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# Patterns of interdisciplinary citations and asymmetry between economics and the neighboring social sciences from 1959 to 2018

*Padrões de citações e assimetria interdisciplinares entre a economia e as demais ciências sociais entre 1959 e 2018*

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## Abstract

This paper offers a quantitative study measuring, through citation analysis, the historical relationship between economics and the other social sciences (that is, anthropology, political science, psychology, and sociology). The exercise suggested here comprehends the period from 1959 to 2018 in order to understand both whether economics has opened more space for the other social sciences and, if so, the subtleties of this process. The paper also develops an original asymmetry measure for interdisciplinarity—the Coefficient of Interdisciplinary Asymmetry.

## Keywords

Interdisciplinarity, Social Sciences, Bibliometrics, Citation Analysis, Coefficient of Interdisciplinary Asymmetry.

**JEL Codes** A12, B29, C89.

## Resumo

*Esse artigo apresenta um estudo quantitativo que mede, através de análise de citação, as relações históricas entre a ciência econômica e as outras ciências sociais (isto é, antropologia, ciência política, psicologia e sociologia). O exercício aqui proposto abarca o período entre 1959 e 2018, e busca compreender se a economia abriu mais espaço para as demais ciências, e, se esse for o caso, as sutilezas desse processo. Esse artigo desenvolve, ainda, uma medida original de assimetria para a interdisciplinaridade – o Coeficiente de Assimetria Interdisciplinar.*

## Palavras-chave

*Interdisciplinaridade, Ciências Sociais, Bibliometria, Análise de Citação, Coeficiente de Assimetria Interdisciplinar.*

**Códigos JEL** *A12, B29, C89.*

## 1 **Introduction**

Some time ago, commenting about the history of economics and the social sciences, Backhouse and Fontaine (2010, 3) stated that "whatever the period being considered, references to the relationships between economics and other social sciences are almost universally incidental in general histories of economics." In an attempt to contribute to this literature, this essay focuses on the evolution of the interdisciplinary relationships between economics and the social sciences.

Our research presents a descriptive quantitative analysis of the patterns of interaction among economics and other social sciences since 1959, an endeavor recently undertook by a handful of studies. In these accounts, knowledge exchange appears asymmetric, and economics is considered more insular than its neighboring disciplines. Fourcade *et al*. (2015, 94), for instance, evaluating the insularity – the absence of interdisciplinarity – of economics for the 2000s, identify economics as the least interdisciplinary[1] discipline in relation to other social sciences.

Notwithstanding, there are contemporary discussions on the topic indicating that economics has open-mindedly embraced other social sciences in the recent years, thereby increasing interdisciplinary interactions (Bögenhold, 2018, 1126; Fontaine, 2015, 3; Mäki, 2017). These discussions find support in a paper published by Angrist *et al*. (2020), which presents the growing tendency of economics to engage in interdisciplinary interaction with other social sciences.

The present study, though close to Angrist *et al*.'s (2020) exercise, offers a more comprehensive and focused discussion of the knowledge exchange between economics and the other social sciences. Our research is more comprehensive because it offers information on several fronts related to economics' social science interdisciplinarity, such as economics' evolution in citations to and from the fellow social sciences, the decennial growth rate of the interdisciplinary ties, and the rise in economics' significance within the network of the social sciences. In these exercises, our results

1 There is a vast literature on the differences between inter-, trans-, multi-, and cross-disciplinarity. We do not intend to discuss taxonomies (cf. Piaget, 1972; Klein, 2010). In the remainder of this essay, interdisciplinarity will be adopted simply to represent knowledge flow among separate disciplines.

corroborate the idea that economics has indeed become a more interdisciplinary social science – even though it still has a lot ground to cover.

More important, however, is the coefficient for measuring asymmetry patterns in interdisciplinary exchange originally offered by this paper. Asymmetry in interdisciplinary citations is vaguely defined in Fourcade *et al*. (2015, 93), Pieters and Baumgartner (2002, 498), and Rigney and Barnes (1980, 119). These works loosely use this concept to represent an absolute mismatch between two disciplines' reciprocal interdisciplinary citations. Our Coefficient of Interdisciplinary Asymmetry, on the other hand, offers both a more thorough perception of economics' *relative relevance* before each social science and an evaluation of changes in the interdisciplinary structure of the social sciences in terms of reciprocal ties. Therefore, this coefficient indicates a *direction* for the interdisciplinary exchange between the social sciences and represents this paper's main contribution. Our results demonstrate that, as the attention devoted to economics by the social sciences grew much more than the other way around in the last decades, economics has moved to the center of the social sciences' network.

## 2 **Methodology: citation analysis, empirical strategy, and the Coefficient of Interdisciplinary Asymmetry**

This section has three subsections. The first explains what comprises a citation analysis and describes the four studies that, to our knowledge, measure social science interdisciplinarity. The second presents our empirical strategy, encompassing data, time span, and methodology. Finally, the third subsection lays out the estimation of the *Coefficient of Interdisciplinary Asymmetry*.

### 2.1 **Citation Analysis**

Citation analysis is a quantitative technique that answers for a bibliometric effort to understand how communication flows within a given scholarly network. Its aim is to describe the structure of the flow of ideas and understand the position journals, disciplines, and scholars occupy within a network (Edwards *et al*., 2018, 287; Jovanovic, 2018, 302; Pieters &

Baumgartner 2002, 483-484). In this sense, we may understand the social sciences as a specific social network of scholars, journals, and academic departments, within which we are interested in the *journal* citation network. The disciplines commonly regarded as social sciences are anthropology, economics, political science, psychology, and sociology (Abbott, 2001, 123; Angrist *et al*., 2020, 4; Pieters & Baumgartner, 2002, 485; Rigney & Barnes, 1980, 114-115). To the best of our knowledge, four works aiming at understanding the structure of interdisciplinary journal citations within this network have been hitherto published.

Rigney and Barnes' (1980) study consists of a comprehensive citation analysis to examine the interdisciplinary citations from 1936 to 1975 both a) within the social sciences network and b) between each individual social science and other groups of academic disciplines. Their conclusion about interdisciplinarity in economics is that, along with psychology, the discipline had the lowest rates of interdisciplinary borrowing, the highest levels of intradisciplinary citations, and an insignificant number of citations from fellow social sciences.

Pieters and Baumgartner (2002) analyzed the communication flows from 1995 to 1997 both a) between economics journals and b) between economics journals and other social sciences and business. They worked with forty-two economics journals and divided them into seven clusters, organized by citation proximity. Again, economics exhibited high levels of intradisciplinarity, engaging in an allegedly asymmetric citation exchange with other social sciences.

Fourcade *et al*. (2015) explored the relationship between economics and other social sciences in different measures, among which insularity is the most relevant to us. The authors considered the period 2000-2009, and the analysis was made *vis-à-vis* sociology and political science. The citing source adopted, as in Rigney and Barnes (1980), was the flagship journal of each discipline, and the reference sources comprised the top 25 journals from each discipline. Their conclusion was that economics is more insular than the other social sciences and has more space in the neighboring disciplines than the neighboring disciplines in economics.

Finally, Angrist *et al*. (2020) evaluated, for the period 1970-2015, the impacts of extramural – that is, interdisciplinary – citations among the social sciences and many other fields of knowledge. The authors show that economics is among the most insular social sciences, but that this situation

has been improved in the past few years. Their unit of analysis also comprises a flagship journal for each discipline.

As such, these studies commonly regard economics as a discipline that relatively neglects its neighboring social sciences. To this extent, Angrist *et al*. (2020) differs from the other works insofar as it demonstrates the progressive improvement of economics in terms of interdisciplinarity. The most comprehensive discussion in Angrist *et al*. (2020), however, regards the fields of economics that have gained importance outside the discipline, not the interdisciplinary phenomena *per se*. Finally, this literature – once again, with the exception of Angrist *et al*. (2020), which does not make any reference to asymmetry patterns – employs the concept of asymmetry rather loosely, which, as we will see, may jeopardize an accurate comprehension of the asymmetry patterns.

## 2.2 **Empirical Strategy and Methodology**

Our empirical strategy is, to some extent, a hybrid effort. It combines features from the four aforementioned studies and some original elements. Above all, it is a quantitative evaluation of economics' relations with the neighboring social sciences as circumscribed to our time span.

Following Angrist *et al*. (2020), Fourcade *et al*. (2015), and Rigney and Barnes (1980), we will concentrate our analysis on one publication per discipline. This publication is each social science's flagship journal of the main American learned society. This is meant to compare how each discipline's flagship journal evolved in terms of interdisciplinary citations to the social sciences. From this comparison, as do Angrist *et al*. (2020) and Fourcade *et al*. (2015), we will extrapolate some general patterns to the social sciences as a whole, keeping in mind that this extrapolation must not be overstated.

