Development and Interdisciplinarity: A Citation Analysis

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Abstract

Development is often defined as an inherently interdisciplinary field of study. Yet there has been limited examination of this interdisciplinarity. Using *Web of Science* data, we present citation patterns since 1990 between leading journals of two fields of development, development economics and development studies, and other social science disciplines (economics, geography, political science and sociology). We find negligible interdisciplinary interactions in development, with the bulk of cross-disciplinary citations taking place between development economics, development studies, and economics. There is an increasing trend since the mid 2000s in the number of citations between development economics and development studies. We explore a number of potential contributing factors and conclude that the most likely explanation is rising numbers of economists publishing in development studies journals in response to increasing relative competition in development economics journals. While there appears to be growing communications among different fields of development cross-citation rates remain low at two-three percent of total citations and are driven by select journals. Overall, results suggest that development is not an interdisciplinary field of study as measured by flows of citations.

Key words:

Development; Interdisciplinarity; Development Studies; Development Economics; Social Sciences

1. Introduction

Definitions of what constitutes the field of development studies vary. The European Association of Development Research and Training Institutes (EADI 2017) explains that the field of development studies (also known as 'international development studies' or 'international development') "seeks to understand the interplay between social, economic, political, technological, ecological, cultural and gendered aspects of societal change at the local, national, regional and global levels."

As noted by Madrueno & Tezanos (2018), this definition is broad and not without criticism. What is less disputed is its interdisciplinary nature which requires the collective insights of different academic disciplines: it is "a multi- and inter-disciplinary field of study rather than a single discipline" (EADI 2017). The Development Studies Association notes on its website that "Because real life is complex, development studies brings together diverse disciplines. With roots in anthropology, economics, sociology, politics and geography, it may also combine with others such as psychology, law, management, natural science, history, agriculture or engineering."

In development economics, the importance of interdisciplinary exchanges has been noted. In their textbook, *Development Economics: Theory and Practice,* Alain De Janvry and Elisabeth Sadoulet (2016; p.24) argue that development economics is distinct as a field of economics: "it is uniquely integrative as the many dimensions of economics have to be brought together and related to other disciplines… Development economists thus require depth in the tools of their trade and breadth in the multiple dimensions of the development problem, both across fields of economics and across disciplines not only in the social sciences but beyond."

This article examines interdisciplinarity in development research through a citation analysis. In particular, it assesses to what extent different fields of development research, development studies (DS) and development economics (DE), draw upon the work of other social science disciplines and of each other and how this has changed over time. According to Frodeman (2017), interdisciplinarity "specifically refers to the intra-academic integration of different types of disciplinary knowledge."

Frodeman (2017) adds: "interdisciplinarity consists of not only the study of how to integrate various kinds of disciplinary knowledge - call this the epistemic task - but just as much the analysis of the challenges surrounding effective communication to different audiences - call this the political and rhetorical element." Interdisciplinarity in development research has thus far been tackled through discussion (e.g. Harriss, 2002; Kanbur, 2002). We capture interdisciplinary engagement in the epistemic task through citations, in that citations may reflect flows of scholarship across disciplines. Citation analysis has been used as a tool to describe the flow of information and exchanges among journals in a discipline and across disciplines (Pieters & Baumgartner, 2002). Our analysis of interdisciplinarity is thus limited to the number of citations within academic journals and excludes important communications with non-academic audiences and the uptake of knowledge by wider society (Frodeman, 2017)[i].

In this paper, going back to 1990, we present an analysis of citation patterns between the top-five DS and DE journals as well as top generalist journals in other disciplines that do development research: sociology, anthropology, political science, and geography. Overall, we find limited citation flows between DE, DS and other social science disciplines, with the bulk of cross-disciplinary citations taking place among the two development fields and economics. The level and growth of citations from DS to DE is considerably higher than the reverse yet mitigated somewhat when weighted by the total number of citations. DS increasingly cites economics and to a more limited extent political science and geography while DS gets cited in geography and to a smaller extent in political science. DE overwhelmingly cites economics in increasing frequency and to a much more limited extent political science while DE gets cited in economics, and political science and anthropology to a lesser extent. We observe a clear break in the trend of cross-citations between DS and DE with the number of citations increasing significantly since the mid-2000s. We find evidence of a disproportionate rise in the volume of papers published in development studies (with a rising number of citations per paper) since the mid-2000 period and a corresponding increase in the

number of economists publishing in development studies journals. While there appears to be growing communications among different fields of development cross-citation rates remain very low at two-three percent of total citations and are driven by select journals.

This paper contributes to the literature on the inter-disciplinary engagement of development research in several ways. First, with respect to development economics, there has been a growing interest in the interactions of economics with other disciplines (Angrist, Azoulay, Ellison, Hill, & Lu, 2020; Fourcade, Ollion, & Algan, 2015; Pieters & Baumgartner, 2002). In their paper, titled *The Superiority of Economists*, Fourcade, Ollion and Algan (2015) present the relationship between economics and other social science disciplines as one of insularity: over the 2000-2009 period, their citation analysis of flagship journals in economics, political science and sociology indicate asymmetric flows between economics and the other social sciences. Recently, Angrist et al. (2020) find that economics is increasingly likely to reference other social sciences, but like earlier studies has analogous results with economics being more heavily referenced in other social sciences which the authors interpret as indicative of a rise in the extramural influence of economics research. Does this hold for fields of economics that are potentially more interdisciplinary such as development economics? Interactions between economics and other disciplines may vary across fields. It is important to assess what the situation is in development economics since, as noted earlier, development economics is argued to be a distinct field requiring interdisciplinary knowledge and insights (de Janvry and Sadoulet, 2016; Kanbur, 2002). The picture of insularity and dominance painted by Fourcade et al (2015) may not hold for development economics. In addition, we examine the relationship between economics and an inherently inter-disciplinary field, that of development studies. Earlier citation analyses focused on economics in interaction with singular social science disciplines. This provides a different lens through which to view the interdisciplinary interactions of economics, that could potentially be used for further analyses of economics in relation with other interdisciplinary fields such as public health, urban studies, women studies.

In addition, this paper contributes to understanding the role of disciplines and journals in forming the contemporary international development discourse. There exists a relatively large literature discussing what development studies is about and what makes it distinctive (e.g. Loxley, 2004; Madrueño & Tezanos, 2018; Tezanos Vázquez & Sumner, 2013; Ziai, 2015). Previous literature, by and large, has not examined development studies journals. Madrueno & Tezanos (2018) undertake a cluster citation analysis from four development studies journals to identify research interests over the last 15 years, as well as the most influential countries, institutions and languages[ii]. We build on this research by presenting citation patterns from leading development studies journals to other disciplines, and vice-versa, to examine citation patterns in the field of development studies over the last three decades.

2. Data and Methods

We use the *Web of Science* to construct a database of all articles published for the core journals in each discipline over the 1990-2019 period. A full list of references is available for each article in the database.

Using this dataset of citations for the core journals of each discipline, our citation analysis proceeds in several steps. We first present cross-citation analysis patterns between development fields, development economics (DE) and development studies (DS), and other social science disciplines. Specifically, we count the number of times each paper cites the core journals in other disciplines and aggregate these numbers by the year of publication of the citing paper. Next, we provide detailed analysis of cross-citation patterns between two development fields, development economics (DE) and development studies (DS), both in terms of the absolute number of citations and the proportion of total citations. We do this both for the core journals of DE and DS and for individual journals. We construct a cross-citation ratio to examine the balance between the proportion of citations from one field to another and vice versa. We calculate the cross-citation ratio between DE and DS by

dividing the proportion of citations to DS in DE journals by the proportion of citations to DE in DS journals.

Consistent with other studies, we analyse disciplines and fields through their core journals. We do not consider books, conference proceedings, refereed working papers, flagship reports from development organizations. We concentrate on the core five journals since interdisciplinary citation flows have been shown to be driven by a few journals only (Miller, 1997; Pieters & Baumgartner, 2002). By drawing upon five of the most influential journals for each discipline/field we anticipate to capture the majority of citation flows. We test the sensitivity of our results against the top ten journals from each discipline and the results are qualitatively unchanged (these results are available upon request). We also test the sensitivity of the results against alternate selection criteria for the top five DS journals and present results in Section 5.

To investigate the drivers of trends, we draw upon other data sources. We match aggregated data on the core five journal articles in each field published in the *Web of Science* over the period 1991-2018 to *Journal of Economic Literature* (JEL) codes[iii] contained in the *EconLit* database. In addition, we draw upon historical submission data obtained from personal communication with the editors and editorial staff of the core five DE and the core five DS journals. Information was requested on the number of annual submissions, desk rejections and final acceptance rates. Information supplied varied across the journals. Finally, for further analysis we draw upon detailed bibliographic data on author institutional affiliations found in the *Web of Science* electronic database.

2.1 Selection of Core Journals

We compiled a list of core journals starting from the lists of journals in the *Social Sciences Citation Index* (SSCI) published by the Institute for Scientific Information (ISI) for DE, DS and in each social science: economics, anthropology, geography, political science and sociology. We excluded from these lists journals which specialise in a specific country or region or in a subfield (e.g. environment or sustainability). As we are primarily interested in citation flows between DE, DS and other

disciplines, we focused on journals indexed in EconLit. EconLit is a database developed and maintained by the American Economic Association that indexes journals in economics and related social sciences. As previously noted, EconLit provides JEL code information for indexed articles which enables us to examine research fields. For each field and discipline, we checked the mission statement for each journal on its website to ensure that the journal's stated mission is in line with the discipline/field the journal was categorized in. Finally, we ranked journals by their five-year impact factor as published in the SSCI and selected as core those in the top five.

It should be noted that to compile the DS core journal list, we went through additional steps. Although DS is inherently interdisciplinary, it is possible that a journal with a DS label might in fact belong to a single discipline. For instance, for the *Journal of Development Studies*, Cooper and Fitzgerald (1989) note that the journal was founded in the British tradition of political economy to "provide publication for work on development economics not easy to secure in general economics journals". We therefore checked the current disciplinary composition of the editorial board members to ensure that they do not predominantly belong to a single discipline such as economics. That was the case for all the journals in our core DS journals, including JDS. In addition, for the generalist journals in the social sciences, we cross checked with colleagues working in these disciplines to ensure that our core journals can be viewed as top general interest journals and do not belong to a discipline sub-field. For economics, we followed the well-known 'top five' general interest economics journals included in previous citation analyses in economics (Ellison, 2002; Heckman & Moktan, 2020).

