	29.9

Table 3 provides some interesting preliminary information. First, it shows that the phenomenon of limited learning that has been documented elsewhere with respect to standard economic textbooks (e.g., Busom et al., 2017) is certainly relevant also for the CORE textbook. Indeed, for a significant proportion of students, the introductory economic course does not determine any change of view with respect to the different economic concepts taught. This phenomenon is particularly evident for the statement concerning institutional complexity.

Second, it is remarkable that "indoctrination" appears overall dominant over "learning" effects. Only for the statement regarding self-/other-regarding preferences the proportion of students exhibiting learning effects is substantially analogous to the proportion of students exhibiting indoctrination. Thus, in spite of the emphasis *The Economy* places on a broader and more nuanced set of topics than those included in the standard textbooks, students exposed to this variant of introductory economics tend to change their mind in a direction that is normally associated to "indoctrination" in the relevant literature, when they do change their mind at all.

Third, there are differences with respect to the extent of "learning" and "indoctrination" that occurs for different topics addressed in the CORE textbook. Quite surprisingly, the proportion of students showing indoctrination effects is highest for the statement concerning fairness and inequality, i.e. the highest proportion of the students who change their mind (about 36%) becomes more likely to agree with the statement that inequality and pollution are inevitable consequences of economic progress. This increased perception of the inevitability of market outcomes has been associated to indoctrination effects and is at odds with the CORE textbook's emphasis on the existence of policy antidotes to inequality.

[8] It might be the case that this perception is affected by the decision to introduce some more technical exercises, along with the MCQs included in the CORE textbook, in all of the courses (both in Italian and in English) taught in Siena.

As mentioned in the previous section, the questionnaire also explored whether students tend to change their mind on the idea of what economics is about after the introductory course. In this regard it is interesting to note, first, that Siena students do not tend to emphasize, in their answers, the same issues that Bowles and Carlin (2020) indicate as the most relevant to *The Economy*'s implied readers: both in the ex-ante and in the ex-post questionnaires, a limited percentage of respondents indicates "the study of inequality" as the domain of analysis of economics (4.6% and 8% respectively) and only 7.3% and 6.6% respectively "the study of why economies face crises (financial, growth, employment)". Studying the book does not significantly change the proportion of students that attributes relevance to these definitions. It does, however, induce a non-negligible portion of students to move from a more generic view that economics is about 'markets', to a view of economics as the study of 'incentives'.

Students' personal features as determinants of learning and indoctrination effects. To understand the determinants of learning and indoctrination effects, we run a multinomial logistic regression with the categorical variable "change of view" as dependent variable, for each of the three topics considered, and a number of student features present in our database as regressors. The students' personal features that we include in the analysis have the greatest explanatory power for the variable that captures learning and indoctrination in relation to the statement on self- and other-regarding preferences. For both of the other topics only one regressor turns out to be statistically significant (see **Errore. L'origine riferimento non è stata trovata.**Table 4).

Three student features increase the probability of learning effects taking place with respect to the baseline category "no change" with regard to the concept of self- and other-regarding preferences. The first is, unsurprisingly, performance at the exam. An increase in the mark obtained at the exam, a proxy for both ability and interest for the subject, increases the probability of learning. The second is the interest in real-world phenomena and current issues, as indicated by a positive value of the dummy variable "reading news at least 2 times per week". The third is given by the belief that studying economics may provide tools useful to improve society with respect to the baseline category "belief that studying economics may be useful for career and job opportunities".

Table 4a. Multinomial logistic estimates: self/other-regarding preferences

Variables	**no change**	**change coherent with CORE/learning**	**change not coherent with CORE/indoctrination**
Tuscany place of high school degree (=1)		0.281 (0.437)	-0.843* (0.488)
Gender (M=1)		-0.219 (0.433)	-0.279 (0.442)
Final mark at exam		0.0743 (0.0505)	-0.0937** (0.0471)
Studied economics in high school (=1)		0.00681 (0.433)	-1.100** (0.461)
Relevance of the study of economics (for career as base category)			
To understand the world		0.271 (0.554)	0.641 (0.545)
To improve the society I live in		1.271** (0.625)	0.973 (0.706)
Reading news at least 2 times per week (=1)		0.967** (0.492)	0.133 (0.443)
Constant		-3.447** (1.358)	1.670 (1.166)
Observations	147	147	147

Table 4b. Multinomial logistic estimates: fairness and inequality

Variables	no change	change coherent with CORE/learning	change not coherent with CORE/indoctrination
Tuscany place of high school degree (=1)		-0.580 (0.457)	-0.381 (0.404)
Gender (M=1)		0.431 (0.457)	0.193 (0.396)
Final mark at exam		-0.0356 (0.0478)	-0.0134 (0.0446)
Studied economics in high school (=1)		0.325 (0.456)	0.160 (0.400)
Relevance of the study of economics (for career as base category)			
To understand the world		-0.396 (0.528)	-0.270 (0.482)
To improve the society I live in		0.517 (0.659)	0.0435 (0.620)
Reading news at least 2 times per week (=1)		-0.860* (0.467)	-0.625 (0.419)
Constant		0.926 (1.283)	0.803 (1.104)
Observations	147	147	147