In the literature, we find four reasons to defend the selection of the flagship journals as capable of indicating general patterns. First, it is reasonable to assume that the flagship journal of the main American learned society for each discipline represents the central currents of research in their respective fields (Rigney & Barnes, 1980). Second, knowledge production is a socially and institutionally embedded act, and the learned societies play a crucial role in this process, creating stimuli and development conditions, sponsoring research agendas, and coordinating research activities

(Almeida *et al*., 2017; Coats, 1985). Third, the choice for the learned societies' journals reduces the probability of publication biases emerging from the selection of journals maintained by single departments whose publication screening processes might follow particular internal logics (cf. Colussi, 2018; Heckman & Moktan, 2020). Finally, the American academy still holds the highest-ranked journals and faculty departments in economics (Coupé, 2003; Kalaitzidakis *et al*., 2003). Therefore, the journals analyzed are *American Anthropologist* (*AA*), *American Political Science Review* (*APSR*), *American Sociological Review* (*ASR*), *Psychological Review* (*PR*), and *The American Economic Review* (*AER*).

From these flagship journals, we collect the bibliographic references in each original article to build our database. Subsequently, we search for references to the top 25 journals from each social discipline. Following this, our investigation seeks patterns of interdisciplinary *journal* citations flowing from the flagship journals to this group of representative publications. It does not consider sources outside the top 25 journals of each discipline. We perform our analysis using the statistical programming framework *R*, and most of our main functionalities pertain to the *bibliometrix* package (Aria & Cuccurullo, 2017). The citation database is compiled from the *Elsevier Scopus* and *Web of Science* (henceforth WoS) databases.[2]

Our time span ranges from 1959 to 2018, which is different from the periods Rigney and Barnes (1980) and Angrist *et al*. (2020) analyzed. We chose the year 1959 as the starting point both because it marks the first record of the word *interdisciplinarity* and its variations in economics, according to Scopus and WoS, and because the quality of citation data on WoS is significantly worse before 1956 – which marks the creation of the Science Citation Index. In order to compare the interdisciplinarity of our flagship journals and gain some insight on how economics' interdisciplinarity with the other social sciences evolved through time, we separated our time span in decades, from the 1960s (which includes 1959) to the 2010s (ending in 2018), and built a *dynamic* Top 25 Journal Ranking (henceforth T25) for each discipline. We qualify the T25 as dynamic because we constructed one ranking for each decade, with the objective of grasping each journal's influence in that specific period. Moreover, we built our rankings based

2 Databases were accessed in September 21, 2018. Therefore, our sample covers up to the third quarter of 2018.

exclusively on the *inCites Journal Citation Reports* (henceforth JCR), which orders journals according to their impact factors. There are, furthermore, three issues involving the construction of these dynamic rankings.

First, the dynamic rankings per decade comprise the arithmetic means of the year-by-year impact factors within each interval. We rely on the arithmetic mean of the simple journal impact factor because the 5-year impact factor was made available only from 2007 onward. Second, the Social Science Citation Index's JCR is only available from 1979 onward (Garfield, 2007, 65; Rice *et al.*, 1988, 258). This means that social sciences' journal rankings do not have observations for the period 1959-1978. Hence, we adopted the same retrospective ranking for the 1960s and the 1970s. The reference for this ranking is the triennium 1979-1981. Moreover, there is a difference between the rankings for the 1960s and the 1970s related to journal coverage: journals that did not exist in the 1960s were kept solely for the 1970s ranking and were replaced by the next highest-ranked journal covering the 1960s. Finally, in cases where we had a coincidence of journals for two different sciences, we removed that journal from the discipline in which it occupied a lower average position; these journals were also replaced by the next highest-ranked publication.

## 2.3 **The Coefficient of Interdisciplinary Asymmetry**

Rigney and Barnes (1980, 114) understand asymmetry as the situation in which "one field cites another more often than it is cited in return." Pieters and Baumgartner (2002, 498-503), conversely, thinking of asymmetry as "reciprocal citation relationships," present asymmetry in relation to overall interdisciplinary citations of a discipline, but do not advance on this analysis. To amend the need for a more concrete approach to asymmetry in interdisciplinary exchange, we devised the *Coefficient of Interdisciplinary Asymmetry* (henceforth CIA). The CIA is designed to measure the relationship between two disciplines in terms of reciprocal proportion of citations; it quantifies the importance of discipline *A* to discipline *B* in relation to discipline *B*'s importance to discipline *A*. Its formula for a given point in time is $CIA_{A,B} = \ln\left(\left(\frac{\sigma_B^A}{\theta_B}\right)\left(\frac{\theta_A}{\sigma_A^B}\right)\right)$. This equation measures the asymmetry

of discipline $A$ in relation to discipline $B$. In this formula, $\sigma_B^A$ gives the number of citations to discipline $A$ in discipline $B$, $\sigma_A^B$ gives the number of citations to discipline $B$ in discipline $A$, and $\theta_A$ and $\theta_B$ yield the total number of interdisciplinary citations in disciplines $A$ and $B$, respectively. Therefore, the CIA equation depicts the relationship between the proportion occupied by disciplines $A$ and $B$ in the interdisciplinary citation network of each other. We furthermore use a logarithmic function because, without it, since all variables are positive, our ratios would have an inferior bound (in the limit, zero), but no superior bound (the ratio might tend to infinity). Once this is calculated, $CIA_{B,A}$ is simply $CIA_{A,B}$'s inverse: $CIA_{B,A} = -CIA_{A,B}$. Therefore, since this is a coefficient regarding symmetry, the logarithmic function renders our results more symmetrically related.

If $CIA_{A,B}$ equals zero, then we have that $A$ plays a role in $B$'s network of interdisciplinary citations equivalent to the role played by $B$ in $A$'s. As such, values closer to zero represent higher symmetry than those farther away. Alternatively, a positive $CIA_{A,B}$ means that $A$ is more representative to $B$ than $B$ to $A$, while a negative $CIA_{A,B}$ yields the opposite result.

We believe that the CIA offers a more accurate perspective on bilateral relations than the loose comparison between the absolute levels of interdisciplinary citations among disciplines, because the latter does not consider the fact that disciplines present different institutional and historical patterns of interdisciplinarity. Since this difference exists, such analyses almost inevitably present asymmetry toward the less interdisciplinary discipline, inasmuch as its propensity to cite the neighboring sciences is smaller. On the contrary, the CIA considers different degrees of interdisciplinarity among disciplines as given. In this sense, each discipline's weight in relation to each other is measured exclusively *within* the interdisciplinary citations to the network. Therefore, it is our claim that the CIA facilitates an effective understanding of the asymmetry patterns in terms of the relative relevance between two sciences within a given network, offering a *direction* for the analysis of interdisciplinarity.

## 3 **Results: interdisciplinarity within the social sciences network across time**

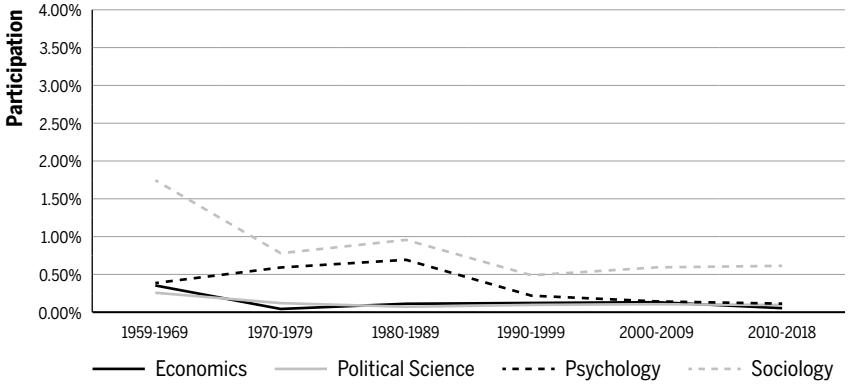
The main results to be detailed in this section are: a) the evolution of each flagship journal's openness to the other social sciences' T25; b) the evolution of the citations in anthropology, political science, psychology, and sociology to the economics' T25 journals per decade; c) the aggregate relationships between the flagship journals and a group of core journals for each science; d) the patterns of asymmetry in interdisciplinary citations; and e) the evolution of each flagship journal's references to the T25 of its own discipline. Among these, a) and b) resemble the results presented by Angrist *et al*. (2020). Point e) is close to the conclusion of Fourcade *et al*.'s (2015, 94) concerning economics' regard for the top of its internal hierarchy. Despite these prior discussions, nevertheless, we believe our analyses offer new inputs and insights on the nature of these developments. Evaluations c) and d), furthermore, offer, to the best of our knowledge, original assessments on the structure of the interdisciplinary citations within the social sciences network.

That said, figures 1 to 5 illustrate the evolution of each flagship journal's degree of interdisciplinarity in relation to the social sciences.

Figures 1 to 5 depict how each T25 was cited in particular flagship journals. In these figures, each line denotes the citations to one single alien discipline. Accordingly, Figure 1 establishes the evolution of *AA*'s citations to the T25 journals on each discipline, except anthropology; Figure 2 evaluates the progress of *APSR*'s citations to the highest-ranked journals on each discipline, except political science; and so forth. The y-axis represents each T25's participation in the citations of the flagship journals of the neighboring social sciences. If we take, for instance, the last observation of the black line in Figure 5, we have that 0.666% of all entries in the references of papers published by the *AER* belongs to political science's T25 in the 2010s. Angrist *et al*. (2020, 12) present similar figures, whose tendencies figures 1 to 5 corroborate.

