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Does the institutional diversity of editorial boards increase journal quality? The case economics field

Dengsheng Wu[1,2] · Xiaoli Lu[3] · Jianping Li[2] · Jing Li[4]

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Abstract
In academic communication, editors exert a significant influence on a journal's mission and content. We examined how the composition of editorial board members, in particular diversity in terms of institution, is related to journal quality. Our sample comprised 6916 editors who were affiliated with 246 economics journals. Using Stirling Index of Diversity, we provided a single numeric index (DI) to measure the diversity of institutions which is composed of variety, balance, and disparity. Then we related it to journal quality, as reflected in three widely used indices in economics: the five-year impact factor, the association of business schools' (ABS) journal quality guide, and the eigenfactors. The results show that academic journals in the field of economics are heavily dominated by US institutions, but in terms of geographic distribution, there are more institutions in Europe than in North America. Surprisingly, we found that the diversity of editorial board members in terms of institution is negatively related to ABS ranking, but unrelated to the five-year impact factor and the eigenfactors. While when we removed the US journals from the sample, there was a significant positive impact between institutional diversity and the five-year impact factor. Our study extends the scarce knowledge on the composition of editorial teams and their relevance to journal quality by study the correlation between the institutional diversity index and three different journal quality indices. The implication of this study is that more effort is needed to increase the diversity in the composition of editorial teams in order to ensure transparency and promote equity.

Keywords Journal ranking · Journal quality · Editorial member · Editorial diversity · ABS journal · Economics

✉ Jing Li
lijing1602@163.com

[1] Business School, Shandong Normal University, Jinan 250014, China

[2] Institutes of Science and Development, Chinese Academy of Sciences, Beijing 100190, China

[3] National Geological Library of China, Beijing 100083, China

[4] School of Information Management, Sun Yat-Sen University, No. 132, East Ring Road, Guangzhou University Town, Guangzhou 510006, China

Introduction

The fundamental modes of scientific communication revolve around publication in a peer-reviewed journal. Academic journals are the primary medium for the communication of scholarly knowledge and are important not just for the group of scholars but for the whole academic field. For researchers, publishing manuscripts in top-tier journals may bring prestige and may affect their annual raises, research grants, tenure, and promotion (Matherly and Shortridge 2009; Wakefield 2008). In terms of the system of scientific communication, journals continue to be an integral component and pertinent to the creation and dissemination of scientific knowledge (Brown 2010).

Editors and editorial board members collectively contribute to the publication process of their journals and are responsible for evaluating manuscripts and controlling the quality of the journals' contents (Giménez-Toledo et al. 2009; Zsindely et al. 1982). As reported by Wu et al. (2018), the academic prestige of editorial board members (EBMs) has a close correlation with the quality of their journals (Wu et al. 2018). Editors, especially those of top-tier journals, have the duty of being the gatekeepers of scientific studies in their subject, thereby monitoring and shaping intellectual developments in the field so that they drive the advancement of scientific knowledge (Forrester and Watson 1994; Pagel and Hudetz 2011).

Due to these significant functions, some scholars have studied the composition of EBMs, typically focusing on the editorial community's diversity (Jokić and Sirotić 2015; Mazove et al. 2018). Diverse perspectives on editorial teams could contribute to a wider range of research topics and methodology, and more openness to innovative approaches (Corbett et al. 2014; Stegmaier et al. 2011). The high degree of institutional concentration could impede innovation and progress in economics as a whole (Hodgson and Rothman 1999). This seems particularly crucial and should be adequately reflected in the composition of editorial teams. Unfortunately, institutional and geographical concentration of EBMs, predominantly US-based is often reported in the literatures (Dhanani and Jones 2017; Espin et al. 2017; Hodgson and Rothman 1999). Some might wish to explain this phenomenon by supposing that top journals often recruit famous scholars from their editorial community, so that the most prestigious scholars are largely concentrated in few institutions (Hodgson and Rothman 1999; Tsui and Hollenbeck 2009). However, journal quality does entail not only technically valid but also openness to innovative approaches, which might be promoted by diverse perspectives anchored in editorial teams (Corbett et al. 2014; Harzing and Metz 2013). Accordingly, one would expect how the composition of editorial board members is related to journal quality as reflected in citation indices and rankings (Petersen et al. 2017; Serenko and Bontis 2009).

A review of the current literature highlighted the following three points. First, most of the existing studies considered representation in terms of gender (see Murray et al. 2019; Stegmaier et al. 2011) and nationality (see Rosenstreich and Wooliscroft 2005) merely from descriptive statistics but paid a little attention to institutional diversity. Second, a few empirical studies focused on the relationship between team diversity and journal success (exceptions for Jokić and Sirotić 2015 and Petersen et al. 2017). Jokić and Sirotić addressed the problem of EBM diversity and to some extent tried to compare foreign EBM participation with journal quality (Jokić and Sirotić 2015). Petersen et al. (2017), using a sample of business and management journals, examined how the diversity of editorial teams is related to journal impact and found that the diversity of editorial teams in terms of gender and nationality is unrelated to journal impact (Petersen et al. 2017). It would be

interesting to extend this knowledge to diversity in terms of institution and its relevance to journal quality, especially using a different sample of journals from the fields of business and management. Third, to date, empirical research into the institutional diversity of editorial boards in economics has attracted limited attention (exceptions Hodgson and Rothman 1999). Hodgson and Rothman (1999) reported a degree of institutional and geographical concentration of editors and authors using the top 30 economics journals (Hodgson and Rothman 1999). However, with the rapid changes globally, economics field should keep pace with the times. Accordingly, an analysis of institutional diversity in economics based on the current data is important and necessary.

