WHAT DO WE TEACH IN MACROECONOMICS? EVIDENCE OF A THEORETICAL DIVIDE

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Evidence of a theoretical divide [*]

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Abstract

This paper studies the way in which macroeconomics is taught at the undergraduate and graduate levels. Based on two sources of information, the world's largest network of library content and services, the WorldCat data base, and a survey of the textbooks used for teaching at leading universities across the world, the paper provides an up-to-date description of macroeconomics teaching. Our results show a clear methodological divide: whereas IS-LM/AS-AD modeling is the theoretical core of undergraduate textbooks, graduate ones have the RBC model as their baseline model.

Keywords: macroeconomics, textbooks, IS-LM/AS-AD, RBC

JEL codes: A22, A23, E00

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I Introduction

In every area of knowledge, textbooks are the main vehicle for acquainting students with the content of a given field or sub-field. When it comes to undergraduate macroeconomics textbooks – our object of study in this paper - authors face two challenges. The first is to meet the aspiration of students to decipher the workings of real-world present-day economies, which implies addressing issues such as the existence of business cycles, unemployment, inflation, and the role of government. The second, pertaining to the fraction of students who consider specializing in macroeconomics, is to acquaint them with its distinct way of reasoning and present practice.

Over the last decades, shocks, like the 2008 financial crisis and the 2020 Covid pandemic, and other issues, such as rising concerns regarding the environment and inequalities, have elicited a new reflexive thinking on what good textbooks might consist of. In this respect, most of the attention has been given to the teaching of Econ 101 or Principles of Economics (Allgood et al. 2015, Mankiw 2021, 2020, Bowles & Carlin 2020) with the *Core Econ Project* playing a leading role. Macroeconomics textbooks have received less attention.[1] The few studies available consider a small set of textbooks, usually four or five. They focus on certain topics – e.g. the financial sector, liquidity traps, etc. – rather than on the theoretical content and methodological approach adopted in these textbooks. Finally, as they center on undergraduate textbooks, they fail to address the issue of the congruence, or lack thereof, between undergraduate and graduate teaching.

Investigating this issue is the aim we pursue in this paper. To this end, we proceed in two steps. First, we engage in an empirical examination of the diffusion and use of textbooks using two pieces of evidence. The first is the WorldCat data base, a unique catalogue of more than 72,000 libraries around the world. Its existence allows us to get a picture of the whole range of undergraduate macroeconomics textbooks available to students. The second, the 'teaching sample', is a data base of our own construction. It strives to document the actual teaching of macroeconomics at the undergraduate and graduate levels in a sample of economics departments. *Mutatis mutandum*, the relationship between the two sets of data can be regarded as one of supply and demand.

In the second step, we study the theoretical core upon which the teaching of macroeconomics is based.

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[1]See, however, De Araujo et al. (2013), Gärtner et al. (2013), Bowles et al. (2019)

Broadly described, the history of macroeconomics has undergone two phases. In the first, Keynesian macroeconomics, the IS-LM/AS-AD model was the dominating conceptual apparatus; in the second – the era of dynamic general equilibrium macroeconomics – RBC modeling took over. Congruence between undergraduate and graduate teaching implies that this transformation percolated into the content of textbooks.

The results of our query are as follows. As for our empirical examination, we find that, although several undergraduate textbooks are widely available across libraries, only two are predominant in teaching, one by Olivier Blanchard and the other by Gregory Mankiw. As far as our theoretical analysis is concerned, we conclude that there is a deep discrepancy between the undergraduate and the graduate teaching of macroeconomics: the theoretical core of undergraduate textbooks is the IS-LM/AS-AD model, while that of graduate textbooks is the RBC model. This is a cleavage that many graduate students have experienced yet which has hardly been explored.

The paper is structured as follows. In Section II, we present findings drawn from the WorldCat data base. In Section III, we identify the textbooks used in undergraduate teaching in a representative sample of economics departments. Section IV compares the results of the two sets of data. Section V describes how macroeconomics is taught at the graduate level. In Section VI, we classify undergraduate textbooks according to the theoretical framework upon which they are based. Section VII concludes.

II   The diffusion of macroeconomics textbooks across libraries

Our first source of information is the WorldCat data base. Introduced in 1971, it itemizes the collections of more than 72,000 libraries belonging to the Online Computer Library Center (OCLC) in 170 countries, containing over 412 million records with 2.6 billion cataloged items. Moreover, the catalog contains records from 491 different languages, 39% of which are in English. It allows us to identify the available macroeconomics textbooks published between 1960 and 2018.[2] To instruct our query, we adopt two selection criteria. First, the title of the textbook has to include the word "macroeconomics." Second, we retain only those textbooks whose last edition was published after 2009. Forty textbooks satisfy these criteria. With the exception of David Romer's *Advanced Macroeconomic*, they are undergraduate textbooks. As we need to separate

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[2]The available information for each of them consists of the authors, title, number of editions, year of the first and last edition, translations, and number of libraries holding a (digital or hardcover) copy of it.

undergraduate from graduate textbooks, we eliminate Romer's book from our sample.[3] They are listed in Table 1.

In the left panel, from column (1) to (3), textbooks are ranked by the number of libraries holding at least one copy of them. This number is a proxy of the diffusion and relevance of the textbook in the market. We call this number absolute availability (AA_b) for each textbook b. The right panel, columns (4) to (6), provides a second measure – their relative availability. By taking into account the lifetime of textbooks, it allows us to cope with the over-representation in the sample of textbooks published earlier on. The measure of relative availability (RA_b) for each textbook b is the ratio between the number of libraries that hold a copy of it over the years since its first edition:

$$RA_b = \frac{AA_b}{2021 - Year\ 1^{st}_b}.\tag{1}$$

Starting with the left-panel, the first textbook ranked in terms of absolute availability is *Macroeconomics* initially authored by Rudy Dornbusch and Stanley Fischer with Richard Startz becoming an additional author from the seventh edition onwards (in 1999). Its first edition dates from 1978 and it is available in almost 3,700 libraries. The other textbooks available in more than 2,500 libraries are Robert Barro's, Blanchard's, and Mankiw's. The broad diffusion of these four textbooks can be related to their lasting presence in the market, since their first editions were published more than 25 years ago. Unsurprisingly, more recent textbooks rank lower. On exception is Paul Krugman and Robin Wells' *Macroeconomics* which ranks fifth although its first edition dates from 2006.

Turning to the right panel, we observe that, Krugman and Wells's book now occupies the first place. Blanchard's, Mankiw's, and Barro's books roughly keep their rank. By contrast, Dornbusch et al. (1978) and Robert Gordon (1971) fall in the ranking, respectively by four and ten places. Krugman and Wells's textbook is not the only one that jumps in the ranking as compared to the AA_b-based ranking. Some notable mentions are: Gheorghe Popescu's *Macroeconomics* (from 19th to 10th place), Peter Kennedy's *Macroeconomic Essentials: Understanding Economics in the News* (from 8th to 3rd place), Robert J. Rossana's *Macroeconomics* (from 20th to 7th place) and Stephen Williamson's *Macroeconomics* (from 15th to 11th place). Also some poorly-ranked textbooks according to the absolute availability measure get a better score

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[3]As will be seen, Romer's book is the only graduate textbook having the macroeconomics' word in its title.

Table 1: Ranking of macroeconomics textbooks indexed in WorldCat (2021)

