Trends in the publication of experimental economics articles

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ABSTRACT

We report data on the experimental articles published in the last two decades in seven prominent, general-interest economics journals, considering laboratory and other types of experiments separately. In addition, we also look at time trends in the characteristics of the published experimental articles. We find an overall increasing trend in the publication of experimental research. This is mainly driven by non-lab experiments, which have overtaken lab experiments in all considered outlets. The reversal of fortunes is most striking in the AER, where the share of lab experiments more than halved over the past twenty years and converged to the share of lab experiments in other Top 5 journals. We also observe some heterogeneities in publication, citations, rankings, and locations of authors' affiliations across journals and types of experiments.

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Economists "cannot perform the controlled experiments of chemists or biologists because they cannot easily control other important factors. Like astronomers or meteorologists, they generally must be content largely to observe."

Samuelson and Nordhaus (1985, p.8)

Economics

"As currently practiced, economics is ideally suited for experimental investigation."

Hey (1991, p. 15)

Experiments in Economics

Experimental methods in economics have come a long way. Even as the quote by Samuelson and Nordhaus appeared in their famous textbook, the economics discipline was gradually abandoning the view that it was inherently a non-experimental discipline and has progressed to the general acceptance of experimental methods, even while most in the profession have never run an experiment (Svorenčík 2016, 2018, 2020). As an indicator of this acceptance, by 2010, field and laboratory experiments accounted for a non-negligible fraction of publications featured in the top economic journals. The increasing recognition of experimental methods is also evident in the awarding of Nobel Prizes to several researchers who feature experiments at the core of their empirical work.

In recent years, there has been increasing discussion within the Economic Science Association (ESA) whether the use of experimental methods in economics has plateaued or even declined due to unjustified skepticism from non-experimentalists. In keynote speeches[1] and online forums, scholars who use experimental methods contemplate whether their work is being discounted on the grounds of its methodology and whether the exclusive use of experimental methods diminishes career prospects.

Nikiforakis and Slonim (2015, 2019) show that since 2010 there has been a reduction in the publication of articles using laboratory experiments in the so-called "Top 5" journals, and that much of this decline is accounted for by the number of experimental articles published in the *American Economic Review*. Motivated by these findings, the ESA Executive Committee created an ad-hoc committee to investigate further the publishing trends in experimental economics. This article is one of the outcomes of this investigation.

We update, broaden and deepen the analysis of Nikiforakis and Slonim to develop a fuller picture of the state of research using experimental methods in leading journals in economics. We construct a dataset tabulating all articles using experimental methods, including both traditional laboratory

[1] See Roberto Weber's keynote at the European ESA meetings in 2019.

settings as well as field experiments. We extend the analysis to two other well-regarded general-interest journals, the *Journal of the European Economic Association* and the *Economic Journal*.

We replicate the finding of Nikiforakis and Slonim (2019) that the *American Economic Review* published fewer experimental articles over the last decade, a decline attributable specifically to *laboratory* experiments. Meanwhile, the fraction of articles in the other Top 5 journals featuring laboratory experiments has remained low but constant. By contrast, the fraction of other types of experimental articles published in the Top 5 journals (including field experiments) has risen over the past two decades. Trends are quite different in the *Journal of the European Economic Association* and the *Economic Journal.* In these journals, we observe a positive trend in the publication of both laboratory and other types of experiments, with laboratory experiments accounting for the largest share.

We also analyze trends in the citations of these published articles and find that articles with laboratory experiments are generally cited less than other experimental articles in the same journal. Finally, we document trends in the characteristics of authors of experimental articles, who are now more likely to be in "top 30" departments.

I. Methodology and data

We reviewed all the published articles from 2000 to 2020 inclusive in the *American Economic Review* (AER), *Econometrica* (ECTA), *Quarterly Journal of Economics* (QJE), *Journal of Political Economy* (JPE), and *Review of Economic Studies* (ReSTUD) plus two other prominent general-interest journals, the *Journal of the European Economic Association* (JEEA) and the *Economic Journal* (EJ). We identified articles that applied experimental methods either exclusively or jointly with other methods. To circumvent potential issues due to different definitions of what an experiment is, we rely on whether authors refer to their method as either an experiment or a randomized control trial. We exclude all natural experiments, where treatment assignment is not due to an active choice by the experimenter, and randomized control trials in which the dependent variable is not at the individual level (e.g., exposing counties randomly to a new policy to study the effect of such policy on county-level outcomes).[2] We also exclude articles that do not go through peer review: these include comments, errata, and editorials in all journals, as well as articles published in the *AER Papers & Proceedings.*

Classifying experiments

We started by classifying these experiments into five coarse categories, according to the following criteria:

[2] We included articles that meta-analyzed experimental data, but they are less than five.