This paper responds to this need by conducting a large-scale study on how the institutional diversity of EBMs is related to journal quality. Our sample comprised 6,916 editors affiliated with 246 scholarly journals in the field of economics. Our study serves the following three purposes: First, using Stirling Index of Diversity, we propose a diversity index (DI) to measure the institutional diversity, which, to our knowledge, has not before been measured. Second, we explored how institutional diversity is related to journal quality by taking three widely used measures of journal quality into account: the Five-year Impact Factor (5YIF), the Association of Business Schools' Journal Quality Guide (ABS ranking) and the Eigenfactors. Third, we provide a benchmark to which future measurements can be compared in economics, since there is a lack of empirical study in the field of economics, which does not benefit the development of science.

The remainder of this paper is organized as follows: In "Literature review" section, we provide an overview of relevant studies of editorial boards and discuss key findings on editorial board characteristics. In "Measuring the institutional diversity of editorial teams" section, we present our methods, especially how to measure diversity. In "Empirical analysis in the field of economics" section, the empirical results are introduced. In "Discussion" section, we discuss our results and offer some directions for further investigation. The final section is a conclusion.

Literature review

EBM data and journal evaluation

Research interest in the function of editorial boards has increased in recent years, largely due to the rising importance of publishing in scientific journals. Kaufman et al. (1984), who were the first to evaluate faculty's influence on the basis of editorial review board memberships, found that editorships serve as a good indicator of academic influence (Kaufman 1984). Since then, a growing number of studies of quality assessment index have been based on editorial board memberships (e.g., (Frey and Rost 2010; Gibbons and Fish 1991; Kurtz and Boone 1988; Wu et al. 2018). These studies reveal at least three general observations: First, editorship is as an alternative index providing reliable information for the evaluation: scholar performance or journal (Nisonger 2002). Second, they all see editors as powerful gatekeepers of science who enjoy a higher academic level and influence in their subject field (Petersen et al. 2017). Third, they often have two purposes: descriptive (Baccini and Barabesi 2009) or hypothesis-testing (Harzing and Metz 2013).

In studies of the relationship between the characteristics of editors and journals, at least two major strands of research have crystallized. The first focuses on the reputation of editors and their affiliated institutions, providing some vague judgments, such as that a range

of high-impact journals are controlled by group of scholars (Petersen et al. 2017), that the scientific achievements of EBMs affect the quality of the outcomes of the review and editorial-decision processes (Bedeian et al. 2009), and that high-quality journals might attract international members to their editorial boards (Nisonger 2002). Similarly, the study of Flowerdew (2001) also indicated that nonnative English-speaking members are essential if the journal was to live up to its claim to be international one (Flowerdew 2001). Unfortunately, these judgments are not directly supported by empirical research. The second strand suggests an interaction between the sociodemographic characteristics of EBMs and authorship in the peer review, especially gender and geographic diversity (García-Carpintero et al. 2010; Gardner et al. 2018; Lauf 2005; Murray et al. 2019). However, very few studies focused on both the diversity of editorial boards and journal reputation.

Value of diversity on editorial teams

"Diversity" has long been a general term discussed in a variety disciplines, such as ecology (McCann 2000), economics (Nguyen et al. 2005), physics (Shevchenko et al. 2006), information sciences (Kauffman 1993), and politics (Gillett 2003). In the area of science and technology, interactions between diverse disciplinary perspectives are held to be important means to enhancing rigor, creativity, and productivity (Stirling 2007). This is also true in fields like editorial governance: when different groups are recruited in the editorial board, different points of view and a wider set of counterpoints are expressed, greater information will be generated and input into decision-making through a broader network of relationships, and problem-solving capabilities will be enhanced (Dhanani and Jones 2017; Eagly 2013). Diversity thus enhances "absorptive capacity" (Cohen and Levinthal 1990) and fosters the ability to recognize novel, fruitful research directions (Alvesson and Sandberg 2014; Harzing and Metz 2013). However, the value of diversity goes far beyond that. Based on the literatures, an editorial board is a social institution and should reflect the society's inherent diversity as a social and collective good (Agrast et al. 2017). This perspective is formulated around the notion that minority communities should be granted the same rights and opportunities as the majority. In institutions, journal boards should be institutionally representative from a societal and moral perspective (Dhanani and Jones 2017). For example, if the US and some English-speaking countries take the permanent positions on the editorial boards of some journals, it is rare for scholars from Eastern Europe, Africa, and developing Asian countries to be EBMs of the journals, nor do authors from these countries publish papers in those journals (Harzing and Metz 2013; Nisonger 2002). This makes certain scholars less likely to be visible and to be appointed as EBMs, which further enhances a negative feedback loop, not only in academic communication but also on economic and social levels (Goyanes 2019; Youk and Park 2019). This has been confirmed by some studies (see Harzing and Metz 2013; Nisonger 2002). Considering at least the two values of diversity above, equality and diversity practices should be embedded into academic communication culture and occupy a pivotal role in journal governance.