Absolute Availability			*Relative Availability*		
(1)	(2)	(3)	(4)	(5)	(6)
Author(s) (1st Ed.)	Ranking (AA_b)	AA_b	Author(s) (Last Ed. - 1st Ed.)	Ranking (RA_b)	RA_b
Dornbusch R. *et al.* (1978)	1	3722	Krugman P. & Wells R. (2021 - 2006)	1	141.73
Blanchard O. (1996)	2	3003	Blanchard O. (2021 - 1996)	2	120.12
Barro R. J. (1984)	3	2737	Kennedy P. (2019 - 2000)	3	93.24
Mankiw G. (1991)	4	2694	Mankiw G. (2020 - 1991)	4	89.80
Krugman P. & Wells R. (2006)	5	2126	Dornbusch R. *et al.* (2018 - 1978)	5	86.56
Gordon R. J. (1971)	6	2056	Barro R. J. (2010 - 1984)	6	73.97
Parkin M. (1984)	7	2055	Rossana R. J. (2011 - 2011)	7	63.30
Kennedy P. E. & Prag J. (2000)	8	1958	Abel A. *et al.* (2021 - 1991)	8	63.27
Abel A. *et al.* (1991)	9	1898	Parkin M. (2019 - 1984)	9	55.54
Colander D. (1986)	10	1531	Popescu G. (2018 - 2006)	10	54.93
Burda M. & Wyplosz C. (1993)	11	1363	Williamson S. D. (2019 - 2002)	11	50.16
Froyen R. T. (1983)	12	1280	Burda M. & Wyplosz C. (2017 - 1993)	12	48.68
McEachern W. (1988)	13	996	Richards D. *et al.* (2017 - 2016)	13	44.40
Hall R.E. & Taylor J.B. (1986)	14	983	Colander D. (2020 - 1986)	14	43.74
Williamson S. D. (2002)	15	953	Jones C. (2021 - 2008)	15	41.31
McConnell C. *et al.* (1990)	16	914	Gordon R. J. (2014 - 1971)	16	41.12
Gwartney J. D. (1976)	17	883	Hubbard G. & O'Brian P. (2021 - 2006)	17	37.73
Lindauer J. (1968)	18	828	Froyen R. T. (2014 - 1983)	18	33.68
Popescu G. (2006)	19	824	McEachern W. (2017 - 1988)	19	30.18
Rossana R. J. (2011)	20	633	McConnell C. *et al.* (2018 - 1990)	20	29.48
Hubbard G. & O'Brian P. (2006)	21	566	Hall R.E. & Taylor J.B. (2012 - 1986)	21	28.09
Jones C. (2008)	22	537	Chakraborty S. (2020 - 2009)	22	26.92
Gartner M. (1997)	23	510	Carlin W. & Soskice D. (2017 - 2014)	23	26.71
Samuelson P. & Nordhaus W. (1988)	24	502	Mishkin F. (2020 - 2011)	24	24.40
Bradford DeLong J. & Olney M. (1994)	25	405	Acemoglu D. *et al.* (2019 - 2014)	25	22.29
Boyes W. & Melvin M. (1991)	26	348	Gartner M. (2016 - 1997)	26	21.25
Slavin S. (1994)	27	329	Gwartney J. D. (2021 - 1976)	27	19.62
Chakraborty S. (2009)	28	323	O' Sullivan A. *et al.* (2020 - 2007)	28	17.71
O' Sullivan A. *et al.* (2007)	29	248	Chugh S. (2015 - 2015)	29	17.33
Mishkin F. (2011)	30	244	Lindauer J. (2012 - 1968)	30	15.62
Richards D. *et al.* (2016)	31	222	Samuelson P. & Nordhaus W. (2011 - 1988)	31	15.21
Carlin W. & Soskice D. (2014)	32	187	Bradford DeLong J. & Olney M. (2017 - 1994)	32	15.00
Acemoglu D. *et al.* (2014)	33	156	Gottfries N. (2013 - 2012)	33	12.22
Gottfries N. (2012)	34	110	Slavin S. (2019 - 1994)	34	12.19
Chugh S. (2015)	35	104	Boyes W. & Melvin M. (2016 - 1991)	35	11.60
Brooman F.S & Jacoby F. D. (2008)	36	95	Brooman F.S & Jacoby F. D. (2017 - 2008)	36	7.31
Handa J. (2010)	37	61	Karlan D.S. & Morduch J. (2021 - 2014)	37	7.00
Karlan D.S. & Morduch J. (2014)	38	49	Handa J. (2011 - 2010)	38	5.55
James E. M. *et al.* (2008)	39	9	James E. M. *et al.* (2012 - 2008)	39	0.69

Note: The list above is related to a WorldCat exploration made in March 2021. Columns (1) and (4) present the name(s) of the author(s), the year of the first edition and last edition of the textbook. Columns (2) and (5) show the ranking of the textbook, based on a measure of absolute availability, which captures the number of libraries that hold a copy of the book (AA_b), and on a relative availability, which is measured as the number of libraries that hold a copy divided by the number of years on the market (RA_b), presented respectively in columns (3) and (6).

Table 2: Ranking of recent textbooks based on the growth rate in absolute availability

(1) Author(s) (1st Ed.)	(2) Ranking (Gr_{AA_b})	(3) Gr_{AA_b} (%)	(4) AA_b (2021)	(5) AA_b (2019)
Jones C. (2008)	1	366.9	537	115
Rossana R. J. (2011)	2	257.6	633	177
Karlan D.S. & Morduch J. (2014)	3	53.1	49	32
Acemoglu D. *et al.* (2014)	4	44.4	156	108
Chugh S. (2015)	5	22.3	104	85
Chakraborty S. (2009)	6	16.7	323	277
Richards D. *et al.* (2016)	7	14.4	222	194
Gottfries N. (2012)	8	13.4	110	97
Mishkin F. (2011)	9	10.4	244	221
Carlin W. & Soskice D. (2014)	10	8.1	187	173
Handa J. (2010)	11	5.2	61	58

Note: The list above is related to a WorldCat extraction made in January 2019 and March 2021, and it shows the results for textbooks whose first edition dates from 2008 onwards. Column (1) presents the name(s) of the author(s) and the year of the first edition. Column (2) shows the ranking of the textbook, based on the growth rate (in percentage points) of the number of libraries that hold the textbook between 2019 and 2021, which is presented in column (3). The number of libraries that hold a textbook is available in column (4) (March 2021 extraction) and column (5) (January 2019 extraction)

when the relative availiabity measure is used. This is the case of Daron Acemoglu, David Laibson and John A. List's *Macroeconomics* (moving from the 33rd to the 25th place), David Soskice and Wendy Carlin's *Macroeconomics: Institutions, Instability, and the Financial System* (moving from the 32nd to the 23rd place) and Dan Richards, Manzur Rashid, and Peter Antonioni's *Macroeconomics For Dummies* (moving from the 31st to the 13th place).

The evidence presented hitherto provides a snapshot of the availability of undergraduate macroeconomics textbooks in a given period (in this case March 2021). To get a slightly more dynamic view, we focus on the eleven textbooks whose first edition is posterior to 2008 and compute the growth rate of the number of libraries holding a copy of the textbooks (i.e. our absolute availability measure) between January 2019 and March 2021. Table 2 displays the results of this little exercise. It comes as no surprise that recent textbooks display a high growth rate.[4] This is particularly true for Charles Jones's, Rossana's, and Acemoglu *et al.*'s books.

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[4]Two forces can explain the eventual growth rate of the diffusion of textbooks: (i) the inclusion in the OCLC system of new libraries which already held a copy of the textbook, and (ii) the higher diffusion of textbooks across libraries that already belonged to the OCLC. With our data, we cannot disentangle these two potential forces.

III The use of macroeconomics textbooks in undergraduate teaching

In this section, we document the current use of textbooks in undergraduate macroeconomics teaching. To this end, we created a dataset of undergraduate macroeconomics textbooks used in a sample of Economics Departments drawn from the Tilburg University Economics Ranking. The latter ranks departments on the basis of the number of publications in seventy-four leading peer-reviewed economics journals since 2004. Although the whole ranking covers one thousand one hundred and seventy-nine universities, we focused on the four hundred and eleven departments with a publication index at least equal to ten. From this subset, we randomly picked eight departments in each decile. Twenty seven of the eighty departments selected are located in the U.S. and Canada, forty-four in Europe, and the remaining nine universities are spread around the world.[5] To proceed, we contacted the heads of the Economics Departments or the teachers of macroeconomics courses directly when they were easily identifiable on the university websites, and asked them two simple questions: (i) "What is the current sequence of macroeconomics courses in both undergraduate and graduate programs in your department?" and (ii) "What are the textbooks used in these courses for the 2020-2021 academic year?" Among the 80 universities of our sample, 65 answered our query.[6]

Leaving aside 101-type courses with half of the course devoted to microeconomics and the other half to macroeconomics, the teaching of macroeconomics at the undergraduate level can take two forms: (a) it can consist in a single course as often the case in three-year long programs; (b) it can consist of a sequence of macroeconomic courses, with either two of them – an introductory course followed by an intermediate one – or three of them, the additional one being an advanced course; this is especially the case in four-year programs. We faced these different configurations in our survey. To get a homogeneous set-up, we gathered the textbooks used in type (a) courses with those used in intermediate courses of the type (b) sequence. Together, these textbooks form our main object of attention.

Table 3 displays the results of our inquiry. For each textbook, column (3) indicates the number of times

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[5]We consider all universities located within one of the 48 countries that are part of the European Higher Education Area (EHEA) as belonging to the same broad geographical area labelled as Europe. The EHEA is a group of countries that follow the directives of the so-called Bologna Process and that cooperate to achieve comparable and compatible higher education systems throughout Europe. It consists of the 27 EU Members plus Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Iceland, Kazakhstan, Liechtenstein, Moldova, Montenegro, North Macedonia, Norway, The Russian Federation, San Marino, Serbia, Switzerland, Turkey, Ukraine, and the United Kingdom. The remaining universities are located in Australia, Brazil, China, Israel, New-Zealand and Singapore.

[6]Table B-1 in the Appendix gives the list of the departments selected.