Table 1 displays the core journals selected for DE, DS, anthropology, economics, geography, political science and sociology ranked by 5-year impact factor. Table 1 also shows the total number of citations for each journal in 2018, the year each journal was established and the year it was indexed by WoS. The core journals for DE are: *Journal of Development Economics* (*JDE*), *World Bank Research Observer* (*WBRO*), *World Bank Economic Review* (*WBER*), *Economic Development and Cultural Change* (*EDCC*) and *Review of Development Economics* (*RDE*). The core journals for DS are: *World*

Development (*WD*), *Development and Change* (*DC*), *Journal of Development Studies* (*JDS*), *Journal of Human Development and Capabilities* (*JHDC*) and *Development Policy Review* (*DPR*). For both DE and DS, there exists a clear leader with respectively *JDE* and *WD* experiencing significantly higher citations than other core journals.

3. Cross-citations

3.1 *Social Science Citations in Development Economics and in Development Studies*

We examine trends in the level of citations of articles in generalist journals in several social sciences found in DE and DS in Figure 1a and 1b respectively. DE and DS have increasingly cited economics. Starting with DE, Figure 1a shows that DE started from a level of about 200 economics citations in 1990 to above 1600 economics citations in 2018, representing an eight-fold increase. An increase in political science is noteworthy though since 2012. Citations of social sciences other than economics in DE have remained negligible. In 2018, for instance, DE made seven citations to anthropology, 16 citations to sociology, 36 citations to political science, and six citations to geography; a combined total of 65 citations. Moving onto DS in Figure 1b, DS cites economics most and increasingly so. As to other disciplines, there is little to note for the two decades prior to 2010 before a recent trend emerges in the level of citations of political science since 2015 and geography since 2017. However, relative to economics, the number of citations to other social sciences remains modest. In 2018, in DS, the political science and geography citations was just one-sixth of the number of economics citations. Like DE, DS draws substantially on economics and less on other social sciences. Overall, DE and DS cite generalist social science journals in a negligible manner except for economics which has been increasingly cited in both DE and DS, and especially since 2008 for DS.

3.2 Development Economics and Development Studies Citations in Social Sciences

We now analyse whether generalist social science core journals cite DE and DS. Figures 2a and 2b respectively illustrate the levels of DE and DS citations in the social sciences. Both DE and DS receive negligible citations in the social sciences. There is a gradual rising trend in the volume of DE

citations in economics, from a low of 11 citations in 1990 to a high of 95 citations in 2018 (Fig 2a). However, economics barely cites DS with a total of only 12 citations in 2018. Geography is the social science that cites DS the most, with a sharp increase in 2010-2013. In 2018, there were 105 DS citations in geography, compared to 35 in political science, 5 in sociology and 11 in anthropology. Comparing Figure 2 to Figure 1, economics cites DE and DS far less than the other way around. Overall, since 1990, DE and DS have increasingly been cited in economics and geography respectively, and DE and DS citations in other social sciences have remained limited.

3.3 Cross-citations between Development Economics and Development Studies

Table 2 gives the cross-citations from DE to DS and vice versa over the 1990-2018 period. There were 3,434 citations of DS papers in DE journals (DS citations in DE) and 10,351 citations of DE papers in DS journals (DE citations in DS). At the same time, DS journals tend to have a much larger volume of citations. The total number of citations in DE and DS core journals stood at 160,378 and 413,211 respectively. It is then important to analyse cross-citations in relative terms. Citations of DE articles account for 2.51% of citations in DS while citations of DS articles account 2.14% of citations in DE. Table 2 also shows the ratio of the share of DS citations in DE to the share of DE citations in DS. Parity in this ratio indicates that the two fields cite each other at the same rate whereas a value higher than (less than) one indicates that DE cites DS at a relatively higher (lower) rate. The ratio stands at 0.85, indicating that over the 1990-2018 period, DE has cited DS at a lower rate. In addition, it is noteworthy that most of the cross-disciplinary citations are driven by five of the core journals: *JDE*, *EDCC* and *WBER* in DE, and *WD* and *JDS* in DS. In fact, based on the number of citations in Table 2, 95% of DS citations in DE are citations of *JDS* and *WD* papers and 88% of DE citations in DS are citations of *JDE*, *EDCC* and *WBER* papers. Overall, cross citations between DE and DS account for a negligible share of total citations and mainly come from a handful of journals. It also suggests a somewhat asymmetrical relation with DS citing DE a bit more than the reverse.

Table 2 presents the stack of cross citations over three decades. Table 3 breaks them down by decade. Table 3 shows an increase in the number and rate of cross citations. The increase was more pronounced from DS to DE leading to an asymmetry in the 2010s. The share of DS citations in DE increased from 1.95% in the 1990s to 2.11% in the 2010s, while the share of DE citations in DS went up from 2.02% in the 1990s to 2.74%. In DS, *WD* and *JDS* have consistently accounted for the large majority of the DE citations. In DE, the bulk of DS citations are in *JDE* and *EDCC*. *RDE*, *WBER* and *WBRO* grew in the number of DS citations over the decades. Overall, results show a modest increase in cross-citations over time and more recently, *WD*, *JDS*, *JDE* and *RDE* are the four leading sources of cross citations. The bottom of Table 3 shows the cross-citation ratio for each decade. Cross-citations grew faster in DS compared to DE leading to a cross citation ratio declining from 0.96 in the 1990s to 0.91 in the 2000s and 0.81 in the 2010s.

Figure 3 shows cross-citations annually over the 1990-2018 period. Figure 3a and 3b focus on DS citations in DE and show the breakdown by citing DE journal and cited DS journal. In 3a and 3b, the upper line is the same: it shows the total DS citations in DE. In Figure 3c and 3d, the upper line shows the total DE citations in DS with the breakdown by cited DE journal and citing DS journal . Since 1990, DS has consistently cited DE more than DE has cited DS. From 1990 to the mid-2000, levels of cross citations were steady for both DE and DS. Since 2008/2009 respectively, DS and DE have increasingly cited each other, with a rate of growth that is sharply higher for DE citations in DS than for DS citations in DE. DS citations in DE increased from around 50 citations in the early 1990s to around 350 citations in 2018, representing a seven-fold increase. DE citations in DS rose from a low of around 100 citations in 1990 to a peak of 900 citations in 2018, representing a nine-fold increase. Looking at the breakdown by journal in Figures 3a and 3c, the growth of DS citations in DE comes from two journals, JDE and RDE and in Figures 3b and 3d the growth in DE citations in DS comes largely from two journals, *WD* and *JDS*.

Comparing Figure 3a to Figure 1a, DE cites economics twice more than it cites DS, but cites DS more than non-economics social sciences. These results overall suggest that DE draws heavily from economics and very little from other disciplines outside of DS, in fact outside two DS journals, *WD* and *JDS*. Comparing Figure 3c to Figure 1b, DS cites economics more than it cites DE and citation patterns to economics and DE track each other closely over time and emerge strongly from the mid-2000 period. Putting together Figure 3 and Figure 2, out of all disciplines, the largest number of DE citations is found in DS and vice versa. This is particularly the case for DE where the number of citations received from DS far outweighs those received from economics and other social sciences. Figure 3e presents the cross-citation ratio on an annual basis since 1990. The ratio is highly variable oscillating between values above and below one until around 2007 before a sustained fall to a low of 0.56 in 2015 and a recent increase since 2016 up to 1.02 in 2018. Thus, for the 2007-2015 period, DS outstripped DE in cross-citations, whereas since 2016 the trend has reversed towards parity.

There are several noteworthy limitations of the analysis above and opportunities for future research. Our analysis for the most part is limited to aggregated citations across five journals for each field/discipline. We did increase the list of core journals to 10 for DS and results were largely similar (Appendix Table 1, Figures 4-6). What is important to note is that when we dropped *WD* and JDS from the analysis, the trend results were changed substantially. Indeed, cross citations between DE and DS are then almost non-existent and the growing trend in cross citations since the mid 2000s vanishes.

All in all, results from the citation analysis suggest that in development research there is insularity as we find negligible interdisciplinary cross-citations with the bulk of cross-citations taking place between economics and DE/DS and between DE and DS. In particular, for DE and DS, cross-citations are limited to 2.14% of citations in DE going to DS articles and 2.51% of citations in DS going to DE articles. Cross-citations are to some extent asymmetrical with DS citing DE more than DE citing DS. Since the mid-2000s, we find an increasing trend in the number of citations from DE

to DS and from DS to DE. This trend does not suggest deepening interactions between DE and DS as it is limited to few journals. In fact, the interplay between DE and DS is driven largely in DE by *JDE* and *RDE* and in DS by *JDS*, *WD*, two journals with historically a strong association with economics (e.g. Cooper and Fitzgerald, 1989). Next, we investigate the drivers of the growing cross-citation trend between DE and DS since the mid2000s.

4. Why have development economics and development studies increasingly cited each other since the mid-2000s?

We investigate several mechanisms that could potentially be at play behind the growing trend in cross-citations between DE and DS.

4.1 Changes in research fields

The documented rise in cross-citations between DE and DS might be explained by changes in published fields of research. It is conceivable that DE may be publishing increasingly in fields which require collective insights from different academic disciplines or that DS may be publishing increasingly in fields which traditionally have been the domain of economists. To assess the importance of field composition, we classify articles according to *Journal of Economic Literature* (JEL) codes contained in the American Economic Association's *EconLit* database. We match articles in the *Web of Science* database to JEL codes found in the *EconLit* database (Angrist et al., 2020; Card & DellaVigna, 2013). We matched 92% of *Web of Science* articles in DE journals and 93.4% of articles in DS to the *EconLit* database over the period from 1991 to 2018. Articles can reference up to five JEL codes which fall within a broader set of JEL categories.[iv]

Figure 4 shows the JEL codes in DE and DS over time.[v] For both DE and DS, Economic Development is the dominant field of research, although for DE (Figure 4a), there has been a clear decline for this field. In both DE and DS, three fields have been growing: (i) Microeconomics (ii) Health, education and welfare, and (iii) Labour and demographic. For DS (Figure 4b), an additional

field experiencing growth is Agriculture & Environmental. Similar results were found when we limited DS to articles published in the two journals that are major drivers of trends in DS in Figure 3 (*WD* and *JDS*).

These changing trends in the composition of research fields is consistent with DE increasingly publishing in fields which are inherently more interdisciplinary in nature, such as health and education, which may contribute to trends in cross-citations. However, contrary to cross-citation patterns illustrated in Figure 3 there exists no apparent secular change in research fields from the mid 2000 period when the sustained increase in cross-citations started. Changing research fields do not seem to be the primary driver of growing cross-citations since the mid 2000s.

4.2 The volumes of articles and citations

The volume of published and cited development research may have grown differentially in DS and in DE thus leading to changes in cross-citations. Figure 5 shows that there has been a growth in citations in DE and an even larger growth in DS. For DS, the growth is very pronounced since 2005. This is explained by higher growth in the number of articles published in DS compared to DE as well as higher number of citations per article (Appendix Figures 1 and 2). The larger growth in the volume of citations in DS may explain the larger increase in DE citations in DS compared to DS citations in DE. As shown in Appendix Figure 1, there exists a clear break in the trend of articles published in the core DS journals from the mid-2000 period. Since this period, the annual number of articles published in DS increased three-fold compared to a two-fold increase for DE. It is shown further in Appendix Figure 3 that the bulk of this increase derives from *WD* and the *JDS*; the very two journals that often cite DE. The decline in the cross-citation ratio in Table 3 may reflect to some extent these differential patterns in volumes of articles and citations in DE and DS over time.

