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Full Length Article

Japan at the forefront of the economics of aging? A bibliometric analysis☆

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ABSTRACT

This paper analyzes how economists have considered the question of aging over the last fifty years. The major originality of this paper is to conduct a bibliometric analysis of the economics of aging literature, based on the textual analysis of three different and complementary corpora, while existing studies only concern subfields. It shows that the definition of the economics of aging is less straightforward than expected and introduces some identification criteria to get quantitative results on the growth of the literature, its geography, and its research agenda. One claim of the paper is that aging has emerged as a distinct topic that spans different fields, from population to labor economics, and has strong connections with health economics, macroeconomics, and public economics. Topics of interest have evolved over time with notably a major growth for health issues, while pensions issues have been at the center of the investigation for several decades. In addition, we show that the geography of the economics of aging does not correspond to the geography of aging, with Japan somewhat underrepresented in the literature. Lastly, we draw some lessons from this neglect in the dominant research agenda on the economics of aging and suggest directions for future research that would give to Japan more space in comparative studies, given its position at the forefront of aging.

Introduction

Thomas Malthus assumed people would die of famine, not of old age (Malthus, 2015). Population is a perennial topic in economics, aging[1] a more recent one (Bloom and Luca, 2016). Economists seem to have been relatively slow to investigate aging issues within the multidisciplinary field of aging studies, compared to medical researchers, demographers, or sociologists. However, there are some signs that the economics of aging as a subdiscipline has been growing in recent decades. For example, the second edition of the Palgrave Dictionary of Economics (1923) contains no article on aging but several articles on population and a technical article discussing civil and military pensions. Aging appears in the New Palgrave Dictionary of Economics (Clark, 1987; Weil, 2008) with one article and in the most recent edition (2018) with not just one but two articles on aging.

A pioneering survey on the economics of aging (Clark, Kreps, and Spengler, 1978) was published in the *Journal of Economic Perspective* forty-seven years ago, but no update of such a survey has appeared since then. Only in the last ten years have two handbooks on the economics of aging been published (Piggott and Woodland, 2016; Bloom, Sousa-Poza, and Sunde, 2023, respectively HBA1 and HBA2 thereafter) demonstrating that during this gap of two generations the field has not been dormant but has branched out in many directions. The economics of aging also has its specialized journal since 2013, the *Journal of the Economics of Ageing* (JOEA thereafter).

The authors of the aforementioned survey predicted the rise of the economics of aging: "We argue that the economics of ageing is an important and relatively unexplored area of economic analysis. Many significant policy issues that require the nation's immediate attention are related to or caused by population ageing. The projected continued

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[1] In this paper, we prefer the US spelling to the British spelling. However, we also use "ageing" as an alternative keyword to "aging" in our textual analysis and we respect the use of "ageing" in the titles of articles and journals as well as in citations.

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ageing of the population will only intensify the importance of the economics of ageing." (Clark et al. 1978: 949-950). This prediction seems to have been confirmed as shown above but the development of the economics of aging requires a more precise quantitative evaluation.

It is also important to identify the specificities of the economics of aging within aging studies. One issue that stands out as closely related to economics is pensions, which has long dominated the field, as well shown in HBA1 and HBA2, among other references. Around the mid-1980s, policymakers started to express a growing concern about the sustainability of pension systems and, more broadly, the economic costs of aging. This led to an increase of academic studies and official reports on aging, such as reports by the International Monetary Fund (IMF) or the Organization for Economic Co-operation and Development (OECD) on aging in advanced economies (OECD, 1985; Heller et al., 1986) and a World Bank report on "averting the old-age crisis" (World Bank, 1994). National and international organizations started to publish regular reports on aging, as seen by the European Union "Ageing Report," whose earlier publication dates back from 2001 (European Union, 2001; European Union, 2006 to 2024). Is it possible to confirm quantitatively the importance of pensions as a major topic considered by the economics of aging? Are there other topics that have emerged and developed rapidly?

To summarize, in this article, we address the following research questions. How has academic research grown on the economics of aging over time, and how specific is it compared to other related fields of economics (e.g., population economics, labor economics, or health economics)? What are the main research topics within the economics of aging and how have these topics changed over time? Finally, in the context of this special issue, given Japan's place at the forefront of aging, we have also investigated the geography of the economics of aging and the specific place of Japan. In short, we compare the global scientific literature and the more specific one that deal with Japan – by topics or by sources – in order to identify the commonalities and the differences.

To deal with the questions above, we study how economists have considered the question of aging over the past fifty years by using bibliometric techniques applied to textual content of our materials. To our knowledge, this is the first paper to do so.[2]

As the definition of the economics of aging is less straightforward than we may think, it is important to establish identification criteria for our quantitative results on the growth of the literature, its geography and research agenda. We rely on three different corpora: a corpus of references from the SCOPUS citation database, a corpus of references on aging in the leading economic journals, and thirdly a corpus of references from the two handbooks on the economics of aging and associated sources. The corpora are complementary to one another, as each corpus has its benefits and its shortcomings. This is why we have to go back and forth between each corpus.

The expected contribution of our paper to the literature on the economics of aging in general and to this special issue in particular is manyfold.

First, the economics of aging has emerged as a distinct discipline that spans different fields, from population and labor economics, and has strong connections with health economics, macroeconomics, and public economics fields. Overall, the economics of aging literature in top economic journals has increased from 5 articles per year in the 1980s to 40 in the early 2020s. In the SCOPUS database, the increase is from 50 articles per year in the 1980s to 1300 per year in the early 2020s. The relative share in the total economic literature has registered a more modest rise over a longer period but has at least doubled, from 0.5 % in the 1960s to 1 % in the early 2020s. While the figure for the economics of aging seems small, we also have reason to believe than our estimate of the relative share is conservative, underestimating the true relative share by half.

Another result of the paper is that the literature is less U.S.-centric than it used to be, as demonstrated by the countries studied or mentioned in the references or by the affiliations of the authors. Japan has long been one of the most studied countries after the U.S. However, it accounts for 4 % of the total literature over 1980 to 2024. Japan was overtaken by Germany two decades ago, and by China in the last decade. Thus, the Japanese experience seems to be somehow understudied. This has several consequences on our understanding of aging and the setting of the research agenda that may not properly take into account lessons from the Japanese experience. From this perspective, our paper confirms the interest of the special issue of JOEA, "Economics of ageing: Japan in comparative perspective", in filling the gap in the literature, and we hope we substantially contribute to it.

A third result of the paper is that the economics of aging has diversified away from the economics of pensions, which dominated the earlier literature. Today, still, about half of articles on the economics of aging concern pension issues. As in economics in general, health has emerged as a rising topic, covering a third of the economics of aging literature from a tenth half a century ago. Labor issues have also registered a similar if more modest rise, now covering a fourth of the literature. Meanwhile, the share of papers covering macro issues (income and growth, fiscal and monetary issues) has been broadly constant. We also identify two emerging topics: innovation, as well as inequality and poverty, for which the research is relatively more active in Japan, and leads to the identification of mechanisms that are not well studied in the general literature.

The rest of the paper is organized as follows. Section 2 presents the methodology and section 3 discusses the three corpora used in this study. Moving to our results, section 3 discusses the growth of the economics of aging and explores its geographical dimension while section 4 analyses the different subfields of the economics of aging, while section 5 concludes.

Defining the economics of aging

We discuss here three potentially competing definitions of the economics of aging: one derived from insights from academic research; another one based on relevant JEL codes; a final one based on textual analysis and the selection of specific keywords. In this paper, we favor this third definition, which is enriched by considerations on the scope of the economics of aging proposed by the first two.

Population aging and individual aging

Defining aging and defining the economics of aging are two separate matters. The major purpose of this paper is to propose an analysis of the evolution of the economics of aging (its research agenda, its scope, its geography) through a bibliometric analysis applied to textual data. It thus requires a definition of aging in order to stabilize the textual content of our material. It is worth distinguishing first between population aging and individual aging: the former can be considered the core of the economics of aging while the latter is not absent from the economics of aging but relatively secondary, whereas it is the focus of other disciplines such as medicine and sociology. For example, the three editions of Palgrave dictionary have entries on "ageing populations" (1986, 2008, 2018) and "population ageing" but not on individual aging. The two handbooks we consider in this article (HBA1 and HBA2), explicitly focus on population aging, as in the co-editors' statement of the JOEA, even if both this last text and the introduction of the HBA2 (with the same authors, Bloom, Souza-Posa and Sunde, 2013 and 2023) also consider

[2] We have found several articles related to specific subfields of the economics of aging, such as Wagstaff and Culyerb (2011) on health economics or Bell and Lemmon (2023) on long-term care. The first paper relies on Econlit and the second on SCOPUS. Beyond these papers, important topics related to the economics of aging, such as the impact of aging on pensions, on the labor market, or its macroeconomic impacts, are not covered. It is also worth noting the existence of a bibliometric paper on aging research (Li et al., 2022), which is adopting a medical perspective.

individual aging at the micro level with an emphasis on individual differences in behavior over the life cycle. This is why we focus here on population aging: while not fully putting aside the individual dimension of aging, we recognize that it is a matter of secondary importance in the context of this paper, with few exceptions (e.g. later, when we discuss the literature on pensions).

Population aging is relatively easier to define from an economic perspective. We refer to David Weil's general definition in Palgrave: "Population ageing is the shift in the distribution of a country's population towards older ages. An increase in the population's mean or median age, a decline in the fraction of the population composed of children, or a rise in the fraction of the population that is elderly are all aspects of population ageing" (Weil, 2008: 10468). As for individual aging, the definition from an economic perspective is less established and will rather adopt a functional perspective, such as the one proposed by Rothermund et al. (2023: 1437) for example: "We define aging as a characteristic deterioration in one (or more) observable attributes of an organism that typically occurs during later life. With this narrow functional definition, we gain the freedom to separate aging from other processes of age-related change (e.g., maturation, growth, illness, terminal decline)."

Aging within JEL classification codes

The above approach was based on the Palgrave dictionaries of Economics, the two handbooks specifically dedicated to the economics of aging that we have identified, as well as the editorial statement of the JOEA, the only journal specifically dedicated to the economics of aging.[3] A complementary approach is to mobilize the JEL classification codes. However, this usage is much less straightforward than we may have expected, given the relations of the economics of aging with other fields. A major characteristic is indeed that there is no single JEL code dedicated to the economics of aging, which is not a unique case. However, the second feature is that the economics of aging is mainly related to the J code "Labor and Demographic economics".

At a lower level of classification, aging is particularly related to J1 (demographic economics) and more precisely J10 (general) and J11 (demographic trends, macroeconomic effects, and forecasts). Within the J code, J14 (economics of the elderly, economics of disability, non-labor market discrimination) is of particular interest, although it does not focus exclusively on the economics of aging. The classification system has two subcategories related to retirement, J26 (retirement, retirement policies) and J32 (nonwage labor costs and benefits, retirement plans, private pensions). Pension issues are treated either as part of the same general category or as under "public economics" (H), with a total of three subcategories related to private and public pensions: J32 already mentioned, H55 (social security and public pensions), H75 (state and local government: health, education, welfare, public pensions). Finally, economics of aging is also related to the JEL code I (health, education, and welfare) and in particular I1 (health).

Although, we retain as our main source SCOPUS over Econlit, which provides JEL codes, the discussion on the definition of the economics of aging from the perspective of JEL codes has important implications for our bibliometric work in its textual component, which is the basis of our empirical strategy. In short, we use the JEL codes as a semantic source rather than as a statistical source (through Econlit). In the JEL classification system, only the word "elderly" is present (J14) but other direct keywords related to aging are not present. Moreover, the J14 code is a broad item covering topics that go much beyond aging. As for pensions and retirement, which are keywords in our analysis, they are present in four subcategories (J26, J32, H55 and H75, while there are no specific keywords related to aging in the general category "health, education, and welfare" (I) despite its relation to economics of aging. The two keywords related to "care" are "healthcare" (I11) and "childcare" (J13). According to Google Ngram, the words "long-term care" or "eldercare" emerged concurrently in the mid-1980s but while the former took off after the 2000s, the latter languished. One may wonder if the current classification is fully adequate to capture the economics of aging given its recent growth. Since its introduction a century ago, the JEL classification system has been revised periodically about every one or two decades, but the last major revision dates back from 1988 to 1990 (Cherrier, 2017).

Identification strategy: narrow and broad definitions

Our statistical analysis primarily relies on textual analysis (Bybee et al., 2024; Grimmer, Roberts, and Stewart, 2022; Gentzkow, Kelly, and Taddy, 2019) and on bibliometric studies (Nees and Waltman, 2010; Wagstaff and Culye, 2011; Goutsmedt, 2021; Bell and Lemmon, 2023).[4]

We do not attempt to define population aging with a specific cutoff age. The scope of each study is often buried inside each paper or in its annexes. Also, given the focus on textual analysis, it would be difficult to capture such information from data contained in titles or in abstracts. Let us simply notice that the specific cutoff age has changed over time, in relations to institutional setups as well as with the rising share of older people. Most papers study aging in populations aged above 60 or 65, with specific papers focused on the "oldest of the old" over 80 or 85. These cutoffs have bearing on the specific interest of each study, with studies on pensions or on the labor market focusing on the earlier cutoff related to retirement and studies on health or long-term care expenditures focusing on the later cutoff related to loss of autonomy or to rising healthcare expenditures.