Measuring the institutional diversity of editorial teams

The institutional diversity of editorial teams indicates the geographical dispersion of the EBMs of a journal. Stirling (2007) proposed a common practical framework which was defined as the "Stirling Index of Diversity" to measure diversity within a population

(Stirling 2007). It was widely used in measuring the features of a system that can be divided into categories, such as interdisciplinarity (Leydesdorff and Rafols 2011; Leydesdorff et al. 2019), research policy (Rafols et al. 2010), sustainability governance (Smith and Stirling 2008), etc. In this paper, we use Stirling's measures of institutional diversity (see Fig. 1), which includes three distinct components: variety, balance, and disparity (Leydesdorff et al. 2019; Stirling 2007).

Variety

Variety is the number of categories into which system elements are apportioned. It is the answer to the question "how many types of thing do we have?" (Stirling 2007). In ecology for instance, the variety aspect of diversity is seen in the use of species-number indices. Considering the affiliations of editors, the variety aspect of diversity is in the counting of institutions, all else being equal: the greater the number, the greater the diversity.

Balance

Balance is a function of the pattern of the apportionment of elements across categories. It is the answer to the question "how much of each type of thing do we have?" (Stirling 2007). Considering the affiliations of editors, the balance aspect of diversity is the "evenness" of members of each institution. All else being equal, the more even the balance, the greater the diversity.

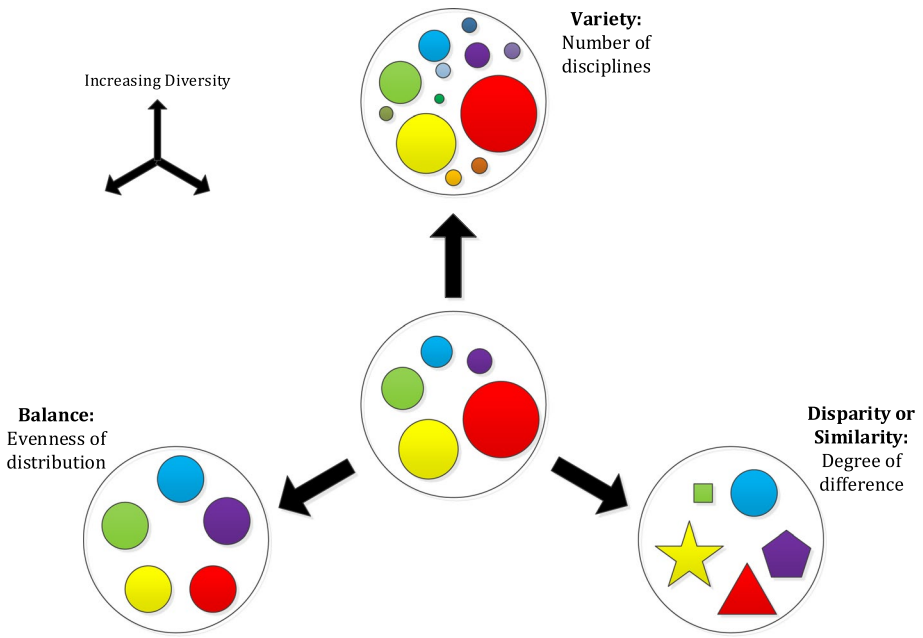


Fig. 1 Schematic representation of the attributes of diversity. *Source*: Leydesdorff et al. (2019), p. 257

Disparity

Disparity refers to the manner and degree in which the elements may be distinguished (Stirling 2007). It is the answer to the question "how different from each other are the types of thing that we have?" (Stirling 2007). It is judgments over disparity that (often implicitly) necessarily govern the resolving of categories used to characterize variety and balance. It is usually based on some form of distance measure, such as an array of taxonomic indices in economics (Stirling 2007). Considering the affiliations of editors, the disparity aspect of diversity is the geographical distribution of the institutions. In order to adjust the disparity (D_{ij}), we give the following rubric:

$$D_{ij} = \begin{cases} 1 & \text{Different continents} \\ 0.66 & \text{Same continent but different countries} \\ 0.33 & \text{Same country but different institutions} \end{cases} \quad (1)$$

The index D is the disparity weight. We refer to continent and country to distinguish the degree of differences between institution i and institution j. The six continents are: Asia, Europe, North America, South America, Oceania, and Africa. If both institutions are on different continents, then D = 1; if both institutions are on same continent but in different countries, then D = 0.66; if both institutions are in same country, then D = 0.33. All else being equal, the more institutions from different continents, the greater the diversity.

We propose the following formula to describe institutional diversity:

$$\mathrm{DI} = \sum_{\mathrm{ij}(\mathrm{i}\neq\mathrm{j})} \mathrm{V_i} \cdot \mathrm{B_j} \cdot \mathrm{D_{ij}} \quad (2)$$

where V_i and B_j are the proportional representations of institutions i and j on the editorial board (balance) and D is the degree of difference (disparity) attributed to institutions i and j. A value of DI = 0 would be assigned to a perfectly homogeneous team of editors in which all members are affiliated with the same institution, whereas DI = 1 would be, theoretically, valid for a journal whose editors come from all six continents (the mix number of continents is six).