Table 3: Ranking of textbooks used in intermediate macroeconomics courses

(1) Author(s)	(2) Title	(3) # of citations	(4) Weighted use
Blanchard O.	Macroeconomics	30	22.8
Mankiw G.	Macroeconomics	20	11.3
Williamson S. D.	Macroeconomics	13	6.8
Burda M. & Wyplosz C.	Macroeconomics	7	6.3
Jones C.	Macroeconomics	5	4
Abel A. & Bernanke B.	Macroeconomics	4	2.5
Carlin S. & Soskice D.	Macroeconomics: Institutions, Instability and the Fin. Sys.	3	1.5
Dornbusch R. *et al.*	Macroeconomics	2	1.5
Gaertner M.	Macroeconomics	1	1
Gottfries N.	Macroeconomics	1	1
Flaschel et al.	Keynesianische Makroökonomik	1	1
Sachs J. & Larrain F.	Macroeconomics in the Global Economy	1	1
Hubbard G. R. & A. P. O'Brien	Macroeconomics	2	0.8
Mishkin F.	Macroeconomics	1	0.5
	The Economics of Money, Banking and Financial Markets	1	0.5
No reference text		3	2.5
Total		95	65

Note: The table shows the sample of textbooks used in the economics departments considered in the academic year 2020-2021. Column (1) presents the name(s) of the author(s). Column (2) shows the title of the textbook. Column (3) provides the number of departments using the textbook in their intermediate macroeconomics course. Column (4) displays the sum over economics departments of the probability for each textbook to be used as a reference textbook in the department's intermediate macroeconomics course. Probabilities are proxied by the actual use of the textbook: 0 if not used, 1 if it is the only reference textbook, 0.5 if two textbooks are used, etc. We label this indicator 'Weighted use.'

a textbook is cited as the reference text for the course. To account for the fact that sometimes we received more than one answer (for example, when the course is given by several teachers with different preferences), we constructed a weighted indicator. When just one book is cited by a department, it receives a weight equal to 1; when two books are cited, they are registered as 0.5, etc. These data are displayed in column 4.

Table 3 shows the existence of a leading trio composed of Blanchard's, Mankiw's, and Steven Williamson's books, with Blanchard being the indisputable champion. Looking at the share in total weighted use, the first two represent 52.4%, while the first three represent the 62.9% of the total. Noticeably, Michael Burda and Charles Wyplosz's book fares quite well. By contrast, Dornbusch, Fisher, and Startz's book has lost its leading position.

Two additional results are worth mentioning. The first relates to the geographical distribution of textbooks. Table B-2 in the Appendix displays the result of splitting the sample of universities into three regions: North America (U.S. and Canada), Europe, and the rest of the world. Williamson's and Mankiw's stand out as the most taught textbooks in the U.S. and Canada, whilst Blanchard's is by far the most used in Europe.

Notice also the fine ranking of Burda and Wyplosz's textbook and the underperformance of Williamson's in Europe.

Another interesting question is whether the use of textbooks is similar in the best ranked departments of the Tilburg ranking and the others. To answer it, we divide our sample into two sub-samples: (a) the top-ranked departments, defined as belonging to Tilburg ranking's first decile (London School of Economics, University of Munich, Texas A&M University, MIT, University of Toronto, Boston University, Stanford University, and Tilburg University) and the others (the remaining departments provided in Table B-1 in the Appendix). Table B-3 in the Appendix summarizes the results. As far as the first two positions are concerned, there is no difference between the two groups: Blanchard's and Mankiw's textbooks are ranked first. Surprisingly, Williamson's textbook is used in none of the eight top-ranked departments, whilst it fares well in the second sub-group.[7]

IV   Comparing the two rankings

In this section, we compare the WorldCat and teaching rankings. More precisely, we compare the ten most diffused textbooks in the WorldCat catalogue (using our relative availability measure) with the ten most used textbooks in the teaching sample. To make the two rankings comparable, we eliminate introductory textbooks from the WorldCat data base.[8] The result of this comparison is displayed in Table 4.

Seven textbooks are common to the two rankings. Among them, three hold the same place, Blanchard (first), Mankiw (second), and Andrew Abel, Ben Bernanke, and Dean Croushore (sixth). Williamson's, Burda and Wyplosz's, and Jones's books perform better in the teaching than in the WorldCat ranking. Again, Dornbusch et al.'s book undergoes a sharp drop. Absent from the WorldCat top-ranking, yet present in the teaching sample top ranking are Carlin and Soskice's, Manfred Gartner's and Nils Gottfries's books. By contrast, three books present in the WorldCat ranking – Gordon's, Barro's, and Rossana's – do not make it in the teaching ranking. Each of these 'excess supply' cases has a specific explanation. Gordon's was a pioneering textbook, whose first edition was published in the late seventies. Therefore, it is little surprise

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[7]These results are robust to alternative definitions of top-ranked universities (e.g. two or three deciles).

[8]We eliminated six introductory textbooks from the WorldCat data base: *Macroeconomics* by Krugman and Wells, *Macroeconomics Essentials: Understanding Economics in the News* by Kennedy, *Macroeconomics* by Parkin, *Macroeconomics for Dummies* by Richards et al., and *Macroeconomics* by Colander. Among them, only Krugman and Wells and Parkin were mentioned in the teaching sample. We also deleted Popescu's book, *Macroeconomics*, because it has little analytical content.

Table 4: Comparison of rankings of textbooks in WorldCat and in the teaching sample

WorldCat	Teaching Sample
1. Blanchard O.	1. Blanchard O.
2. Mankiw G.	2. Mankiw G.
3. Dornbusch R. et al.	3. Williamson S.D.
4. Barro R. J.	4. Burda M. & Wyplosz C.
5. Rossana R. J.	5. Jones C.
6. Abel A. & Bernanke B.	6. Abel A. & Bernanke B.
7. Williamson S.D.	7. Carlin S. & Soskice D.
8. Burda M. & Wyplosz C.	8. Dornbusch R. et al.
9. Jones C.	9. Gaertner M.
10. Gordon R. J.	10. Gottfries N.

Note: The first column of the table lists the authors of the 10 highest ranked textbooks according to the relative availability index and based on our World-Cat exploration in March 2021. The ranking has been adjusted to keep only intermediate macroeconomics textbooks (footnote 8 lists the textbooks that have been removed from the ranking). The second column gives the ranking of the textbooks in our representative sample of universities selected in the Tilburg University Economics ranking.

that it has become somewhat outdated. The case of Barro's book, the pioneering anti-Keynesian textbook, is more surprising. It turns out that it has been dethroned by Williamson's textbook.[9] Rossana's is still another story. It is a rather recent book. Its author's was already emeritus at the time of its publication and died since. Hence, its impact will probably fade away.

Finally, the absence Krugman and Well's *Macroeconomics* from the two rankings despite its first place in the relative availability ranking of the WorldCat data base is worth noticing. This absence is normal since Table 4 is limited to intermediate textbooks, whilst theirs must be regarded as an introductory textbook. Still, it is worth asking how it fares among textbooks of this category. A partial answer to this question can be found in the paper's Appendix (see Table B-4). It can then be observed that it is only used in introductory macroeconomics courses and it accounts for 5% of the total (weighted) use. This suggests a discrepancy between the presence of Krugman and Wells's book in libraries and its use in teaching.

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[9] As shown in Table B-2, Williamson's book is more used in the U.S. than in Europe. It can be surmised that Barro became aware of this situation. Indeed, in 2017, he published a new version of his book – this time entitled *Intermediate Macroeconomics* – and co-signed by Angus Chu and Guido Cozzi. The oddity is that the theoretical part is quasi-identical to that of the 2008 version, but the empirical part is original. It is based on Eurozone rather than US data as in the 2008 version.

V   Macroeconomic textbooks in graduate teaching

The terms "graduate program" covers different realities. Subsequently to the Bologna Process, higher education systems across the European Higher Education Area have converged to a two-step teaching sequence beginning with a bachelor's degree (3 to 4 years) often followed by a master's degree (1 to 2 years). Two types of master's degrees are available: *professional masters* – targeting students interested in pursuing a professional career and offering a large set of subjects in economics – and *research masters* - providing advanced training in core subjects of economics and preparing students for Ph.D. programs. In the U.S., undergraduate programs take four years to be completed, Master's programs are the exception and graduate programs are about getting a Ph.D. In this section we examine the European research master's program and the first year of the U.S. Ph.D. program together.

As seen, as far as undergraduate programs are concerned, textbooks are the almost exclusive teaching device. This is less the case for graduate programs. Advanced textbooks do exist yet most of the teachers we contacted declared that their teaching mixes chapters from different textbooks, seminal papers, and their own lecture notes. Therefore, our data no longer refer to textbooks *used* but rather to textbooks *cited* in syllabi.