We can however capture semantic variations related to aging. This is evident in the change of the preferred keyword (Fig. 1). The word "elderly", present in titles of 10 % of one of the corpora in the 1980s, has now declined to cover less than 5 % of these same titles. This may also explain the lower popularity of "eldercare" compared to "long-term care". The expressions "older adult" or "older worker" have registered a modest rise from close to zero until the 2010s to about 2.5 % now. Meanwhile, the more general word "aging" or "ageing" has increased in use from 5 % to 7.5 % over the period of study. We tested a number of additional words related to aging, such as "aged" or "age": while the former allows to capture a few additional articles related to aging, the latter captures any cohort-related study discussing any age profile but without any specific focus on the old. Overall, these terms only capture about 15 % of the total literature related to aging.

The keywords above allow us to *narrowly* identify articles in the aging field. A broader characterization of aging is to capture topics that are clearly related to aging such as "pension", "retirement", "social security", "long-term care" or "older worker". The list of keywords in the previous paragraph is what we call the *narrow definition* of aging and the full set of keywords the *broad definition* of aging. As evident from the sample list of keywords, it is easier to capture articles related to pension issues but less so for health or labor issues. This issue is even more acute for questions related to macroeconomic policies: aging might be one important factor in the assessment of fiscal "sustainability" but not the only one. Another example comes from the literature that deals with Japan: aging is discussed as one driving factor of "deflation" but again

[3] It is also worth mentioning, among other relevant journals, the *Journal of Population Economics*, which covers economics of aging but goes much beyond, as well as the *Journal of Population Ageing*, which partially covers economics of aging but is in fact much broader from a disciplinary perspective.

[4] In identifying subfields in economics, we were also guided by general surveys of the economic literature (Kim, Morse, and Zingales, 2006; Heckman and Moktan, 2020; Hamermesh, 2013; Angrist et al. 2017).

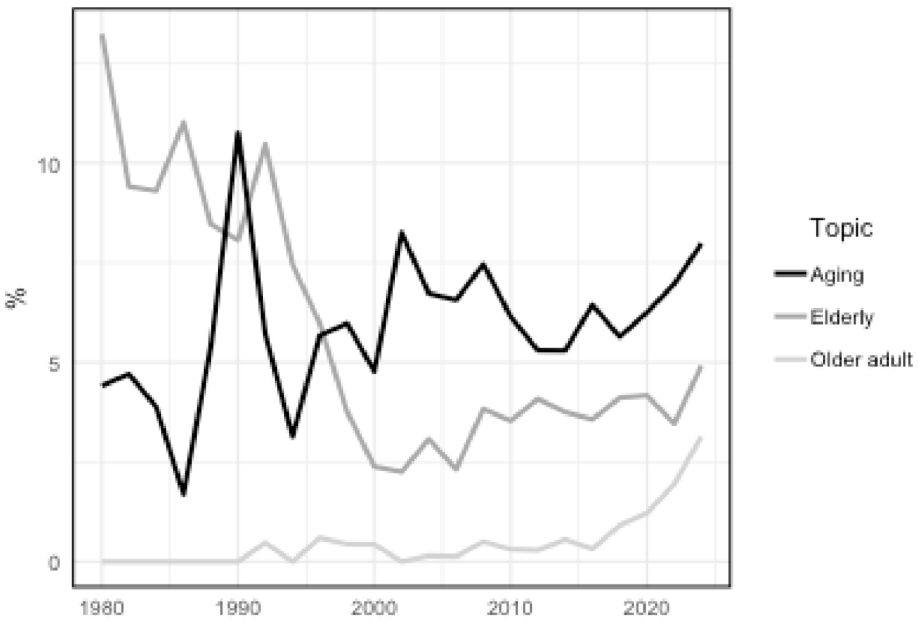


Fig. 1. Preferred keyword related to aging.
Source: corpus 1 (SCOPUS)

this is not the only one. We will return below on how the topic related keywords adequately capture aging.[5]

To test the robustness of our approach, we performed two specific exercises.[6] Given the negative connotations of "aging", it might be the case that the academic literature has preferred more neutral terminology, the wording "aging" being often mobilized to promote pronatalist policies. A possible consequence is the exclusion of "aging" in the titles and abstracts of some articles. The existence of a literature that addresses aging without naming it would indeed be a problem for our identification strategy. We have applied sentiment analysis to the titles which shows that the connotation of aging is not particularly negative, and we therefore consider that our approach is not significantly biased from this perspective. We have also used various expressions to capture aging while avoiding the pitfalls of the keyword "age" mentioned above as "demographic structure", "age structure", "declining fertility", and "increasing life expectancy". This leads to a marginal increase of the articles of the first corpus by 6 % without significant changes to the main results, but we eventually decided against including those keywords.[7]

Data and empirical strategy

Based on the above discussion on the definition of the economics of aging, we refined our empirical strategy as follows. Its core is to rely on a textual analysis that is coherent with our narrow and broad definitions of the economics of aging. We complement this textual analysis with an analysis of the references found in the two handbooks which offers a recent view of editors and contributors about what constitutes the economics of aging, sometimes extending beyond economics.

Specifically, we mobilize three different corpora, each with its specific purpose and each with its own benefits and shortcomings (Table 1 and Table 2). We present the list of keywords in Table 3: our identification procedure is adapted to each corpus but also coherent for all three corpora. The first corpus of papers is extracted from SCOPUS and contains 20,380 items; the second corpus of articles published in top economic journals contains 81,887 items of which 769 related to aging; the third corpus with references in two handbooks contains 4184 items. Concerning the first corpus, while it provides the most detailed information, the inflation of titles added to SCOPUS makes it impractical to use it to assess the growth of the literature on aging. Concerning the second corpus, the challenge is of capturing articles related to aging based solely on our keywords and on the limited information provided by a title and not the abstract. One issue concerning the third corpus is that many quoted references are outside economics. We mobilize successively these three corpora in a complementary and coherent way to answer each of our research questions.

First corpus: SCOPUS

The first corpus, based on SCOPUS, is the most comprehensive since in addition to providing the author(s), the year of publication, the publication and the title – all in the two other corpora – it also provides abstracts, list of references, the affiliation of the authors, or the number of citation quotes. The standard search in SCOPUS for a given term encompasses three items (title, name of the journal, abstract) which allows to identify a far greater list of references that concise or occasionally quixotic titles.

Since SCOPUS contains a total of 160 million references with closed to 5 million related to economics, it was not possible to use SCOPUS to assess the relative importance of the field of the economics of aging. In addition, as we moved further back in times, SCOPUS is increasingly less reliable. For example, embarrassingly, the 1978 survey published in the *Journal of Economic Literature*, with which we started our investigation on the economics of aging, is absent from SCOPUS. This is why, assessing the rise of a subfield of the economics of aging based solely on SCOPUS, as done by Bell and Lemmon (2023), has its shortcomings.

[5] We also recognize that much of the economics literature addresses aging from the perspective of its causes (e.g. declining fertility or increasing life expectancy. This may affect our results and we thank an anonymous referee for pointing out this possible limitation of our strategy. However, as mentioned below (p. 14), we found that the word "fertility" appears with a relatively low frequency in the word cloud of HBA1 and it seems that this finding can be generalized.

[6] We thank a referee for suggesting these robustness checks.

[7] The main analysis was finalized with data accessed in March 2025. The robustness checks were performed in September 2025. Even if we use only historical data up to 2024, we observed numerous changes in SCOPUS that are not explicit (for example, citation counts increase or decrease by about 5%; books and book chapters being removed…). This is another potential weakness of SCOPUS in addition to those discussed in the next section.

Table 1
Main Economic Journals and Main Economic Journals on Aging (by number of articles on the economics of aging).

	Name	Journal	Influence						Articles on aging	
		Code	Date of creation	Availability SCOPUS	CiteScore SCOPUS	Impact Clarivate	Ranking RePEc	H-index RePEc	Total	In %
Top journals										
1	Journal of Public Economics	JPUE	1972	1975	8.8	4.9	27	16	250	5 %
2	American Economic Review	AER	1911	1973	17.8	11.6	3	1	72	1 %
3	Economic Journal	EJO	1891	1973	7.7	3.6	21	13	62	1 %
4	Journal of Financial Economics	JFE	1974	=	22	10.4	5	6	57	2 %
5	Review of Economics and Statistics	RESTAT	1969	1978	_	7.6	17	11	52	1 %
6	Quarterly Journal of Economics	QJE	1886	=	21.9	11.1	4	2	27	0 %
7	Journal of Finance	JOF	1946	=	12.6	9.5	8	3	38	1 %
8	Journal of the European Economic Association	JEEA	2003	=	7.4	3.3	24	39	32	2 %
9	Review of Financial Studies	RFS	1988	1996	_	6.8	11	9	34	1 %
10	Journal of Monetary Economics	JME	1973	1975	7.4	4.1	15	8	28	1 %
11	Journal of Labor Economics	JOLE	1983	1985	6.4	3.9	19	29	23	2 %
12	Journal of Political Economy	JPE	1892	1969	15.2	6.9	6	5	25	0 %
13	Review of Economic Studies	RES	1933	=	12.7	6.4	13	7	25	1 %
14	Brookings Papers on Economic Activity	BPEA	1970	1990	7.6	_	14	32	15	2 %
15	Econometrica	ECMT	1933	1974	13.1	7.1	1	4	14	0 %
16	Journal of Economic Perspectives	JEP	1987	1992	12.8	8.8	10	9	16	1 %
17	Journal of Economic Literature	JEL	1969	1981	15.4	_	2	14	6	1 %
18	Journal of International Economics	JIE	1971	=	6.0	4.0	25	15	4	0 %
19	RAND Journal of Economics	RAND	1970	1984	4.9	2.8	20	23	4	0 %
20	Journal of Economic Growth	JEG	1996	=	_	2.3	9	67	4	1 %
Other journals on the economics of aging										
1	Journal of Pension Economics and Finance	JPEF	2002	=	1.3	4.2	336	453	437	58 %
2	International Social Security Review	ISSR	1948	1967	1.7	0.9	1074	995	329	31 %
3	Journal of the Economics of Ageing	JOEA	2013	=	3.8	1.9	446	759	307	75 %
4	Insurance: Mathematics and Economics	IME	1982	=	3.9	2.2	393	292	266	72 %
5	European Journal of Health Economics	EJHE	2000	2002	_	3.1	599	494	252	41 %
6	Work, Aging and Retirement	WAR	2015	=	_	2.3	_	_	225	72 %
7	Applied Economics	AE	1969	=	3.8	1.8	199	104	223	3 %
8	North American Actuarial Journal	NAAJ	1997	=	2.8	1.4	550	434	212	15 %
9	Geneva Papers on Risk and Insurance	GPRI	1976	_	5.1	3.3	715	556	185	12 %
10	Journal of Population Economics	POP	1987	1988	_	3.3	91	100	160	11 %

Sources: SCOPUS (article selection); RePEc (journal ranking); Wikipedia (journals' history); publishers (CiteSCORE); authors. Information from RePEC accessed in June 2025. CiteScore (SCOPUS) and Impact Factor (Clarivate) for 2024 or most recent available year. Notes. The convention "=" denotes that SCOPUS covers the journal since its creation. The number of articles on aging are counted using the keyword identification method by without applying any cutoff date of 1980. Articles on aging: using a keyword search method on the title and the abstract but no on the name of the journal. The percentage is computed on articles for which the information is available on SCOPUS. The ranking in REPEC is only informative: while relevant for the top journals, it is probably less so for a journal like the JOEA covering a multidisciplinary topic; the ranking of the JOEA in REPEC is lower than that of comparable journals with the same Impact factor from Clarivate and same Citescore index from SCOPUS, as Applied Economics or Insurance: Mathematics and Economics.

Another shortcoming of SCOPUS is the occasionally blurred boundaries between subject areas. We use specific keywords related to aging, restricting the search to the subject area "economics, econometrics, and finance". This subject area allowed us to capture all top journals in our second corpus, albeit sometimes with a much shorter lifetime. In addition, the subject area sometimes included some misclassified journals demonstrably not related to economics, which we exclude in the final analysis.[8]

[8] A competing bibliographic database, Web of Science (WoS), provides interesting summary information about the fields in which key authors in the economics of aging publish, but the relation between SCOPUS's 27 subject areas and WoS's 254 subject areas is confusing in our view. A more comprehensive analysis of the subject areas in SCOPUS or WoS was beyond the scope of this paper.

Table 2
Comparison of the three corpora.

	First corpus SCOPUS	Second corpus Top journals	Third corpus Handbooks	Identification	Availability Period
SCOPUS	20,380	788	430	Title & abstract	1980–2024
Top journals		769	177	Title only	1960–2024
Handbooks			4,184	Title only	1939–2023

Sources: three corpora.
Note. The first corpus contains all articles in SCOPUS from 1980 to 2024 published in the field of economics and with any keyword related to aging in the title, in the abstract, or the name of the journal. The SCOPUS database was accessed in March 2025. Two robustness checks were performed in September 2025 using an update of the SCOPUS database. The second corpus is extracted from a list of all articles published in top economic journals (of 81,887 articles): we derive a subsect of articles related to aging. The third corpus contains all the references in both handbooks, excluding double-counting. The number of articles from top journals in SCOPUS is somewhat larger (788 against 769) despite a shorter time frame because SCOPUS also allows to apply the keyword search to the abstract. The number of articles on aging from top journals in the handbooks is of 177 articles, a considerably smaller number than those published in top journals in general (739 in total, not in the table above) because references also include general or technical articles not related to aging (e.g. a specific econometric technique).

Table 3
Main Keywords.