Table 4c. Multinomial logistic estimates: institutional complexity

Variables	no change	change coherent with CORE/learning	change not coherent with CORE/indoctrination
Tuscany place of high school degree (=1)		-0.00384 (0.536)	-0.527 (0.407)
Gender (M=1)		-0.670 (0.507)	-0.204 (0.395)
Final mark at exam		-0.0137 (0.0475)	-0.0886* (0.0480)
Studied economics in high school (=1)		-0.220 (0.521)	0.0662 (0.392)
Relevance of the study of economics (for career as base category)			
To understand the world		-0.632 (0.571)	-0.311 (0.488)
To improve the society I live in		-0.569 (0.772)	0.625 (0.570)
Reading news at least 2 times per week (=1)		0.0532 (0.530)	0.00549 (0.409)
Constant		-0.158 (1.378)	1.711 (1.148)
Observations	147	147	147

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

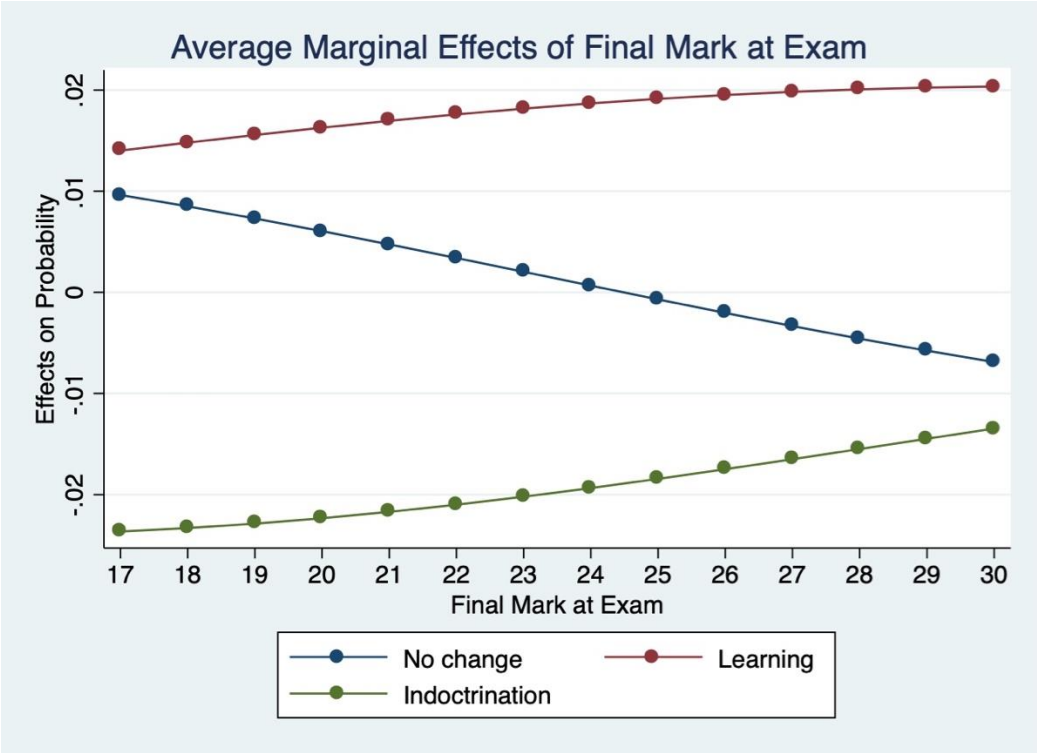
As for indoctrination effects, other three variables turn out to be significant. All three have a negative effect on the probability of indoctrination. These are: the fact that students have attended a secondary school in Tuscany; the final mark obtained at the exam; and the fact that students have taken an economics course in secondary school.

To better explore the magnitude of the phenomena identified, we computed the average marginal effects for each outcome. The probability of learning is on average about 17 percentage points higher for those believing that economics could provide them with tools useful to change society, relative to those believing that economics is mostly useful for their career, all else equal. The probability of learning is also on average about 16 percentage points higher for those students that report reading newspapers at least 2 times per week. The probability of indoctrination, in turn, is about 15% lower for students who graduated from a secondary school

in Tuscany and about 18% lower for students that have been exposed to economics teaching in their previous course of study.

As for the effect of grade performance at the exam, since point estimates of marginal effects for continuous variables may not be particularly accurate (Williams, 2012), we prefer to provide below a graph plotting the average marginal effects of the variable "final mark at exam" on the probability of the different outcomes of our dependent variable (Figure 1).

Figure 1. Average marginal effects of the variable "Final Mark at Exam"



The figure shows that, overall, the positive effect of the final grade obtained at the exam on the probability of learning is between 1.5 and 2 percentage points for each additional grade on the scale between 17/30 (insufficient) and 30/30. It also shows that this variable has a negative effect on the probability of indoctrination that falls in a similar range of values in terms of magnitude. Interestingly, the effect of grade on learning increases in magnitude as the grade increases, while the effect on indoctrination decreases in magnitude with the increase in grades.