Table 5: Advanced textbooks referred to in graduate teaching

(1) Author(s)	(2) Title	(3) Overall	(4) *Professional* Master's	(5) PhD & *Research* Master's
Romer D.	Advanced Macroeconomics	32	23	9
Ljungqvist L. & Sargent T.	Recursive Macroeconomic Theory	21	1	20
Stokey N. Lucas R. & Prescott E.	Recursive Methods in Economic Dynamics	12	1	11
Gali J.	Monetary Policy, Inflation and the Business Cycle	10	/	10
Acemoglu D.	Introduction to Modern Economic Growth	7	1	6
Blanchard O. & Fischer S.	Lectures on Macroeconomics	5	2	3
Barro R. & Sala-i-Martin X.	Economic Growth	5	2	3
Walsh C.	Monetary Theory and Policy	5	1	4
Woodford M.	Interest and Prices: Foundations of a Theory of Monetary Policy	4	/	4
Cooley T.	Frontiers of Business Cycle Research	4	1	3
Wickens M.	Macroeconomic Theory. A Dynamic General Equilibrium Approach	4	2	2
Obstfeld M. & Rogoff K.	Foundations of International Macroeconomics	3	2	1
Adda J. & Cooper R.	Dynamic Economics: Quantitative Methods and Applications	2	1	1
Alogoskoufis G.	Dynamic Macroeconomics	2	2	/
Azariadis C.	Intertemporal Macroeconomics	2	1	1
McCandless G.	The ABCs of RBCs: An Introduction to Dynamic Macroeconomic Mod.	2	1	1

Notes: The table shows the sample of textbooks used in the economics departments considered in the academic year 2020-2021. Column (1) presents the names of the authors and column (2) displays the titles of the textbooks. Column (3) shows the number of institutions using the textbook in their graduate macroeconomics courses either as reference text or as a recommended readings, and columns (4) and (5) make the distinction between (i) *professional* master's and (ii) *research* master's/PhD courses. Only textbooks that are used in at least two universities appear in the table.

Table 5 displays the textbooks used or referred to.[10] Four prevail: *Recursive Macroeconomic Theory* by

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[10]The table presents textbooks that are used in at least two universities.

Lars Ljungqvist and Thomas Sargent; *Recursive Methods in Economic Dynamics* by Nancy Stokey, Robert Lucas, and Edward Prescott; *Monetary policy, inflation, and the business cycle: an introduction to the new Keynesian framework and its applications* by Jordi Gali; and *Advanced Macroeconomics* by David Romer. They all have the RBC model as their baseline model.[11] A quick glance at them makes it clear that quantitative methods dominate graduate-level macroeconomics. As for substance, growth theory and business cycle (with a specific focus on monetary policy) are the dominant objects of study. Whilst labor economics and international macroeconomics receive pride of place in undergraduate macroeconomics textbooks, it is no longer the case in graduate ones. These topics are outsourced to dedicated courses.

VI   Typology of theoretical approaches

Now that we have a clearer picture of the textbooks used in macroeconomics, we can focus on the anomaly which lies at the center of this paper, the existence of a discrepancy between the teaching of macroeconomics at the undergraduate and graduate levels. The question at stake is whether undergraduate textbooks are based on the same methodological core as graduate ones, it being understood that the latter are in tune with cutting-edge research. This matter can be further narrowed by realizing that the issue bears only on one of the two specializations forming macroeconomics, the study of business cycles. Indeed, as far as growth theory is concerned, no basic discrepancy is present. The Solow model is regarded as the base-camp of growth theory in both graduate and undergraduate textbooks. In the early editions of undergraduate textbooks, the topic of growth received scant attention; it was studied in the last chapters as a sort of appendix. This is no longer so in present days. It often constitutes the first part of textbooks, and several chapters are devoted to it. However, their content is rudimentary with respect to the developments that have taken place both at graduate level and in cutting-edge research.[12] Moreover, no attempt is made at piecing together the growth and the business fluctuations topics.

Two stages can be distinguished in the development of the business fluctuations sub-specialization of macroeconomics. Its birth as a discipline can be associated with the rise of the IS-LM model, itself an

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[11]As argued by Moreira & Wren-Lewis (2016), uniformity in graduate teaching emerged in the late 1980s. This is confirmed in our data, as shown in Table B-6 in the Appendix: it displays no substantial differences in references between highly ranked departments and the rest.

[12]Current economic growth theory is based on an endogenous formation of technology and ideas. On this, see Jones (2021)

offspring of Keynes's *General Theory*. In the 1970s, macroeconomists enriched the IS-LM model by the addition of the AS-AD apparatus thereby giving it a monetarist twist. It gradually appeared that the AS-AD apparatus constitutes the core of the model, the IS-LM model serving as a steppingstone in its construction. The transformation that occurred in textbooks from the turn of the century onwards, in particular the disappearance of the LM curve, confirms the decisive role of the AS-AD model.[13] However, this addition hardly sufficed for its survival in research. Indeed, it came to be dethroned in the 1980s, the result of the 'rational expectations revolution' initiated by Lucas and stabilized by RBC modeling. The latter subsequently evolved into 'new Keynesian' or DSGE macroeconomics – an offshoot rather than a break from RBC modeling.[14]

Hence, the question we must ask ourselves is whether the central theoretical apparatus of undergraduate textbooks is the IS-LM/AS-AD or the RBC baseline model. To answer it, we characterize each of these approaches by using four basic methodological bifurcations: (a) their main object of analysis, (b) their equilibrium concept adopted, (c) their attitude toward the microfoundations requirement, and (d) their overriding purpose governing the construction and usage of the theoretical model. Their respective choices are summarized in Table 6.

We begin with IS-LM/AS-AD modeling:[15]

(a) *Main object of analysis* - The main object of inquiry of IS-LM/AS-AD models is the trade-off between unemployment and inflation. As far as labor is concerned, the focus is on the extensive rather than the intensive margin. To explain unemployment, these models resort to wage sluggishness or rigidity.

(b) *Equilibrium* - IS-LM/AS-AD economists tread the footsteps of classical political economists by adopting the state of rest equilibrium notion, a single standstill equilibrium position acting as a center of gravity. As described by Frisch (1950), this notion is reminiscent of a pendulum. When it is observed that the pendulum moves, the conclusion to be drawn is that the economy experiences a state of disequilibrium what in turn

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[13]See Romer (2000).

[14]Alternative labels are DSGE, dynamic stochastic general equilibrium, or DGE, dynamic general equilibrium, modeling. The 'new Keynesian terminology is ambiguous because it overlooks the fact that two generations of new Keynesian economists must be distinguished. The first was composed of a loose group of economists many of whom were microeconomists rather than macroeconomists like e.g. Stiglitz or Akerlof. Whilst accepting Lucas's microfoundations requirement, they were stern defenders of the involuntary unemployment and sticky prices notions. They were radically opposed to RBC modeling without however being keen on using the IS-LM model. By contrast, second-generation new Keynesian economists, such as Gali or Woodford, accept the RBC model as their baseline model. The aim they pursue is to superimpose Keynesian elements on it, such as price stickiness, imperfect competition, and the presence of money. Henceforth, whenever we use the 'RBC modeling' wording, we mean the extended RBC modeling – that is, including second-generation new Keynesian models.

[15]For the sake of keeping track of the origin of AS/AD modeling, we have kept the IS-LM/AS-AD label.

triggers a re-equilibration process. A distinctive feature of the IS-LM/AS-AD approach is that unemployment exists in equilibrium – the natural rate of unemployment.

(c) *Microfoundations* - In IS-LM/AS-AD modeling the optimizing behavior of the agents, i.e. their decision-making process, is evoked but not substantiated. That is, microeconomic foundations are present only implicitly.

(d) *Overarching methodological rule* - The overriding methodological purpose is to provide a framework to interpret and act on real-world economic events. Hence, external validity prevails; it comes at the expense of a serious consideration for the internal consistency of the theory developed.

   Turning to RBC modeling, the picture is as follows:

(a) *Main object of analysis* - The purpose of RBC modeling is to construct an equilibrium model of business fluctuations, having for object variations in output, consumption, investment, labor, etc. When it comes to labor, the total hours worked is the main – and for long, has been the only – variable taken into consideration. In other words, it is assumed that unemployment can be studied separately from business fluctuations.

(b) *Equilibrium* - The equilibrium notion is the neo-Walrasian notion of intertemporal equilibrium. Equilibrium is defined as generalized individual equilibrium; it being understood that agents engage in intertemporal substitution – hence the concern is optimizing paths. The existence of equilibrium is postulated; no room is left for disequilibrium occurrences.

(c) *Microfoundations* - Explicit microfoundations is a *sine qua non*.

(d) *Overarching methodological rule* - A theory and a model (understood as a mathematical model) are one

Table 6: Basic methodological differences between IS-LM/AS-AD and RBC modelling

	IS-LM/AS-AD	**RBC**
(a) *Main object of analysis*	Unemployment & inflation	Business fluctuations
(b) *Equilibrium concept*	State of rest equilibrium	Intertemporal equilibrium
(c) *Microfoundations*	Evoked but not substantiated	Required
(d) *Overriding methodological rule*	External validity	Internal consistency

and the same thing. This implies giving priority to internal over external consistency, which makes their model strongly unrealistic. The validity of this counter-intuitive research strategy, RBC economists argue, must be judged on its ability to fit the data and to display a strong cumulative development rather than on the plausibility of the model itself.

One point of contrast deserving an additional comment is the implication of the two equilibrium concepts adopted. Central to the AS-AD model is that equilibrium acts as a center of gravity, which in turn implies that the basic data of the economy remain fixed during the adjustment process – only temporary shocks are possible. This is what the term dynamics means in reference to the AS-AD model – a poor notion of dynamics since it implies a static environment. By contrast, whenever the intertemporal equilibrium is adopted, irreversible changes in the data can enter the scene.