4.3 Changes in where economists publish in development

The top-five journals in economics have experienced significant growth in the number of submissions which combined with a reduction in the number of published papers has resulted in a significant reduction in acceptance rates at these journals (Card & DellaVigna, 2013). One hypothesis that we explore below is whether the same trends of increasing competition have occurred in DE relative to DS which may have led to a spill-over of economists publishing in DS and a subsequent increase in cross-citations between the two fields. First, we compare levels and trends in article acceptance rates of select journals from data obtained from journal editors and editorial staff. Second, we examine trends in author affiliations in 'Economics' registered to articles published in the top-five development studies journals obtained from bibliometric data from *Web of Science*.

As shown in Figure 6, acceptance rates of the three DE journals for which data could be obtained are all below 10 percent. *WBER* has experienced a notable decline in acceptance rates from 16 percent in 2005 to just 5 percent a decade later before increasing to 7 percent in 2018. This is partly because of a more than doubling in the number of submissions to the journal over the last decade (McKenzie, 2019). *EDCC* experienced a small rise in acceptance rates from 3 to 5 percent over the six year period from 2013 to 2018. Similarly, *JDE* acceptance rates have risen from 6 to 8 percent over the three years from 2016 to 2018. For DS, the acceptance rates are generally higher at 10 percent or above (Figure 7). In 2000, *JDS* had an acceptance rate of over 20 percent which has declined to 14 percent in 2013 (recent years are unavailable). Acceptance rates at *DPR* have oscillated around 20 percent since the first data point of 2008 with a spike of up to 45 percent in 2016. *WD* is an exception experiencing a downward trend in acceptance rates from 17 percent in 2013 to 9 percent in the year 2018. The journal has received a dramatic increase in the annual number of submissions, the number more than doubling from 1,282 in 2011 to 2,864 in 2018.[vi] In

response, the journal has significantly increased the number of articles published in recent years yet not enough to offset falling acceptance rates (McKenzie, 2019).

Figure 7a illustrates annual frequencies of papers with an economics affiliation published in DS journals over the 1998-2018 period.[vii]

The number of papers with an economics affiliation remained below fifty until 2008 before a sustained increase to over 100 papers in 2014 and a jump to over 200 papers in 2018. Moreover, the structural break in the mid-2000 period is similar to the pattern of cross-citations from DS to DE as illustrated in Figure 1. As illustrated further in Figure 7a, the bulk of the papers with an economics affiliation are published in *JDS* and *WD*, the very two journals that have accounted for the majority of cross-citations between DE and DS in Figure 3. There is a jump in the number of papers from economists in *WD* in 2018, which corresponds to recent exponential growth in citations from DE to the journal.

Figure 7b displays the annual proportion of papers with an economics affiliation in published DS journals over the same time period. There are several points of note. The most striking is that *JDS* has strong historical ties to economics. Since 1998 some 50-60 percent of published papers had at least one economics affiliation among authors which dropped to around 40 percent in the mid-2000 period before gradually rising to historical levels. In 2018, 61 percent of published papers in *JDS* had an economics affiliation. For *WD* and other DS journals, by contrast, the degree of economics affiliation is significantly lower and exhibits a rising trend over time. In 2018, there was a jump in the proportion of papers with economics affiliations in *WD* to almost equal all three other DS journals combined (*DC, DPR, JHDC*). In 2018, approximately 30 percent of papers in *WD* and other DS journals had an economics affiliation. We observe further that the structural break and rising trend from the mid-2000 period observed in Figure 7a holds when adjusting for the annual number of articles published.

Overall, our findings provide suggestive evidence that increasing competition in DE journals may have led economists to publish in increasing numbers in DS journals, namely the *JDS* and *WD*. The timing of this phenomenon is consistent with the surge in cross-citations between DE and DS of Figure 3. The question remains why this occurred systematically from the mid-2000 period. Unfortunately, we do not have journal acceptance rate (or article submission) data dating back that far. Together these findings imply that one significant pathway through which DE interacts with DS is through economists publishing in selected DS journals.

5. Sensitivity analyses of top five DS journals

As noted in Section 2.1, DS journal selection was conditional on being indexed in EconLit and not specialising in a subfield among other criteria. In this section, we undertake sensitivity analyses of the main results of Section 3 by altering the DS journal category removing the EconLit restriction and then both the EconLit and subfield restrictions. The two alternate sets of DS journals and associated journal information are displayed in Table 4. .

(i) Alternate DS journals without the Econlit indexation requirement

Two high ranking impact factor general DS journals, *Third World Quarterly (TWQ)* and *Sustainable Development (SD)*, were not indexed in EconLit and therefore excluded from the analysis above.

For the journal selection without the EconLit restriction, *DPR* and *JHDC* are replaced with *SD* and *TWQ* whereas the other three journals remain (*WD, JDS and DC*). As shown in Table 5, which displays cross-citations between the five DE and alternate five DS over the period 1990-2018, the picture is starker than for the original five DS journals. DE journals do not cite *TWQ* (14 citations) and *SD* (0 citations) whereas *TWQ* and *SD* cite DE journals less than *DPR*. The cross-citation ratio of 1.04 is higher than that for the original DS journal set (0.85). Interactions between the top five DS journals without the EconLit restriction (including *TWQ* and *SD*) and other social sciences are

shown in Appendix Figures 5a & 5b. They are almost identical to the baseline results in Figures 1b and 2b respectively .

(ii) Alternate DS journals without the Econlit indexation and subfield restrictions

When removing EconLit and subfield restrictions to form the DS category, only one of the original DS journals remains (*WD*). The other four journals are now: *Journal of Peasant Studies, (JPS), Long Range Planning (LRP), Cambridge Journal of Regions, Economic and Society (CJRES)* and *Entrepreneurship and Regional Development* (*ERD).* These are long-standing journals in agricultural, planning and regional development subfields with the exception of *ERD* which was established in 2008.

The analogous results for DS without the EconLit and subfield restriction shown in Table 6 reveal that cross-citations between DE and DS are almost non-existent outside of *WD*. The cross-citation ratio of 0.85 is equal to the original DS category (Table 2). Figure 8a & 8b show these alternate DS journals and the extent to which they cite or are cited in social science journals. They display similar patterns to the original DS category in Figures 1b and 2b respectively. It should be noted though that this alternate set of DS journals cites geography journals more than the original DS journals (Figures 2b and 8b) and, in turn, geography journals cite this alternate set of DS journals more often and increasingly so (Figures 1b and 8a).

Overall, the results of the sensitivity analyses reinforce earlier findings that citation patterns between DS, DE and social sciences are driven by a few select journals, in particular JDS and WD in DS.

5. Conclusion

This article explores citation flows between DE, DS and other social sciences. Drawing upon citation data from the core five journals for each discipline over three decades, we identify several patterns and trends.

First, we find limited interdisciplinary interactions in development as measured by citations, with the bulk of cross-disciplinary citations taking place between DE, DS and economics. Among the social sciences, DE gets cited and heavily cites general interest economics journals but its interactions with other social sciences are negligible. DE rarely cites from the core journals in anthropology, sociology, political science and geography. DS increasingly cites economics and to a more limited extent political science and geography while DS gets cited in geography and to a smaller extent in political science. In spite of sizeable and rising citations to mainstream economics journals from DS, economics in turn does not cite DS.

Second, whilst DS outstrips DE in the absolute number of cross-citations, as a proportion of total citations cross-citations are small and similar across the two development fields: 2.18% of citations in DE go to DS articles and 2.58% of citations in DS go to DE articles. Our analysis suggests that DE does not dominate DS in terms of citations and vice-versa.

Third, most cross citations between DE and DS come from few journals. The interplay between DE and DS is driven largely by *JDS*, *WD* in DS and *JDE* and *RDE* in DE.

Fourth, since the mid-2000s, we find an increasing trend in the number of citations from DE to DS and in particular from DS to DE. This trend does not suggest deepening interactions between DE and DS as it is limited to few journals.

Fifth, we explore factors of the growth in cross-citations between DE and DS since the mid-2000s. We find support for two explanations: (i) a disproportionate rise in the volume of papers published

in DS with a rising number of citations and (ii) an increase in the number of economists publishing in DS, likely in response to growing competition in DE journals.

Of course, our findings are limited to citation patterns in academic journals. Future research would benefit from analyses that include other publication types, such as books, conference proceedings and flagship reports of international development organizations such as the World Development Reports or Human Development Reports. Further research should analyse other aspects of the epistemic task of interdisciplinary interactions between DE, DS and the social sciences beyond knowledge integration through citations. For instance, what characterizes research projects in development that integrate knowledge production methods from multiple disciplines? Although scholars, donors and associations (e.g. De Janvry and Sadoulet 2016; DSA 2020) stress the benefits of interdisciplinarity in development, the negligible interdisciplinary interactions found in our citation analysis point towards the need to investigate barriers to interdisciplinarity in knowledge production in development.

In an age of the 'knowledge society' fuelled by advances in information and communication technology, future research should examine the political and rhetorical elements of interdisciplinarity in development (Frodeman, 2017), and in particular how DE, DS and the social science disciplines communicate to different audiences, including policy-makers, practitioners and people who are affected by development. Another potential area for further research is the institutional background of development research and how it might influence interdisciplinarity in development. Using Calhoun (2017)'s analysis of interdisciplinarity in the social sciences, we wonder if development research lacks institutional conditions for interdisciplinary research to be produced and flourish .

Despite the limitations above and the need for further research, we contribute to the literature on the development discourse (Loxley, 2004; Madrueño & Tezanos, 2018; Tezanos Vázquez & Sumner, 2013; Ziai, 2015). We document rising economics and DE citations in DS journals, in part due to rising numbers of economists publishing in WD and JDS. Our findings also contribute to the on-

going discussion about economics and interdisciplinarity (Angrist et al., 2020; Fourcade et al., 2015; Pieters & Baumgartner, 2002). Angrist et al. (2020) document a clear rise in extramural influence of economics research through growing citations in other disciplines, while also showing that economics is increasingly likely to reference other social sciences. They attribute the increasing reach of economics to growth in citations to empirical work owing to advancements in economic methods, specifically the increased use of randomised control trials and quasi-experimental methods. Our findings for the development field are less flattering for economics than in Angrist et al (2020). While we also find a shift in research fields towards more applied fields in development, our findings do not support the idea that DE's influence in other disciplines might be growing through increasing citations. Instead, we find a new and previously unexplored pathway to interdisciplinary interactions in the spill-over of economists publishing outside of economics.

Finally, our findings add to the literature on interdisciplinarity in the social sciences. Although we are at a time when universities and societies encourage interdisciplinary research, the negligible interdisciplinary interactions found in our citation analysis point towards disciplinary silos in development research.