- *Traditional lab*: experiments run in a classroom or laboratory at a university using students as subjects.
- *Lab-in-the-field*: experiments run in laboratory-like environments but outside a university and with physically present, non-student subjects.
- *Online*: experiments run online, typically using subjects from online marketplaces such as Amazon MTurk.
- *Field*: experiments run in field environments in which subjects make similar decisions to those they regularly make in those environments. Subjects might or might not be aware that they are participating in the experiment. This category includes randomized control trials (RCTs).
- *Miscellaneous*: for articles that do not fit in the above categories, use multiple types of experiments, or rely heavily on experimental data from other articles.

Over the 21 years in our sample, we classified 47.1% of the published articles using experiments as traditional lab, 5.2% as lab-in-the-field, 3.4% as online, 35.1% as field, and the remaining 9.2% as miscellaneous. For the data analysis reported in this article, we opt for an even simpler classification: LAB (traditional lab) or OTHER (all other groups). This classification has two advantages. First, it splits the data roughly in half, ensuring that we have enough observations to make a meaningful analysis. Second, it is based on the definition of traditional lab experiments, which we found was the most straightforward definition to apply.

Affiliation ranking, location, and ESA membership

For each article, we record the authors' affiliations. We assign one affiliation to each author; for authors affiliated with multiple institutions, we assign them to the first university affiliation they list. We then use these affiliations to determine the ranking of each author's institution as well as their location.

To assign rankings to the authors' affiliations, we use the Tilburg University Worldwide Economics Schools Research Ranking (https://econtop.uvt.nl/). Specifically, we use the sandbox tool to rank institutions in 5-year intervals using journal impact factors as criteria.[3] Affiliations that do not appear in the rankings are assigned to the lowest rank. We then assign this ranking to each affiliation depending on the year the article was published. For an article, we report the average rank of the authors' affiliations and the fraction of authors affiliated to a top-30 or top-50 institution.

We also collect data about the location of all authors' affiliations. Overall, 56.6% of all affiliations are in the United States (US) or Canada, 35.5% in Western Europe, and the remaining 7.8% are in other world regions. For simplicity, we analyze the percentage of authors located in the US or Canada per article.

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[3] The intervals were 2001-2005, 2006-2010, 2011-2015, 2016-2019 as the rankings for 2020 were not yet available.

Lastly, we coded whether authors were paying members of the ESA. We had access to the list of ESA members only for recent years. Specifically, we coded someone as an ESA member if they paid the membership fee at least once between 2018 to 2021.

Citations

We record the number of citations for all the identified articles. We did so by consulting the "cited by" feature of Google Scholar. For each article, we record the number of citations each article has in the three-year and five-year period after publication (including the year of publication). We present these as 3-year and 5-year citations. We opted for Google Scholar for citations for two reasons. First, due to its accessibility, it is one of the most commonly used citation metrics. Second, it includes citations to the working paper versions of the published articles and thus represents a broader measure of an article's impact, particularly for articles that recently appeared in print.

II. Results

We present the findings separately for articles published in the AER, the "Other Top 5" journals, and then the JEEA together with EJ. We separate AER from the other Top 5 journals because of its size—it publishes around twice as many articles as the other Top 5 journals—and the substantial decline in the publication of laboratory experiments in this journal. Table 1 shows the descriptive statistics by category (the top panel for LAB and the bottom panel for OTHER) and journal type.

Fraction of experimental publications

Figure 1 depicts the yearly fraction of published articles that use experimental methods. The fraction is reported separately for LAB and OTHER. In the 21-year period, 3.9% of all published articles are LAB experiments, and 4.8% are OTHER experiments. However, we see noticeable variation across journal categories. In AER, LAB experiments make up 5.7% of all publications, which is almost identical to the fraction of OTHER experiments, 5.6%. The Other Top 5 journals publish fewer LAB experiments, 2.5% of all publications (p<0.001),[4] and a comparable fraction of OTHER experiments 4.8% (p=0.358). In JEEA+EJ, we see a similar fraction of LAB experiments as in AER, 5.8% of all publications (p=0.904), and a slightly lower fraction of OTHER experiments, 4.5% (p=0.172).