In 1978, when Dornbusch and Fischer, the pioneers of the IS-LM/AS-AD-based textbooks, published their first edition, the IS-LM/AS-AD model still prevailed in advanced teaching. A situation of congruence between the two levels of teaching thus existed.[16] The fact that in the 1980s, the decade during which RBC modeling grew to dominance, the content of undergraduate textbooks hardly changed could be regarded as a mere delay in adjustment. However, the fact that most present-day textbooks belong to the IS-LM/AS-AD approach signifies a case of lack of congruence. That is, the transformations that occurred in cutting-edge research has scarcely percolated into undergraduate textbooks. Table 7 shows that this is the prevailing situation currently.

The left panel of Table 7 displays how the thirty-nine textbooks from the WorldCat catalogue fare with respect to the divide between IS-LM/AS-AD and RBC modeling. Thirty-two out of them are based on the IS-LM/AS-AD apparatus. Only three of them – Barro's, Williamson's and Sanjay Chugh's – are grounded on the RBC methodological principles. As for the three remaining ones, the situation is as follows. Abel, Bernanke, and Croushore's book aims to provide a synthesis of the two approaches – for sure, an appealing project yet also a thorny one in view of the opposed features of the two approaches. Richard Froyen adopts a historical approach to macroeconomics, going through the historical evolution of the methodology and of macroeconomic thought rather than dwelling on one of the two lines. Popescu's book fits neither of the two approaches because of the socio-economic line it takes.

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[16]It can be argued that Dornbusch and Fischer's first edition lies between the undergraduate and graduate teaching levels.

Table 7: Distribution of undergraduate textbooks according to their methodological lines
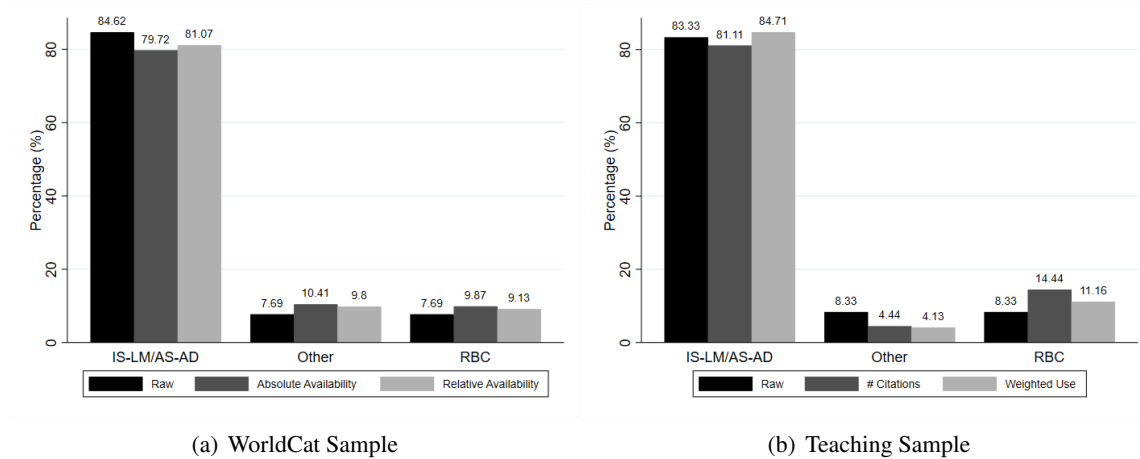
	WorldCat Sample			Teaching Sample	
(1)	(2)	(3)	(4)	(5)	(6)
Author(s)	Typology	Ranking (RA_b)	Author(s)	Typology	Ranking (Weighted Use)
Krugman P. & Wells R.	IS-LM/AS-AD	1	Blanchard O.	IS-LM/AS-AD	1
Blanchard O.	IS-LM/AS-AD	2	Mankiw G.	IS-LM/AS-AD	2
Kennedy P.	IS-LM/AS-AD	3	Williamson S. D.	RBC	3
Mankiw G.	IS-LM/AS-AD	4	Burda M. & Wyplosz C.	IS-LM/AS-AD	4
Dornbusch R.	IS-LM/AS-AD	5	Jones C.	IS-LM/AS-AD	5
Barro R. J.	RBC	6	Abel A. *et al.*	Other	6
Rossana R. J.	IS-LM/AS-AD	7	Carlin W. & Soskice D.	IS-LM/AS-AD	7
Abel A. *et al.*	Other	8	Dornbusch R.	IS-LM/AS-AD	8
Parkin M.	IS-LM/AS-AD	9	Gartner M.	IS-LM/AS-AD	9
Popescu G.	Other	10	Gottfries N.	IS-LM/AS-AD	10
Williamson S. D.	RBC	11	Hubbard G. & O'Brian P.	IS-LM/AS-AD	11
Burda M. & Wyplosz C.	IS-LM/AS-AD	12	Mishkin F.	IS-LM/AS-AD	12
Richards D. *et al.*	IS-LM/AS-AD	13			
Colander D.	IS-LM/AS-AD	14			
Jones C.	IS-LM/AS-AD	15			
Gordon R. J.	IS-LM/AS-AD	16			
Hubbard G. & O'Brian P.	IS-LM/AS-AD	17			
Froyen R. T.	Other	18			
McEachern W.	IS-LM/AS-AD	19			
Campbell R. McConnell *et al.*	IS-LM/AS-AD	20			
Hall R.E. & Taylor J.B.	IS-LM/AS-AD	21			
Chakraborty S.	IS-LM/AS-AD	22			
Carlin W. & Soskice D.	IS-LM/AS-AD	23			
Mishkin F.	IS-LM/AS-AD	24			
Acemoglu D. *et al.*	IS-LM/AS-AD	25			
Gartner M.	IS-LM/AS-AD	26			
Gwartney J. D.	IS-LM/AS-AD	27			
O' Sullivan A. *et al.*	IS-LM/AS-AD	28			
Chugh S.	RBC	29			
Lindauer J.	IS-LM/AS-AD	30			
Samuelson P. & Nordhaus W.	IS-LM/AS-AD	31			
Bradford DeLong J. & Olney M.	IS-LM/AS-AD	32			
Gottfries N.	IS-LM/AS-AD	33			
Slavin S.	IS-LM/AS-AD	34			
Boyes W. & Melvin M.	IS-LM/AS-AD	35			
Brooman H.D. & Jacoby F. D.	IS-LM/AS-AD	36			
Karlan D.S. & Morduch J.	IS-LM/AS-AD	37			
Handa J.	IS-LM/AS-AD	38			
James E. M.	IS-LM/AS-AD	39			

Note: The list above is related to a WorldCat exploration made in March 2021 (col. (1) to (3)) and to the economic departments considered in the academic year 2020-2021 (col. (4) to (6)). Columns (1) and (4) present the names of the authors. Columns (2) and (5) show the broad methodological category associated with each macroeconomics textbook. Columns (3) and (6) present the ranking of textbooks based either on the relative availability measure (see Table 1) or on the number of departments using the textbook in their intermediate economics course (see Table 3).

The right panel of Table 7 displays the result of the same exercise for the teaching sample. Eleven of the twelve textbooks used adopt the IS-LM/AS-AD framework. Only one of them, Williamson's, belongs to RBC modeling.[17]

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[17]The other two present into the WorldCat data base, Barro's and Chugh's, have not found a way in the departments in our sample.

Figure 1: Distribution of textbooks according to their methodological lines

(a) WorldCat Sample

(b) Teaching Sample

Notes: Authors' calculations on WorldCat data and teaching sample. Figure (a) shows the distribution by category, giving each textbook the same weight (Raw) or weighting each textbooks by the number of libraries which hold a copy (AA_b) or by the index of relative availability (RA_b). Figure (b) shows the distribution of the sample of textbooks used in intermediate courses by category, using the same weight (Raw) or weighting them using the # of citations or the weighted use displayed in Table 3.

These results confirm the claim that a methodological discrepancy between undergraduate and graduate teaching is present in macroeconomics. Admittedly, several textbooks which we classified as IS-LM/AS-AD – for example, Burda and Wyplosz or Nils Gottfries – comprise one or a few chapters on intertemporal substitution. However, in as far as the AS-AD model remains the core of the conceptual apparatus, and if it is accepted that this apparatus and the state of rest equilibrium concept are part and parcel of each other, it must be concluded that these chapters are a mere adornment or *pro forma* modification with respect to the central theoretical core of the textbook. When these authors move to the analysis of the workings of their model economy, intertemporal substitution vanishes from the scene.

The geographical discrepancy of the use of macroeconomics textbooks is also worth considering. It turns out that Williamson's textbook is mostly used in the U.S. and Canada, while Blanchard's textbook is predominant in Europe, so that we can conclude that North American universities are more inclined to teach macroeconomics based on the RBC paradigm than their European peers. As displayed in Table B-3 in the Appendix, this difference does not seem to be explained by the higher ranking of economics departments in the Tilburg ranking, which would have suggested that the use of RBC textbooks reflects a stronger research orientation.