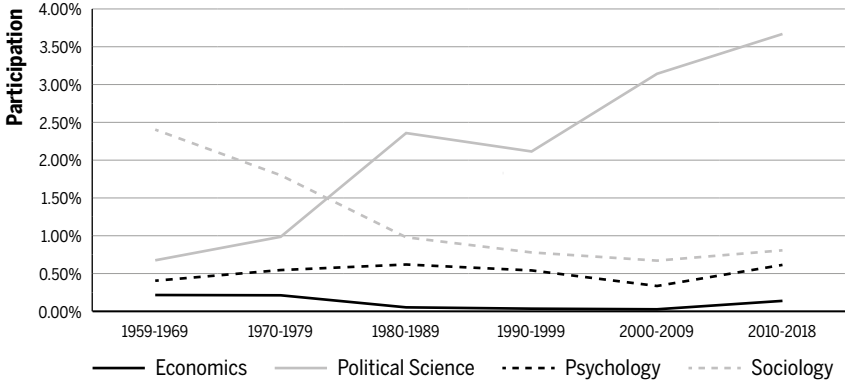
Figure 6, alternatively, aggregates each discipline's overall openness to the social sciences. Its lines represent how each individual flagship journal evolved in its citations to each of the aggregate T25s. Again, citations to a discipline's own T25 were not taken into consideration, and the logic for the y-axis here is the same as detailed above for figures 1 to 5, except that now we deal with aggregate T25s. This figure also finds a similar representation in Angrist *et al*. (2020, 10).

Figure 1 **The Social Sciences in the *American Anthropologist***



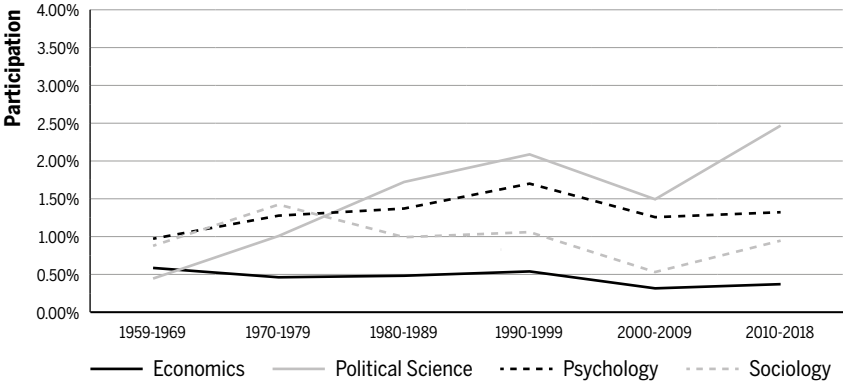

*Source: Elaborated by the authors.*

Figure 2 **The Social Sciences in the *American Political Science Review***



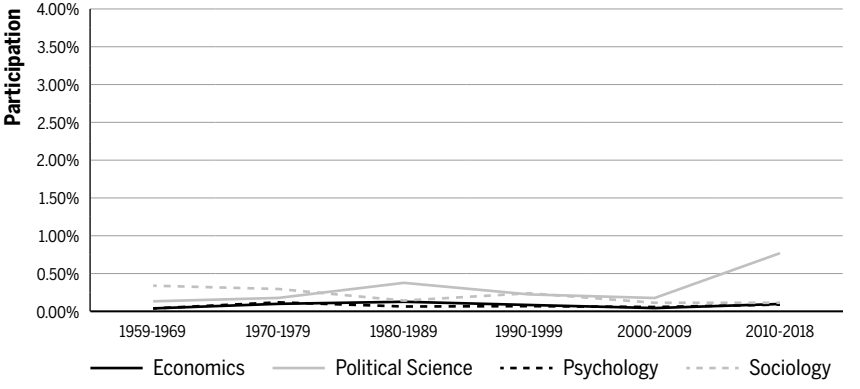

*Source: Elaborated by the authors.*

Figure 3 **The Social Sciences in the *American Sociological Review***



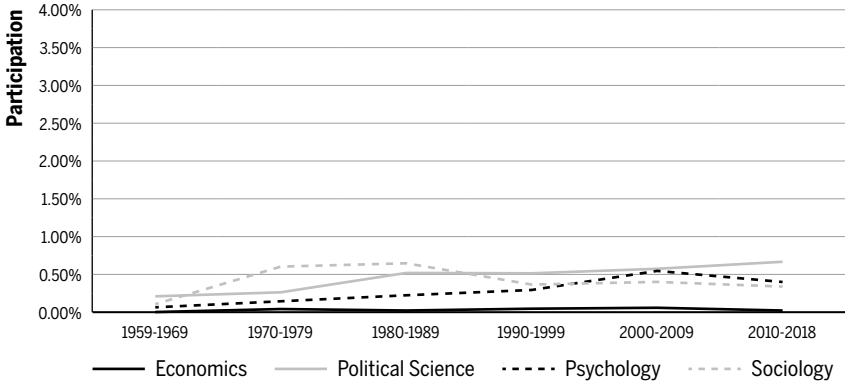

*Source: Elaborated by the authors.*

Figure 4 **The Social Sciences in the *Psychological Review***



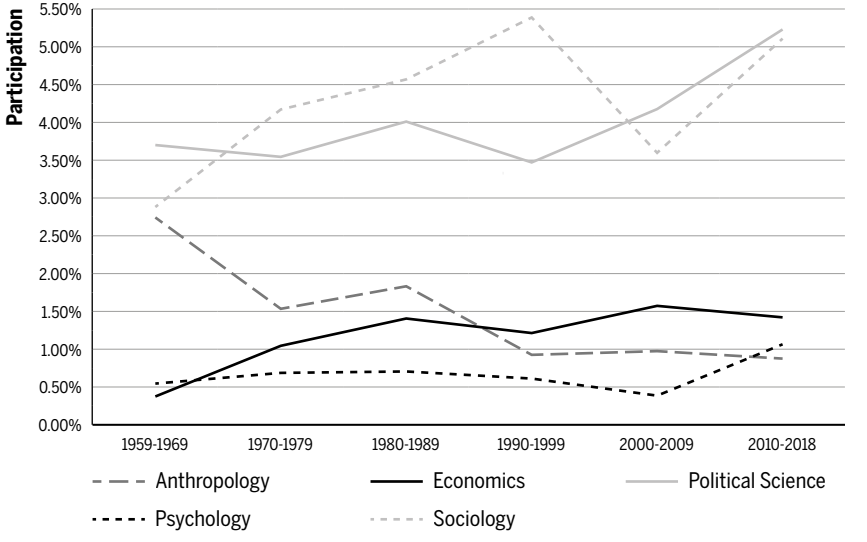

*Source: Elaborated by the authors.*

Figure 5 **The Social Sciences in the *American Economic Review***




*Source: Elaborated by the authors.*

Figure 6 **Overall Openness to the Social Sciences in each flagship journal**




*Source: Elaborated by the authors.*

Table 1 **Percentage of interdisciplinary citations**

| Decade | Journal | Discipline | | | | | |
|---|---|---|---|---|---|---|---|
| | | Economics | Anthropology | Political Science | Psychology | Sociology | Overall Openness |
| 1960s | AER | 20.524% | 0.000% | 0.208% | 0.062% | 0.104% | 0.374% |
| | AA | 0.354% | 7.274% | 0.257% | 0.386% | 1.746% | 2.742% |
| | APSR | 0.675% | 0.216% | 7.900% | 0.405% | 2.404% | 3.700% |
| | PR | 0.132% | 0.038% | 0.038% | 15.169% | 0.338% | 0.545% |
| | ASR | 0.445% | 0.586% | 0.972% | 0.878% | 12.554% | 2.881% |
| 1970s | AER | 27.394% | 0.040% | 0.261% | 0.142% | 0.602% | 1.045% |
| | AA | 0.043% | 6.368% | 0.120% | 0.591% | 0.780% | 1.534% |
| | APSR | 0.986% | 0.212% | 8.170% | 0.546% | 1.800% | 3.544% |
| | PR | 0.177% | 0.098% | 0.118% | 12.341% | 0.294% | 0.687% |
| | ASR | 1.008% | 0.462% | 1.277% | 1.424% | 10.327% | 4.171% |
| 1980s | AER | 28.244% | 0.020% | 0.518% | 0.222% | 0.646% | 1.406% |
| | AA | 0.112% | 7.305% | 0.072% | 0.693% | 0.956% | 1.832% |
| | APSR | 2.358% | 0.053% | 9.592% | 0.620% | 0.980% | 4.011% |
| | PR | 0.376% | 0.125% | 0.063% | 16.693% | 0.141% | 0.705% |
| | ASR | 1.723% | 0.482% | 1.371% | 0.992% | 9.827% | 4.569% |
| 1990s | AER | 23.045% | 0.044% | 0.513% | 0.292% | 0.364% | 1.213% |
| | AA | 0.122% | 5.629% | 0.096% | 0.218% | 0.488% | 0.925% |
| | APSR | 2.115% | 0.035% | 9.577% | 0.541% | 0.779% | 3.471% |
| | PR | 0.223% | 0.083% | 0.067% | 9.585% | 0.238% | 0.611% |
| | ASR | 2.088% | 0.539% | 1.701% | 1.060% | 9.614% | 5.388% |
| 2000s | AER | 23.586% | 0.056% | 0.573% | 0.545% | 0.399% | 1.573% |
| | AA | 0.132% | 4.489% | 0.106% | 0.143% | 0.593% | 0.974% |
| | APSR | 3.142% | 0.027% | 8.380% | 0.335% | 0.671% | 4.176% |
| | PR | 0.175% | 0.042% | 0.056% | 8.106% | 0.112% | 0.385% |
| | ASR | 1.494% | 0.316% | 1.257% | 0.531% | 8.637% | 3.598% |
| 2010s | AER | 21.904% | 0.020% | 0.666% | 0.398% | 0.337% | 1.421% |
| | AA | 0.054% | 7.320% | 0.095% | 0.113% | 0.613% | 0.876% |
| | APSR | 3.669% | 0.139% | 8.597% | 0.614% | 0.807% | 5.229% |
| | PR | 0.769% | 0.096% | 0.088% | 10.800% | 0.112% | 1.065% |
| | ASR | 2.468% | 0.371% | 1.323% | 0.946% | 8.014% | 5.108% |