Overall, we believe that the analysis of marginal effects may be cautiously taken to suggest two main insights on the impact of an approach to introductory economics teaching based on "pluralism by integration". First, the effects of exposure to the same introductory economics content tend to be mediated by students' cultural background and personal interests. Indeed, the circumstance that attendance of secondary school in Tuscany has a negative effect on indoctrination may reflect the underlying socio-economic environment in which students grew up[9]. Also, whether students show interest in being up-to-date on current events and the fact that they manifest a pro-active attitude towards the possibility of bringing forth change in society has a measurable influence on the probability that they assimilate the content proposed by the CORE textbook, nuanced and broader than that proposed in standard textbooks. Thus, it appears that an approach that does not foresee an explicit contrast among alternative explanations of reality tends to be conveyed more effectively to students with a cultural background that can be

[9] Electoral behavior in Tuscany tends to indicate a consistent historical prevalence of progressive over conservative views. It may be the case that the cultural milieu whereby Tuscan students grow up makes them less prone to assimilate the more liberal-oriented views associated to indoctrination.

considered more coherent with CORE's views and have an interest in actively engaging with societal issues.

Second, and even more interesting for the purposes of this paper, the fact that having previously studied economics – typically on a standard textbook – reduces, rather than increases, indoctrination effects may be interpreted as supporting the idea that awareness of controversy and disagreement within the discipline may promote students' critical thinking and deeper understanding of contentious economic topics. This, in turn, tends to support the view that "pluralism by juxtaposition" has some merit as a pedagogical approach.

Finally, as can be seen from Table 1Tables 4 (a), (b) and (c), the personal characteristics of students we have considered do not explain much of the learning and indoctrination effects taking place with respect to the topics "fairness and inequality" and "institutional complexity". For the first, only the variable indicating the mark at the exam has a (weakly) significant negative effect on indoctrination. For the second, only the variable "reading news at least 2 times per week" has a (weakly) significant negative effect on learning. More research is certainly needed to provide general insights on the key issue whether a change of methodology is needed along with a broadening of the subject matter of introductory economics.

5. Conclusions and implications of the analysis

This paper aimed at discussing the highly relevant issue of the impact of introductory economic courses on students' views by providing some new empirical evidence. We sought to explore aspects of the CORE project, a new approach to economics teaching developed in response to a widespread discontent with the current state of "Economics 101" within the profession. The approach is based on the belief that a coherent set of economic concepts, which reflects the present state of economics and is broader than that included in standard textbooks, can be delivered to students without contrasting alternative explanations of reality (an approach its proposers have dubbed "pluralism by integration"). In particular, we attempted an analysis of whether this approach tends to generate similar indoctrination effects as those uncovered by the literature for standard (neoclassical/monist) textbooks.

The generalizability of our conclusions is certainly limited. First, the sample of students that have answered to both the ex-ante and ex-post surveys on which we base most of our analysis is narrow. Second, since we only have data for students attending courses based on the CORE textbook, we are unable to make a difference-in-differences analysis with a sample of students exposed to a standard textbook, so as to better single out causal effects. Finally, our research design does not allow us to fully distinguish between effects driven by learning/indoctrination and effects driven by critical thinking that lead students to take positions at odds with the main contents of textbooks.

Nonetheless, we believe the preliminary evidence we provide may contribute to advance a debate that has so far been mainly theoretical. Students at the University of Siena appear to be very different from the "implied readers" of CORE, that are assumed to be very interested in "pressing issues" such as inequality and climate change. Our analysis may thus suggest the type of effects from exposure to the CORE material to be expected in presence of somewhat "unfavourable conditions".

The main findings relevant to the issue of the pedagogical merits of "pluralism by juxtaposition" are as follows. First, we provide evidence of indoctrination effects – meaning a shift of students' views towards more "neoclassical" or "liberal-oriented" views, as widely assumed in the literature – also in the case of a textbook that emphasizes a different set of topics with respect to standard textbooks, and particularly other-regarding preferences, fairness and inequality and institutional complexity. This suggests that broadening the set of topics included in the textbook may not be sufficient to convey effectively a more nuanced view of what

economics is about, possibly because some powerful neoclassical concepts tend to disproportionately capture students' attention absent explicit contrast of alternatives.

We also found that the features of the environment as well as students' personal interests play a role in mediating the assimilation of the articulated set of concepts presented in the CORE textbook. Finally, at least for one of the topics considered (other-regarding preferences), we found that previous study of economics (typically on a conventional textbook) reduces the probability of indoctrination with respect to the baseline of "no change of views". We interpret this as evidence of the value of students' exposure to contrasting views as a pedagogical tool, and therefore of "pluralism by juxtaposition". Overall, we believe we can draw a cautious conclusion in favour of a middle ground position between "pluralism by juxtaposition" and "pluralism by integration". While "paradigm tournament" is likely to be an ineffective pedagogical strategy for the reasons well explained by Bowles and Carlin (2020), there appears to be some value in highlighting the existence of past and present controversies as a way of eliciting students' critical thinking. More can therefore be done to find an appropriate balance in this trade-off.

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