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Tables and Figures

Table 1. Disciplines and their core journals

Disciplines and their core journals	Impact factor (5-year average)	Total cites	Year established	Indexed by WoS from year
Development Economics (DE)				
Journal of Development Economics (JDE)	4.00	8,391	1974	1976
World Bank Research Observer (WBRO)	4.00	1,360	1986	1993
World Bank Economic Review (WBER)	2.27	2,586	1986	1986
Economic Development and Cultural Change (EDCC)	2.44	2,537	1952	1956
Review of Development Economics (RDE)	0.87	995	1997	2005
Development Studies (DS)				
World Development (WD)	4.61	19,090	1973	1976
Development and Change (DC)	2.46	3,441	1970	1970
Journal of Development Studies (JDS)	2.07	4,009	1964	1964
Journal of Human Development and Capabilities (JHDC)	1.99	526	2000	2009
Development Policy Review (DPR)	1.93	1,396	1966	2006
Anthropology				
American Ethnologist	3.30	3,207	1974	1980
Current Anthropology	3.38	5,963	1959	1960
American Anthropologist	2.66	4,944	1888	1956
Annual Review of Anthropology	4.76	4,810	1959	1972
Cultural Anthropology	4.37	2,595	1986	1989
Economics				
Quarterly Journal of Economics	14.15	28,500	1886	1956
Econometrica	6.72	35,295	1933	1933
Journal of Political Economy	7.08	25,790	1892	1956
Review of Economic Studies	6.54	13,674	1933	1956
American Economic Review	7.05	55,340	1911	1956
Geography				
Global Environmental Change – Human and Policy Dimensions	11.22	17,370	1990	1990
Economic Geography	8.69	3,351	1925	1956
Progress in Human Geography	7.53	7,098	1977	1982
Journal of Economic Geography	5.35	4,230	2001	2002
Cambridge Journal of Regions Economy and Society	4.81	1,492	2008	2008
Political Science				

International Organization	5.66	7,262	1947	1956
American Journal of Political Science	7.32	12,069	1956	1973
Annual Review of Political Science	6.19	3,666	1998	1998
American Political Science Review	6.63	14,993	1906	1956
British Journal of Political Science	4.72	3,983	1971	1971
Sociology				
American Sociological Review	7.38	20,192	1936	1956
American Journal of Sociology	5.90	19,544	1895	1956
British Journal of Sociology	3.52	3,308	1950	1956
Social Problems	3.44	4,591	1953	1956
European Sociological Review	3.44	3,712	1985	1993

Source: Authors' compilation of SSCI data on journals

Notes: WoS stands for Web of Science. SSCI stands for Social Science Citation Index.

Table 2. Cross-citations between DE and DS, 1990-2018

DS citations in DE									
		Cited journals					Number of references to articles in core DS	Total references	Share of references to articles in core DS
		JDS	WD	DC	DPR	JHDC			
Citing journals	JDE	322	850	39	22	2	1,235	71,216	1.73%
	RDE	193	466	18	23	0	700	25,842	2.71%
	EDCC	258	524	41	8	0	831	29,410	2.83%
	WBER	89	302	7	8	0	406	20,945	1.94%
	WBRO	51	195	5	11	0	262	12,965	2.02%
	Total	913	2,337	110	72	2	3,434	160,378	2.14%
DE citations in DS									
		Cited journals					Number of references to articles in core DE	Total references	Share of references to articles in core DE
		JDE	RDE	EDCC	WBER	WBRO			
Citing journals	JDS	1,585	112	688	482	194	3,061	78,927	3.88%
	WD	3,208	268	1,309	1,081	546	6,412	231,889	2.77%
	DC	111	6	73	43	50	283	60,841	0.47%
	DPR	215	27	89	98	60	489	28,835	1.70%
	JHDC	44	11	12	20	19	106	12,719	0.83%
	Total	5,163	424	2,171	1,724	869	10,351	413,211	2.51%
Cross-citation ratio									0.85

Source: Authors' calculations based on WoS citation data

Table 3. Cross-citations between DE and DS by decade, 1990-2018

DS citations in DE

2010-2018		Cited journals					Number of references to articles in core DS	Total references	Share of references to articles in core DS
		JDS	WD	DC	DPR	JHDC			
Citing journals	JDE	144	400	19	17	2	582	35,662	1.63%
	RDE	105	285	11	15	0	416	17,046	2.44%
	EDCC	89	137	5	6	0	237	9,201	2.58%
	WBER	49	168	4	5	0	226	8,996	2.51%
	WBRO	28	131	3	10	0	172	6,293	2.73%
	Total	415	1,121	42	53	2	1,633	77,198	2.12%
2000-2009		JDS	WD	DC	DPR	JHDC			
Citing journals	JDE	113	240	13	3	0	369	20,784	1.78%
	RDE	50	79	6	5	0	140	5,700	2.46%
	EDCC	91	200	16	1	0	308	10,199	3.02%
	WBER	22	71	2	0	0	95	5,744	1.65%
	WBRO	18	32	1	1	0	52	3,806	1.37%
	Total	294	622	38	10	0	964	46,233	2.09%
1990-1999		JDS	WD	DC	DPR	JHDC			
Citing journals	JDE	53	169	4	1	0	227	12,343	1.84%
	RDE	0	0	0	0	0	-	-	-
	EDCC	67	162	18	0	0	247	8,955	2.76%
	WBER	14	55	1	0	0	70	5,708	1.23%
	WBRO	5	32	1	0	0	38	2,866	1.33%
	Total	139	418	24	1	0	582	29,872	1.95%

DE citations in DS

2010-2018		Cited journals					Number of references to articles in core DE	Total references	Share of references to articles in core DE
		JDE	RDE	WBER	WBRO	EDCC			
Citing journals	JDS	848	79	255	103	372	1,657	42,025	3.94%
	WD	1,948	208	630	312	701	3,799	117,022	3.25%

	DC	38	5	13	21	21	98	27,955	0.35%
	DPR	156	23	70	38	69	356	21,311	1.67%
	JHDC	37	9	18	17	9	90	10,815	0.83%
	Total	3,027	324	986	491	1,172	6,000	219,128	2.74%

2000-2009		JDE	RDE	WBER	WBRO	EDCC			
Citing journals	JDS	398	19	120	53	161	751	19,517	3.85%
	WD	563	42	235	118	280	1,238	51,465	2.41%
	DC	39	1	16	17	19	92	18,352	0.50%
	DPR	27	3	19	16	11	76	4,564	1.67%
	JHDC	5	1	1	1	2	10	809	1.24%
	Total	1,032	66	391	205	473	2,167	94,707	2.29%

1990-1999		JDE	RDE	WBER	WBRO	EDCC			
Citing journals	JDS	165	1	45	13	95	319	10,360	3.08%
	WD	462	0	147	73	241	923	44,758	2.06%
	DC	24	0	11	9	33	77	10,202	0.75%
	DPR	0	0	0	0	0	-	-	-
	JHDC	0	0	0	0	0	-	-	-
	Total	651	1	203	95	369	1,319	65,320	2.02%

Cross-citation ratio	
2010-2018	0.77
2000-2009	0.91
1990-1999	0.96

Source: Authors' calculations based on WoS citation data

Table 4. Alternate sets of core DS journals

Journals	Impact factor (5-year average)	Total cites	Year established	Indexed by WoS from year
Without EconLit criterion				
World Development (WD)	4.61	19,090	1973	1976
Sustainable Development (SD)	4.17	2,257	1993	1999
Third World Quarterly (TWQ)	2.74	4,248	1979	1980
Development and Change (DC)	2.46	3,441	1970	1970
Journal of Development Studies (JDS)	2.07	4,009	1964	1964
Without EconLit and subfield criteria				
Journal of Peasant Studies (JPS)	6.16	3,838	1973	1975
Long Range Planning (LRP)	5.40	4,841	1968	1968
Cambridge Journal of Regions Economy and Society (CJRES)	4.81	1,492	2008	2008
World Development (WD)	4.61	19,090	1973	1976
Entrepreneurship and Regional Development (ERD)	4.58	2,913	1989	2001

Source: Authors' compilation of SSCI data on journals

Notes: WoS stands for Web of Science. SSCI stands for Social Science Citation Index.

Table 5. Cross-citations between DE and DS, 1990-2018 (DS journal selection without EconLit criterion)

DS citations in DE									
		Cited journals					Number of references to articles in core DS	Total references	Share of references to articles in core DS
		JDS	WD	DC	SD	TWQ			
Citing journals	JDE	322	850	39	0	5	1,216	71,216	1.71%
	RDE	193	466	18	0	6	683	25,842	2.64%
	EDCC	258	524	41	0	2	825	29,410	2.81%
	WBER	89	302	7	0	1	399	20,945	1.90%
	WBRO	51	195	5	0	0	251	12,965	1.94%
	Total	913	2,337	110	0	14	3,374	160,378	2.10%
DE citations in DS									
		Cited journals					Number of references to articles in core DE	Total references	Share of references to articles in core DE
		JDE	RDE	EDCC	WBER	WBRO			
Citing journals	JDS	1,585	112	688	482	194	3,061	78,926	3.88%
	WD	3,208	268	1,311	1,081	546	6,414	231,891	2.77%
	DC	111	6	73	43	50	283	60,841	0.47%
	TWQ	33	8	27	18	22	108	89,162	0.12%
	SD	19	3	3	13	7	45	30,226	0.15%
	Total	4,956	397	2,102	1,637	819	9,911	491,046	2.02%
Cross-citation ratio									1.04

Source: Authors' calculations based on WoS citation data

Table 6. Cross-citations between DE and DS, 1990-2018 (DS journal selection without subfield removal and EconLit criteria)

DS citations in DE									
		Cited journals					Number of references to articles in core DS	Total references	Share of references to articles in core DS
		JPS	LRP	CJRES	WD	ERD			
Citing journals	JDE	10	0	0	850	2	862	71,216	1.21%
	RDE	5	1	1	466	2	475	25,842	1.84%
	EDCC	13	0	0	524	0	537	29,410	1.83%
	WBER	0	0	0	302	1	303	20,945	1.45%
	WBRO	2	0	0	195	1	198	12,965	1.53%
	Total	30	1	1	2,337	6	2,375	160,378	1.48%
DE citations in DS									
		Cited journals					Number of references to articles in core DE	Total references	Share of references to articles in core DE
		JDE	RDE	EDCC	WBER	WBRO			
Citing journals	JPS	25	4	27	9	14	79	44,731	0.18%
	LRP	2	2	5	0	0	9	47,056	0.02%
	CJRES	28	1	10	8	13	60	17,506	0.34%
	WD	2,959	211	1,233	1,014	497	5,914	213,253	2.77%
	ERD	29	3	16	7	9	64	34,640	0.18%
	Total	3,043	221	1,291	1,038	533	6,126	357,186	1.72%
Cross-citation ratio									0.86