Until now, we have only considered the rankings of the textbooks. Nonetheless, it may be the case that the importance of RBC textbooks is underestimated because the share of libraries distributing these textbooks and/or the number of departments using them in their teaching are relatively important. This is not the case. As can be seen in Figure 1, our above results hold even when indexing each textbook by their respective weights.[18] RBC textbooks account for less than 10% of the available (panel (a)) or used (panel (b)) textbooks. Hence, the discrepancy between undergraduate and graduate textbooks cannot be ruled out by the relevance of a few outliers, like Williamson in our teaching sample, or the weights associated with each textbook.

VII   Concluding Remarks

Our aim in this paper was to establish evidence about the teaching of macroeconomics at the undergraduate and graduate levels. After having identified the main undergraduate macroeconomics textbooks used in teaching and having confronted them with the teaching material used in graduate courses, we have concluded that they are based on distinct theoretical cores. Hence, the discrepancy claim is confirmed.

This conclusion calls for an explanation. A full one is beyond the scope of this paper. However, it is worth sketching out our view on the matter. Two factors evoked in the paper can serve as benchmarks for our judgment. The first relates to a remark made in the introduction about the tension between two objectives faced by the authors of undergraduate textbooks – shedding light on prevalent macroeconomics issues and acquainting students with the present-day practice of macroeconomics. The predominance of IS-LM/AS-AD textbooks can be explained by the fact that they give a priority to the first objective. By contrast, Barro's textbook is an emblematic example of the opposite standpoint. As for Williamson, it also bends towards the second objective yet in a more mitigated way.

The second factor, which is a consequence of the former, is the methodological bifurcations exposed above, and the priority given to internal or external consistency.[19] The IS-LM/AS-AD line privileges the second, the RBC line the first. The question to be asked then is whether methodologically principles that

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[18]For the WorldCat sample, textbooks are weighted by the number of libraries holding a copy (i.e. absolute availability) and the indicator of relative availability (RA_b). For the teaching sample, textbooks are weighted by the number of departments using the textbooks and the weighted use index.

[19]This bifurcation is underpinned by an even deeper one, the Marshall-Walras divide. On this, see Hoover (1984), De Vroey (2016, 2018).

are compulsory for advanced research must also be so for introductory works. That is, we must go beyond acknowledging the existence of a lack of congruence between the undergraduate/graduate teaching of macroeconomics and ponder whether its existence must be deplored or justified.

For our part, we lean toward the second standpoint. The IS-LM model is certainly sloppy, but it is intuitively relevant. It has also revealed a high rebounding ability. Fischer aptly pointed this out:

> The versatility of the (IS-LM) model is responsible for its survival: it can be used to analyze both monetary and fiscal policy, in both full employment and unemployment modes; it can generate quantity theory or pure Keynesian results with only minor modifications. The model is capable of accommodating monetarist and Keynesian views, as Friedman's (1970) theoretical framework shows. In my view, it can also accommodate a basic rational expectations-market clearing view, though I am not sure adherents of that approach would agree. Fischer 1986 (Note 7).

The above remark was made at a conference honoring Franco Modigliani, and it would have been inappropriate for Fischer to take this opportunity to defend his own textbook. However, the authors of the two most used textbooks currently have taken the plunge. In 1990, Mankiw published a paper entitled "A Quick Refresher Course in Macroeconomics" in which he discusses the discrepancy between the theoretical developments of macroeconomics and applied macroeconomics by drawing an analogy between Ptolemy's and Copernicus's astronomic theories. The latter was more elegant and, ultimately, more useful. However, Mankiw claimed that for some purposes it was appropriate to content oneself with Ptolemy's theory: "If you had been an academic astronomer, you would have devoted your research to improving the Copernican system. [...] Yet if you had been an applied astronomer, you would have continued to use the Ptolemaic system. (Mankiw 1990)."

Replace 'academic astronomer' by 'graduate teacher' and 'applied astronomer' by 'undergraduate teacher' and you have a justification of IS-LM/AD-AS textbooks. Blanchard makes a similar point in an article entitled "On the Future of Macroeconomic Models." (Blanchard 2018). According to him, economists face different types of tasks, each requiring a specific approach. In his words:

> (a) Foundational models. The purpose of these models is to make a deep theoretical point, likely of relevance to nearly any macro model, but not pretending to capture reality closely.

(b) DSGE models. The purpose of these models is to explore the macro implications of distortions or sets of distortions.

(c) Policy models. The purpose of these models is to help policy, to study the dynamic effects of specific shocks, to allow for the exploration of alternative policies.

(d) Forecasting models. The purpose of these models is straightforward: give the best forecasts.

(e) Toy models. Here, I have in mind models such as the many variations of the IS–LM model; (52-53)

IS-LM/AS-AD textbooks are thus justified as toy models. When it comes to introducing students to the field, such models are appropriate despite their defects.

Our study paves the way for several developments aiming to provide a more exhaustive answer on the reasons behind the methodological divide sketched out in Section VI. First, it would be worth the while to study the present state status of the IS-LM/AS-AD approach by accounting for its evolution from its pioneering textbook (Donrbusch and Fischer) to its current most popular expression (Blanchard's last edition). Second, as far as the RBC line is concerned, it would be interesting to delve deeper into the methodological differences between Barro's and Williamson's textbooks and investigate their internal consistency. A third possible quest is to appraise the attempts at making a synthesis between the IS-LM/AS-AD and the RBC lines, such as Abel and Bernanke's textbook. A fourth and last quest is to zero in on more recent textbooks in the RBC line, written after of the rise of new Keynesian macroeconomics, such as Chugh's. All these elements would certainly allow getting a sharper answer on the rationale behind the riddle exposed in the paper and a better evaluation on whether the present state of affair is acceptable or must be changed.

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Moreira, A. & Wren-Lewis, S. (2016), 'Saltwater vs freshwater: A small survey of postgraduate macro courses', *Mimeo* .

Romer, D. H. (2000), 'Keynesian macroeconomics without the lm curve', *Journal of economic perspectives* **14**(2), 149–169.

Appendix A   List of Textbooks

Undergraduate textbooks

1. Abel, A. B., Bernanke, B. S. & Croushore, D. (2016), *Macroeconomics*, Pearson 9th Edition

2. Acemoglu, D., Laibson, D. & List, J. A. (2017), *Macroeconomic (Global Edition)*, Pearson

3. Barro, R. J. (2007), *Macroeconomics: A Modern Approach*, Thomsosn South-Western

4. Blanchard, O. (2017), *Macroeconomics*, Pearson Higher Ed. 7th Edition

5. Boyes, W. & Melvin, M. (2015), *Macroeconomics*, Cengage Learning 10th Edition

6. Bradford DeLong, J. & Olney, M. (2005), *Macroeconomics*, McGraw-Hill/Irwin. 2nd Edition

7. Brooman, F. S. & Jacoby, H.D. (2017), *Foundations of macroeconomics: Its theory and policy*, Routledge

8. Burda, M. & Wyplosz, C. (2017), *Macroeconomics: a European text*, Oxford University Press

9. Carlin, W. & Soskice, D. W. (2014), *Macroeconomics: Institutions, instability, and the financial system*, Oxford University Press, USA

10. Chakraborty, S. K. (2010), *Macroeconomics*, Himalaya Pub. House

11. Chugh, S. K. (2015), *Modern macroeconomics*, MIT Press

12. Colander, D. (2016), *Macroeconomics*, McGraw-Hill Education. 10th Edition

13. Dornbusch, R., Fischer, S. & Startz, R. (2018), *Macroeconomics*, McGraw-Hill Education. 13th Edition

14. Flaschel, P., Groh, G. & Proano, C. (2007), *Keynesianische Makroökonomik: Unterbeschäftigung, Inflation und Wachstum*, Springer-Verlag

15. Froyen, R. T. (2012), *Macroeconomics: Theories and policies*, Pearson Series in Economics, 10th Ed.

16. Gartner, M. (2016), *Macroeconomics*, Trans-Atlantic Publications, Inc. 5th Edition.

17. Gordon, R. J. (2011), *Macroeconomics*, Perason Series in Economics 12th Edition

18. Gottfries, N., (2013), *Macroeconomic*, Red Globe Press 2013 Edition

19. Gwartney, J. D., Stroup, R.L., Sobel, R.S. & Macpheron, D.A. (2017), *Macroeconomics: Private and Public Choice*, Cengage Learning. 16th Edition.