	Selected keywords
Aging	
• Aging (narrow)	Elderly, older worker, aging, ageing, old-age, longevity
• Pension	Pension, retirement
• Health	Long-term care, eldercare, dependency
• Aging (broad)	Elderly, older worker, aging, ageing, old-age, pension, retirment, long-term care, eldercare
Related fields	
• Population	Population, demography, demographic, fertility, immigration
• Health	Health, healthcare, medicine, infection, hospital

Source: first corpus (SCOPUS) and third corpus (top journals).
Note. The specific keywords are applied on the titles, names of the journals and abstract to extract articles from SCOPUS to build up the first corpus. The same method is applied to titles only on the third corpus (top journals) to assess the evolution over time of the economics of aging.

Second corpus: top economics journals

As one major aim of this study is to capture the relative size of the economic literature over time, we use as a second corpus all the articles in top economic journals since 1960. This would be impossible to do with SCOPUS. This corpus is also not a subset of the first corpus but the information is obtained through web scraping on RePEc (Research Papers in Economics); the information is much less limited than SCOPUS (limited to the title, the authors, the date and the journal) but tends to cover journals since their creation, not since an arbitrary cutoff date as in SCOPUS. We use the aggregate ranking in RePEc to select those journals. We exclude a few journals with a shorter life span, such as five journals created in 2009 (the *Annual Review of Economics* and the four *American Economic Journals*, on macroeconomics, microeconomics, applied economics, and economic policies). We also exclude two more specific journals classified in the top 25, such as the *Journal of Econometrics* and the *Journal of Accounting and Economics*.

Our final list includes 20 journals, with the last journal in our sample being ranked 27 in RePEc as of June 2025 (upper section of Table 1). The list also allows us to cover a wide range of issues, including growth, finance, labor, and public economics. No health journals are included in the list, the *Journal of Health Economics* being ranked 68. The list also excludes the possibly relevant *Journal of Population Economics*, and the much relevant JOEA.

In total, our second corpus contains 81,887 references, from which we extract 769 articles related to aging. Out of 20 journals, 11 were created before 1970 and 15 before 1980. The upward drift in articles in this corpus is due to the addition of new journals, but also to the slight increase of yearly published articles per journal over the period. For each article, we collect the name of its author or authors, the name of the journal, and the date of publication.

Third corpus: handbooks and related materials

Another aim of the paper is to identify the scope of the economics of aging. The third corpus collects all the articles listed in the bibliography of each chapter of the two handbooks on the economics of aging. The first handbook (HBA1), edited by Piggott and Woodland (2016) contains 17 chapters and 1,253 references. The second handbook (HBA2), edited by Bloom, Sousa-Poza, and Sunde (2023) contains 40 chapters and 2,931 references in total. For this aggregate corpus of 4,184 references, excluding double counting, we have the same barebone information as in the second corpus: the author(s), the title, the date of publication, and the journal or institution in which the article appears.

The main advantage of this corpus is that it can be considered as our baseline regarding our definition of the economics of aging from the perspective of published and cited papers. It is indeed clearly related to aging, as identified by the five editors of both handbooks and the more than one hundred contributors selected by them. However, this corpus has a strong bias towards more recent research, including unpublished research. In addition, the two handbooks have a somewhat different emphasis as discussed below.

We have considered alternative sources to add to this third corpus but, for practical reasons, have eventually limited the analysis to the two handbooks. We have produced word clouds of these sources to compare them to those of the handbooks. First, the *Journal of the Economics of ageing* is a good alternative candidate, but it shares the editors as the second handbook and, in effect, the topics covered are broadly similar. It led us not to include it, except to answer specific questions. Second, the 1978 survey in the *Journal of Economic Literature* (Clark, Kreps, and Spengler, 1978), to our understanding the only survey on the issue, also provides an interesting complement in terms of the topics covered to the two handbooks published forty years later. However, the survey was not used for formal analysis, as it does not allow us to cover the most recent period.

To bridge the gap between these two periods (late 1970s and the last 10 years), a possible candidate would have been the 18 volumes of the NBER series on the economics of aging (1989–2017), produced under the editorship of David Wise, with three volumes focused on the United-States and Japan (Noguchi and Wise, 1994; Hurd and Naohiro, 1996; Ogura, Tachibanaki and Wise, 2001). These volumes were extremely informative in constructing our understanding of aging, but we did not perform any systematic analysis of this source. One issue is the strong U.S. bias of this series: all but two of the authors of the first volume were based in the U.S. (8 %); the bias is reduced but remains in the last volume with only nine authors based outside the U.S. (22 %). With about a dozen papers each year, these volumes also offer spotlights on specific research topics, but without the ambition of providing a comprehensive picture of the economics of aging, as in HBA1 and HBA2.

Finally, the RePEc website also lists two additional working paper series on the economics of aging, the Program on the Global Demography of ageing (PGDA, 2005–2017) at Harvard University, with 494 references, and the Munich Center for the Economics of aging (2002–2018) at the Max Planck Institute for Social Law and Social Policy, with 531 references. For some reason, both series were discontinued five years ago. Moreover, we found that the information these series could have provided might have been redundant to the one we already have.

Comparing the three corpora

One could naively expect a majority of articles related to aging in the second corpus (top journals) to be also included in the third corpus (references in handbooks) and the first corpus (SCOPUS). In the same way, the third corpus could be expected to be largely included in the first corpus. This is however not the case.

Regarding the relations between SCOPUS and top journals, only about 80 % of articles in top journals (related or unrelated to aging) are included in SCOPUS due to the gradual expansion of SCOPUS.[9] By contrast, since SCOPUS also includes abstract and not just the title, we also capture a few additional articles from top journals not present in the second corpus. To draw an analogy, constructing corpus 1 and corpus 2 is similar to a fisherman using two types of fishing nets: a fine-mesh net (selecting keywords from titles and abstracts for corpus 1) and a wide-mesh net (selecting keywords in titles only for corpus 2). Our estimation is that the wide-mesh net captures only half as many articles as the fine-mesh net.

In total, adding abstracts allow to capture an extra 15 % of the articles in top journals. This is our first estimate of the underestimation resulting from our keyword identification applied to titles. Regarding the overlap between the second and third corpus, we find that only 23 % of articles in top journals are referenced in the handbooks. Finally, only 10 % of references included in the handbooks are present in SCOPUS.

Regarding now the relation between SCOPUS and the handbooks, one reason for the low overlap ratio is due to the fact that they include articles published outside of economics, in particular in medical sciences. In addition, the authors of the chapters in the handbooks tend to rely not just on published articles in economic journals but also on official reports produced by international organizations (e.g. OECD, IMF, World Bank, as well as the World Health Organization or the International Labor Organization).

Finally, regarding the relations between the second and third corpora, about 50 % of articles published in top journals and mentioned in the handbooks are not related to aging but rather deal with technical methodology in an econometric journal or broader macro strategy for example.

For both the first and the second corpora, our analysis relies heavily on a specific set of keywords used to extract articles related to aging in a wider database, be it the full references in SCOPUS or all articles published in top journals, irrespective of the fact that they are related to aging or not. To check the robustness of our identification strategy, we use the same keywords on the third corpus, which we know for sure relates to aging. With our *narrow* characterization of aging ("elderly", "aging", "older adults", and the like) applied to the titles only of the articles, we capture only 40 % of all articles. The same narrow characterization of aging yields only 15 % of all articles in our SCOPUS corpus. When applied to both titles, abstracts, and journals, this characterization captures 30 % of all articles. This vindicates our approach of choosing a broader set of keywords to identify the economics of aging.

The remaining keywords when considering aging in a *broader* sense (i.e. including "pension", "long-term care" and the like) thus allow to capture 70 % of all articles. If we repeat the same exercise on the articles published in the *Journal of the Economics of ageing*, the narrow characterization captures only 20 % of all articles while the broad characterization captures 50 % of all articles. This is our second estimate of the underestimation of the measure of the economics of aging. This suggests that any estimate of the size of the literature on aging based on a selection of keywords is an underestimation.

To compare the understanding of aging between our three corpora, we have produced word clouds of the titles of all articles included in these corpora. Titles are the only variable present in all three corpora. Words are preliminary lemmatized, thus counting as the same element "pensions" and "pension" or "health" and "healthy". In addition, we have included bigrams or trigrams, so as to capture such terms as "social security" or "long-term care". Stop words (articles, prepositions, pronouns…) and a few irrelevant words have been removed from the list of the top 50 words by frequency in the titles of each corpus.

The analysis confirms the diversity of understanding of aging from one corpus to the next and from the full period as opposed to the most recent period (Fig. 2). Both SCOPUS and the top journals are dominated by pension and retirement issues, two of our major keywords to extract articles on aging from a broader database (the full SCOPUS corpus or the complete list of articles published in top journals). By contrast, the two handbooks, published in the past ten years, give a greater emphasis on issues related to health or care.

To derive some additional insights on the economics of aging, a broader analysis performed on abstracts available only in our first corpus, SCOPUS, and this time focusing on the top 100 words by frequency, also allows to identify the key methodologies used in academic research on the economics of aging, namely: overlapping generation models, surveys, randomized controlled trials… Mirroring the shift of focus of topics of the economics of aging, this also demonstrates the change of methodologies applied to this field.

The economics of aging over time and across regions

In this section, we discuss the growth of the economics of aging literature as well as its geography. The first sub-section relies mainly on the second database (top journals) since this is the only one allowing to compute relative shares while the second sub-section uses the first (SCOPUS) providing the affiliations of researchers on top of a richer semantic content with the title and the abstract.

The rise of aging as a distinct research field

Over the past fifty years, aging has emerged as a distinct field with a growing body of articles identified in our first corpus. In top journals, articles on the economics of aging have increased from 5 articles per year in the 1980s to 40 in the early 2020s. In the SCOPUS corpus, the increase is from 50 articles per year in the 1980s to 1300 per year in the early 2020s. Those increases reflect in part the general inflation of academic publications and the gradual extension of the SCOPUS database.

In relative terms, using now our second corpus, articles related to aging represented less than 0.5 % of the total literature in the 1960s and 1970s, but now hover above 1 %, a twofold increase. While this increase may appear modest, this estimate is probably an underestimation of the growth of the literature on aging as discussed earlier. In addition, economics is a fragmented field. For example, related research on economics divides the fields into ten or a dozen categories (Hamermesh, 2013, among others), with each field covering thus about 10 % of the literature. Moreover, some fields, such as game theory, econometrics, or industrial organization, have little relation to aging. For example, the *RAND Journal of Economics* publishes an article related to aging only once every ten years (Fig. 3).

To assess the relative rise of the economics of aging, we then compare it to fields related to population economics, a much older topic in economics, and health economics. Both sub-disciplines have significant overlap with aging, as mentioned above in the analysis of JEL codes (section 2). One key difference is that they tend to discuss the other end of the age spectrum (e.g. fertility or infant mortality). The decline of fertility is of course a driving factor alongside the rise of longevity as a major determinant in the increase of the old-age ratio (Weil, 2008; Bloom and Luca, 2016). Still, there is not a single chapter with "fertility" in its title in the two handbooks on the economics of aging. The word "fertility" appears with a relatively low frequency in the word cloud of HBA1 presented above. We use a similar methodology to identify within top journals those related to population economics ("population", "demography", "fertility", or "immigration") and to health economics

[9] See also annex figure A1.

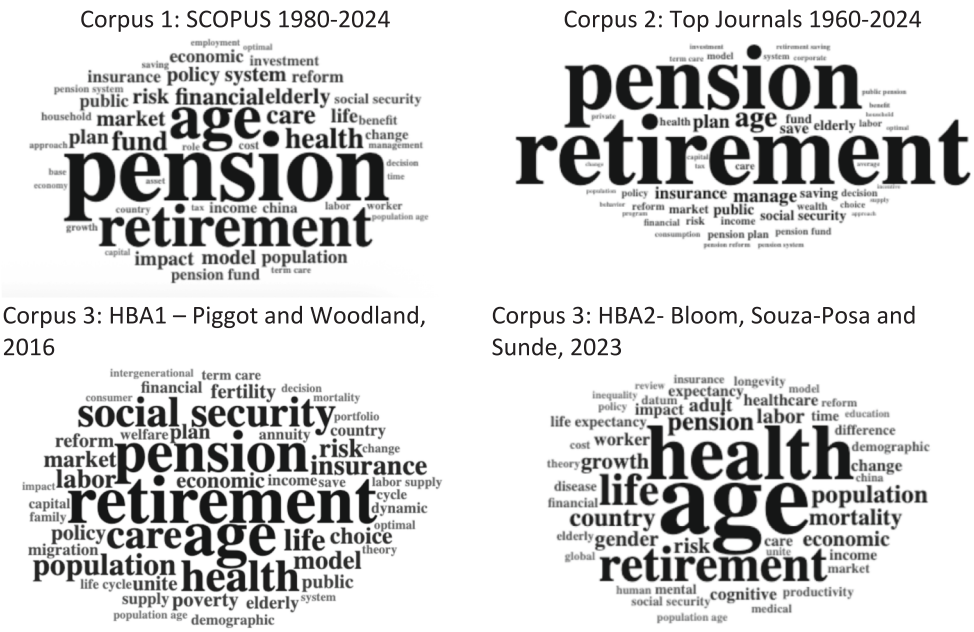
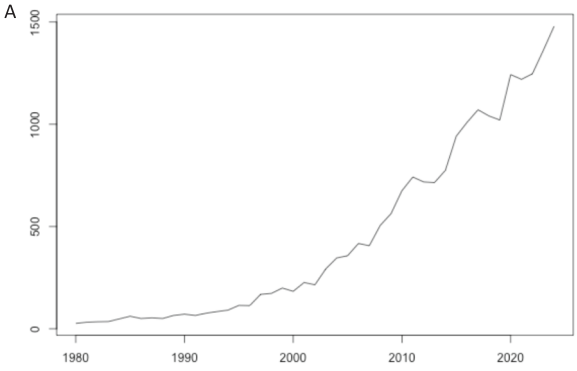
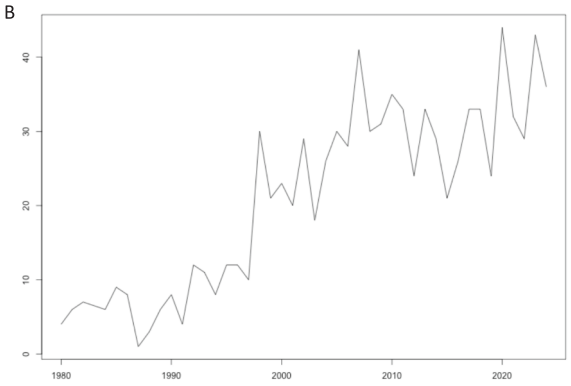


Fig. 2. Word Clouds of the Three Corpora. Sources: three corpora (SCOPUS, Top journals, HBA1 and HBA2). Note. List of the top 50 words by frequency, including bigrams and trigrams, after a preliminary lemmatization and removal of stop words. As the consequence of lemmatization, the word "aging" was replaced by "age" in the word clouds. As indicated in the text, "age" is not used as a keyword to extract articles from databases as it captures cohort-studies not specifically focused on older adults.