*Source: Elaborated by the authors.*

The coefficients behind figures 1 to 6 are summarized in Table 1, which presents the percentage of interdisciplinary citations by decade for each flagship journal. The colored diagonals represent citations to a discipline's own T25. The last column, which supplies the observations presented in Figure 6, is a sum of all the coefficients in a given line – minus the colored diagonal.

Collectively, figures 1 to 6 and Table 1 offer two insights. First, they reveal that the overall openness of the social sciences – if we take the flagship journals as sufficiently representative – to the neighboring disciplines has risen in the last 60 years, from 2.05 percent, in the 1960s, to 2.74 percent, in the 2010s – peaking throughout the six decades. This represents a growth of 33.74 percent in the average interdisciplinarity within the social sciences network (with an average growth rate of 5.99 percent per decade). The second perception is that we may divide the social sciences into three classes of disciplines by interdisciplinarity status. The class of *high and growing interdisciplinarity*, composed by political science and sociology, kept its degree of interdisciplinarity growing and above the average overall interdisciplinary openness throughout the entire series. In the class of *low and growing interdisciplinarity*, which comprises economics and psychology, interdisciplinarity levels grew along our time span but remained below the interdisciplinarity average of the social sciences. Anthropology is the only discipline in the class of *decreasing interdisciplinarity*, in which the interdisciplinarity levels fell below the average levels from a certain decade onward. These same groups could also be inferred from Angrist *et al*. (2020, 10) – even though the authors do not follow the above classification.

Political science's and sociology's flagship journals present the highest degrees of interdisciplinarity. The disciplines' relatively high levels of interdisciplinarity are ratified by the recognition that their lowest decennial percentages (3.47 percent and 2.88 percent, respectively), are greater than the highest decennial percentages of the other three disciplines. In fact, if it were not for these two disciplines, the social sciences' aggregate average of interdisciplinary openness would have decreased in the sample (from 1.22 percent in the 1960s to 1.12 percent in the 2010s). Additionally, in the 2010s, political science and sociology collectively represented more than three-quarters (75.46 percent) of the interdisciplinary citations within the network.

Economics' and psychology's flagship journals show low but intertemporally growing degrees of interdisciplinarity. Economics departs from 0.37 percent in the 1960s to reach 1.42 percent in the 2010s, while psy-

chology departs from 0.55 percent and reaches 1.06 percent. Economics departs from a lower degree of interdisciplinary openness and evolves prominently in relation to its first observation, nearly quadrupling from this stage, while psychology's decennial percentages nearly double. Still, both economics and psychology remain below the average levels of interdisciplinary openness through all the decades.

Anthropology, at last, is the only discipline whose degree of interdisciplinary openness decreased throughout our period of analysis. In the 1960s, anthropology was above the average level of interdisciplinary openness, with 2.74 percent of its citations directed toward its fellow social sciences. From the 1970s onward, however, the tendency of anthropology to cite these disciplines decreased progressively, reaching 0.88 percent in the 2010s, which is anthropology's lowest degree of social science interdisciplinarity in our sample.

Based on these findings, Table 2 compares the sampled points of departure and arrival of each flagship journal. Political science, sociology, and psychology did not have their positions altered between the 1960s and the 2010s; they remained in the first, second, and fourth positions, respectively. Economics, however, rose from the fifth to the third place, superseding psychology and anthropology. Anthropology, given its progressively decreasing regard for the social sciences, descended from the third to the fifth position.

Table 2 **The evolution of the flagship journals in terms of interdisciplinarity**

| Position | 1960s | | 2010s | | Δ% | |
|---|---|---|---|---|---|---|
| | ***Discipline*** | **Percentage** | ***Discipline*** | **Percentage** | ***Discipline*** | **Percentage** |
| **1** | Political Science | 3.70 | Political Science | 5.23 | **Economics** | 279.65 |
| **2** | Sociology | 2.88 | Sociology | 5.11 | Psychology | 95.33 |
| **3** | Anthropology | 2.74 | **Economics** | 1.42 | Sociology | 77.31 |
| **4** | Psychology | 0.55 | Psychology | 1.06 | Political Science | 41.32 |
| **5** | **Economics** | 0.37 | Anthropology | 0.88 | Anthropology | –68.07 |

*Source: Elaborated by the authors.*

The first four columns, regarding the starting and final stages of interdisciplinary openness, are important to situate economics in relation to its fellow social sciences. Economics is much below political science and sociology in terms of interdisciplinarity citations to the other social sciences.

This was true in the 1960s, and it remains true in the 2010s. Economics, however, managed to improve its situation and became more mindful of the social sciences than psychology and anthropology. In the case of the latter, this can be partially attributed to anthropology's contraction of its own interdisciplinarity levels. However, the escalation of economics' degree of interdisciplinarity *vis-à-vis* those of psychology, political science, and sociology, surpassing the first and reducing the gap with respect to the remaining two, must be credited to economics.

These results comprise the flagship journals, but, extrapolating them to the disciplines, we have reason to believe that economics, among all the five disciplines, is the one that became more open in relation to its own former levels. This is depicted in the last two columns of Table 2. As already presented, anthropology is the only discipline whose degree of interdisciplinary openness decreased. It had a growth rate of –68.07 percent. Among those whose interdisciplinary citations increased, psychology nearly doubled, growing 95.33 percent, while sociology and political science also grew significantly, recording growth rates of 77.31 percent and 41.32 percent, respectively. It must be noted that the latter two disciplines already departed from relatively high degrees of interdisciplinarity, which makes these numbers expressive. Economics, finally, even though it might be argued that its point of departure was – for reasons discussed in the next section – absurdly low, grew 279.65 percent. This means that, in the 2010s, within the universe of *AER* citations, articles originally published in the highly ranked journals of the alien social sciences occupied a space nearly four times bigger than in the 1960s. Therefore, when we compare economics in the 2010s with economics in the 1960s, we are compelled to conclude that our study does not find enough substance to reject the hypothesis defended by Fontaine (2015, 3) and Mäki (2017) and measured by Angrist *et al*. (2020, 10-12): the attention of economics to other social sciences – as long as the *AER* as a proxy is concerned – has indeed become more prominent.

Furthermore, the increasing attention of economics to the neighboring social disciplines was answered by an active – and much more incisive – increase in the attention of the alien social sciences to economics. Table 3 compares these rates of growth. The overall openness of the social sciences went up 33.74 percent, with an average growth rate of 5.99 percent per decade, as aforementioned. Meanwhile, the *AER* citations to the T25s

of anthropology, political science, psychology, and sociology increased 279.65 percent, with an average growth rate of 30.58 percent. At the same time, the average number of citations of other flagship journals to economics grew 333.52 percent, with an average growth rate of 34.09 percent per decade.