Empirical analysis in the field of economics

Data collection and sample

In this study, we selected ABS ranking to research the institutional diversity of EBMs. The ABS ranking is a national organization of UK business schools and periodically compiles the academic journal quality guide. In the ABS ranking list, journals are classified into five quality tiers, from high (tier 4*) to medium (tier 1) (Morris et al. 2009). ABS ranking covered 22 sub-fields within the social science and we sampled journals in the subject area of "Economics, Econometrics and Statistics". This procedure resulted in an initial set of 315 economics journals. Since data on the 5YIF and the Eigenfactors would be used to explore the connection between the institutional diversity of EBMs and journal quality, we gathered 5YIF and Eigenfactors from Journal Citation Reports by Clarivate Analytics (formerly

Thomson Reuters). These indicators are for the year 2019. This procedure arrived at an effective sample of 246 journals because only 246 of 315 journals are indexed in the Clarivate Analytics and thus have all necessary metrics.

Since academic journals usually publish the names and affiliations of their editors on the inside of the front or back cover, we consulted the electronic or print versions of the journals and extracted the full names and institutional affiliations of the team members. We also carefully checked each individual's personal website to reconfirm any new institutional information. During the process, any misspellings of the names, institutions, or countries were also corrected. By editor team, we mean editors who should be involved in the decision-making process in the role of "acting editors" responsible for the handling of manuscripts. We didn't include editorial members who offer general administrative assistance or professional advice, such as honorary board members, advisory board members, and editorial advisory councils and so on. This procedure resulted in a set of 6,916 people from 1,521 institutions.

In the last stage, in order to reduce the influence of overrepresentation of institutions from the US, we gave a definition to the US journal, and removed all of US journals from the sample to calculate the relationship between DI and journal quality. In this stage, 135 journals and 4832 editors are calculated. We also described this stage of data processing in the reducing the influence of US institution to recognize the relationship between institutional diversity and journal quality section. The data processing is detailed in Fig. 2.

Overview of the editor data

The top 20 institutions according to the number of editorial board members are shown in Table 1. 15 out of the 20 institutions are in the US, 4 are in the UK, and only one institution is in Australia. If we consider the "top 4" institutions here, namely Harvard University, the London School of Economics, Stanford University, and Columbia University, these contributed 6.35% of all editors, and three of them are from US.

We further inspected the distribution of countries by the proportion of editorial members and their affiliated institutions. Table 2 shows the number of editors per country as well as the number of institutions of editor team per country. Together, 28.67% of institutions are located in the US and 48.55% of editors are from the US. Outside the US, 7.89% of institutions are located in the UK and 7.30% are in Germany. Table 2 also shows some detailed information about the institutional breakdown: among the top five high-editorship countries with the greatest representation of affiliated institutions, four countries are in Europe, following the US. This table also shows more institutions located in Europe than in North America. To our knowledge, this is the first report in the literature that there is European dominance, rather than North American, in terms of institutions represented on EBMs in the field of economics. Considering this geographical distribution, it can be seen that Europe plays the leading role in the economics profession, with the highest number of editorial members and the largest number of affiliated institutions. Furthermore, we can see that in the top 20 countries, very few institutions are located in developing countries, except China (4.21%), India (1.25%), Brazil, (1.12%) and Turkey (0.85%). It is a clearly uneven distribution, and obviously developed countries dominate.

Figure 3 visualizes our data on a world map, with the percentage of affiliated institutions held by editorial members. Focusing on the countries' distribution, the two high-editorship countries with the greatest representation of institutions are the US and the UK, followed

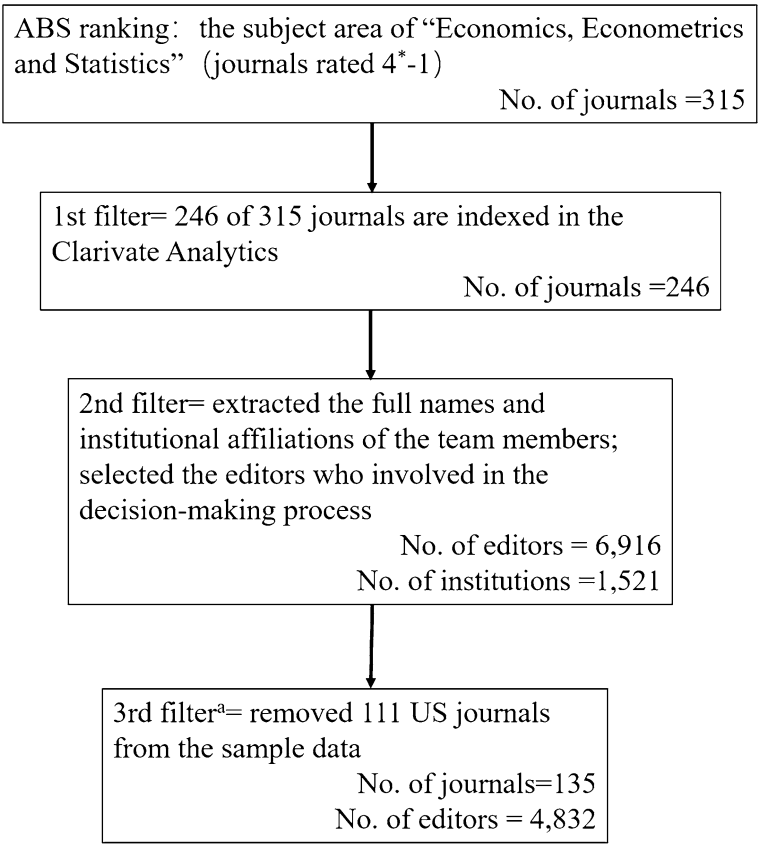


Fig. 2 Flow chart of detailed data processing. [a]The data in this stage is only used in the reducing the influence of US institution to recognize the relationship between institutional diversity and journal quality section

by three other European countries: Germany, France, and Italy. Very few institutions in Africa are shown on the map. This clearly shows an uneven distribution of regions.