Source: corpus 1 (SCOPUS).

Note. Identification method: selected keywords on titles, abstracts and journal articles.



Source: subset of corpus 1 (SCOPUS) for publications in top journals listed in table 1.

Note. Identification method: selected keywords on titles, abstracts and journal articles.

Fig. 3. Total articles published on the economics of aging in SCOPUS and in top journals.

("health", "healthcare", "medicine", "infection", or "hospital"), as summarized in Table 3.

The comparative results are reported in Fig. 4. The rise of the field of aging is stronger than for population economics, which represents 1 % of the total literature, as the result of a slight rise over the last three decades but with a decline in the 1980s. By contrast, the rise of the economics of aging is dwarfed by that of health economics, from a similarly low level at 0.5 % in the 1960s to 6 % now. This rise is also documented in Heckman and Moktan (2020) and can be explained also by developments in econometrics and the growing availability of large datasets, not to mention the impact of research on Covid in the final years. While health expenditures tend to increase with age – except for the oldest old (Nakanishi et al, 2021) – and thus be concentrated on older adults, a small portion of the literature on health in top journals is concerned specifically with aging issues.

To summarize, based on an analysis of the top journals, we find a slightly significant but modest rise of the share of papers related to the economics of aging. Our next questions concern the geographical topical scope of the economics of aging and its evolution over time.

The geography of aging …

Before looking at the geography of the economics of aging, we must examine the geography of aging itself. Aging is a relatively recent phenomenon, and its importance has increased in recent years (Bloom and Luca, 2016). Moreover, a major finding of the literature is the universality of aging, in the more general context of demographic transition (Lee, 2002). However, the literature has also emphasized its diversity in time and space: "While the phenomenon of population ageing is taking place throughout the world, considerable heterogeneity exists across nations and among regions" (Bloom and Luca, 2016: 7). The most important source of differentiation is the level of development. The most (economically) developed countries typically have larger elderly cohorts and thus higher dependency ratios. Most developed countries have in general more than 20 % of the population aged over 60 and the ratio is expected to increase further to above 30 % by 2050. By contrast, elderly people comprise only 10 % in the developing world. This figure is expected to double by 2050. Nevertheless, the level of development is not a sufficient explanation, given the diversity among OECD countries in terms of aging, which will not vanish in the coming decades (Fig. 5).[10]

Japan is ahead of the rest of the world with the largest proportion of people aged over 60, currently above 30 % and set to reach almost 45 % by 2050. Japan is followed by European countries such as Italy and Germany, and caught up by relatively young countries such as Korea and China, where aging is extremely rapid. However, in countries such as the United States, the United Kingdom, and France, where birth rates have been maintained higher until recently, aging is less dramatic, despite similar or higher levels of income.

As a result, as summarized by Börsch-Supan (2013: 3), international comparison is an essential dimension of the research agenda in the economics of aging. To quote him at length: "The international dimension is especially valuable since learning about ageing requires variation in ageing. For individual ageing, we can compare respondents of different ages in panel data. For population ageing, however, we need to compare countries and regions that exhibit different demographics. (…) The cross-national perspective is of particular importance since time-series offer no comparison scenarios: the current demographic change is without precedent in history." This is also emphasized in HBA2 (contrary to HBA1), which dedicates a full part to "regional development" with chapters on Latin America, India, Indonesia, China, but not Japan.

Besides, this is all the more the case since the mechanisms at work (e.g. the respective importance of declining fertility and increase longevity or the potential correcting effect of migration) and the way economies adjust to the changes are not the same across countries because cultural values and institutional arrangements differ from place to place (Lee, 2002; Börsch-Supan, 2013; Lee, 2016; Weil, 2008; Piggott and Woodland, 2016).

If population aging is mainly due to reduced fertility, it may well impose important resource costs on the population, regardless of institutional arrangements for old-age support. By contrast, population aging due to declining mortality is generally associated with increased health costs and improved functional status of the elderly. In this case, aging puts pressures on pension programs but the problem can be solved through institutional reforms (Lee, 2002). However, systems adjust themselves more or less depending on cultural values, institutional mechanisms or political economy factors. As well explained by Lee (2016), in some countries, the elderly continue to work productively into old age, in others they withdraw early from the labor force; in some countries, the elderly are supported by transfers from their families, in others by transfers from the public sector. For all these reasons, the elderly depend to varying degrees on transfers from the younger population, and consequently population aging has larger or smaller macroeconomic impacts (Lee, 2016).

… and the geography of the economics of aging

Thus, the question is to determine whether the geography of the economics of aging more or less corresponds to the geography of aging. We use three criteria to assess the geography of the economics of aging: the affiliation of researchers, the countries studied, the countries mentioned in the references. The most relevant is the second one, but the first one is directly available and not irrelevant in case of "home bias" in terms of the countries studied.

Is the hierarchy of countries in terms of aging (its stage, its speed) reflected in these criteria? Our bibliometric approach allows us to confirm (or not) quantitatively whether and how the literature on aging is comparable to the geography of aging. To investigate this question, we use our first corpus, SCOPUS, the only one containing readily available information on the affiliation of researchers. Japan was one of the top countries, second to the U.S. until the 1990s but after Germany in the 2000s. Since the 2010s, Japan has been overtaken by China. The U.S. has registered a steady decline, with half of researchers based in the U.S. half a century ago but only a quarter for the most recent period (Fig. 6). Incidentally, out of the five editors of the two handbooks we mentioned, two are based in Germany, another two in Australia, and the third one in the United States.

We also analyzed the country or countries mentioned in each article. Unlike the first criterion directly available as a variable in SCOPUS, it is possible that studies fail to mention in their title or in their abstract a country nonetheless discussed in the main text. Another possibility is that a theoretical paper does not cover any country in particular. Given the dominance of the U.S. in the field of economics, it is quite likely that U.S. based economist fail to mention that their article is about the U.S. or relies on U.S. data, unless they perform comparative analyses. However, some elements may betray the country of study: for example, "social security" refers to the pension system in the U.S. but has often the broader understanding of "welfare state" in European countries. While imperfect, this second indicator confirms several trends: the decline of the U.S.; the relative importance of Japan this time neck and neck with Germany for another decade; and the rise of China in the final decade.[11]

Third, we tested if the word "Japan" is present or not in the title of the references quoted in each article. The full list of references is present for about 80 % of the articles from SCOPUS. On the one hand, articles

[10] See also annex table A4 for key demographic and economic indicators for Japan and comparator countries.

[11] For a comparison of the geography of aging and the geography of the economics of aging, see also the maps in annex figure A2.

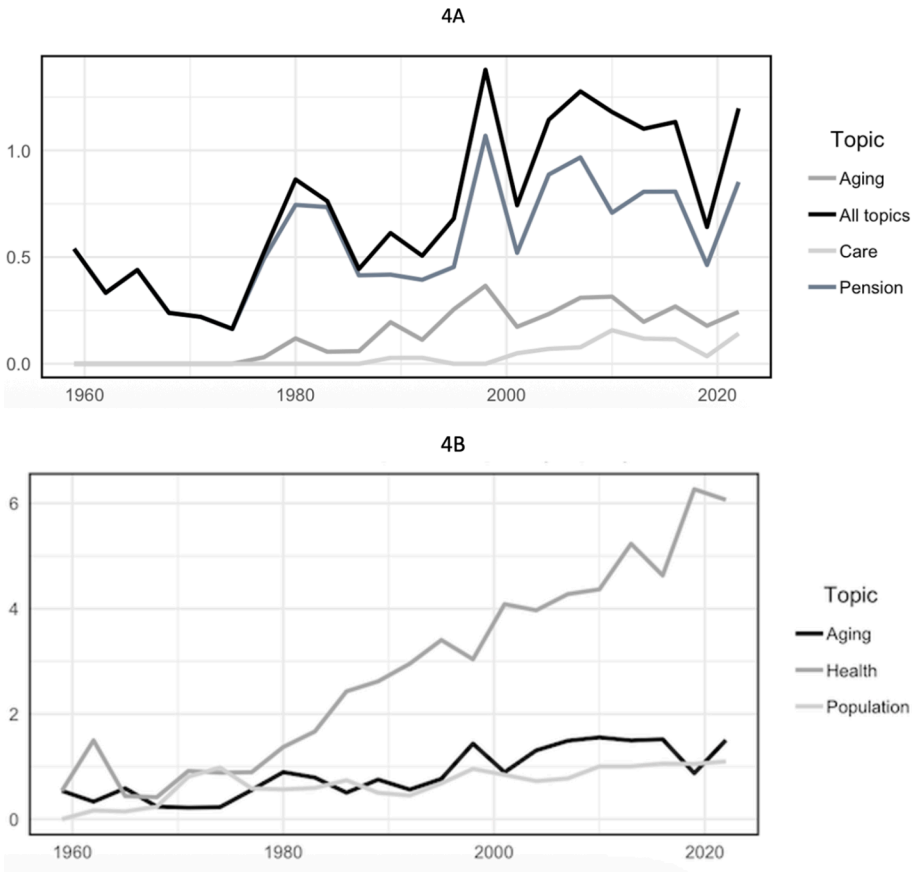


Fig. 4. Relative Growth of the Literature on Aging and of Related Literatures.
Source: top journals (second corpus). Note. The top chart presents the share of articles on aging (both with the narrow and the broad definition on aging) using the keyword search on titles, while the bottom chart presents the share of articles on health and population issues. The keywords used to extract the articles are presented in table 3.

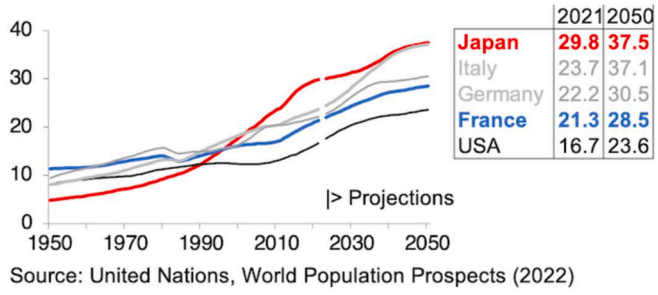


Fig. 5. Share of the population above 65 in %.
Source: first corpus (SCOPUS). Note. Method: adjective or substantive related to a given country for the identification of the country in the abstract or in the references. For the affiliation: provided by SCOPUS.

citing at least one reference on Japan have rising from less than 5 % at the beginning of the period of study to close to 20 % for the most recent subperiod. Besides, this measure is conservative because an article could be about Japan without any explicit reference to it in the title. On the other hand, this is also a weak measure of influence, since having one reference out of many may only reflect a fleeting interest on Japan. Paralleling the inflation of academic publications, the average number of references since the 1980s has increased from 10 per article to about 40 now. Thus, while academic papers increasingly refer to Japan, these references might be somewhat shallower than before.

Explaining Japan's position in the research agenda

One might have expected a somewhat more prominent role of Japan in the economics of aging literature, given the rapid and early aging in Japan. In fact, the academic interest on Japan is demonstrated by the three volumes (out of 19) of the NBER series on aging mentioned above. One should also note that Japan is present with specific Japanese scholars in HBA1, by contrast to HBA2, despite numerous references to the Japanese experience throughout the second handbook.

Besides, Japan is also a pioneer not just in terms of aging but also in being the first country to become an aged society with a large significant share of older adults and a shrinking population. This is why it is interesting to draw lessons from the Japanese experience that are relevant for countries confronting the prospect of an aged population, while recognizing the importance of viewing Japan's policies in the context of its specific culture and history. An earlier contribution to the JOEA insisted on this potential lesson (Heller, 2016).

What may explain the gap between the importance of aging in Japan and Japan's relatively modest place in the economics of aging? We provide here a few tentative answers.