Table 3 **Growth rates per decade (economics and overall)**

| Decade | Average overall openness (%) | Growth rate (Δ%) | Average citations to economics (%) | Growth rate (Δ%) | Average citations to economics (%) | Growth rate (Δ%) |
|---|---|---|---|---|---|---|
| 1960s | 2.05 | – | 0.40 | – | 0.37 | – |
| 1970s | 2.20 | 7.20 | 0.55 | 37.88 | 1.04 | 179.14 |
| 1980s | 2.50 | 14.05 | 1.14 | 106.42 | 1.41 | 34.55 |
| 1990s | 2.32 | –7.30 | 1.14 | –0.47 | 1.21 | –13.68 |
| 2000s | 2.14 | –7.77 | 1.24 | 8.71 | 1.57 | 29.65 |
| 2010s | 2.74 | 27.95 | 1.74 | 40.77 | 1.42 | –9.67 |
| Growth rate | – | 33.74 | – | 333.52 | – | 279.65 |
| Average growth rate | – | 5.99 | – | 34.09 | – | 30.58 |

*Source: Elaborated by the authors.*

This intertemporal evaluation further indicates that economics rose to the highest rank among the social sciences in terms of prestige in the 1980s, after an increase of 106.42 percent in citations directed toward its T25. From this decade onward, as displayed in figures 1 to 4, economics became the most cited social discipline in political science, psychology (both of which had sociology as most cited discipline in 1960s-1970s), and sociology (in psychology's stead) – the exception here is anthropology, in which sociology remained as the most cited discipline throughout the entire sample.

This movement of economics towards the center of the social sciences network may be inferred from Table 4 and Figure 7. Table 4 contains information regarding the proportions of interdisciplinary (ID in the table) citations to and from economics. The first three columns show that, among the five disciplines and among all the interdisciplinary citations to social sciences (SS in the table) – accounted by the simple addition of the absolute number of interdisciplinary citations – the *AER* evolved from representing merely 2.19 percent in the 1960s to representing 19.23 percent in

the 2010s. Additionally, the final three columns illustrate that economics, which represented 15.90 percent of all the interdisciplinary citations of the flagship journals of anthropology, political science, psychology, and sociology to the neighboring social sciences in the 1960s, accounted for 56.01 percent of these citations in the 2010s. Accordingly, these columns inform the reader that economics, from the 1990s onwards, became the target of more than half of the absolute number of interdisciplinary citations to the social sciences employed by *AA*, *APSR*, *ASR*, and *PR*.

Table 4 **Economics' rise in significance within the social sciences network**

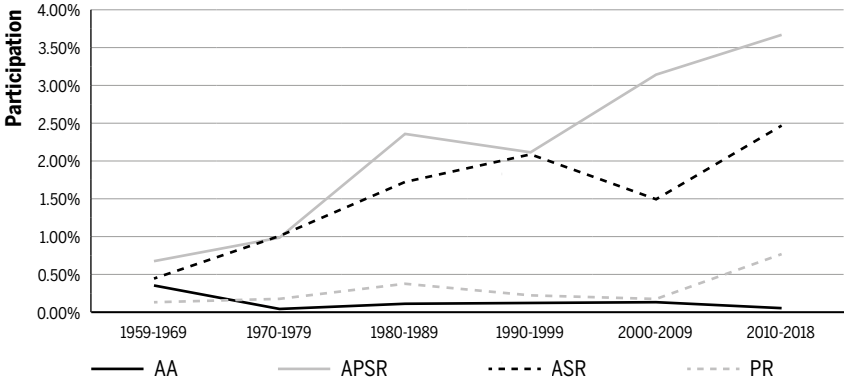
| Decade | SS Overall ID citations (with economics') | Economics' ID citations to the SS | Economics' ID citations within the SS network (%) | SS Overall ID citations (without economics') | Overall ID citations to economics from the SS | ID citations to economics within the SS network (%) |
|---|---|---|---|---|---|---|
| **1960s** | 823 | 18 | 2.19 | 805 | 128 | 15.90 |
| **1970s** | 1,589 | 132 | 8.31 | 1,457 | 340 | 23.34 |
| **1980s** | 1,982 | 209 | 10.54 | 1,773 | 779 | 43.94 |
| **1990s** | 2,017 | 220 | 10.91 | 1,797 | 809 | 45.02 |
| **2000s** | 1,978 | 390 | 19.72 | 1,588 | 818 | 51.51 |
| **2010s** | 2,564 | 493 | **19.23** | 2,071 | 1,160 | **56.01** |

*Source: Elaborated by the authors.*

Furthermore, Figure 7 shows that this rise in attention toward economics was more conspicuous in political science and sociology, while anthropology actually contracted its utilization of citations to economics.

A comparison between figures 5 and 7 facilitates the introduction of the asymmetric relationships between economics and other social sciences, as presented by Fourcade *et al*. (2015, 94). The comparison between these figures allows us to pair economics with each one of the other four disciplines per decade. This gives us twenty-four pairing observations, summarized in Table 5. The first column in each box gives economics' citations to the paired discipline, while the second column gives the opposite relationship. The higher percentages in each comparison are in bold. In twenty-two out of the twenty-four observations, economics' space in the paired social science is bigger than the other way around. The only exception is psychology, both in the 1990s and 2000s.

Figure 7 **References to economics' T25**




*Source: Elaborated by the authors.*

Table 5 **Unweighted relationships between economics and its fellow social sciences**

| Decade | Economics vs Anthropology (%) | | Economics vs Political Science (%) | | Economics vs Sociology (%) | | Economics vs Psychology (%) | |
|---|---|---|---|---|---|---|---|---|
| **1960s** | 0.000 | **0.354** | 0.208 | **0.675** | 0.104 | **0.445** | 0.062 | **0.132** |
| **1970s** | 0.040 | **0.043** | 0.261 | **0.986** | 0.602 | **1.008** | 0.142 | **0.177** |
| **1980s** | 0.020 | **0.112** | 0.518 | **2.358** | 0.646 | **1.723** | 0.222 | **0.376** |
| **1990s** | 0.044 | **0.122** | 0.513 | **2.115** | 0.364 | **2.088** | **0.292** | 0.223 |
| **2000s** | 0.056 | **0.132** | 0.573 | **3.142** | 0.399 | **1.494** | **0.545** | 0.175 |
| **2010s** | 0.020 | **0.054** | 0.666 | **3.669** | 0.337 | **2.468** | 0.398 | **0.769** |
| **Growth rate** | – | –84.84 | 220.20 | 443.36 | 224.36 | 454.66 | 537.63 | 484.10 |
| **Average growth rate** | – | –31.43 | 26.21 | 40.29 | 26.53 | 40.87 | 44.85 | 42.33 |

*Source: Elaborated by the authors.*

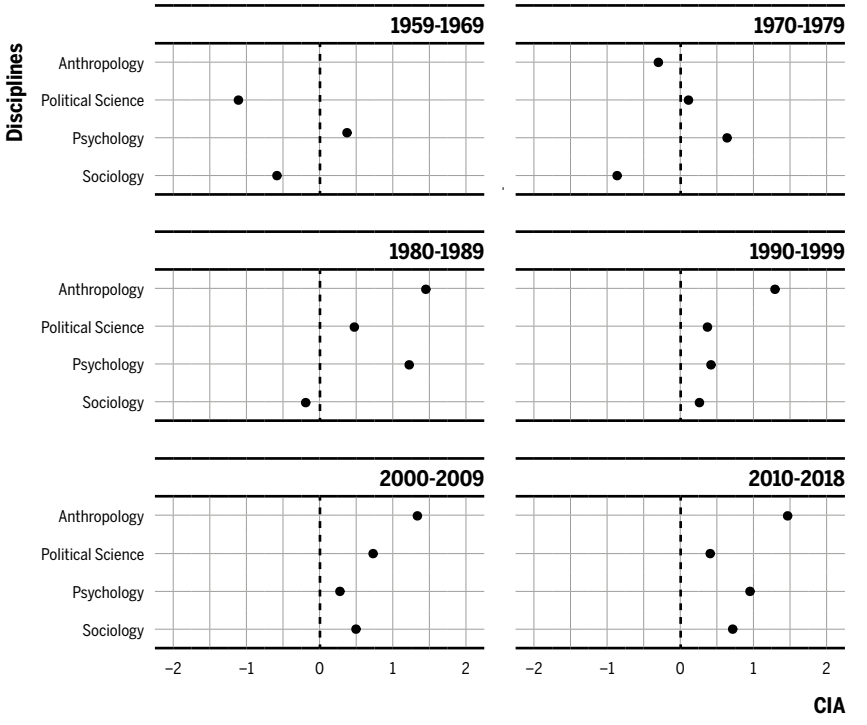
This table indicates that economic knowledge flows into the other social sciences, more than contrariwise. In percentage terms, in the beginning of our sample, we find that economics is more important to each alien discipline than each alien discipline to economics, and this relationship remained nearly untouched across the time period analyzed in our study.

In terms of growth rates, anthropology's citations to economics is the only one to have decreased, at an average rate of 31.43 percent per decade. Despite this, the *AER* never cited anthropology' T25 more than the *AA* cited economics' T25 in any given decade. Political science's and sociology's growth of citations to economics were much more prominent than

the opposite. Alternatively, psychology's citations to economics grew in significance – more than economics' citations to psychology. Given that economics' representation in articles on psychology remained higher than psychology's representation in economics' articles (exception made to the 1990s-2000s observations), one might loosely infer that this movement actually represented a reduction of the asymmetry between economics and psychology or that the asymmetry took place towards psychology in 2000s-2010s.