We observe a clear increasing time trend in the fraction of published articles that are OTHER experiments in all three journal categories. Comparing the first decade to the second, we see that the fraction of OTHER experiments roughly doubles (p<0.03).

[4] These statistical comparisons are based on OLS regressions. In all regressions the dependent variable corresponds to the fraction of LAB or OTHER experiments published by each journal in each year. As independent variables, we use dummy variables identifying the different journal types (AER, Other Top 5, or JEEA+EJ), article types (LAB or OTHER), and decades (2000s or 2010s) and their interactions. We use two-sided Wald tests based on robust standard errors to test the different hypotheses. The results are qualitatively and quantitatively similar if instead we use a panel regression with journal fixed effects.

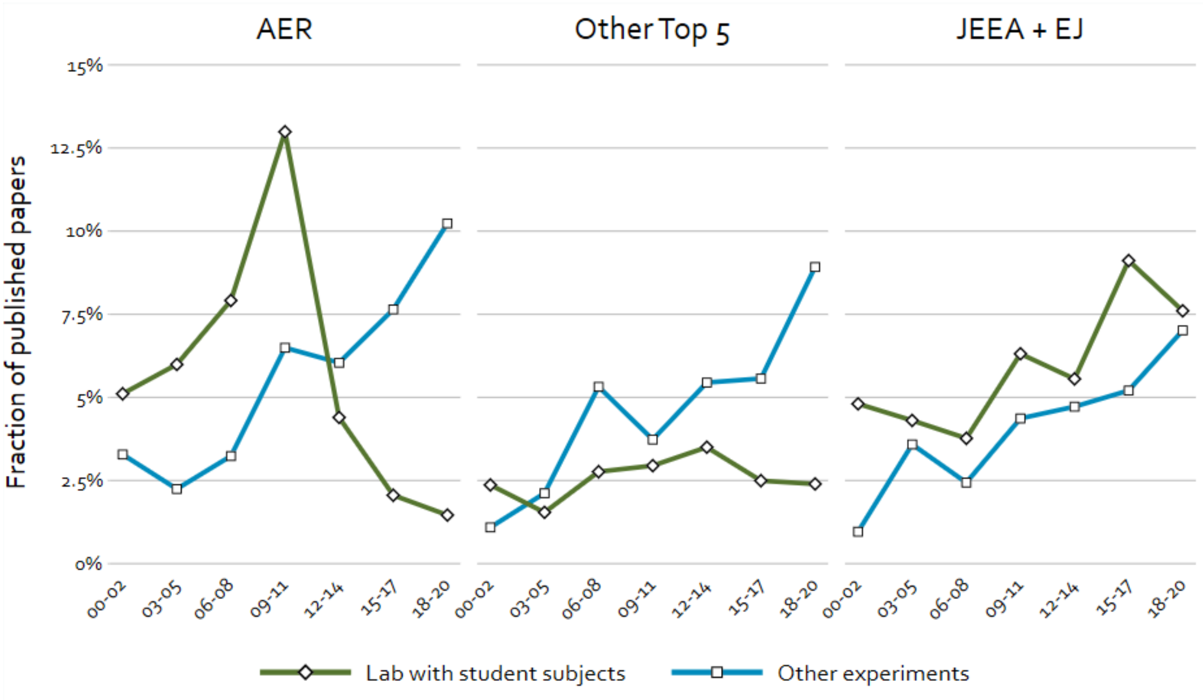

Figure 1 – Fraction published articles classified as experimental per year

For LAB experiments, we observe very different patterns in the three journal categories. In AER, we see a sharp increase in the first decade followed by a sharp drop in the second. Hence, while in the late "noughties" AER published a noticeably higher fraction of LAB experiments than Other Top 5 journals, this has not been the case since 2013. In Other Top 5 journals, the fraction of published LAB experiments has largely remained constant at 2.4% in the first decade and 2.6% in the second (p=0.603). Lastly, in JEEA+EJ, the fraction of published LAB experiments has increased from 4.5% in the first decade to 6.8% in the second (p=0.049).