One obvious explanation is related to the share of Japanese economists in the economic profession and of those who wanted to invest on a subject that until recently might have seemed somewhat specific to Japan. In addition, Japan might be seen as culturally different, hence having little relevance to other advanced economies. This bias is not specific to Japan and may affect many countries with the exception of the United States (Karolyi, 2016; Zhu, 2021) but the bias is noteworthy in the case of aging. Several authors have deplored this bias and have called "to take Japan seriously" (Dore, 1987) and to better include Asia

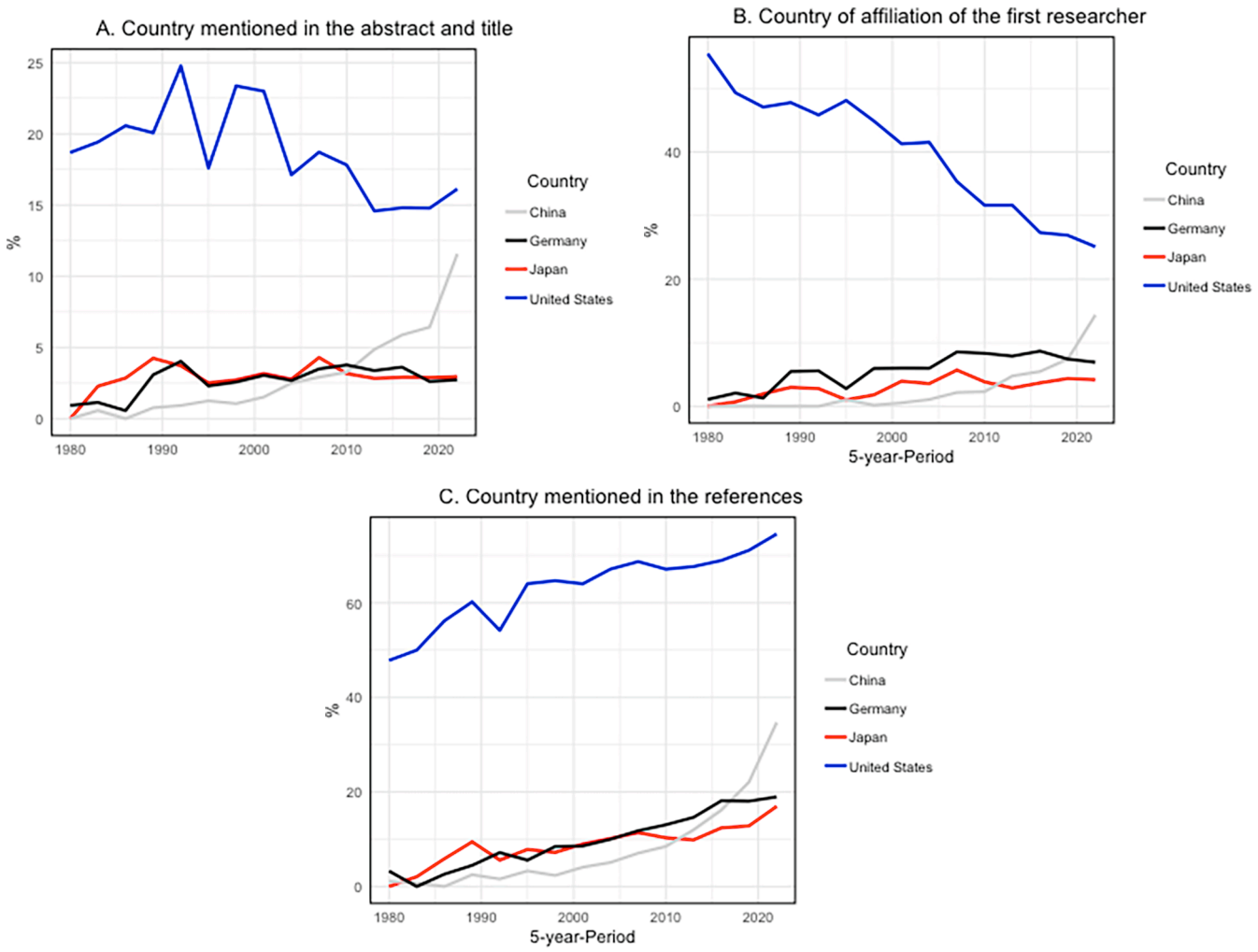


Fig. 6. The geography of the economics of aging.
Source: first corpus (SCOPUS). Note. Method: adjective or substantive related to a given country for the identification of the country in the abstract or in the references. For the affiliation: provided by SCOPUS.

in general in our international comparisons, to go beyond the dominant transatlantic perspective in terms of comparative perspective in economics (Storz et al., 2013).

A second explanatory factor relates to the share of articles in the economic literature on Japan across all subjects. Using a similar methodology as the one used for aging in top journals, we identify articles written on Japan in top journals.[12] We find that only 0.25 % of all articles contain the word Japan in their title, while about 0.75 % contain the word Japan in their abstract. Hence, the proportion of articles written on Japan and aging, at 4 %, is higher than those written only about Japan. This demonstrates a somewhat greater interest in Japan *and* aging instead of Japan only.

The third explanation relates to the distinction between articles written on Japan and articles referencing Japan. Looking at the overall literature about Japan, there is a noted increase of articles about Japan immediately after the "lost decades", an interest which seems to wane thereafter. However, the Japanese macroeconomic experience remained prominent in the mindset of the policymakers to avoid deflation after the dot com bubble and the WTC terrorist attack in the early 2000s and even more so during the Lehman shock (Lechevalier and Monfort, 2016). This continued interest is demonstrated by the fact that while the fraction of articles on Japan declined after 2000s, the fraction of articles referencing at least one paper about Japan remains at a sustained level of 6–7 % even since. For aging, we demonstrate a similar interest on Japan with about 20 % of papers referencing an article about Japan as opposed to only 4 % of articles written on Japan *and* aging. In both cases, this increasing trend is partly driven by the inflation of references with a fourfold increase of references in all articles in the period of study.

We do not have any good metrics about what a relevant share of Japan in the overall economics of aging should be. According to the United Nations Population Division, in 2022, Japan had 5 % of the global population over 65, 10 % of the global population over 85 and 23 % of the global population of centenarians. As a whole, our conclusion remains that there are significant biases regarding the geography of the economics of aging if one compares it to the geography of aging. Given Japan's role at the forefront of aging, this suggests some missed opportunity to learn about Japanese experience. We return to this point in the next section by comparing the research agenda on the economics of aging in general as opposed to Japan.

[12] We use the full database from top journals and extract the articles with the word "Japan" in the title. For SCOPUS, we create a separate database of economic articles with the word "Japan". This is a separate SCOPUS database than the one discussed so far. See annex figure A3.

Which research agenda?

This section relies mainly on the first corpus (SCOPUS).[13] Besides the question related to the economics of aging, for which the key issue is a better integration of demographics to economics (Bloom and Luca, 2016), the core contribution of the economics of aging is to measure the economic impact of aging (Weil, 2008). Thus, it revisits several fields of economics through the lens of aging, notably: income and economic growth (including saving and consumption); pensions; work and employment (which explains the relation between labor economics and population economics, as it appears in the JEL broad category); and health (Lee,2016, among others). We also discuss emerging issues in relations to aging as innovation, inequality and poverty.

Main topics and impact

In this context, what does our bibliometric method have to say about this research agenda? To capture a given topic, we use a set of different keywords to select articles within our first corpus (SCOPUS). Note that since this corpus is restricted to articles about aging in the broad sense, we can use this time much more general keywords, e.g. "eldercare" or "long-term care" but also simply "disease" or "hospital". The word clouds applied to the second corpus and more generally the table of contents of those handbooks inform us about the dominant topics as seen by scholars in the field of the economics of aging. Eventually, we define four mainstream topics (pensions, health and long-term care, work and employment, macroeconomics) and two emerging topics (innovation, inequality and poverty) based on several keywords for each of them (Table 4).

The results are presented in Table 5. Within the first corpus, we repeat the same exercise on three different subsets: (1) articles published in top journals included in SCOPUS (hence a subset of the first corpus, not the full third corpus), (2) articles published in the JOEA; (3) articles on Japan. One needs to bear in mind the limits of this comparison since, for example, the first subset cover articles published over the full period, while the second subset covers a much shorter timeframe with the creation of the JOEA in 2013.

Tables 6 and 7 list the most quoted articles for each topic, which allows us to measure their impact (defined through the citation count). The articles are classified by descending citation counts provided by SCOPUS. We also include information on whether the article is published in one top journal (thus relating to our second corpus) or whether it is mentioned in one of the handbooks (thus relating to our third corpus). We also include an index of how many keywords are related to aging, based on the list provided in these tables. While the list is predominantly based on citation count, we also exclude a few articles with a shallow connection to our topic of interest, aging, similar to what is done in other bibliometric studies (Bell and Lemmon, 2023; Wagstaff and Culye, 2011).[14] Thus, Tables 6 and 7 should not be interpreted as reading lists but are illustrative of the topics covered and of the most read papers within the economics of aging.

Table 4
Keywords for the selection of topics.

	Main keywords
• Pension	Pension, retirement (J32), Social security, Social security (H55)
• Health	Health (I11), healthcare, hospital, long-term care Chronic disease, Alzheimer, healthy aging, gerontechnology
• Labor	Labor, labor force (J21), unemployment, employment, participation Discrimination (J14), human capital, occupation, job, labor productivity, wage, mobility, worker
• Macroeconomics	
– Fiscal issues	Fiscal (H3), budget (H61), debt (H63), government expenditures, deficit Taxation (H2), welfare (H53), public sector (H8)
– Money & finance	Money (E4), interest rate, monetary, financial markets (E44), monetary policy (E5)
– Other	Growth (O4), macroeconomics (E), Secular stagnation, intergeneration
• Innovation	Innovation (O3), invention, R&D, technological change, intellectual property
• Inequality	Inequality, poverty, redistribution.

Note. JEL codes are used to suggest keywords to filter articles related to each topic.

Without surprise, pension-related articles represent the "lion share" of aging articles: whatever the database we consider, more than 60 % of the articles mention pension-related keywords (Table 5). The two following topics are respectively health and long-term care, work and employment. It is worth noting here that while each of them represents about a quarter of the articles in our SCOPUS corpus, the figures are substantially different in our second subset and in the JOEA: labor-related articles do represent about 30 % in top Journals and in JOEA while the figures are respectively 21 % and 50 % for health and long-term care. By contrast, the share of macroeconomic issues is around a quarter. In what follows, we detail these general results.

The long dominance of pension issues

Lee (2016) emphasizes a key characteristic that defines the research agenda of the economics of aging is the intergenerational dimension of our economies.[15] This is why the dependency ratio (defined in Lee et al., (2016) as the sum of the population under 15 and over 65 divided by the population in the intermediate range of 15–64 years) is a key variable scrutinized by the economics of aging.

From this perspective, it is not surprising that the issue of pensions has attracted the most important and continuous attention: as a major impact of aging is the rise of the dependency ratio, it is understandable that economists have primarily investigated the issue of the sustainability of pension systems that have been institutionalized after the second World War in the most developed countries, building on institutions created during the Inter-War period. In addition, the expansion of social expenditures in the 1960s combined with concerns in the

[13] In this section, we leave aside a significant evolution, namely the rise of the research agenda on the microeconomic dimension of aging, as we cannot capture it through our bibliometric analysis. It is nonetheless worth to be mentioned, as it appears in the editors' statement of the JOEA in 2013. It leads researchers to increasingly investigate the ways individuals adjust themselves to the fact they are living longer. The related questions are not new as they concern saving, work, retirement but the approach is obviously different than the macro approach that has been dominant in the early age of the economics of aging, which was focusing on population aging, as it is visible in the successive edition of the Palgrave dictionary of economics. Let us also mention that, while distinguishing the micro and macro spheres, the editors of JOEA do not use these categories as a way to define different research agendas within the economics of aging, as they recognize some bridges between them.

[14] As an illustration, we have excluded an article on pension funds, where one of our preferred key word, "pension", appeared multiple times in the title and in the abstract but where the topic of the paper is really on institutional trading, not directly on an aging issue. (Lakonishok, Shleifer, and Vishny, 1992).

[15] "If individuals lived independent lives in isolation they would not care about the ages of others—the age distribution of the population would be irrelevant to them. However, human generations overlap so economic interactions among them can and do occur, both through markets and through nonmarket intergenerational transfers, both private and public" (Lee, 2016: 61).

Table 5
Main Topics by Source.

	SCOPUS	Top journals	JOEA	Japan
In number of articles				
Pension	13,948	646	191	343
Health & long-term care	4,905	174	156	187
Work & employement	4,704	253	95	220
Macroeconomics	5,431	177	71	277
Innovation	1,168	50	16	70
Inequality & poverty	1,930	85	34	90
Total	20,380	788	314	778
In percentage				
Pension	68 %	82 %	61 %	44 %
Health & long-term care	24 %	22 %	50 %	24 %
Work & employement	23 %	32 %	30 %	28 %
Macroeconomics	27 %	22 %	23 %	36 %
Innovation	6 %	6 %	5 %	9 %
Inequality & poverty	9 %	11 %	11 %	12 %
Total	100 %	100 %	100 %	100 %

Source: first corpus (SCOPUS). Note the first corpus contains references from 1980 to 2024 when the JOEA started its publication only in 2013. Note that the sum of the percentages is not equal to 100 as a same article can refer to several topics (e.g. pension, and health).

1970s about rising inflation and lower growth have raised major concerns about sustainability. The area has also benefited from the development of theoretical models and financial theories (intergenerational models, OLG models, life cycle theory, etc.) As an example, pensions and retirement are not constituting by themselves a part of HBA1 but not less than 7 chapters (among 17) are related to pensions, studies from the household perspective (part III) and from the public policy one (part IV).

The keywords "retirement" and "pensions" are standing out from an exercise of word clouds for all our corpora with the exception of HBA2 (Fig. 2). This is also visible from the Fig. 4 that reports the share of articles in top journals related to aging in decomposing it in three key words "aging", "pension" and "care": the overall growth of the economics of aging between the early 1960s and the early 2000s is driven by the rise of articles related to pension.