Source: Authors' calculations based on WoS citation data

Figure 1a: Social Science citations in DE, 1990-2018

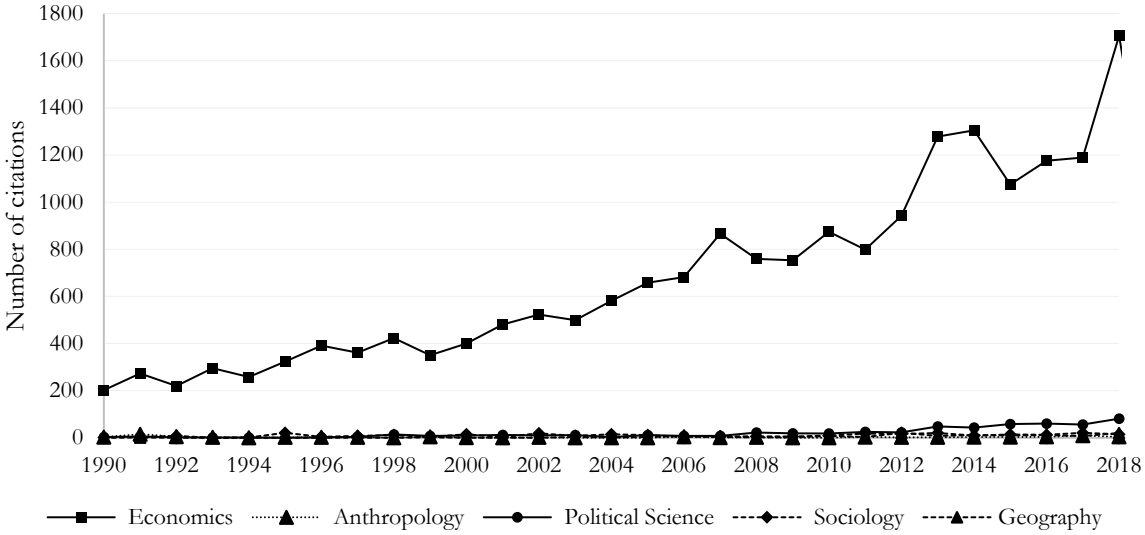


Figure 1b: Social Science citations in DS, 1990-2018

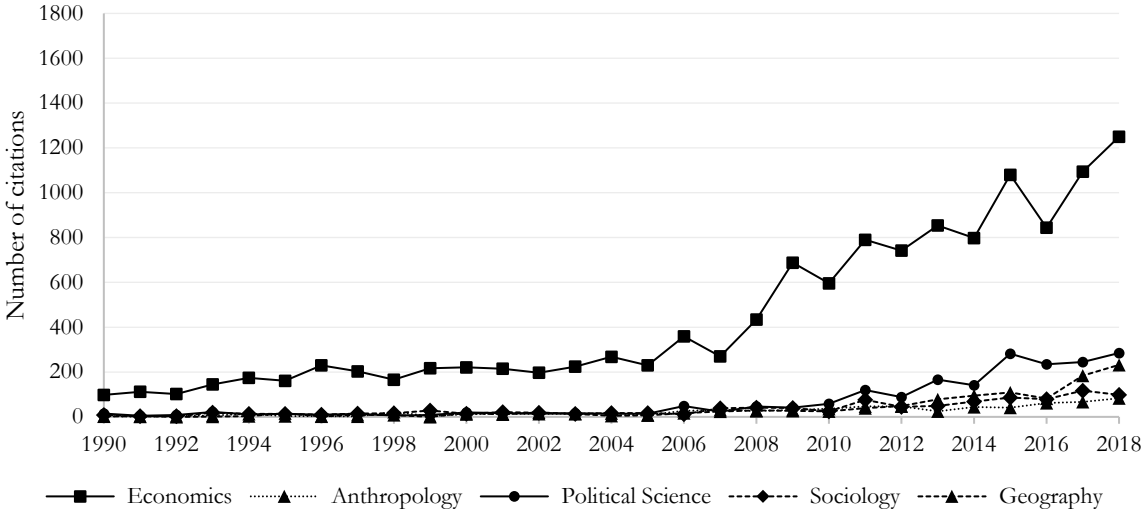


Figure 2a: DE citations in the Social Sciences, 1990-2018

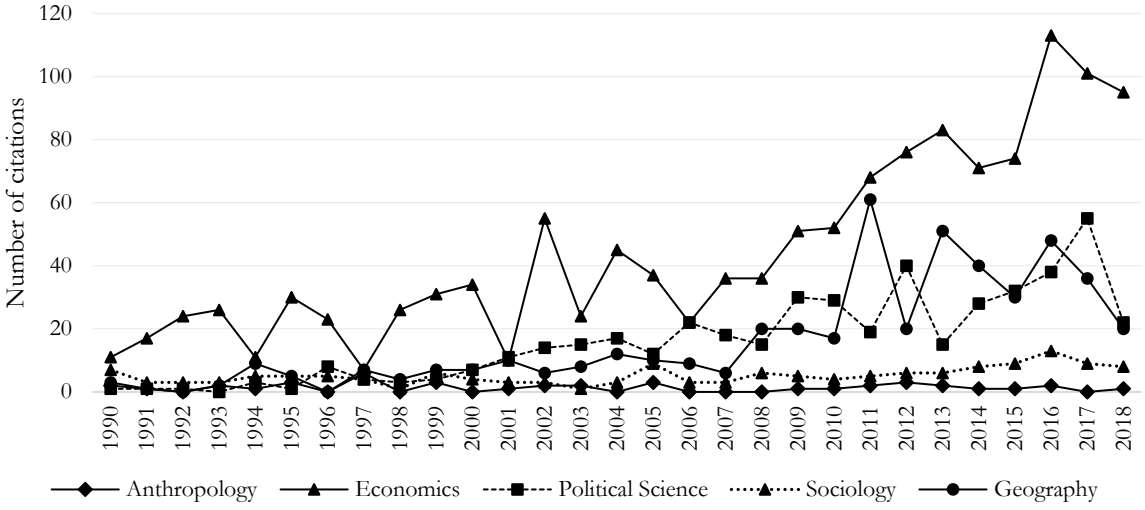


Figure 2b: DS citations in the Social Sciences, 1990-2018

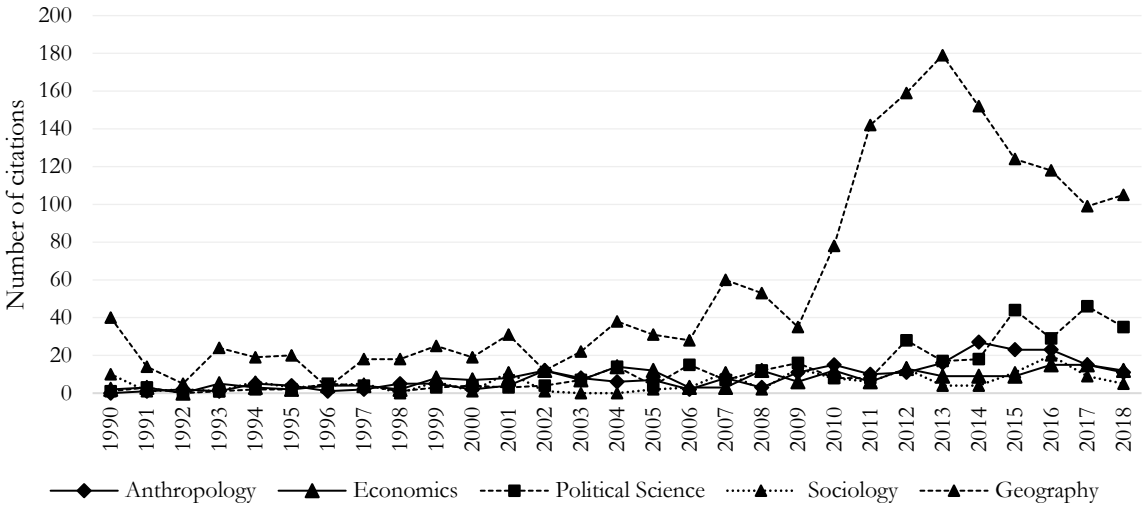


Figure 3a: DS citations in DE by DE journals, 1990-2018

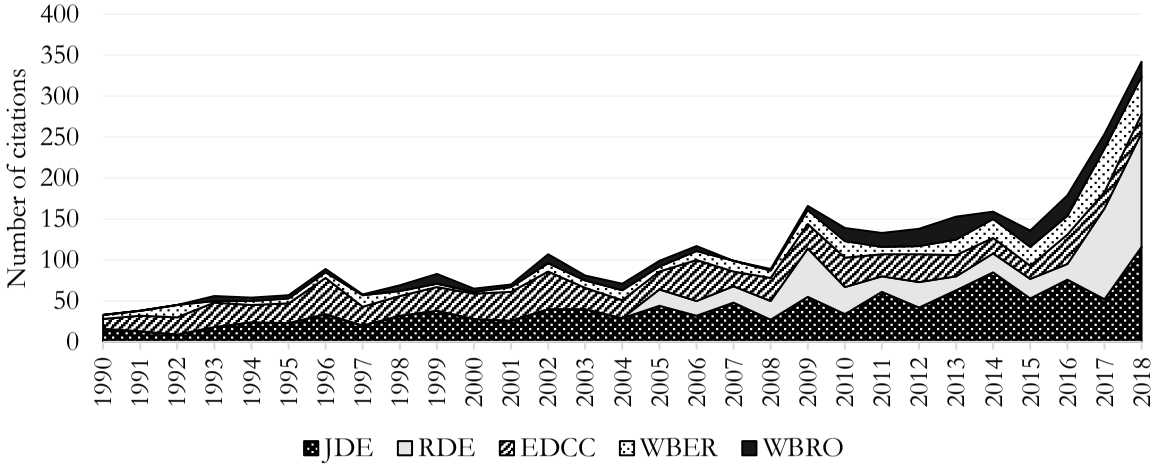


Figure 3b: DS citations in DE by DS journals, 1990-2018