Institutional diversity analysis by journal

Table 3 gives more information about the top 20 journals with the highest institutional diversity, including the number of editors, the count of institutions, the distribution of institutions by continent, as well as the country of publisher. The journal *Environment and Development Economics* ranked as the top one journal with the highest institutional diversity and a large editorial board (44 members affiliated with 40 institutions) and distributed on five continents. Similarly, the journal of *Defence and Peace Economics* and *Journal of Air Transport Management* also have large editorial boards and distributed on all of six continents. Unfortunately, among the top 20 journals, 75% had no institutions located in Africa, 55% had no institutions in South America, and 10% had no institutions in Oceania. This uneven proportion would be further increased when considering all 246 journal

Table 1 Information about the top 20 institutions and editorial membership boards

Rank	Institutions	Country	Count of editorial board membership
1	Harvard University	US	120
2	London School of Economics	UK	115
3	Stanford University	US	104
4	Columbia University	US	100
5	University of California at Berkeley	US	90
6	University of Oxford	UK	82
7	University of Pennsylvania	US	81
8	University of Chicago	US	81
9	Massachusetts Institute of Technology	US	77
10	Northwestern University	US	74
11	Cornell University	US	74
12	New York University	US	73
13	University of Michigan	US	71
14	Duke University	US	71
15	Yale University	US	69
16	University of California at Los Angeles	US	68
17	Princeton University	US	60
18	University of Cambridge	UK	56
19	University College London	UK	49
20	Australian National University	Australia	49

editorial boards. When closely inspecting those journals with low institutional diversity, most of them are "home" journals, which are closely related to a special department or university, and to some extent, their members are often from the "home" institution. For example, for the *Oxford Review of Economic Policy* from the University of Oxford, 90% institutions are University of Oxford in the UK, while two other institutions are also in the UK. In other words, the diversity of EBMs in terms of institution is very low due to a dominance of EBMs affiliated to a home institution from North American or Europe in particular. From the last column of Table 3, we can see the journal published mainly in the US, UK, the Netherlands. This may not be surprising following the fact that some most important publishing companies are located in these countries, e.g., Springer, Wiley. Especially Elsevier, the owner of Scopus and one of the main scientific publishers, is based in Netherlands. From the geographical distribution of publishers, such publication patterns could have a bias in the composition of EBMs.

Identifying the relationship between institutional diversity and journal quality assessment

Regarding the importance of editorial teams, they serve as a highly visible quality indicator (Nisonger 2002). Accordingly, we explore the connection between the institutional diversity of EBMs and journal quality. Three widely used journal metrics in business

Table 2 Information about the top 20 countries and count of affiliated institutions

Rank[a]	Country	Count of institutions	% of total institutions	Count of editorial board membership	% of total editors
1	US	436	28.67	3358	48.55
2	UK	120	7.89	775	11.21
3	Germany	111	7.30	250	3.61
4	France	97	6.38	220	3.18
5	Italy	86	5.65	172	2.49
6	China	64	4.21	165	2.39
7	Spain	54	3.55	122	1.76
8	Japan	53	3.48	160	2.31
9	Australia	46	3.02	263	3.80
10	Canada	39	2.56	226	3.27
10	Netherlands	39	2.56	170	2.46
12	Switzerland	32	2.10	103	1.49
13	Sweden	24	1.58	74	1.07
13	Austria	24	1.58	61	0.88
15	Korea	22	1.45	42	0.61
16	Belgium	20	1.31	71	1.03
17	India	19	1.25	38	0.55
18	Brazil	17	1.12	20	0.29
19	Portugal	15	0.99	28	0.40
20	Israel	13	0.85	84	1.21
20	Norway	13	0.85	42	0.61
20	Turkey	13	0.85	18	0.26