Among the pension-related papers, the most cited are reported in the Table 6. They are two different strands in the literature. One is on financial institutions (pension funds, financial intermediaries, portfolio investors), the other is on the people retired or preparing for retirement. One key concern is the issue of financial literacy and retirement preparation, which mainly focuses on an individual aging perspective (Lusardi and Mitchell, 2007, 2011). As for the share of papers on pension in Japan in Table 7, it is significantly lower than for the general literature, at around 44 % against 67 % in the general case (Table 5). Still, the literature on pension in Japan reflects the same focuses, with the same authors contributing to an article on financial literacy in Japan (Lusardi and Mitchell, 2007), and studies replicating this work with some variants (e.g. Shimizutani and Yamada, 2020). For both the whole literature and Japan, articles on pensions are the most cited among all the articles that are selected in Table 6 and Table 7, for example Lusardi and Mitchell (2007), Sekita (2011), Saito (2008) or Horioka and Watanabe (1997).

The steady rise of health economics

Health economics has emerged as strong research topic in the literature on the economics of aging. As an illustration, the counterpart of the fact that pension and retirement are not the most important keywords in HBA2 is that health is clearly dominating. We argue that it is not an accident but captures a significant evolution: the emergence of health as a major subfield of the economics of aging (besides the three categories that have distinguished above: pensions, which are at the core of the intergenerational dimension of the economics of aging; work and employment; macroeconomics). This is in fact the consequence of a major evolution, the surge of health economics as a discipline, which affects as well the economics of aging, even if they fall in two distinct JEL codes (respectively I and J). This is visible on Fig. 4B presented earlier that compares the growth of the economics of aging to the one of population economics (which is relatively stable) and to the one of health economics, which is exponential throughout the period of study.

As for the most cited articles (tables 6 and 7), we combine articles on health and on long-term care issues. These articles are mainly dealing with healthcare workforce and the impact of health on retirement with no specific focus on the oldest old. What distinguish Japan is a stronger focus on disability and issues related to long-term care (for example Chen et al., 2016). There are also representative papers engaging discussion on aging and public health (Shigeoka, 2014) and health and saving (Horioka and Terada-Hagiwara, 2012). In Bell and Lemmon (2023)'s bibliometric analysis of long-term care, only three articles exceed the threshold of 200 citations (two on informal care, one on long-term care insurance) but those are not listed in our top 10 quoted articles because they are ranked below other articles related to health (see Fig. 7).

Older workers: from concerns about labor discrimination to a solution to increase the labor force

Work and employment is a growing research topic, encompassing 25 % of the total literature, only eclipsed over the past 15 years by the meteoric rise of health economics. Part of the initial literature, of which the 1978 JEL survey, focused on age discrimination, possibly in line with the discussion of the age discrimination act of 1975 in the U.S. This emphasis is also reflected in the J14 JEL code, mixing "elderly" and "disability". Since then, however, the literature has shifted on increasing the labor force and how to mitigate the foreseeable decline of one factor of production on economic growth. A related issue is on the productivity of older workers and the exact shape of the labor productivity by age.

While Japan stands out as a country with the highest labor force participation of senior workers, this fact is, surprisingly, not fully reflected in the literature. A few papers explore the importance of informal female care (e.g. Sugawara and Nakamura, 2014). Still, literature on Japan also emphasizes the fiscal impact of the decline of the labor force, the rise of welfare expenditures and the decline of economic growth. A few articles also discuss issues related to human capital and to productivity (Lee and Song, 2020). It is also worth mentioning contributions that try to revisit labor market issues in the light of the effect of aging (Rebick, 2005).

A number of papers on Japan captured by keywords related to work and employment are in fact focusing on macroeconomic issues (Hansen and İmrohoroğlu, 2016 or Kitao, 2015): investigating this puzzle leads us to see that the keyword filter has captured such expression as "labor supply" or "labor tax". With one of the highest labor force participation rates of older workers among advanced economies, the focus of the discussion has shifted from discrimination or labor force issues to macroeconomic issues, as the effects of aging have become significant at the macro level. This is one of the specificities of the labor literature in Japan.

Table 6
Main Articles on the Economics of Aging.

	Article or book				Influence			
	Author(s)	Title	Journal	Date	Citation count	Top jour	Handbook (HBA1 & HBA2)	Keywords (title & abstract)
Pension								
1	Lusardi A.; Mitchell O.S.	Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth	JME	2007	1079	1	0	3
2	Lusardi A.; Mitchell O.S.	Financial literacy around the world: An overview	JPEF	2011	944	0	2	3
3	Duflo E.	Grandmothers and granddaughters: Old-age pensions and intrahousehold allocation in South Africa	World Bank Economic Review	2003	841	0	0	2
4	Lusardi A.; Mitchelli O.	Financial literacy and retirement preparedness: Evidence and implications for financial education	Business Economics	2007	801	0	2	5
5	Feldstein M.	Social security, induced retirement, and aggregate capital accumulation	JPE	1974	721	1	1	3
6	Duflo E.; Saez E.	The role of information and social interactions in retirement plan decisions: Evidence from a randomized experiment	QJE	2003	659	1	1	2
7	Wang M.; Shultz K.S.	Employee retirement: A review and recommendations for future investigation	Journal of Management	2010	603	0	0	5
8	Lusardi A.; Mitchell O.S.	Financial literacy and retirement planning in the United States	JPEF	2011	479	0	2	3
9	Callen J.L.; Fang X.	Institutional investor stability and crash risk: Monitoring versus short-termism?	Journal of Banking and Finance	2013	443	0	0	2
10	Bloom D.E.; Canning D.; Fink G.	Implications of population ageing for economic growth	Oxford Review of Economic Policy	2010	423	0	1	4
Health & long-term care								
1	Case A.; Deaton A.	Mortality and morbidity in the 21st century	BPEA	2017	805	1	2	3
2	Institute of Medecine	Retooling for an aging America: Building the health care workforce	*Book*	2008	789	0	0	2
3	French E.	The effects of health, wealth, and wages on labour supply and retirement behaviour	RES	2005	393	1	2	3
4	Walker A.	A strategy for active ageing	ISSR	2002	375	0	0	8
5	Rust J.; Phelan C.	How social security and medicare affect retirement behavior in a world of incomplete markets	ECMT	1997	364	1	1	5
6	Finkelstein A.; Luttmer E. F.P.; Notowidigdo M.J.	What good is wealth without health? The effect of health on the marginal utility of consumption	JEEA	2013	255	1	2	2
7	Dave D.; Rashad I.; Spasojevic J.	The effects of retirement on physical and mental health outcomes	Southern Economic Journal	2008	248	0	0	6
8	Fisher G.G.; Ryan L.H.	Overview of the health and retirement study and introduction to the special issue	WAR	2018	238	0	0	7
9	Finkelstein A.; McKnight R.	What did Medicare do? The initial impact of Medicare on mortality and out of pocket medical spending	JPUE	2008	231	1	1	3
10	McGarry K.	Health and retirement: Do changes in health affect retirement expectations?	Journal of Human Resources	2004	216	0	0	7
Work & employment								
1	Case A.; Deaton A.	Mortality and morbidity in the 21st century	BPEA	2017	805	1	2	3
2	French E.	The effects of health, wealth, and wages on labour supply and retirement behaviour	RES	2005	393	1	2	3
3	Aguiar M.; Hurst E.	Consumption versus expenditure	JPE	2005	373	1	0	2
4	Rust J.; Phelan C.	How social security and medicare affect retirement behavior in a world of incomplete markets	ECMT	1997	364	1	1	5
5	Duflo E.; Saez E.	Participation and investment decisions in a retirement plan: The influence of colleagues' choices	JPUE	2002	359	1	0	2
6	Banks J.; Blundell R.; Tanner S.	Is There a Retirement-Savings Puzzle?	AER	1998	323	1	0	2
7	Siegel E.	Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die	*Book*	2016	309	0	0	2
8	Simonazzi A.	Care regimes and national employment models	Cambridge Journal of Economics	2009	261	0	0	5
9	Taylor P.E.; Walker A.	The ageing workforce: Employers' attitudes towards older people	Work Employment & Society	1994	221	0	0	3
10	McGarry K.	Health and retirement: Do changes in health affect retirement expectations?	Journal of Human Resources	2004	216	0	0	7
Macroeconomics								
1	Gordon R.J.	The rise and fall of American growth: The U. S. standard of living since the Civil War	*Book*	2016	1023	0	0	2

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Table 6 (*continued*)

	Article or book				Influence			
	Author(s)	Title	Journal	Date	Citation count	Top jour	Handbook (HBA1 & HBA2)	Keywords (title & abstract)
2	Jeng L.A.; Wells P.C.	The determinants of venture capital funding: Evidence across countries	Journal of Corporate Finance	2000	597	0	2	2
3	Ehrlich I.; Lui F.T.	Intergenerational trade, longevity, and economic growth	JPE	1991	359	1	1	4
4	Sundaram R.K.; Yermack D.L.	Pay me later: Inside debt and its role in managerial compensation	JOF	2007	335	1	0	3
5	Cutler D.M.; Poterba J. M.; Sheiner L.M.; Summers L.H.	An aging society: opportunity or challenge?	BPEA	1990	293	0	1	2
6	Boucekkine R.; De la Croix D.; Licandro O.	Vintage human capital, demographic trends, and endogenous growth	Journal of Economic Theory	2002	271	0	0	2
7	Novy-Marx R.; Rauh J.	Public pension promises: How big are they and what are they worth?	JOF	2011	202	1	1	2
8	Boulier J.-F.; Huang S.; Taillard G.	Optimal management under stochastic interest rates: The case of a protected defined contribution pension fund	IME	2001	191	0	0	3
9	Dalton M.; O'Neill B.; Prskawetz A.; Jiang L.; Pitkin J.	Population aging and future carbon emissions in the United States	Energy Economics	2008	187	0	1	4
10	Rauh J.D.	Risk shifting versus risk management: Investment policy in corporate pension plans	RFS	2009	161	1	0	6
Innovation								
1	Acemoglu D.; Restrepo P.	Demographics and Automation	RES	2022	174	1	0	3
2	Lee R.D.; Mason A.	What is the demographic dividend?	Finance and Development	2006	148	0	1	2
3	Lumsdaine R.L.; Mitchell O.S.	Chapter 49 New developments in the economic analysis of retirement	Handbook of Labor Economics	1999	123	0	0	11
4	Maestas N.; Mullen K.J.; Powell D.	The Effect of Population Aging on Economic Growth, the Labor Force, and Productivity	American Economic Journal: Macroeconomics	2023	93	0	0	4
5	Cocco J.F.; Gomes F.J.	Longevity risk, retirement savings, and financial innovation	JFE	2012	88	1	0	7
6	Sundaresan S.; Zapatero F.	Valuation, optimal asset allocation and retirement incentives of pension plans	RFS	1997	83	1	0	10
7	Mahlberg B.; Freund I.; Crespo Cuaresma J.; Prskawetz A.	Ageing, productivity and wages in Austria	_	2013	75	0	1	2
8	Göbel C.; Zwick T.	Age and Productivity: Sector Differences	Economist	2012	73	0	1	3
9	Boldrin M.; Dolado J.J.; Jimeno J.F.; Peracchi F.	The future of pensions in Europe	Economic Policy	1999	71	0	0	5
10	Mallett O.; Wapshott R.	Making sense of self-employment in late career: understanding the identity work of olderpreneurs	Work, Employment and Society	2015	70	0	0	2
Inequality & poverty								
1	Milanovic B.	The median-voter hypothesis, income inequality, and income redistribution: An empirical test with the required data	European Journal of Political Economy	2000	301	0	0	2
2	Ryff C.D.	Eudaimonic well-being, inequality, and health: Recent findings and future directions	International Review of Economics	2017	151	0	0	2
3	Barrientos A.; Gorman M.; Heslop A.	Old age poverty in developing countries: Contributions and dependence in later life	World Development	2003	143	0	0	3
4	Barr N.; Diamond P.	Reforming Pensions: Principles and Policy Choices	*Book*	2009	142	0	2	3
5	Goodhart C.; Pradhan M.	The Great Demographic Reversal: Ageing Societies, Waning Inequality, and an Inflation Revival	*Book*	2020	99	0	0	2
6	Cai F.; Giles J.; Meng X.	How well do children insure parents against low retirement income? An analysis using survey data from urban China	JPUE	2006	99	1	0	7
7	Lloyd-Sherlock P.	Old age and poverty in developing countries: New policy challenges	World Development	2000	83	0	0	3
8	Galiani S.; Gertler P.; Bando R.	Non-contributory pensions	_	2016	78	0	0	3
9	Ginn J.; Arber S.	Pension penalties: The gendered division of occupational welfare	Work Employment & Society	1993	78	0	0	7
10	Desmet K.; Wacziarg R.	JUE Insight: Understanding spatial variation in COVID-19 across the United States	Journal of Urban Economics	2022	77	0	0	2

Sources: SCOPUS (corpus 1); top journals (corpus 2 / subset of corpus 1); handbooks (corpus 3). See table 1 for the acronyms for the top journals.
Note. The column "keywords" refer to the total number of articles related to the economics of aging in the title and the abstract of the articles (broad definition of aging).

Table 7
Main Articles on Japan and the Economics of Aging.