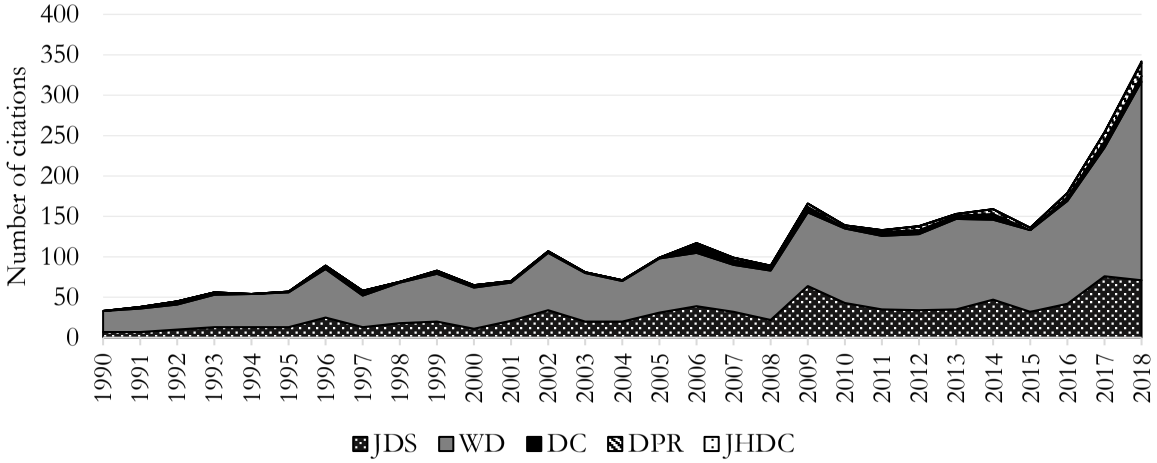


Figure 3c: DE citations in DS by DE journals, 1990-2018

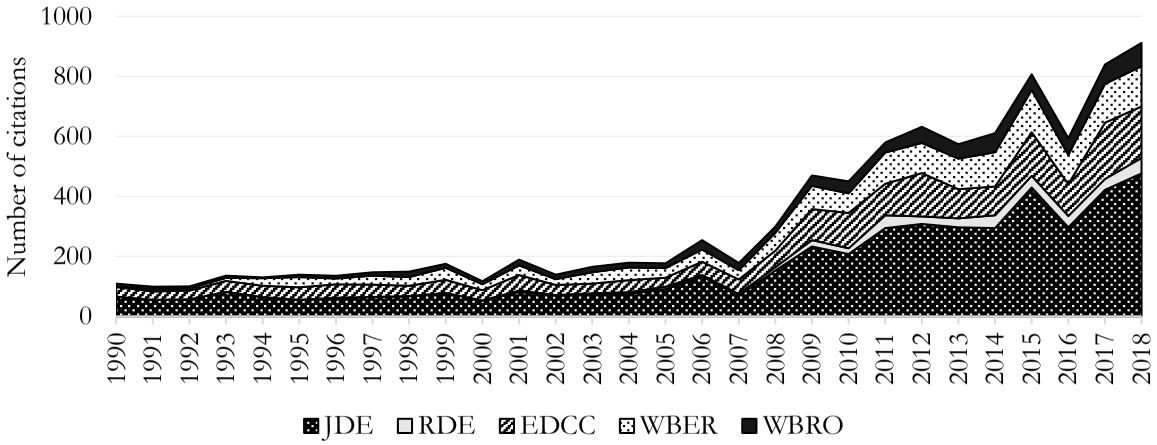


Figure 3d: DE citations in DS by DS journals, 1990-2018

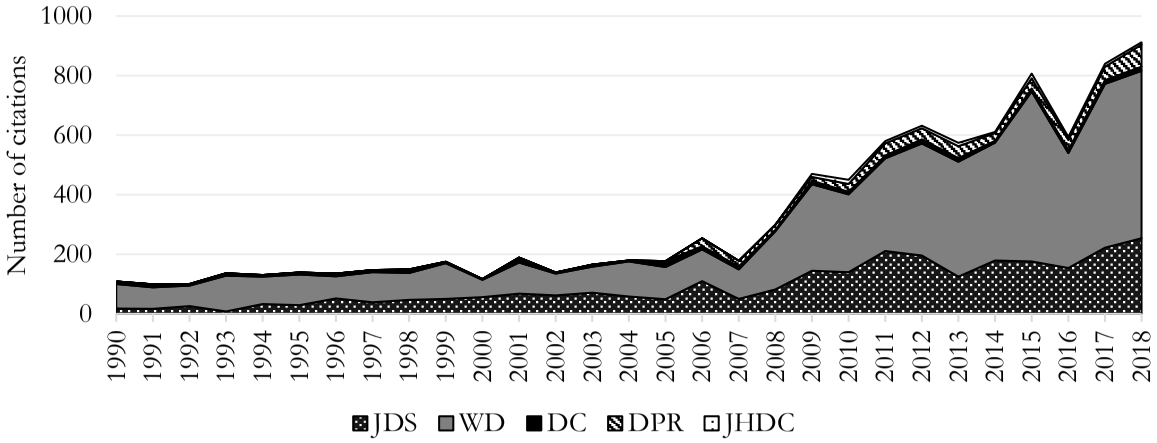


Figure 3e: Cross citation ratio

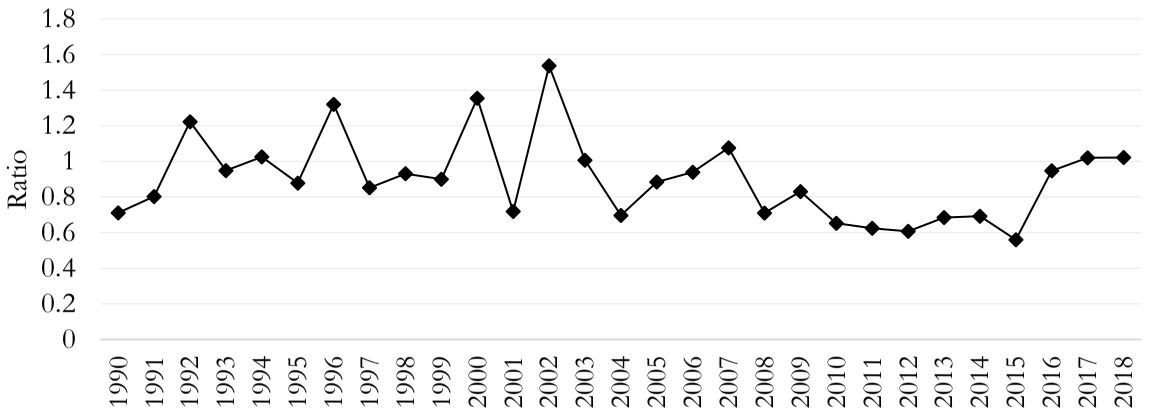


Figure 4a: Share of DE Articles Published by Field of Research, 1991-2018

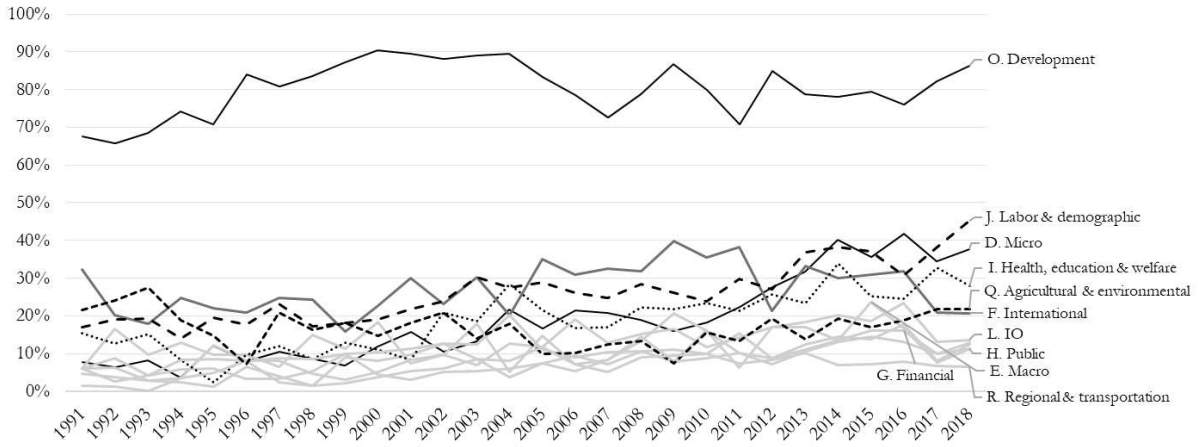


Figure 4b: Share of DS Articles Published by Field of Research, 1991-2018

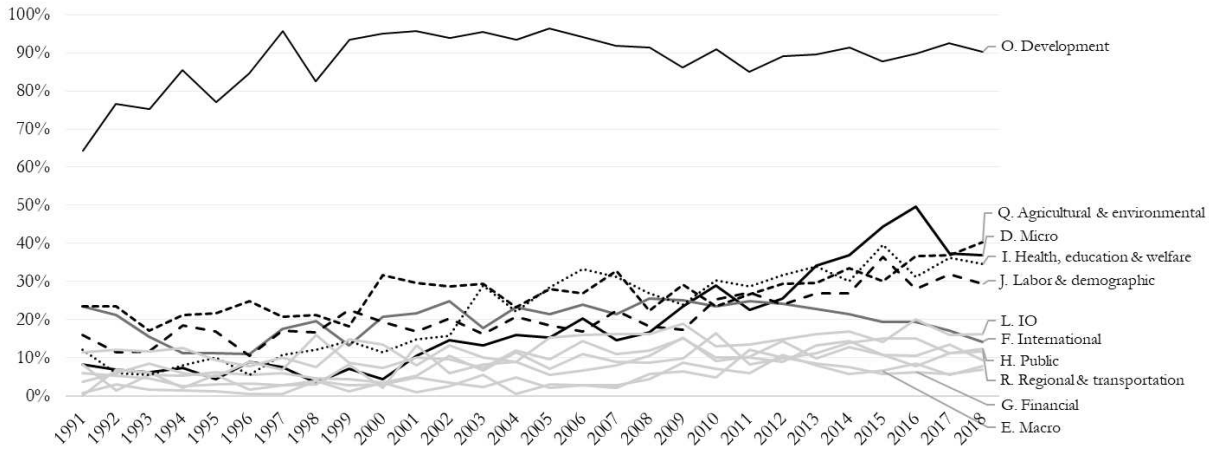


Figure 5: Article Acceptance Rates at Select Development Journals

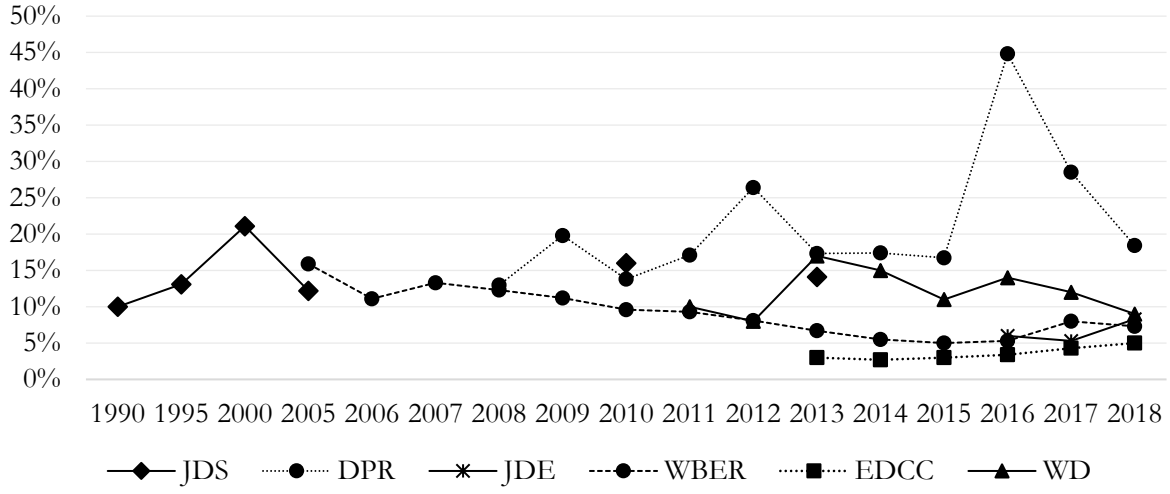