However, this result is unweighted for interdisciplinary citations within the social sciences network. In order to further our understanding of the asymmetry patterns, we must resort to the CIA. Accordingly, Figure 8 offers a visualization of how economics' asymmetry with the neighboring social sciences evolved between the 1960s and the 2010s. Table 6 presents the calculated CIAs.

Figure 8 **Economics'** ***Coefficient of Interdisciplinary Asymmetry***




*Source: Elaborated by the authors.*

Table 6 **Economics'** ***Coefficient of Interdisciplinary Asymmetry***

| Decade | Anthropology | Political Science | Psychology | Sociology |
|---|---|---|---|---|
| **1960s** | – | –1.11 | 0.37 | –0.59 |
| **1970s** | –0.30 | 0.11 | 0.63 | –0.87 |
| **1980s** | 1.44 | 0.47 | 1.22 | –0.20 |
| **1990s** | 1.29 | 0.37 | 0.41 | 0.26 |
| **2000s** | 1.33 | 0.73 | 0.27 | 0.49 |
| **2010s** | 1.46 | 0.40 | 0.95 | 0.71 |

*Source: Elaborated by the authors.*

The information displayed in Figure 8 is read as follows: the closer a point is to the dashed line in the center of each facet (which represents $CIA = 0$), the more symmetric is the relationship between economics and the indicated alien discipline. Points to the left of the line mean that economics is *less* representative for that science than otherwise – *asymmetry contrary to economics*. Points to the right of the symmetry line, on the other hand, mean that economics' weight in the interdisciplinary citations to social sciences in that specific discipline is greater than the opposite – *asymmetry toward economics*. The figure shows that economics weighted less on the social sciences' interdisciplinary citations in the 1960s than the opposite, with the exception of psychology.[3] In fact, psychology is the only discipline in which asymmetry was never contrary to economics. In the 1970s, economics grew in significance within the network, and an asymmetry toward economics surfaced in political science. In the 1980s, only sociology maintained a pattern of asymmetry contrary to economics. From the 1990s onward, sociology joined the other disciplines; as a result, all the observations gave an asymmetry toward economics.

There is another aspect regarding this figure that inspires caution. A difference exists between economics' relatively symmetric relationships with, for example, both sociology in the 1980s and anthropology in the 1970s. While the former is relatively symmetric because sociology was as important to economics as economics was to sociology in the 1980s, the latter is nearly symmetric because anthropology was as *un*important to economics as economics was to anthropology in the 1970s. Therefore, again,

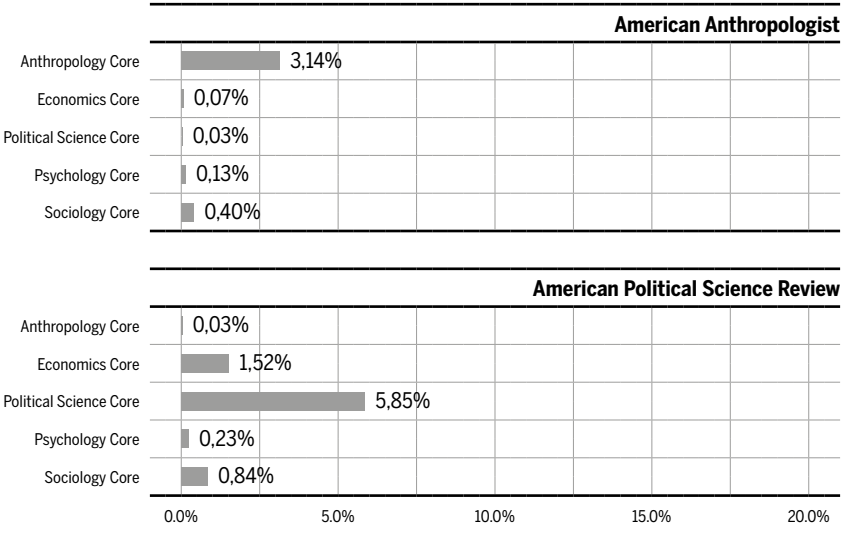
3 For the 1960s, we have a CIA = $\infty$ between economics and anthropology. This is the case because economics did not cite anthropology in this decade, which makes this ratio tend to infinity. Accordingly, we suppressed this observation from the figure.

we must reiterate that these plots represent a reciprocal importance within the network, not absolute relevance of disciplines toward each other.

It also does not mean that a rise in asymmetry toward economics indicates that economics became more cited in that discipline in absolute terms. It means that economics rose in *significance*. Accordingly, this can also be an outcome of the decline in a discipline's citations to *other* social sciences. This is the case, for example, in psychology, whose citations to political science and sociology decreased across time. We have seen that the number of *AER* citations to psychology have grown more than the number of *PR* citations to economics. Still, the asymmetry toward economics in relation to psychology became larger between the 1960s and the 2010s.

Furthermore, an additional and elucidating investigation arises from citations to the *Core Journals*. The results are summarized in Figure 9. The core journals of a discipline are taken to be those that appeared in the T25 of that discipline in all the decades analyzed, from the 1960s to the 2010s. All the disciplines have closely the same number of core journals, which range from four to six.[4]

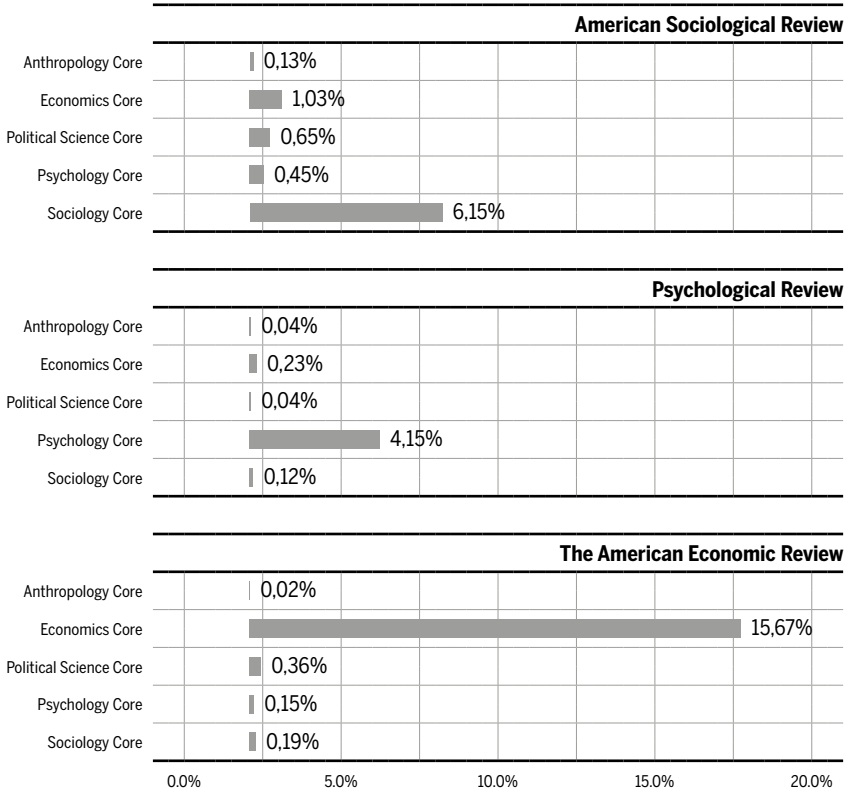
Figure 9 **Unweighted references to core journals**




**(continues on the next page)**

4 Economics' core journals are *AER*, *Econometrica*, *Economic Geography*, *Journal of Political Economy*, *Quarterly Journal of Economics*, and *Review of Economic Studies*.

Figure 9 **(continuation)**

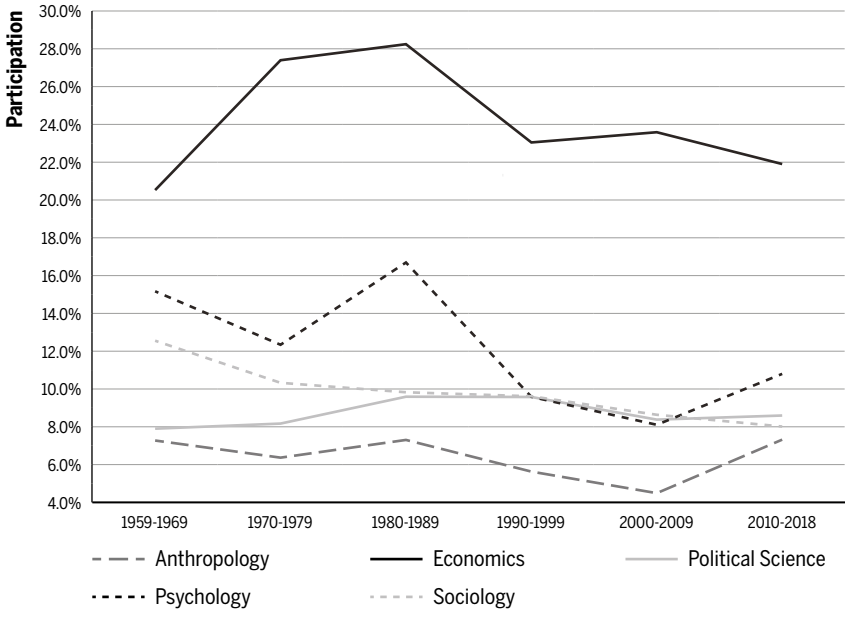



*Source: Elaborated by the authors.*

Figure 9 did not weigh the references for interdisciplinary citations to social sciences. This is intended to offer, beyond the recognition of the overall interdisciplinary citations to key journals, a point in case regarding the flagship journals' citations to their *own* cores as well. From this figure, we may realize that, in regard to unweighted overall citations, economics' core is the most representative one for the *APSR* (1.52 percent), the *PR* (0.23 percent), and the *ASR* (1.03 percent). For the *AER*, on the other hand, the political science core is the most representative one (0.36 percent). These results endorse the weighted investigation, which places economics as the most relevant social science, citation-wise, within the network, and political science is revealed as the discipline to which the *AER* directs more attention. Moreover, again, we can easily identify political science