[a]The rank of countries is ordered by count of institutions

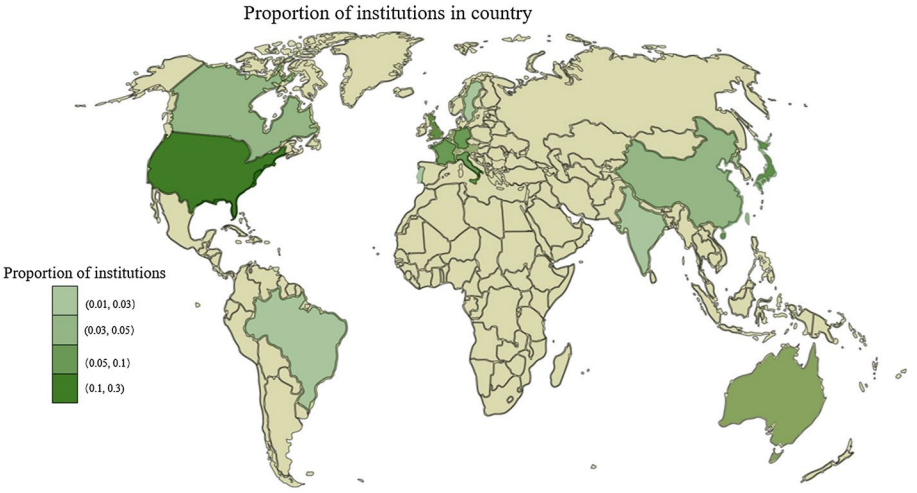


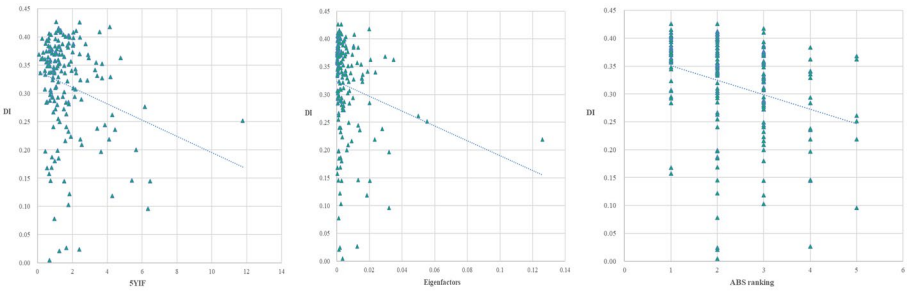
Fig. 3 Proportion of affiliated institutions in each country. Countries with less than 1% of total institutions are shown in gray. (Color figure online)

Table 3 Top 20 journals with the highest institutional diversity

Rank[a]	Journal name	DI	Count of editors	Count of different institution	Count of institutions by continents						Country of publisher
					AS	EU	AF	OC	NA	SA	
1	Environment and Development Economics	0.406	44	40	16	16	4	0	6	2	US
2	Defence and Peace Economics	0.401	36	33	6	12	2	1	14	1	UK
3	Journal of Air Transport Management	0.397	46	43	5	22	1	3	13	2	UK
4	Energy Economics	0.385	37	35	10	12	0	2	13	0	Netherlands
5	Review of Income and Wealth	0.382	39	36	5	20	0	2	12	0	US
6	Dynamic Games and Applications	0.381	53	48	5	27	0	3	18	0	US
7	Journal of Economic Surveys	0.380	32	27	5	16	0	5	6	0	US
8	International Statistical Review	0.379	24	22	1	6	1	3	11	2	US
8	Research in Transportation Economics	0.379	12	11	1	6	0	1	3	1	UK
10	Ecological Economics	0.378	31	30	1	11	1	4	13	1	Netherlands
11	Economic Modelling	0.377	18	18	2	9	0	4	3	0	Netherlands
11	Economic Systems	0.377	18	18	2	9	0	4	3	0	Netherlands
13	Journal of Economic Inequality	0.375	43	39	6	23	0	1	13	0	Netherlands
13	Metroeconomica	0.375	46	39	8	18	0	3	12	5	US
15	Economic Systems Research	0.374	29	27	5	11	0	3	10	0	UK
16	Journal of the Asia Pacific Economy	0.372	41	32	13	4	0	16	8	0	UK
16	Agricultural Economics	0.372	31	28	6	7	0	1	14	3	US
18	Journal of Public Economic Theory	0.370	45	38	7	21	0	2	15	0	US
18	Computational Statistics	0.370	10	9	2	5	0	0	3	0	Germany
20	International Journal of Game Theory	0.368	58	45	11	21	0	1	23	1	Germany

AS Asia, *EU* Europe, *AF* Africa, *OC* Oceania, *NA* North America, *SA* South America

[a]The rank of journals ordered by DI



(a) DI and 5YIF **(b)** DI and Eigenfactors **(c)** DI and ABS ranking

Fig. 4 Scatterplots of DI scores and three journal quality metrics. The dashed line presents the negative relationship between each pair of two metrics

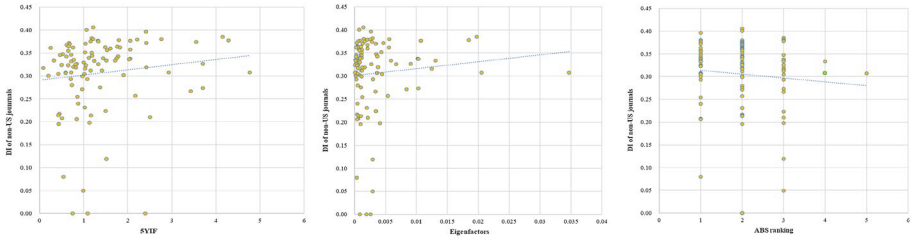
and economics, the 5YIF (Clarivate Analytics), the ABS ranking, and the Eigenfactors (Clarivate Analytics), were identified and compared to the institutional diversity of EBMs.

Figure 4 visually presents the relationship between each group's institutional diversity and the three journal quality metrics. In all three scatterplots, the abscissa respectively shows three measures: 5YIF, Eigenfactors, and ABS ranking. Through the comparison of each metric, it shows a consistent result in each group: a journal's institutional diversity is negatively related to 5YIF, Eigenfactors, and ABS ranking. For the comparison we further display a Spearman's correlation analysis of the study variables in Table 4. Among the three journal quality metrics, DI is strongly and negatively related to ABS ranking ($B = -0.290$, $P < 0.05$), whereas 5YIF and Eigenfactors are unrelated to DI. Result of the empirical study shows the diversity of EBMs in terms of institution is negatively related to some measure of the journal influence (at least to the ABS ranking). It may be inconsistent with the widely spread opinion that diversity among editorial board members is an essential property of editorial board in modern journals which should lead to enhancing the quality of published materials and consequent increase in bibliometric indices (Goyanes 2019; Murray et al. 2019). Considering the relationship between the EBM diversity and the journal quality heavily relies on the definition of DI, we conduct a robust check ("Appendix") and the result shows DI is regarded as superior to this study.