Figure 6: Total citations in DE and DS, 1990-2018

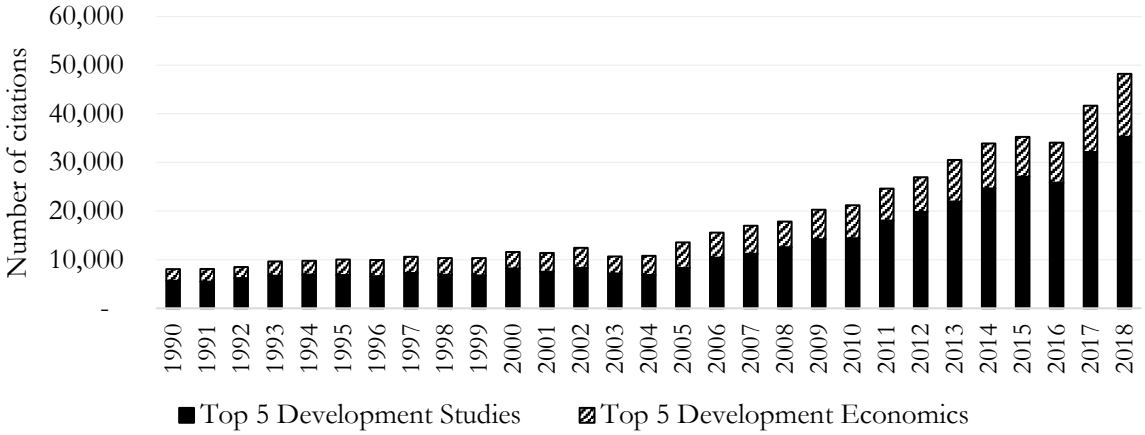


Figure 7a: Number of papers with economics affiliations in DS by journal, 1998-2018

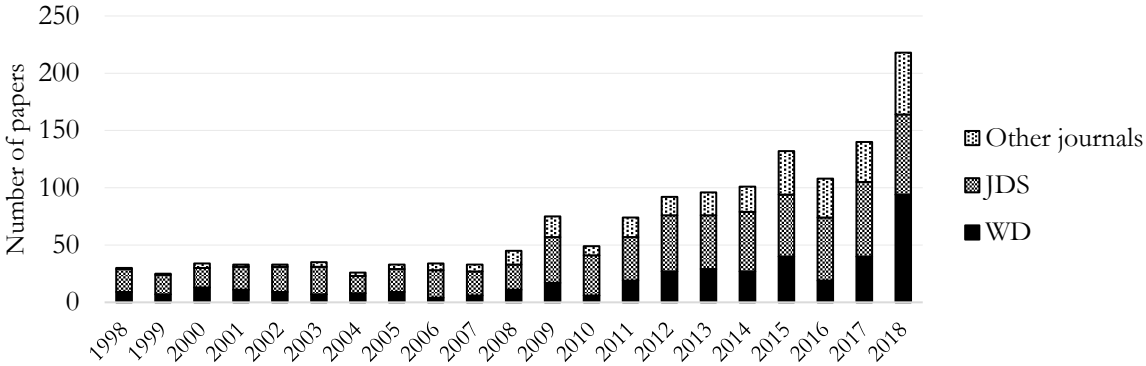


Figure 7b: Proportion of papers with economics affiliations in DS by journal, 1998-2018

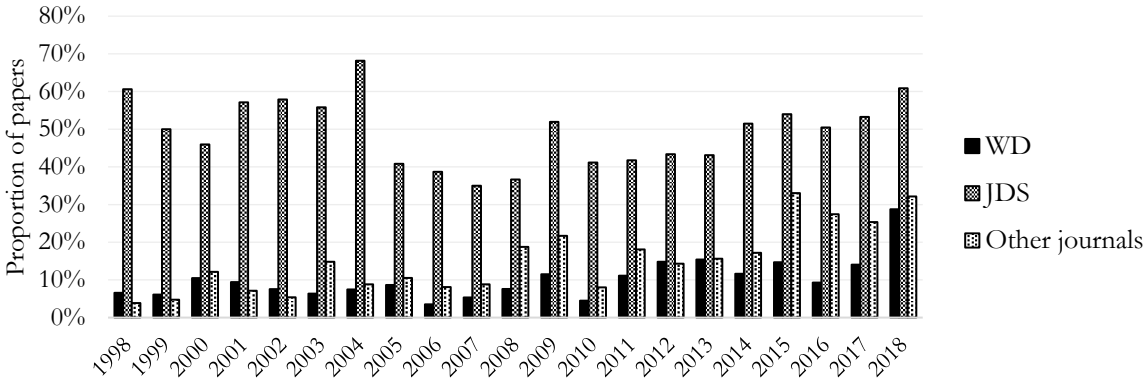


Figure 8a: Number of Social Science citations found in DS, 1990-2018 (DS journal selection without EconLit and subfield criterion)

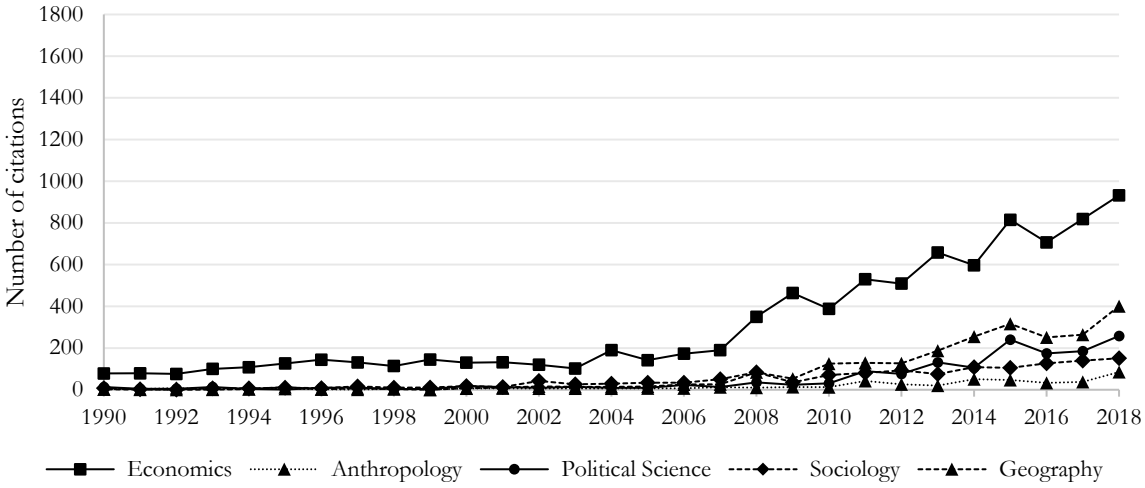
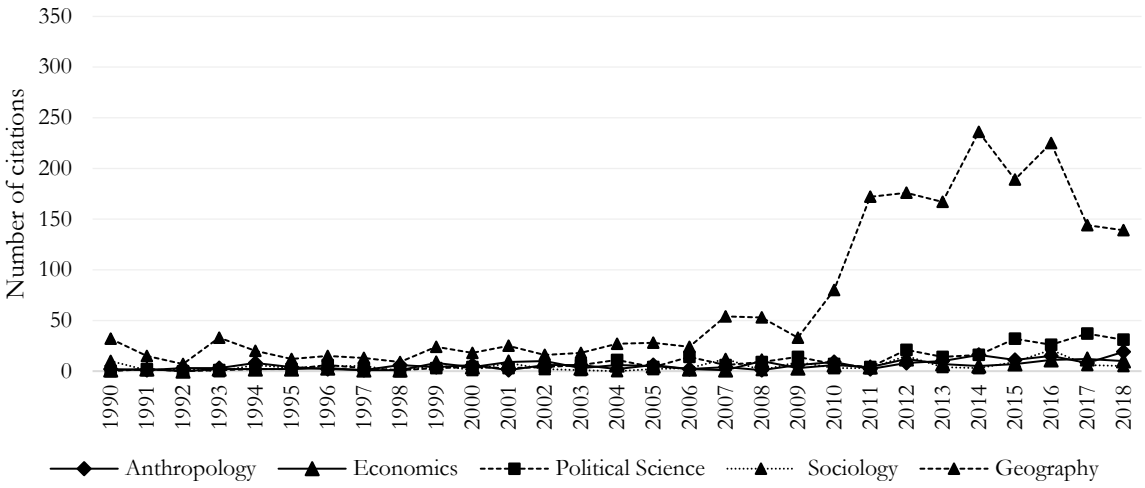
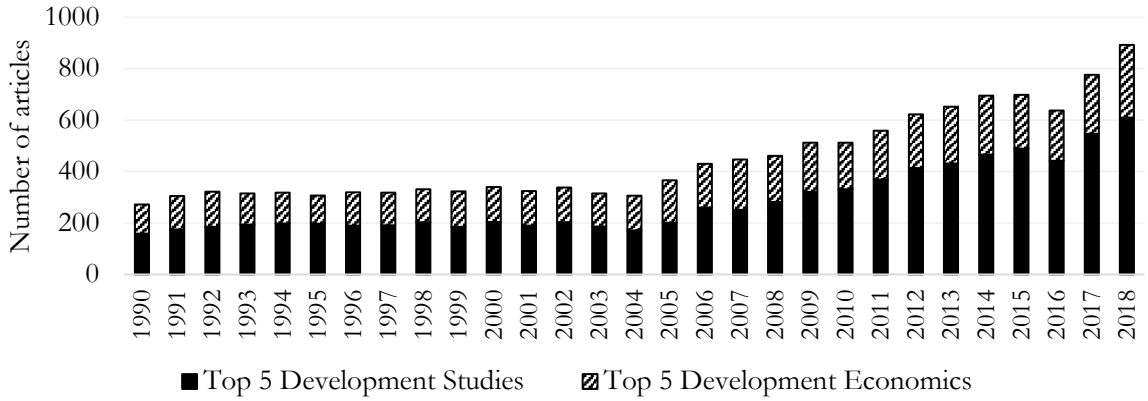