and sociology ahead of anthropology, economics, and psychology in terms of citations to their neighboring disciplines. It is worth highlighting, nonetheless, that anthropology and psychology are below economics in terms of social science interdisciplinarity. Figure 9 also corroborates Fourcade *et al.*'s (2015, 96) realization that economics, besides looking more inward than the other social sciences, also displays a much higher reliance on knowledge produced at the top of its internal hierarchy, a perception that shines through Figure 10 as well.

Figure 10 **Disciplines' citations to their *own* T25**




*Source: Elaborated by the authors.*

This figure points to the fact that, in relation to the social sciences, the most prestigious economics journals occupy a much more central position in the network of intradisciplinary knowledge transmission. Accordingly, it should be noted that, even though knowledge produced in other sources had, by definition, less space to be preserved and replicated within the journal, the *AER* managed to become a more interdisciplinary social science in relation to itself and to the *AA* and the *PR*, and this might indicate, we argue, an overall opening of economics to the social sciences. Economics still has a

lot of ground to cover in order to become as open as political science and sociology to social science knowledge; however, it cannot be denied that the discipline's situation in this regard has undergone some improvement.

## 4 **Discussion**

A study of this nature is unlikely to be free of limitations, which go beyond the general ones pointed out by Cherrier and Svorencik (2018, 368-372). First, even though citations to periodical literature are a useful market-based measure of research quality, they are imperfect measures of interdisciplinary influences[5] (Hamermesh, 2018, 125; Rigney & Barnes, 1980, 116). Second, we restricted our analysis to the flagship journal of each social science. Third, the citation patterns analyzed comprise only journal *articles*. Other sources such as books, book reviews, and conference proceedings are entirely absent in our sample. Fourth, our ranking definitions for the T25 articles in each social science per decade had to extrapolate impact factors listed between 1979 and 1981 all the way back to the 1960s. The implicit assumption here is that the influence of the journals remained unaltered from the 1960s to the early-1980s. Finally, there are many factors that influence one discipline's citations to another, in addition to the influence of the cited discipline *per se*, such as observed scientific status of the cited discipline and the amount of literature available for citation (cf. Rigney & Barnes, 1980, 125). The results here, therefore, ought to be interpreted cautiously.

Still, the findings of this essay are compelling especially in two senses. First, and more importantly, our results examine the asymmetry of knowledge transfer between economics and the social sciences, to which it provides a direction: anthropology, political science, psychology, and sociology resort more to economics than economics to each one of them. This pattern was intensified in the last 60 years, especially from the 1980s onwards. This result is given both by the absolute number of citations and by economics' CIA with each one of the neighboring disciplines. Second, the results also point that three classes of disciplines may be singled out, which

5 Citations and publication follow many other criteria that transcend the search for quality. For a fuller comprehension of the subtleties behind these processes in economics, see Laband and Piette (1994), Colussi (2018), and Heckman and Moktan (2020).

indicates that economics has space to intensify its interdisciplinary ventures, but also indicates that economics is not the most insular social science.

Therefore, given the analysis laid down in this article, our estimates indicate that, between 1959 and 2018, economics became a) a more interdisciplinary social science – even though the openness toward economics in social sciences grew much more acutely than the openness toward social sciences in economics, and b) the most influential discipline within the social sciences interdisciplinary network. Nevertheless, the percentages of economics' openness to the social sciences remain below the average interdisciplinarity within the social sciences network all along our time span (from 0.37 percent *vis-à-vis* 2.05 percent, in the 1960s, to 1.42 percent *vis-à-vis* 2.74 percent, in the 2010s), and this should not be neglected. These conclusions encompass the perception that economics rose from the fifth to the third position in terms of interdisciplinarity within the social sciences network, which is unlike the usual portrayal of economics as the least interdisciplinary social science.

At this point, some qualification is necessary, because, even though economics has actually become a more interdisciplinary social science in the last decades of the twentieth century, this movement by no means represents a return to the levels of interdisciplinarity that prevailed from the first decades of the twentieth century to the years around World War II. It must be noted that academia is undoubtedly much more compartmentalized in the twentieth-first century than it was in the first half of the 1900s (cf. Backhouse & Fontaine, 2018; Cavalieri, 2016; Morgan & Rutherford, 1998).

Nonetheless, we must recognize that economics reached a point of abnormally low interdisciplinarity in the decades comprising precisely the beginning of our time-span, as the years following World War II marked what Fontaine (2015, 6) labeled a cross-disciplinary age for the social sciences. In great part, this low point can be credited to the reversal of the problem-oriented ethos prevailing during and since the war effort. Economists, albeit not immune to the ethos prevailing around the time of World War II, became more and more hubristic and discipline-oriented (cf. Backhouse & Fontaine, 2018; Cohen-Cole, 2014; Crowther-Heyck, 2006).

This cross-disciplinary age, furthermore, coincides with the transformation of economics into a highly mathematical discipline, with a compulsion toward logical rigor (cf. Backhouse, 1998; Debreu, 1991). This resulted in the narrowing of economics' search for insights within other

social sciences, as the discipline came to define itself more in terms of its methods than in terms of its subject matter. It is no coincidence, therefore, that the decades following World War II witnessed the simultaneous rise of a mainstream in economics and of economics imperialism. On the one hand, the upswing of a mainstream as strong as economics' generates a path dependence that hinders the search for alternative arguments both in the outskirts of economics itself and beyond its boundaries. On the other, economics imperialism gave vent to the belief, widespread among economists, that social phenomena located elsewhere in the disciplinary spectrum *could not* be fathomed unless through the tools of economics. Social disciplines, for economists, became competitive rather than complementary (cf. Backhouse & Fontaine, 2018; Becker, 1976; Mäki, 2009; Stigler, 1984). As a matter of fact, the CIA may serve as an illustration of the rise of economics imperialism, as the discipline became overwhelmingly influential within the social sciences network.

Economics imperialism imposes yet another compelling consideration: such a rise in economics' degree of social science interdisciplinarity may epitomize a sort of "recycled interdisciplinarity," insofar as the increment in economics' citations to other social sciences may express simply the restoration of economics' own arguments, previously reproduced outside its boundaries.

Therefore, quantitatively, the movement presented in this article does not amount to a return in V to the previous levels of integration between the social sciences. Likewise, it also does not necessarily represent a qualitative leap in interdisciplinary integration, as this rise in economics' citations to the neighboring social sciences may be of the recycled kind.

Alternatively, what the movement presented in this article *does* amount to is the upsurge in economics' relevance within the network of social sciences. Between 1936 and 1975, Rigney and Barnes (1980, 122) identified that "[…] the only social science discipline that has cited economic literature to any important degree is political science, followed at a distant by sociology." Our results show that, from 1959 to 2018, there was a change in this landscape, especially from the 1980s onwards, when economics became the most cited discipline in the flagship journals of political science, psychology, and sociology. Anthropology, as indicated earlier, is a particular case, and our results corroborate Pearson's (2010, 166) remark that "it would be hard to imagine two social sciences more mutually estranged

than anthropology and economics." Still, the average level of citations to economics by the four neighboring social sciences grew from 0.40 percent in the 1960s to 1.74 percent in the 2010s, which marks a growth of 333.52 percent. This recognition, especially after employing the CIA, indicates a *direction* for the interdisciplinary exchange between the social sciences, as economics became the most significant discipline within the network.

Furthermore, economics' gain of relevance before the social sciences coincides with what has been conventionally called the "empirical turn in economics," a phenomenon occurred in the last decades of the twentieth century (Backhouse & Cherrier, 2017, 2). Hamermesh's (2013, 168) bibliometric investigation shows that a shift toward more empirical work in economics actually took place between 1983 and 1993. Additionally, Angrist *et al*. (2020, 39) highlight a rise in the interest of the social sciences toward empirical studies in economics. Therefore, economics' effective rise as the most prestigious social science coincides precisely with the shift in its attention toward empirical research.