	Article or book				Influence			
	Author(s)	Title	Journal	Date	Citation count	Top journals	Handbook (HBA1 & HBA2)	Keywords (title & abstract)
Pension								
1	Lusardi A.; Mitchelli O.	Financial literacy and retirement preparedness: Evidence and implications for financial education	Business Economics	2007	801	0	2	5
2	Sekita S.	Financial literacy and retirement planning in Japan	JPEF	2011	139	0	2	2
3	Horioka C.Y.; Watanabe W.	Why do people save? A micro-analysis of motives for household saving in Japan	EJO	1997	84	1	0	1
4	Saito T.	Family firms and firm performance: Evidence from Japan	Journal of the Japanese and International Economies	2008	71	0	0	1
5	Brooks R.	Population aging and global capital flows in a parallel universe	IMF Staff Papers	2003	62	0	1	5
6	Mitchell O.S.; Piggott J.	Unlocking housing equity in Japan	Journal of the Japanese and International Economies	2004	45	0	0	4
7	Chomik R.; Piggott J.	Population ageing and social security in Asia	Asian Economic Policy Review	2015	42	0	2	5
8	Kitao S.	Fiscal cost of demographic transition in Japan	Journal of Economic Dynamics and Control	2015	42	0	0	5
9	Kitao S.	Policy uncertainty and cost of delaying reform: The case of aging Japan	Review of Economic Dynamics	2018	32	0	0	3
10	Saita Y.; Shimizu C.; Watanabe T.	Aging and real estate prices: evidence from Japanese and US regional data	International Journal of Housing Markets and Analysis	2016	31	0	0	4
Health & long-term care								
1	Shigeoka H.	The effect of patient cost sharing on utilization, health, and risk protection	AER	2014	107	1	0	1
2	Lee H.-H.; Shin K.	Nonlinear effects of population aging on economic growth	Japan and the World Economy	2019	57	0	0	7
3	Montgomery W.; Ueda K.; Jorgensen M.; Stathis S.; Cheng Y.; Nakamura T.	Epidemiology, associated burden, and current clinical practice for the diagnosis and management of Alzheimer's disease in Japan	ClinicoEconomics and Outcomes Research	2018	57	0	0	3
4	Horioka C.Y.; Terada-Hagiwara A.	The determinants and long-term projections of saving rates in Developing Asia	Japan and the World Economy	2012	51	0	0	3
5	Chen B.K.; Jalal H.; Hashimoto H.; Suen S.-C.; Eggleston K.; Hurley M.; Schoemaker L.; Bhattacharya J.	Forecasting trends in disability in a super-aging society: Adapting the Future Elderly Model to Japan	JOEA	2016	49	0	0	10
6	Chomik R.; Piggott J.	Population ageing and social security in Asia	Asian Economic Policy Review	2015	42	0	2	5
7	Kitao S.	Fiscal cost of demographic transition in Japan	Journal of Economic Dynamics and Control	2015	42	0	0	5
8	Fukuhara S.; Yamazaki C.; Hayashino Y.; Higashi T.; Eichleay M.A.; Akiba T.; Akizawa T.; Saito A.; Port F.K.; Kurokawa K.	The organization and financing of end-stage renal disease treatment in Japan	International Journal of Health Care Finance and Economics	2007	41	0	0	1
9	Saita Y.; Shimizu C.; Watanabe T.	Aging and real estate prices: evidence from Japanese and US regional data	International Journal of Housing Markets and Analysis	2016	31	0	0	4
10	Ihori T.; Kato R.R.; Kawade M.; Bessho S.-I.	Health insurance reform and economic growth: Simulation analysis in Japan	Japan and the World Economy	2011	25	0	1	2
Work & employment								
1	Rebick M.	The Japanese Employment System: Adapting to a New Economic Environment	The Japanese Employment System: Adapting to a New Economic Environment	2005	139	0	0	1
2	Han J.-S.; Lee J.-W.	Demographic change, human capital, and economic growth in Korea	Japan and the World Economy	2020	70	0	2	2
3	Hansen G.D.; İmrohoroğlu S.	Fiscal reform and government debt in Japan: A neoclassical perspective	Review of Economic Dynamics	2016	55	0	0	1

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Table 7 (*continued*)

	Article or book				Influence			
	Author(s)	Title	Journal	Date	Citation count	Top journals	Handbook (HBA1 & HBA2)	Keywords (title & abstract)
4	Kitao S.	Fiscal cost of demographic transition in Japan	Journal of Economic Dynamics and Control	2015	42	0	0	5
5	Imrohoroğlu S.; Kitao S.; Yamada T.	Achieving fiscal balance in Japan	International Economic Review	2016	40	0	0	5
6	Ahmadjian C.	Foreign Investors and Corporate Governance in Japan 1	Corporate Governance in Japan: Institutional Change and Organizational Diversity	2007	38	0	0	1
7	Wei T.; Zhu Q.; Glomsrød S.	How Will Demographic Characteristics of the Labor Force Matter for the Global Economy and Carbon Dioxide Emissions?	Ecological Economics	2018	36	0	0	5
8	Sugawara S.; Nakamura J.	Can formal elderly care stimulate female labor supply? The Japanese experience	Journal of the Japanese and International Economies	2014	36	0	0	2
9	Lee J.-W.; Song E.; Kwak D.W.	Aging labor, ICT capital, and productivity in Japan and Korea	Journal of the Japanese and International Economies	2020	33	0	0	2
10	Yoshino N.; Miyamoto H.	Declined effectiveness of fiscal and monetary policies faced with aging population in Japan	Japan and the World Economy	2017	27	0	0	2
Macroeconomics								
1	Bloom D.E.; Finlay J.E.	Demographic change and economic growth in Asia	Asian Economic Policy Review	2009	116	0	1	1
2	Brooks R.	Population aging and global capital flows in a parallel universe	IMF Staff Papers	2003	62	0	1	5
3	Braun R.A.; Joines D.H.	The implications of a graying Japan for government policy	Journal of Economic Dynamics and Control	2015	43	0	2	3
4	Faruqee H.; Mühleisen M.	Population aging in Japan: Demographic shock and fiscal sustainability	Japan and the World Economy	2003	43	0	0	4
5	Ikeda D.; Saito M.	The effects of demographic changes on the real interest rate in Japan	Japan and the World Economy	2014	37	0	0	1
6	Wei T.; Zhu Q.; Glomsrød S.	How Will Demographic Characteristics of the Labor Force Matter for the Global Economy and Carbon Dioxide Emissions?	Ecological Economics	2018	36	0	0	5
7	Cooley T.; Henriksen E.	The demographic deficit	JME	2018	34	1	1	4
8	Goh S.K.; McNown R.; Wong K. N.	Macroeconomic implications of population aging: Evidence from Japan	Journal of Asian Economics	2020	32	0	1	2
9	Yoshino N.; Miyamoto H.	Declined effectiveness of fiscal and monetary policies faced with aging population in Japan	Japan and the World Economy	2017	27	0	0	2
10	Komine T.; Kabe S.	Long-term forecast of the demographic transition in Japan and Asia	Asian Economic Policy Review	2009	26	0	0	3
Innovation								
1	Goto A.	Japan's national innovation system: Current status and problems	Oxford Review of Economic Policy	2000	59	0	0	1
2	Braun R.A.; Ikeda D.; Joines D. H.	The saving rate in Japan: Why it has fallen and why it will remain low	International Economic Review	2009	53	0	0	1
3	Kohlbacher F.; Herstatt C.	The silver market phenomenon: Marketing and innovation in the aging society	The Silver Market Phenomenon (Second Edition): Marketing and Innovation in the Aging Society	2011	39	0	0	1
4	Cooley T.; Henriksen E.	The demographic deficit	JME	2018	34	1	1	4
5	Lee J.-W.; Song E.; Kwak D.W.	Aging labor, ICT capital, and productivity in Japan and Korea	Journal of the Japanese and International Economies	2020	33	0	0	2
6	Guest R.; Swift R.	Fertility, income inequality, and labour productivity	Oxford Economic Papers	2008	22	0	0	1
7	Dirks D.; Hemmert M.; Legewie J.; Meyer-Ohle H.; Waldenberger F.	The Japanese employment system in transition	International Business Review	2000	20	0	0	1
8	Bührer C.; Hagist C.	The effect of digitalization on the labor market	The Palgrave Handbook of Managing Continuous Business Transformation	2016	19	0	0	1
9	Kitao S.; Mikoshiba M.	Females, the elderly, and also males: Demographic aging and macroeconomy in Japan	Journal of the Japanese and International Economies	2020	18	0	0	6

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Table 7 (*continued*)

	Article or book				Influence			
	Author(s)	Title	Journal	Date	Citation count	Top journals	Handbook (HBA1 & HBA2)	Keywords (title & abstract)
10	Miyazawa K.; Yamada J.	The growth strategy of Abenomics and fiscal consolidation	Journal of the Japanese and International Economies	2015	12	0	0	2
Inequality & poverty								
1	Ohtake F.; Saito M.	Population aging and consumption inequality in Japan	Review of Income and Wealth	1998	63	0	1	2
2	Hofäcker D.; Hess M.; König S.	Delaying retirement: Progress and challenges of active ageing in Europe, the United States and Japan	Delaying Retirement: Progress and Challenges of Active Ageing in Europe, the United States and Japan	2016	25	0	0	14
3	Bauer J.; Mason A.	The Distribution Of Income And Wealth In Japan	Review of Income and Wealth	1992	20	0	0	1
4	Zhuang J.	Income and Wealth Inequality in Asia and the Pacific: Trends, Causes, and Policy Remedies	Asian Economic Policy Review	2023	19	0	0	1
5	Hess M.	Germany: A successful reversal of early retirement?	Delaying Retirement: Progress and Challenges of Active Ageing in Europe, the United States and Japan	2016	13	0	0	8
6	Fukawa T.; Oshio T.	Income inequality trends and their challenges to redistribution policies in Japan	Journal of Income Distribution	2007	11	0	0	4
7	Oshio T.	Income inequality and redistribution policies in Japan during the 1980s and 1990s	Journal of Income Distribution	2006	10	0	1	3
8	Abe N.; Yamada T.	Nonlinear income variance profiles and consumption inequality over the life cycle	Journal of the Japanese and International Economies	2009	9	0	0	1
9	Taghizadeh-Hesary F.; Yoshino N.; Rasoulinezhad E.	Unconventional monetary policy and income disparity in an aging society	Journal of Economic Policy Reform	2022	7	0	0	3

Sources: SCOPUS (corpus 1); top journals (corpus 2 / subset of corpus 1); handbooks (corpus 3). See table 1 for the acronyms for the top journals.
Note. The column "keywords" refer to the total number of articles related to the economics of aging in the title and the abstract of the articles (broad definition of aging).

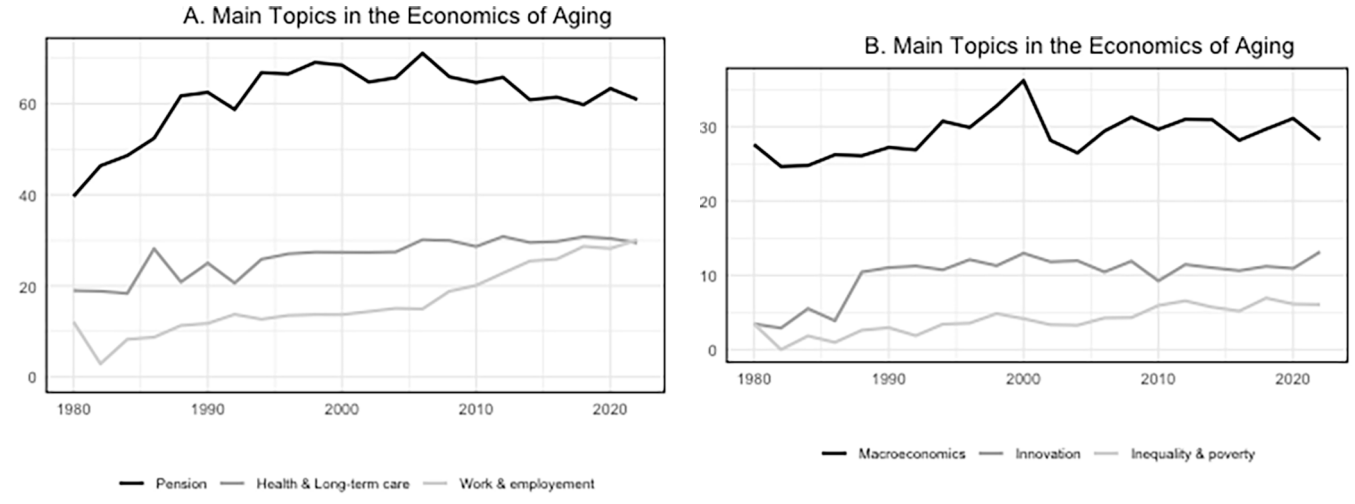

Fig. 7. Main Topics in the Economics of Aging.
Source: first corpus (SCOPUS).

Macroeconomic impact of aging

The labor topic has thus both in the overall literature and in the literature on Japan a strong connection with a broader macroeconomic topic. Overall, macroeconomics covering economic growth, fiscal policies and monetary policies, represent 26 % of the literature. Looking in details at three potentially overlapping subtopics, fiscal issues account for 13 % of the overall literature, followed by growth analyses for 11 % and monetary issues for 7 %. This diversity of topics related to macroeconomics is related in the titles of the most quoted articles, from historical analysis of American's economic growth (Gordon, 2016) to general questions about the challenge of aging (Cutler, Poterba and Sheiner, 1990). Papers related to this topic tend to discuss long-term trends, be they related to trade, investment, natural interest rate, or even climate issues.

The literature on Japan is significantly larger, at 36 %, than the overall literature. The most pressing question is of course that of economic growth (Bloom and Finlay, 2009). Otherwise, while similar issues are discussed (capital flows, growth…), the focus on fiscal challenges are somewhat larger (Kitao, 2015; Hansen and İmrohoroğlu, 2016; İmrohoroğlu et al., 2019), which may reflect Japan's unique position as an advanced economy with a debt to GDP ratio over two years of GDP.