20. Hall, Robert E. & Taylor, J. B. (1997), *Macroeconomics*, W W Norton & Co Inc. 5th Edition.

21. Handa, J. (2010), *Macroeconomics (With Study Guide Cd-rom)*, World Scientific Publishing Company

22. Hubbard, G. & O'Brien, P. (2018), *Macroeconomics*, Pearson 7th Edition

23. James, E., Wellman, S.& Aberra, W. (2011), *Macroeconomics*, Pearson Education Canada. 2nd Edition

24. Jones, C. I. (2017), *Macroeconomics*, W. W. Norton & Company. 4th Edition

25. Karlan, D. & Morduch, J. (2017), *Macroeconomics*, McGraw-Hill Education. 2nd Edition.

26. Kennedy, P. E. & Prag, J. (2017), *Macroeconomic essentials: Understanding economics in the news*, MIT Press

27. Krugman, P. & Wells, R. (2015), *Macroeconomics*, Worth Publisher 4th Edition

28. Lindauer, J.L. (2012), *Macroeconomics*, iUniverse. 4th Edition.

29. Mankiw, N. G. (2018), *Macroeconomics*, Worth Publishers

30. McConnell, C., Brue, S. & Flynn, S. (2014), *Macroeconomics: Principles, Problems, & Policies*, McGraw-Hill Education. 20th Edition

31. McEachern, W. A. (2016). *Macroeconomics: A contemporary introduction*. Cengage Learning.

32. Mishkin, F. S. (2014), *Macroeconomics: Policy and practice*, Pearson Education

33. O'Sullivan, A., Sheffrin, S. & Perez, S. (2016), *Macroeconomics: principles, applications, and tools*, Pearson Higher Ed. 9th Edition

34. Parkin, M. (2015), *Macroeconomics*, Pearson Series in Economics 12th Edition

35. Popescu, G. H. (2013), *Macroeconomics*, Addleton Academic Publishers. 1st Edition. Kindle Version

36. Richards, D. and Rashid, M. & Antonioni, P. (2015), *Macroeconomics For Dummies*, John Wiley & Sons

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38. Sachs, J. D. & Larrain, B. F. (1993), *Macroeconomics in the global economy*, Prentice Hall

39. Samuelson, P. & Nordhaus, W. (2009), *Macroeconomics*, McGraw-Hill/Irwin. 19th Edition

40. Slavin, S. (2013), *Macroeconomics*, McGraw-Hill Series Economics 11th Edition

41. Williamson, S.D (2018), *Macroeconomics*, Pearson 6th Edition

Graduate teaching

1. Acemoglu, D. (2009), *An Introduction to Modern Economic Growth*, Princeton University Press

2. Adda, J. & Cooper, R. (2003), *Dynamic economics: quantitative methods and applications*, MIT press

3. Alogoskoufis, G. (2019), *Dynamic Macroeconomics*, MIT Press

4. Azariadis, C. (1993), *Intertemporal macroeconomics*, Blackwell Publishing Company

5. Barro, R. & Sala-i-Martin, X. (1998), *Economic Growth*, MIT Press

6. Blanchard, O. J. & Fischer, S. (1989), *Lectures on macroeconomics*, MIT Press

7. Cooley, T. F. (1995), *Frontiers of business cycle research*, Princeton University Press

8. Galí, J. (2015), *Monetary policy, inflation, and the business cycle: an introduction to the new Keynesian framework and its applications*, Princeton University Press

9. Ljungqvist, L. & Sargent, T. J. (2018), *Recursive macroeconomic theory*, MIT press

10. McCandless, G. (2008), *The ABCs of RBCs: An Introduction to Dynamic Macroeconomic Models*, Harvard University Press

11. Obstfeld, M. & Rogoff, K. (1996), *Foundations of international macroeconomics*, MIT press

12. Romer, D. (2012), *Advanced macroeconomics, Mcgraw-Hill*

13. Stokey, N., Lucas, R. & Prescott, E. (1989), *Recursive methods in economic dynamics*, Harvard University Press

14. Walsh, C. E. (2017), *Monetary theory and policy*, MIT press

15. Wickens, M. (2012), *Macroeconomic theory: a dynamic general equilibrium approach*, Princeton University Press

16. Woodford, M. (2011), *Interest and prices: Foundations of a theory of monetary policy*, Princeton University Press

Appendix B   Additional Tables

Table B-1: University Sample

Respondent	1st Dec. (8/8)	2nd Dec. (4/8)	3rd Dec. (7/8)	4th Dec. (8/8)	5th Dec. (5/8)
1	London School of Economics	University of New South Wales	Hebrew University of Jerusalem	University of Hamburg	University of Georgia
2	University of Munich	University of Bologna	Georgia State University	Florida State University	North Carolina State University
3	Texas A&M University	Michigan State University	University of Technology Sydney	University of Innsbruck	University of Arkansas
4	MIT	University of Vienna	Humboldt University of Berlin	Vienna University of Econ&Buss.	University of Wisconsin
5	University of Toronto		University of St. Gallen	University of Montreal	University of Rome, Tor Vergata
6	Boston University		Uppsala University	University of Konstanz	
7	Stanford University		University of Bristol	Lund University	
8	Tilburg University			University of Leicester	

Respondent	6th Dec. (8/8)	7th Dec. (7/8)	8th Dec. (6/8)	9th Dec. (5/8)	10th Dec. (7/8)
1	Free University of Berlin	Ryerson University	Kansas State University	University of Augsburg	University of Canterbury
2	York University	Montana State University	University of Paris II	University of Lugano	Radboud University Nijmegen
3	University of Kent	Bielefeld University	University of Namur	Newcastle University	Umea University
4	University of Tennessee, Knoxville	University of Fribourg	Catholic University of Rio de Janeiro	Norwegian Business School	University of Modena
5	University of Padua	University of Lyon	University of Naples Federico II	University of Rennes I	University of Delaware
6	University of Adelaide	Sabanci University	Pablo Olavide University		Catholic University of Portugal
7	The New Economic School	Concordia University			University of Potsdam
8	University of Guelph				

Note: The table shows the random sample of universities considered by decile of Tilburg Ranking. In the parenthesis we report the number of departments that answer to our query with respect to the total number of departments in each decile (8).

Table B-2: Geographical distribution of the use of intermediate textbooks

US-Canada			Europe (EHEA)			Rest of the World		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Author(s)	# of citations	Weighted use	Author(s)	# of citations	Weighted use	Author(s)	# of citations	Weighted use
Mankiw G.	10	5.93	Blanchard O.	22	18.83	Dornbusch D. *et al.*	2	1.5
Williamson S.D.	8	4.5	Burda M. & Wyplosz C.	7	6.33	Mankiw G.	2	1
Blanchard O.	6	3.23	Mankiw G.	8	4.33	Jones C.	1	1
Jones C.	4	3	Williamson S.D.	4	2	Sachs J. & Larrain F.	1	1
Abel A.& Bernanke B.	2	1	Carlin S. & Soskice D.	3	1,5	Blanchard O.	2	0.75
Hubbard G.R. & O'Brien A.P.	2	0.83	Abel A.& Bernanke B.	2	1.5	Mishkin F.	1	0.5
Mishkin F.	1	0.5	Flaschel et al.	1	1	Williamson S.D.	1	0.25
			Gaertner M.	1	1			
			Gottfries N.	1	1			
No reference textbook	1	1	No reference textbook	2	1.5			
Total	34	20		51	39		10	6

Note: The table shows the sample of textbooks used in the economics departments considered in the academic year 2020-2021 by broad geographical area. Columns (1), (2) and (3) respectively present the name(s) of the author(s) of the textbook, the number of U.S. and Canadian departments using the textbook in an intermediate course, and the weighted use of the textbook. Columns (4), (5) and (6) reproduce the same exercise for economics department in the European Higher Education Area (EHEA), while columns (7), (8) and (9) reproduce it for departments that are located outside the US or Canada and do not belong to the EHEA.

Table B-3: Distribution of intermediate textbooks across top- and lower ranked departments in the Tilburg ranking

Top decile			Other deciles		
(1)	(2)	(3)	(4)	(5)	(6)
Author(s)	# of citations	Weighted use	Author(s)	# of citations	Weighted use
Mankiw G.	6	3.1	Blanchard O.	25	19.91
Blanchard O.	5	2.9	Mankiw G.	14	8.16
Jones C.	2	1	Williamson S.D.	13	6.75
Gaertner M.	1	1	Burda M. & Wyplosz C.	7	6.33
			Jones C.	3	3
			Abel A. & Bernanke B.	4	2.5
			Carlin W. & Soskice D.	3	1.5
			Dornbusch R. *et al.*	2	1.5
			Mishkin F.	2	1
			Flaschel *et al.*	1	1
			Gottfries N.	1	1
			Sachs J. & Larrain B.	1	1
			Hubbard G.R. & O'Brien P.	2	0.83
			No reference textbook	3	2.5
Total	14	8		81	57

Note: The table shows the sample of textbooks used in the departments considered according to their rank in the Tilburg Ranking. Columns (1) and (4) display the names of the authors. Column (2) shows the number of institutions belonging to the first decile of the Tilburg Ranking (top-ranked departments) that use the textbook in their intermediate macroeconomics courses. Column (3) weights textbooks according at their actual use in these universities. Columns (5) and (6) reproduce columns (2) and (3), respectively, but only considering lower ranked departments.