Table 4 Means, standard deviations, and correlations of the study variables

Order	Indicator	Means	Standard deviations	1	2	3	4
1	5 YIF	1.660	1.438	1			
2	Eigenfactors	0.062	0.012	0.584**	1		
3	ABS ranking (value from 5 to 1)	2.370	1	−0.603	−0.645	1	
4	DI	0.315	0.088	−0.234	−0.187	−0.290**	1

**$p < 0.05$



(a) DI of non-US journals and 5YIF **(b)** DI of non-US journals and Eigenfactors **(c)** DI of non-US journals and ABS ranking

Fig. 5 Scatterplots of DI of non-US journals and three journal quality metrics. Based on the dashed line, it shows DI of non-US journals has a positive relationship with 5YIF and Eigenfactors, as well as a negative relationship with ABS ranking

Table 5 Means, standard deviations, and correlations of the study variables of non-US journals

Order	Indicator	Means	Standard deviations	1	2	3	4
1	5 YIF	1.366	0.938	1			
2	Eigenfactors	0.003	0.052	0.582**	1		
3	ABS ranking (value from 5 to 1)	1.970	0.834	0.428**	0.721**	1	
4	DI (non-US journals)	0.306	0.084	0.241*	0.083	−0.091	1

*$p < 0.1$, ** $p < 0.05$

Reducing the influence of US institution to recognize the relationship between institutional diversity and journal quality

Considering of the overrepresentation of institutions from the US, we remove all US journals from the database to weaken the weight of the US institution. A US journal is defined as a journal in which more than 50% EBMs are from the US. In the database, there are 111 US journals and 135 non-US journals. We remove 111 US journals and the final sample included 4832 people from 1085 institutions. After the data processing, we explore the relationship between the institutional diversity of these non-US journals and three quality metrics: 5YIF, Eigenfactors, and ABS ranking. From Fig. 5, it shows the DI score of non-US journals is positively related with 5YIF and Eigenfactors, but still negatively related with ABS ranking. For the comparison we apply Spearman's correlation analysis in order to learn about the correlation of the indices. From Table 5, DI of non-US journals is significantly positively related to the 5YIF ($B = 0.241$, $p < 0.1$), whereas not significantly related to the Eigenfactors and ABS ranking. In general, after removed all of US journals and controlling the overrepresentation of institutions from the US, diversity begins to work.

Discussion

For several years, developing a comprehensive index to measure and assess the diversity of the editorial community has been a matter of research interest (Hodgson and Rothman 1999). This paper proposes a new index (DI) to measure institutional diversity based on Stirling Index of Diversity, which operationalizes variety, balance, and disparity independently and then combines them. Among three dimensions, disparity is quite different from others, but a necessary ingredient of DI. Specially, disparity measured using the rubric weighted by regions. Our empirical study indicated that DI could give a more detailed picture of the degree of diversity, as well as supporting the further comparison of the diversity with quality metrics.

Results showed a nonsignificant effect between the institutional diversity of EBMs and the 5YIF, as well as the Eigenfactors. The result was similar to that of Mazov et al. (2018), who conducted an empirical study on Earth Sciences and concluded that in some cases wide geographical variety in EBM is not a critical issue for high journal's rank (Mazov et al. 2018). Based on our empirical study in the field of economics, it was again found that the institutional diversity of EBMs is not so decisive in terms of journal quality, but even negative in impact. There may be two possible explanations. The first is that the pool of editorial institutions comprises a large number of US institutions and their leading position regarding a number of publications. Although institutional diversity on editorial boards has broadly increased in recent years, it has had a minimal influence on journal quality. The second, the characteristics of the field of economics may yield some explanations for the results. Research by Hodgson (1999) and Baccini (2009) suggests that there are two principal geographical domains of strong economic academic communities: the US and the UK (Baccini and Barabesi 2009; Hodgson and Rothman 1999). Of these, the US is perhaps given the long standing importance of publication outputs for academic tenure, i.e. high-level economic research institutions and top journals are mainly concentrated in US. When EBMs are members of close institutions, they share the same vision of what must be a good paper and act as more efficient editors given the aims and scope of a journal. Therefore, members of high-impact journals are mainly affiliated with a few renowned institutions. Such homogeneity institutions may lead to what Andrikopoulos and Economou (2015: 51) have termed "a dense core" in the community of editors (Andrikopoulos and Economou 2015), further enhancing a positive feedback loop and path dependencies (Hodgson and Rothman 1999). Therefore, considering of the history of economics, it is reasonable that editors' homogeneity is a necessary condition for journal quality. Unfortunately, it makes Matthew effect act its role.

Studies of Demeter (2018) and Goyanes (2009) indicated dominance of US institutions in the sample could bias the result, but this judge is not directly supported by empirical research (Demeter 2018; Goyanes 2019). We firstly give a definition to the US journal, then remove all of US journals from the sample. This procedure hence would increase the weight of institutions outside the US in the boards structure. Interestingly, the result shows a significant positive relationship between institutional diversity and 5YIF. While this does not imply causality, it is clear that more diversity in terms of institutions would increase the relative standing of the journal if weakening US dominance in non-US journals. In other words, more diversity in institutions may relate to a higher standing for the journal. Overall, this is consistent with our knowledge that diversity in the science has always played a role in contributing to innovation and progress (see Corbett et al. 2014).