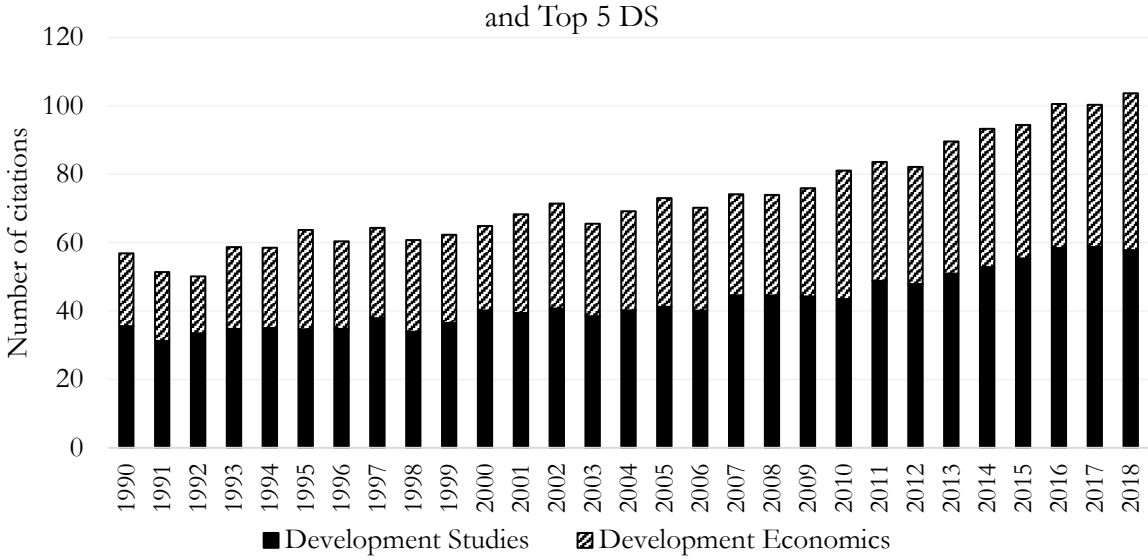
Figure 8b: DS citations in the Social Sciences, 1990-2018 (DS journal selection without EconLit and subfield criterion)



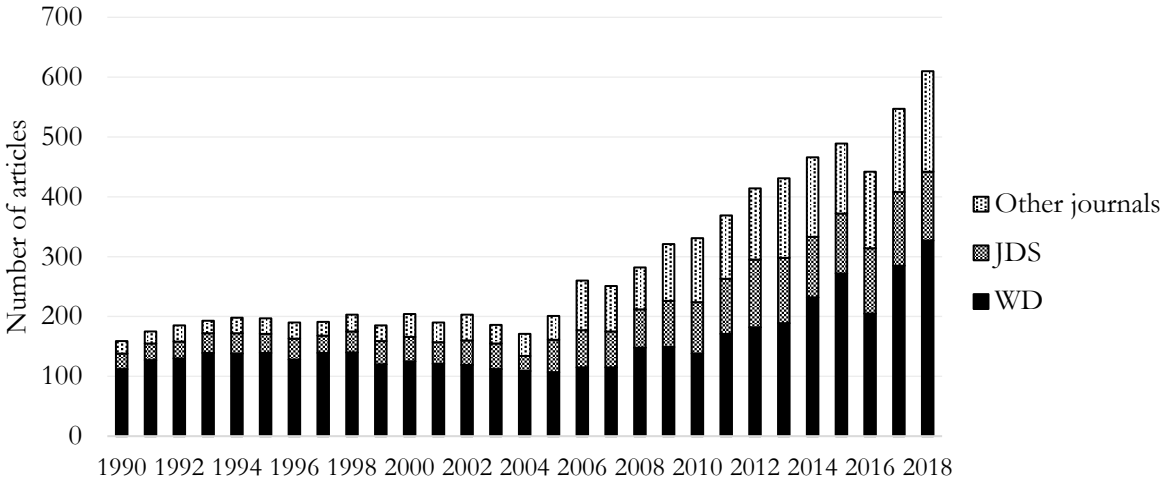
Appendix Figure 1. Annual Total Published Articles in Top 5 DE and Top 5 DS



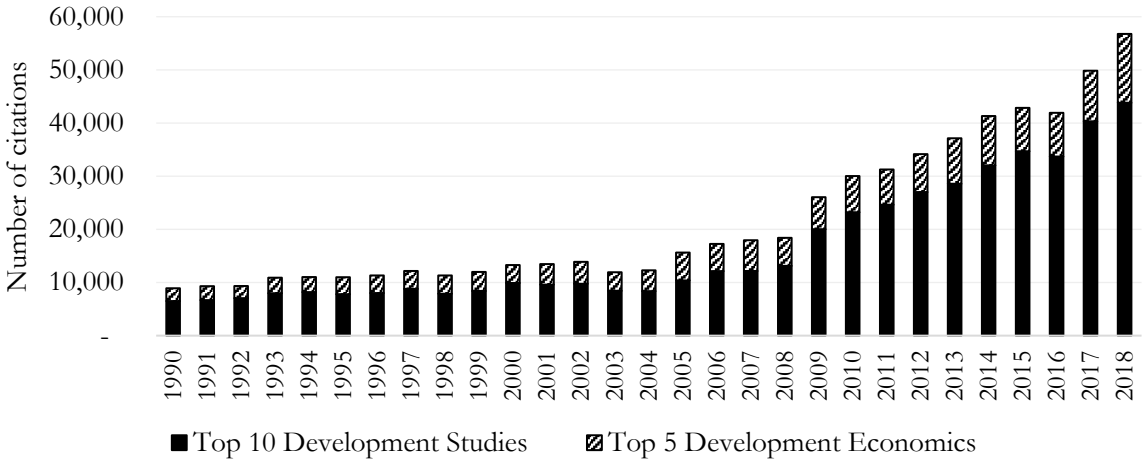
Appendix Figure 2. Average Number of Citations per Paper in Top 5 DE and Top 5 DS



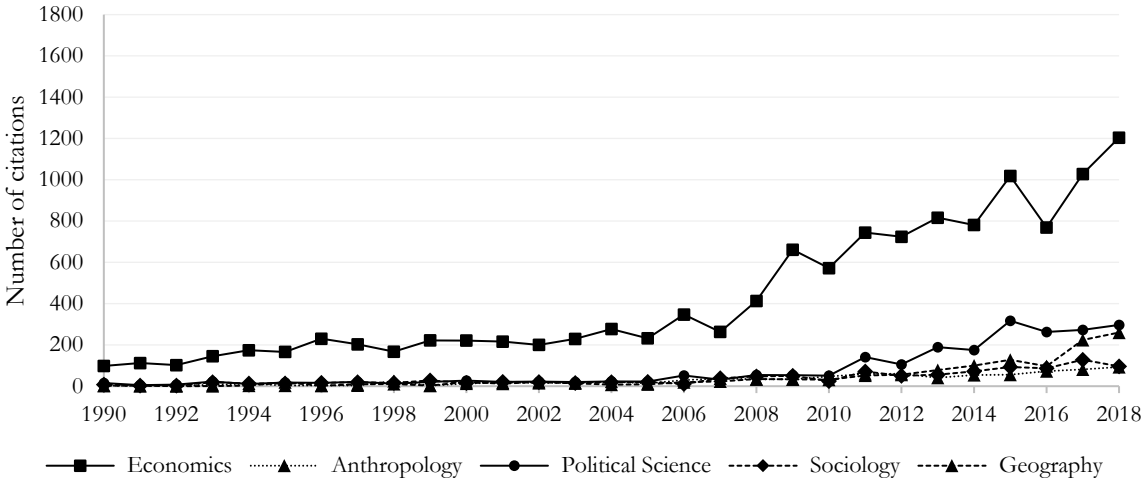
Appendix Figure 3. Annual Total Published Articles in Top 5 DS, by Journal



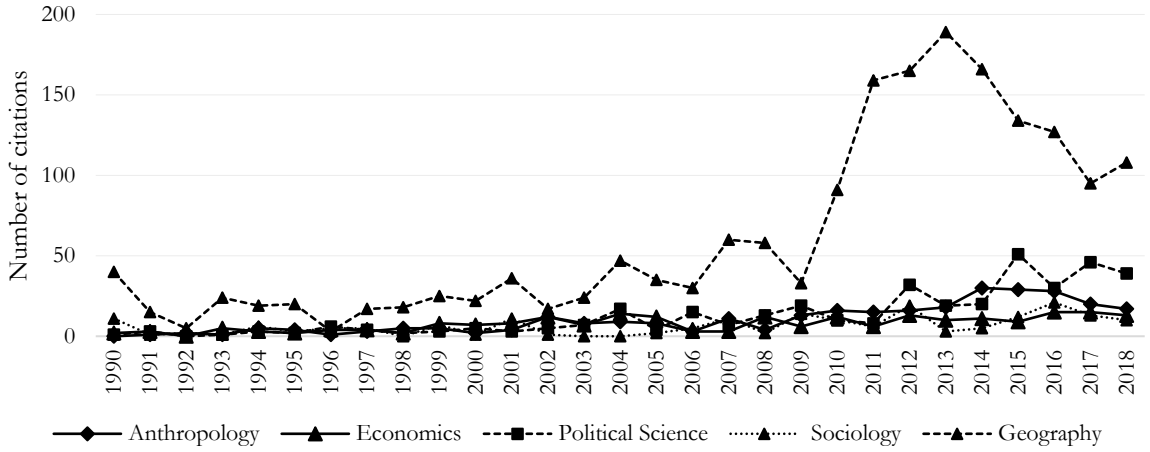
Appendix Figure 4: Total citations in DE and DS, 1990-2018



Appendix Figure 5a: Number of Social Science citations found in DS, 1990-2018 (DS journal selection without EconLit criterion)



Appendix Figure 5b: DS citations in the Social Sciences, 1990-2018 (DS journal selection without EconLit criterion)



Endnotes

[i] We thank an anonymous reviewer for this point. In this paper we use the terms interdisciplinary, multidisciplinary and crossdisciplinary interchangeably to convey the integration of disciplinary knowledge yet acknowledge that this is a simplification (refer discussion Kanbur, 2002).

[ii] The four journals include World Development, Development and Change, Third World Quarterly, and the European Journal of Development Research. It is not stated how and why these particular four journals were selected other than they were included in the SSCI in the cross-disciplinary subject category of 'planning and development.'

[iii] The current JEL classification system was introduced in 1991.

[iv] To classify JEL codes we use the established categories and remove from our analysis categories comprising less than 5 percent of the total share.

[v] Since articles can reference more than one field the share of total JEL codes is greater than one and for both development economics and development studies has risen over the sample period.

[vi] Data obtained through personal correspondence with the Editor.

[vii] We exclude data before 1998 due to the large proportion of papers with missing information on authors' affiliations. We only consider papers with reported affiliations in Figure 7b. A paper is considered to have an economics affiliation when the keyword *economics* appears at least once in the institutional affiliation(s) of the author(s).