Again, as with labor, given the preeminence of the discussion of aging in public policy circles as one factor of deflation (Shirakawa, 2024) or possibly – mostly as dissenting view – as one factor of inflation (Goodhart and Pradhan, 2020), it is surprising to see the issue almost absent from the most quoted articles. A few articles nonetheless (Braun and Joines, 2015; Yoshino and Miyamaoto, 2017) addresses the issue of real interest rates or of the reduced effectiveness of the fiscal and monetary policy in conjunction to aging.

Emerging issues: innovation; inequality and poverty

Finally, we identify two specific topics that are discussed in the general economics of aging literature and including Japan as a comparative term: innovation; inequality and poverty. However, the focus is slightly more important in Japan and, even more critical, taking into account the Japanese experience may lead the researchers involved in this research agenda to explore different mechanisms and reach more nuanced conclusions.

More precisely, innovation covers 9 % of the literature in Japan against 6 % in general while inequality and poverty covers 12 % of the literature on Japan against 9 % in general. In both cases, there are thus about one third more articles relatively on Japan. Both topics have a lower citation counts that the topics mentioned above but we argue that they should become more central in a near future and the way they are studied in the Japanese context may offer insights about the challenges and hopes ahead in relation to aging.

As for the relation between aging and innovation, a major contribution is by Acemoglu and Restrepo (2022). They show that aging leads to greater industrial automation, because it creates a shortage of middle-aged workers specializing in manual production tasks. As a result, higher productivity is expected. This happy scenario is not confirmed in the Japanese case. On the one hand, Goto (2000) shows that the major cause of the decay of potential growth in Japan is the rapid aging of population. On the other hand, Braun et al. (2009) explains about 30 % of the decline of the national saving rate in Japan between 1990 and 2000 by demographic factors (i.e. mainly aging), which may further be an impediment for capital accumulation and productivity growth.

As for inequality and poverty, a representative contribution is Goodhart and Pradhan (2020). It predicts that the great demographic reversal associated to aging will lead, among several substantial effects, to a pullback in inequality, as a result of an increase of the labor share. However, again, this optimistic scenario has not been observed in Japan, as shown by a representative paper. Ohtake and Saito (1998) is an important contribution to the lively debate that took place in Japan from the mid-1990s about the assessment of rising inequalities. While several authors have documented a significant increase of income inequalities in Japan since the mid-1980s, Ohtake and Saito (1998) is among the first papers to show that it is in fact partly a statistical artefact caused by aging workforce: in a country like Japan where the wage dispersion is particularly compressed in the early stage of career and increases only after 20 years of experience, the aging of the working population has a mechanical effect on inequalities. This result has then led to a lively scientific debate.

These two topics (innovation; inequality and poverty) help identify some specific papers on Japan that do not reproduce existing research in the Japanese case but raises questions and introduce some results that are original. This is all the more interesting since that the normal pattern is to see Japanese papers trying to reproduce US papers; in the field of aging the pattern is different as we found several Japanese papers dealing with topics or mechanisms not well investigating in the mainstream literature of aging; despite cultural and institutional differences, we argue that they could be a source for a renewed research agenda outside Japan.

Conclusion

If not dying from famine or old age, we hope that at the end of this bibliometric study our reader is not "drowning by numbers" to borrow a title from a movie of Peter Greenaway. This paper has documented the rise of the economics of aging. The field had experienced a thirtyfold increase of papers from the 1980s to the first half of the 2020s or an increase by a factor of eight over the same period restricting oneself to top journals. Relatively, as a proportion of the articles published in top journals and over longer period, the increase is more modest, from 0.5 % of the literature in the 1960s to over 1 % now, but we have reason to believe this is a conservative estimate.

Relying on three different corpora and on textual analysis has enabled us to grasp the complexity of the economics of aging. Existing JEL classification codes very imperfectly capture the overall content of the economics of aging, a field growing increasingly diverse. The growth of literature on the economics of aging is partly driven by the rise of health economics which has eclipsed labor issues, but pension issues remain a dominant topic. This growing diversity is also reflected in the fact that the field is less U.S.-centric. However, the geography of the economics of aging imperfectly reflects the economy of aging, with the underrepresentation of some countries such as Japan.

We also recognize that this first systematic bibliometric attempt is not without limitation. One is related to the focus on papers published in English, which *de facto* excludes papers published in Japanese. It may have introduced some biases but our understanding is that this bias is small while articles on aging have occasionally specific reference indicated "in Japanese" (185 articles or 0.9 % of the SCOPUS corpus). Moreover, given the focus of this paper on international literature and circulation of ideas, we recognize that economic papers published in Japanese have a small direct impact outside Japan. Another limitation is related to the use of RePEc ranking to assess the influence of papers: we

did not find any alternative proper ranking whose benefits would be higher that its limitation. However, we recognize that in mobilizing RePEc ranking we exclude citations from journals that are not indexed in RePEc, which is problematic given the interdisciplinary nature of the aging literature. In the same vein, in having decided to strictly focus on the economic literature, we have intentionally left aside the issue of the growing influence of the economics of aging in the overall field of ageing studies. Giving the importance of this question, which could be treated in systematically studying non-economics journal in this field, we have decided to leave it for further research.

Besides these limitations, one key argument of this paper is that the somewhat limited study of the Japanese case is visible in the research agenda. We do not share the view that Japan is very specific because of its cultural, historical, and institutional background, thus limiting the conclusions that can be drawn. On the contrary, as pointed out by Heller (2016) in an earlier issue of the JOEA, the position of Japan in terms of aging is ahead of other economies and thus deserve both a specific attention and a comparative approach to draw some lessons. What can we expect from a more balanced geography of the economics of aging that would give more place to the Japanese case? What would be the implications in terms of the research agenda? While being careful with the comparative perspective, given some characteristics of the Japanese configuration (e.g. at the level of mechanisms behind aging: the massive impact of dramatically declining natality; highest level of longevity; modest contribution of migrations), we consider that the expected benefits are threefold: first, for a given topic, there are possible change of perspective; second, mechanisms at work might be different and lead to different conclusion; third, the Japanese case gives incentives to explore new topics, understudied in the international literature.

In more detail, regarding the first benefit, our paper has shown a different focus for some classical topics in the Japanese case, given the advancement of aging in this country. For example, as for research on older workers, the focus is more on macro implications (productivity, growth) than on the issue of discrimination. In the same spirit, the study of the macroeconomic impact of aging is more advanced in Japan, with a focus on growth, fiscal, and price dynamic issues. From this, we may expect that the international literature will more and more incorporate this perspective, once the impact of aging reaches a certain threshold. Second, the analysis of emerging issues in the economics of aging literature such as (innovation, inequality and poverty) has shown that representative studies in Japan focus on different mechanisms and reach different conclusions than influential studies such as Acemoglu and Restrepo (2022) regarding the relation between aging and innovation or Goodhart and Pradhan (2020) regarding the impact of aging on inequalities. In both cases, studies on Japan do not confirm the aforementioned "happy" scenario: aging may rather decrease innovation and increase inequalities, under certain conditions.

Third and lastly, beyond strictly our bibliometric approach, some research topics seem to have emerged in the Japanese case that deserve, in our view, a particular attention, given Japan's position at the forefront of aging. One example is about how eldercare in general and long-term care in particular is connected (social and technological) innovation, beyond classical discussion on the sustainability of welfare systems under aging. Given the nature of this issue, it requires a multidisciplinary approach, with economics of aging if not at the center, at least as an important perspective, such as in Lechevalier et al. (2025). Another approach of importance that emerges is related to issues of possible rising intergenerational conflicts in the context of aging, in particular when tensions appear between the increase of welfare spending in the public budget and the necessity to consolidate it. This is particularly visible in Japan (see for example, Terai et al., 2021; Kirkegaard, 2025), and it requires a political economy approach. This is not new but, in our view, it should be more systematic.

In the same spirit, some of the papers included in this special issue do explore, if not completely new topics at least new approaches to classical questions. This is, for example, the case of Hoshi, Kodama and Li (2025) on the effect of aging on entrepreneurship and aggregate productivity, of Moriyama (2025) on the complementarity between older workers' employment issues and informal caregiving, or of Oshio and Shimizutani (2025) on the comparison of the age-happiness relation in Japan and in Europe.

We hope that this article and more broadly this special issue will help putting Japan at the right place of the geography and the research agenda of the economics of aging. This is a condition to better answer to the challenges ahead.

CRediT authorship contribution statement

Sébastien Lechevalier: Writing – review & editing, Writing – original draft, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Brieuc Monfort:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Annexes

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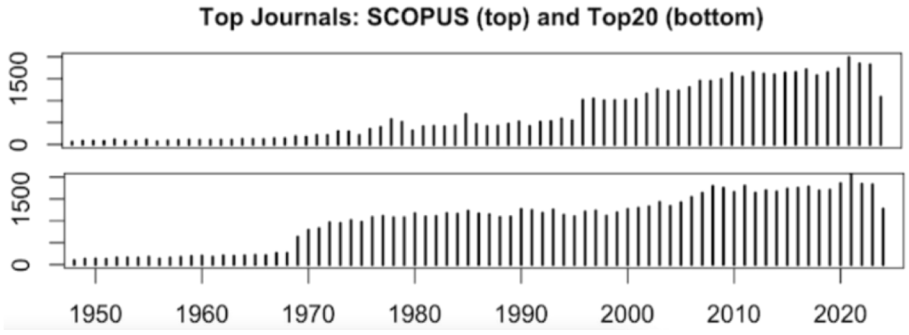
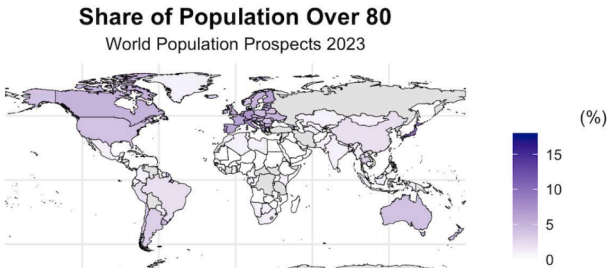
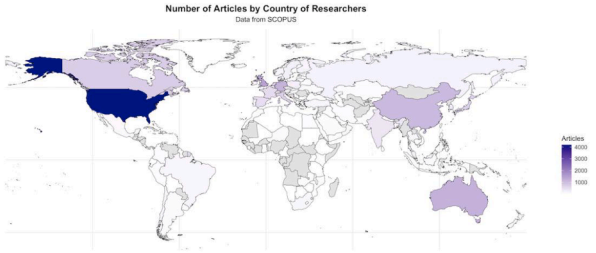


Fig. A1. Coverage of articles from top journals in SCOPUS and actual publications

Note. The figure illustrates one shortcoming of SCOPUS for the coverage of older articles.





Sources: United Nations, World Population Prospects, 2023; SCOPUS.

Fig. A2. The Geography of Aging and the Geography of Economic Research on Aging

Sources: United Nations, World Population Prospects, 2023; SCOPUS.

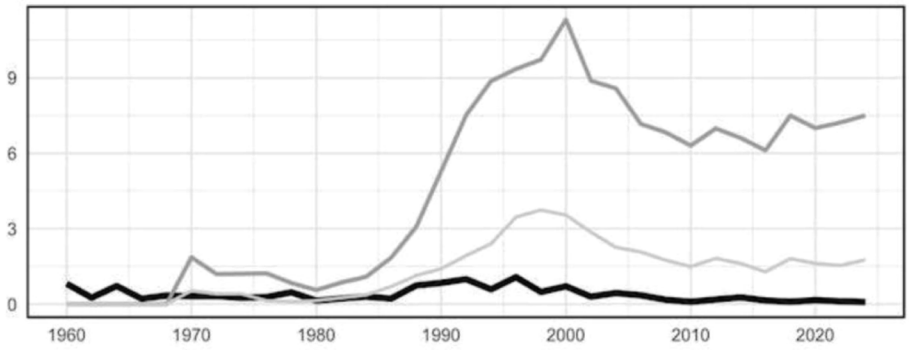


Fig. A3. References on Japan in top economic journals.

Source: SCOPUS. The dark line is the reference in the title, the grey line the reference in the abstract, the dark grey line the references in the abstract. The methodology is applied on a separate extraction of all articles published in top journals in SCOPUS, from which the relevant information is then extracted. This is different from the first and third corpora, restricted to articles on aging.

Table A4
Key Figures about Aging in Japan and in Comparable Countries.

	Fertility rate (children per woman)		Average life expectancy (in years)		Population growth (in %)		Share of the population over 65 (in %)		Labor force participation 55-65 (%)	Labor force participation above 65 (%)	Public pension expenditures (in % of GDP)
	2021	2050	2021	2050	2021	2050	2021	2050	2022	2022	2020
Japan	1.30	1.47	84.6	88.4	−0.6	−0.8	29.8	37.5	80.1	25.6	9.7
United States	1.66	1.70	76.4	83.2	0.1	−0.1	16.7	23.6	65.2	19.2	7.5
China	1.16	1.39	78.1	83.7	0.0	−0.8	13.1	30.1	_	_	7.7
Germany	1.53	1.58	81.1	85.2	−0.3	−0.5	22.2	30.5	75.3	8.5	10.0
France	1.79	1.77	82.3	86.6	0.1	−0.2	21.3	28.5	60.3	4.0	14.5
Italy	1.28	1.44	82.9	87.2	−0.5	−0.8	23.7	37.1	57.8	5.1	16.0
South Korea	0.88	1.17	83.8	87.3	−0.1	−1.1	16.7	39.4	70.3	37.3	3.6

Sources: United Nations, World Population Prospects, 2022 (actual for 2021 and projections for 2050); OECD.

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