Given the importance of editorial boards, journal editors bear an important responsibility for the social character of their boards. Recently, some academic publishers such as Elsevier are actively starting to promote equality and diversity in academia as part of their corporate social responsibility agendas. Recruiting more members from diverse institutions, especially from Africa, South America, and Asia, could increase the visibility and representation of research from these developing countries, further narrowing the gap in scientific and technological development between countries. Given this, equality and diversity should be promoted in academia, and editorial boards should be diverse. We thus suggest that the community of economic scholars develop strategies to expand common standards for a more balanced institutional and regional participation pattern. In order to facilitate both the promotion of novelty and evaluation of new ideas, top journals should recruit more editors from diverse institutions, not confined to a limited number of US institutions. In this way, diversity will play its role on social value and journal quality will go hand in hand.

Conclusion

Journal editors play an important role in evaluating manuscripts and controlling the quality of journals. One of the most important aims of EBMs is to enhance the impact of their journals. Given this, we conducted an empirical study in the field of economics to explore how institutional diversity is related to journal quality assessment as measured by three quality metrics. Our results indicate the diversity of editorial board members in terms of institution is negatively related to ABS ranking, but unrelated to the 5YIF and the Eigenfactors. However, when we remove the US journals from the sample, there is a significant positive impact between the institutional diversity and 5YIF. Considering of the social value of diversity, we should try to make diversity play a role in the improvement of journal quality.

This study has a few limitations, which offer promising opportunities for future research. First, although we separately used three different indicators (5YIF, Eigenfactors and ABS ranking) to measure journal quality, causal inference between EBM diversity and quality is still difficult. We were cautious, interpreting the link between the 5YIF and diversity as correlational rather than causal. Future research could employ more serious tools and designs (e.g., an econometric approach) to control for various parameters (e.g., number of members in the editorial board, mean number of published papers by year, localization of the journal as well as journal seniority), exploring the better relationship between quality and EBM diversity. Second, diversity encompasses multiple dimensions, including gender, ethnicity, age, sexual orientation, internationalization, and disability, but this paper focused only on institution diversity. In the future, we should further explore the role other factors play in editor selection, including the Carnegie classification of an editor's institution (e.g., R1) in the US and top universities in China. Third, our focus in this study was on the field of economics using a large but nonetheless still limited sample of journals. Future research could both broaden the database and consider other disciplines to reconfirm the robustness of the DI.

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Table 6 Means, standard deviations, and correlations between two new variables and the quality indexes

Order	Indicator	Means	Standard deviations	1	2	3	4	5
1	5 YIF	1.66	1.438	1				
2	Eigenfactors	0.006	0.012	0.686**	1			
3	ABS ranking (value from 5 to 1)	2.37	0.997	0.594**	0.821**	1		
4	NDII	29.84	14.775	−0.040	0.148	0.063	1	
5	HHI	0.072	0.095	0.041	−0.141	−0.015	−0.939**	1

**$p < 0.05$

Appendix: Robustness checks

We examined two new indicators, the number of different institutions (NDII) and Herfindahl–Hirschman Index (HHI), as well as their relationship with three journal quality indices. Especially, NDII counts the different institutions in an editorial board. It is representative of the variety aspect of DI. The formula of NDII is as follows.

$$\mathrm{NDII} = \sum_{i=1} x_i \tag{3}$$

where X_i is the i institution in an editorial board. Each institution is counted once.

HHI is a statistical measure of market concentration known in business and economics, and with also been used as a measure of economic diversity (where concentration = 1-diversification) (Chen 2019; Herfindahl 1950). HHI is representative of the balance aspect of DI.

$$\mathrm{HHI} = \sum_{i=1}^{N} \left(\frac{X_i}{X} \right)^2 \tag{4}$$

where X is the total size of the EBMs in a journal. X_i is the size of the i institution. X_i/X is the share of the i institution. N is the number of institutions. From the formula, whereas HHI tends to decrease with the dispersion in size between the institutions.

We apply a Spearman's correlation analysis to find the correlation between the two new variables and the quality indexes. From Table 6, it shows the correlations between the two new variables and the quality indexes are not statistically significant. However, we can also find a consistent result that NDII has a positive relationship with Eigenfactors and ABS ranking, and HHI has a negative relationship with Eigenfactors and ABS ranking. In general, two indices of NDII and HHI show the variety aspect and the balance aspect of institutional diversity are positively related with journal quality. It in fact gives a proof and confirms the robust of DI from the reverse side, i.e. DI gives a big importance to the "disparity" criteria of country consequent reduce in journal quality indices. To give an example: While the journal of *Review of International Economics* has many editors and different institutions in its editorial board, as the institutions are highly concentrated in the US consequent a low DI score. Institutions in the same country are more likely to share the similar cultures, thus have a lower degree of diversity than those institutions in different countries (Goyanes 2019). Inter-geographical differences of institutions should be given

the same attention in the construction of institutional diversity (Leydesdorff et al. 2019). On the whole, considering of the aim of this study, DI is regarded as superior to this study, because it is more comprehensive, i.e. in addition to the variety aspect of diversity, the balance aspect and the disparity aspect as well.

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