Table B-4: Ranking of undergraduate textbooks according to their use in introductory and intermediate courses

Introductory classes				Intermediate classes			
(1) Author(s)	(2) Title	(3) # citations	(4) Weighted use	(5) Author(s)	(6) Title	(7) # citations	(8) Weighted use
Mankiw G.	Principles of Macroeconomics	4	2.25	Mankiw G.	Macroeconomics	8	5.83
Fregert K. & Jonung L.	Makroekonomi	2	2	Blanchard O.	Macroeconomics	7	4.58
Krugman P. & Wells R.	Macroeconomics	3	1.75	Williamson S.D.	Macroeconomics	8	3.75
Parkin M.	Macroeconomics	3	1.75	Jones C.	Macroeconomics	4	3.5
Hubbard G. R. & O'Brian A. P	Macroeconomics	3	1.5	Burda M. & Wyplosz C.	Macroeconomics: a European text	3	3
Asarta C. & Butters R.	Principles of Economics	2	1.5	Abel A.B. *et al.*	Macroeconomics	3	1.5
Mankiw G.	Macroeconomics	3	1.08	Dornbusch R. *et al.*	Macroeconomics	2	1.5
Baumol W. & Blinder A.	Macroeconomics: Principles and Policy	1	1	Carlin W. & Soskice D.W.	Macroeconomics: Institutions. instability and the financial system	2	1
Bernanke B. *et al.*	Principles of Macroeconomics	1	1	Gaertner M.	Macroeconomics	1	1
Blanchard O.	Macroeconomics	1	1	Gottfries N.	Macroeconomics	1	1
Burda M. & Wyplosz C.	Macroeconomics	1	1	Sachs J.D. & Larrain B.F.	Macroeconomics	1	1
Curtis D. & Irvine I.	Principles of Macroeconomics	1	1	Hubbard G. & O'Brien P.	Macroeconomics	2	0.83
Dobrescu I. & Motta A.	Playconomics: Principles of Economics	1	1	Mishkin F.S.	Macroeconomics	1	0.5
Gwartney J. *et al.*	Macroeconomics: Private and Public Choice	1	1				
Mayshar J.	The Macroeconomics of Israel	1	1				
Otto G.	Introduction to Macroeconomics	1	1				
Steigum E.	Moderne makroøkonomi	1	1				
Chiang E.	Economics Principles for a Changing World	2	0.58				
Hickson S.	The New Zealand macroeconomy : what we measure and what it means	1	0.5				
Karlan D. & Morduch J.	Macroeconomics	1	0.5				
Krugman P. & Obstfeld M.	International Macroeconomics	1	0.5				
McConnel C. *et al.*	Macroeconomics	1	0.5				
Acemoglu D. *et al.*	Macroeocnomics	1	0.33				
Feijo C.A. & Ramos R. O.	Contabilidade Social: A nova referência das contas nacionais do Brasil	1	0.33				
Paulani L.& Braga M.	A Nova Contabilidade Social: uma introdução à macroeconomia	1	0.33				
Tucker I.	Survey of Economics	1	0.33				
Coppock L. & Mateer D.	Principles of Macroeconomics	1	0.25				
CORE-ECON		1	1				
No reference textbook		3	3	No reference textbook		2	2
Total		46	31	Total		45	31

Note: We only consider departments offering a sequence of courses in macroeconomics starting with an introductory course to macroeconomics. Columns (1) (2) (3) and (4) provide the names of the author(s) of each textbook. its title. the number of departments using the textbook in the 2020-2021 academic year. as well as its weighted use. Columns (5) to (8) provide the same information for intermediate courses.

Table B-5: Ranking of graduate textbooks according to the number of citations

(1) Author(s)	(2) Title	(3) Overall	(4) *Professional* Master's	(5) PhD & *Research* Master's
Romer D.	Advanced Macroeconomics	32	23	9
Ljungqvist L. & Sargent T.	Recursive Macroeconomic Theory	21	1	20
Stokey N. Lucas R. & Prescott E.	Recursive Methods in Economic Dynamics	12	1	11
Gali J.	Monetary Policy, Inflation and the Business Cycle	10	/	10
Acemoglu D.	Introduction to Modern Economic Growth	7	1	6
Blanchard O. & Fischer S.	Lectures on Macroeconomics	5	2	3
Barro R. & Sala-i-Martin X.	Economic Growth	5	2	3
Walsh C.	Monetary Theory and Policy	5	1	4
Woodford M.	Interest and Prices: Foundations of a Theory of Monetary Policy	4	/	4
Cooley T.	Frontiers of Business Cycle Research	4	1	3
Wickens M.	Macroeconomic Theory. A Dynamic General Equilibrium Approach	4	2	2
Obstfeld M. & Rogoff K.	Foundations of International Macroeconomics	3	2	1
Adda J. & Cooper R.	Dynamic Economics: Quantitative Methods and Applications	2	1	1
Alogoskoufis G.	Dynamic Macroeconomics	2	2	/
Azariadis C.	Intertemporal Macroeconomics	2	1	1
McCandless G.	The ABCs of RBCs: An Introduction to Dynamic Macroeconomic Models	2	1	1
Agenor P-R. & Montiel P.	Development Macroeconomics	1	1	/
Aghion P. &Howitt P.	The economics of growth	1	/	1
Athreya K.	Big Ideas in Macroeconomics: A Nontechnical View	1	1	/
Bagliano F. & Bertola G.	Models for Dynamic Macroeconomics	1	1	/
Bertocchi G.	Strutture Finanziarie Dinamiche	1	/	1
Champ B. *et al.*	Modeling monetary economics	1	1	/
Chiang A. & Wainwright K.	Fundamental Methods of Mathematical Economics	1	/	1
Chugh S.	Modern Macroeconomics	1	1	/
de la Croix D. & Michel P.	A theory of economic growth : Dynamics and policy in Overlapping generations	1	1	/
Enders W.	Applied Econometric Time Series	1	/	1
Froyen R. & Guender A.	Optimal Monetary Policy under Uncertainty	1	1	/
Galor O.	Discrete Dynamical Systems	1	/	1
Heijdra B.	Foundations of Modern Macroeconomics	1	/	1
Jappelli T. & Pistaferri L.	The economics of consumption	1	/	1
Kurlat P.	A Course in Modern Macroeconomics	1	1	/
Mankiw G.	Macroeconomics	1	1	/
Miao J.	Economic Dynamics in Discrete Time	1	/	1
Mishkin F.	The economics of money, banking, and financial markets	1	1	/
Niepelt D.	Macroeconomic Analysis	1	/	1
Pissarides C.	Equilibrium unemployment theory	1	/	1
Sargent T.	Rational Expectations and Inflation	1	1	/
Weil D.	Economic Growth	2	1	1
Williamson S. D.	Macroeconomics	1	1	/
No reference textbook		10	2	8

Notes The table shows the sample of textbooks used in the 2020-2021 academic year in graduate macroeconomics courses in the economics departments considered. Column (1) presents the names of the author(s), while column (2) shows the title of the textbooks. Column (3) shows the number of institutions using the textbook either as a reference text or as a recommended readings, columns (4) and (5) make the distinction between (i) *professional* master's and (ii) *research* master's/PhD courses. Only textbooks that are used in at least two universities appear in the table.

Table B-6: Distribution of graduate textbooks used in research masters or PhD programs across top- and lower ranked departments in the Tilburg ranking

Top-2 deciles		Other deciles	
(1) Author(s)	(2) # of citations	(3) Author(s)	(4) # of citations
Ljungqvist L. & Sargent T.	5	Ljungqvist L. & Sargent T.	16
Stockey N. Lucas R. & Prescott E.	4	Stokey N. Lucas R. & Prescott E.	8
Acemoglu D.	2	Romer D.	8
Gali J.	2	Gali J.	7
Cooley T.	2	Acemoglu D.	3
Woodford M.	2	Barro R. & Sala-i-Martin .	3
Adda J & Cooper R.	1	Blanchard O. & Fischer S.	3
Obstfeld M & Rogoff K.	1	Walsh	3
Walsh C.	1	Wickens	2
		Woodford M.	2
		Aghion P. & Howitt P.	1
		Azariadis C.	1
		Bertocchi G.	1
		Chiang A. & Wainwright K.	1
		Cooley C.	1
		Enders W.	1
		Galor O.	1
		Heijdra B.	1
		Jappelli T. & Pistaferri L.	1
		McCandless G.	1
		Miao J.	1
		Niepelt D.	1
		Pissarides C.	1
		Weil D.	1
No reference textbook	2	No reference textbook	7

Notes: The table shows the sample of textbooks used in the 2020-2021 academic year in graduate macroeconomics courses in the economics departments considered. Only textbooks used in a research master's or a PhD course are considered. Column (1) and (3) display the names of the author(s). Columns (2) and (4) shows the number of institutions using the textbook either as a reference text or as a recommended reading in top-ranked universities (2) and other universities (4). Top-ranked universities are the ones that belong to the first decile of the Tilburg Ranking.

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