These conclusions are in line with part of the literature on the subject, which places economics precisely in this progressive state of interdisciplinarity. Fontaine (2015, 3), for example, defends that, even though economists usually misinterpret interdisciplinarity for economics imperialism, economics "has appeared more cross-disciplinary than expected" since World War II. Bögenhold (2018, 1126), in addition, concludes that, *pari passu* with the decline in sociology's public reputation, economics embraced the earlier discussions on the social dimension of economic behavior, moving toward other social sciences. Finally, in a 2017 *American Economic Association* discussion panel,[6] which examined publishing and promotion in economics, Angus Deaton asserted that economics, in relation to other fields, is a relatively open discipline. Our data show that economics is not among the most open social sciences, but that Deaton is not wrong: economics is not the most insular as well. George Akerlof, alternatively, in the same event, defended that there is almost a total disconnect between economics and sociology and that, perhaps, some combination of both would be more appropriate to deal with the type of situations economists tend to examine – an idea he recently reinforced (Akerlof, 2020). We believe this idea to be extendable to all the social sciences analyzed in this essay.

6 Available at https://www.aeaweb.org/webcasts/2017/curse. The participants were George Akerlof, Angus Deaton, Drew Fudenberg, Lars Hansen, and James Heckman.

Strictly speaking, the data have shown that economics is paying more attention to the social disciplines, and therefore getting closer to Akerlof's ideal. As Angrist *et al*. (2020, 50) postulate in their conclusion, "economists are also increasingly likely to read other social sciences. […] economic scholarship has never been more exciting or useful than it is today." Excitement is a subjective mental state, for sure. Nonetheless, economics' usefulness, if the discipline aims at both honoring Akerlof's plea and following the examples set by political science and sociology in terms of interdisciplinarity, still has a long way to go.

## References


ABBOTT, A. *Chaos of disciplines*. Chicago and London, University of Chicago Press, 2001.

AKERLOF, G. Sins of omission and the practice of economics. *Journal of Economic Literature*, v. 58, n. 2, p. 405-418, 2020.

ALMEIDA, F.; ANGELI, E.; PONTES, R. An institutional explanation for economists' theoretical and methodological choices. *Review of Political Economy*, v. 29, n. 1, p. 80-92, 2017.

ANGRIST, J.; AZOULAY, P.; ELLISON, G.; HILL, R.; LU, S. Inside job or deep impact? Extramural citations and the influence of economic scholarship. *Journal of Economic Literature*, v. 58, n. 1, p. 3-52, 2020.

ARIA, M.; CUCCURULLO, C. *bibliometrix*: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, v. 11, n. 4, p. 959-975, 2017.

BACKHOUSE, R. The transformation of U.S. economics, 1920-1960, viewed through a survey of journal articles. *History of Political Economy*, v. 30, n. Suplementar, p. 85-107, 1998.

BACKHOUSE, R.; CHERRIER, B. The age of the applied economics: the transformation of economics since the 1970s. *History of Political Economy*, v. 49, n. Suplementar, p. 1-33, 2017.

BACKHOUSE, R.; FONTAINE, P. Introduction: history of economics as history of social science. *History of Political Economy*, v, 42, n. Suplementar, p. 1-21, 2010.

BACKHOUSE, R.; FONTAINE, P. Economics and other social sciences: a historical perspective. *Annals of the Fondazione Luigi Einaudi*, v. 52, n. 2, p. 7-44, 2018.

BECKER, G. *The economic approach to human behavior*. Chicago: The University of Chicago Press, 1976.

BÖGENHOLD, D. Economics between insulation and social-scientation: observations by a sociology of economics. *Journal of Economic Issues*, v. 52, n. 4, p. 1125-1142, 2018.

CAVALIERI, M. Inside institutions of Progressive-Era social sciences: the interdisciplinarity of economics and sociology. *Journal of Economic Issues*, v. 50, n. 2, p. 345-361, 2016.

CHERRIER, B.; SVORENCIK, A. The quantitative turn in the history of economics: promises, perils and challenges. *Journal of Economic Methodology*, v. 25, n. 4, p. 367-377, 2018.

COATS, A. W. The American Economic Association and the economics profession. *Journal of Economic Literature*, v. 23, n. 4, p. 1697-1727, 1985.

COHEN-COLE, J. *The open mind: Cold War politics and the sciences of the human nature*. Chicago and London, University of Chicago Press, 2014

COLUSSI, T. Social ties in academia: a friend is a treasure. *Review of Economics and Statistics*, v. 100, n. 1, p. 45-50, 2018.

COUPÉ, T. Revealed performances: worldwide rankings of economists and economics departments, 1990-2000. *Journal of the European Economic Association*, v. 1, n. 6, p. 1309-1345, 2003.

CROWTHER-HEYCK, H. Patrons of the revolution: ideals and institutions in postwar behavioral science. *Isis*, v. 97, n. 3, p. 420-446, 2006.

DEBREU, G. The mathematization of economics. *The American Economic Review*, v. 81, n. 1, p. 1-7, 1991.

EDWARDS, J., GIRAUD, Y.; SCHINCKUS, C. A quantitative turn in the historiography of economics? *Journal of Economic Methodology*, v. 25, n. 4, p. 283-290, 2018.

FONTAINE, P. Introduction: the social sciences in a cross-disciplinary age. *Journal of the History of the Behavioral Sciences*, v. 51, n. 1, p. 1-9, 2015.

FOURCADE, M.; OLLION, E.; ALGAN, Y. The superiority of economists. *Journal of Economic Perspectives*, v. 29, n. 1, p. 89-114, 2015.

GARFIELD, E. The evolution of the Science Citation Index. *International Microbiology*, v. 10, n. 1, p. 65-69, 2007.

HAMERMESH, D. Six decades of top economics publishing: who and how? *Journal of Economic Literature*, v. 51, n. 1, p. 162-172, 2013.

HAMERMESH, D. Citations in economics: measurement, uses, and impacts. *Journal of Economic Literature*, v. 56, n. 1, p. 115-156, 2018.

HECKMAN, J.; MOKTAN, S. Publishing and promotion in economics: the tyranny of the Top Five. *Journal of Economic Literature*, v. 58, n. 2, 419-470, 2020.

JOVANOVIC, F. A comparison between qualitative and quantitative histories: the example of the efficient market hypothesis. *Journal of Economic Methodology*, v. 25, n. 4, p. 291-310, 2018.

KALAITZIDAKIS, P.; MAMUNEAS, T.; STENGOS, T. Rankings of academic journals and institutions in economics. *Journal of the European Economic Association*, v. 1, n. 6, p. 1346-1366, 2003.

KLEIN, J. T. A taxonomy of interdisciplinarity. In: FRODEMAN, R.; KLEIN, J. T.; MITCHAM, C. (Eds.). *The Oxford handbook of interdisciplinarity*. Oxford: Oxford University Press, 2010.

LABAND, D.; PIETTE, M. Favoritism versus search for good papers: empirical evidence regarding the behavior of journal editors. *Journal of Political Economy*, v. 102, n. 1, p. 194-203, 1994.

MÄKI, U. Economics imperialism: concept and constraints. *Philosophy of the Social Sciences*, v. 39, n. 3, p. 351-380, 2009.

MÄKI, U. Empirical turn in economics? *Keynote Speak at the 6th Latin American Conference of the History of Economic Thought*, Bogotá, 2017.

MORGAN, M.; RUTHERFORD, M. American economics: the character of transformation. *History of Political Economy*, v. 30, n. Suplementar, p. 1-26, 1998.

PEARSON, H. Ground between two stones: Melville Herskovits and the fate of economic anthropology. *History of Political Economy*, v. 42, n. Suplementar, p. 165-195, 2010.

PIAGET, J. The epistemology of interdisciplinary relationships. In: BERGER, G.; APOSTEL, L.; BRIGGS, A.; MICHAUD, G. (Eds.), *Interdisciplinarity*: problems of teaching and research in universities, Nice: Organization for Economic Cooperation and Development, 1972.

PIETERS, R.; BAUMGARTNER, H. Who talks to whom? Intra- and interdisciplinary communication of economics journals. *Journal of Economic Literature*, v. 40, n. 2, p. 483-509, 2002.

RICE, R.; BORGMAN, C.; REEVES, B. Citation networks of communication journals, 1977-1985: cliques and positions, citations made and citations received. *Human Communication Research*, v. 15, n. 2, p. 256-283, 1988.

RIGNEY, D.; BARNES, B. Patterns of interdisciplinary citation in the social sciences. *Social Sciences Quarterly*, v. 61, n. 1, p. 114-127, 1980.

SCOPUS INFO. *Elsevier B. V.: Scopus Database*. Available on: <http://scopus.com> (accessed 21 September 2018), 2018.

STIGLER, G. Economics: the imperial science? *The Scandinavian Journal of Economics*, v. 86, n. 3, p. 301-313, 1984.

WEB OF SCIENCE. *Clarivate Analytics: Web of Science Core Collection*. Available on: <http://wokinfo.com/> (accessed 21 September 2018), 2018.

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