Characteristics of authors of experimental publications

Next, we turn to the analysis of author characteristics to see whether authors of LAB experiments are different from authors of OTHER experiments.[5] We start by looking at the number of authors per article. On average, LAB experiments have fewer authors than OTHER experiments (2.61 vs. 2.88, p<0.001). This gap stems from different trends in the number of authors per article. While the number of authors has significantly increased from the first to the second decade for both types of experiments (p<0.007), the increase has been smaller for LAB compared to and OTHER experiments (p=0.011). Hence, while there was no difference in the number of authors between LAB and OTHER

[5] In this and the following subsections, statistical comparisons are based on OLS regressions where the dependent variable corresponds to article characteristic that is being evaluated (i.e., the number of authors, the fraction of authors from top 30 departments, the fraction of authors based in the US or Canada, and the number of citations). Once again, as independent variables, we use dummy variables identifying the different journal types (AER, Other Top 5, or JEEA+EJ), article types (LAB or OTHER), and decades (2000s or 2010s) and their interactions. We use two-sided Wald tests based on robust standard errors to test the different hypotheses. The results are qualitatively and quantitively similar with t-tests.

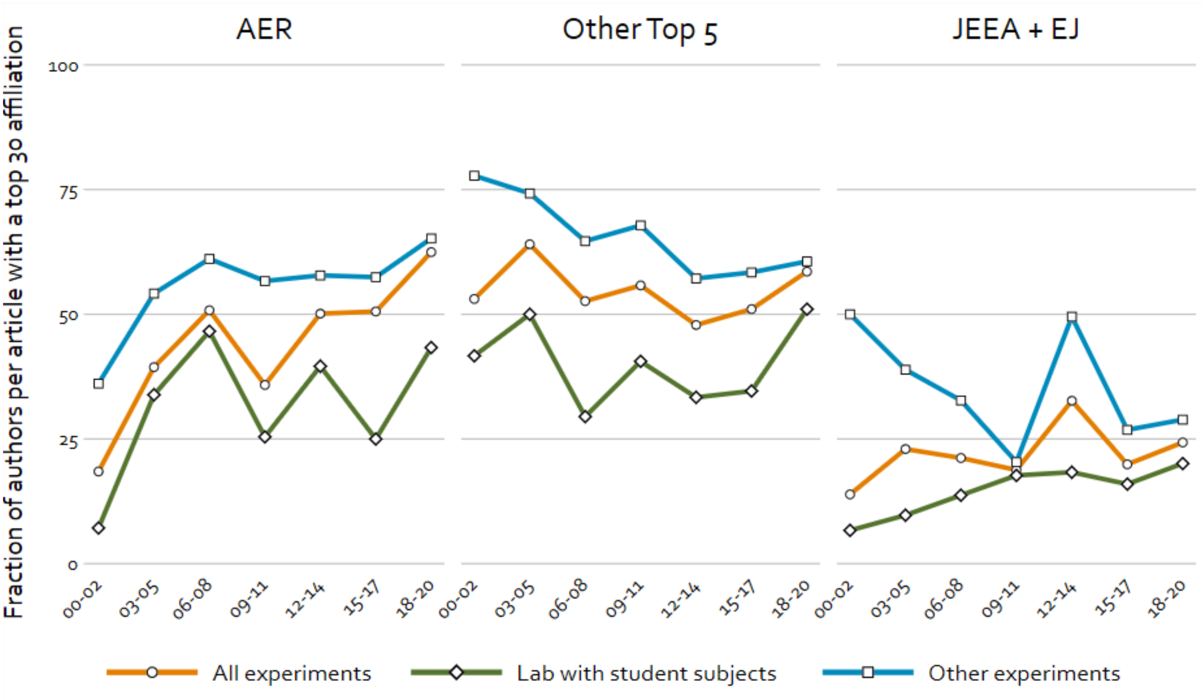

Figure 2 – Fraction of authors affiliated to a top-30 economics department per article

Note: The top-30 departments are determined using the Journal Impact Factor criteria of the Tilburg University Worldwide Economics Schools Research Ranking.

experiments in the first decade (2.47 vs. 2.42, p=0.708), a significant difference emerges in the second (2.72 vs. 3.06, p<0.001). If we take a look at these trends in each journal category, we find similar results in all categories, albeit they are stronger for the Other Top 5 journals compared to AER and JEEA+EJ.

We continue by looking at the ranking of the authors' affiliations. Figure 2 depicts the mean fraction of authors per article whose primary university affiliation is ranked in the top 30 worldwide at the time of publication. Overall, LAB experiments tend to have a smaller fraction of authors affiliated with the top 30 economics departments. This pattern is seen in all three journal categories and does not seem to have changed considerably over time (p<0.001). As shown in Table 1, the pattern is the same if, instead of the top 30, we use affiliations to the top 50 departments or the mean rank.

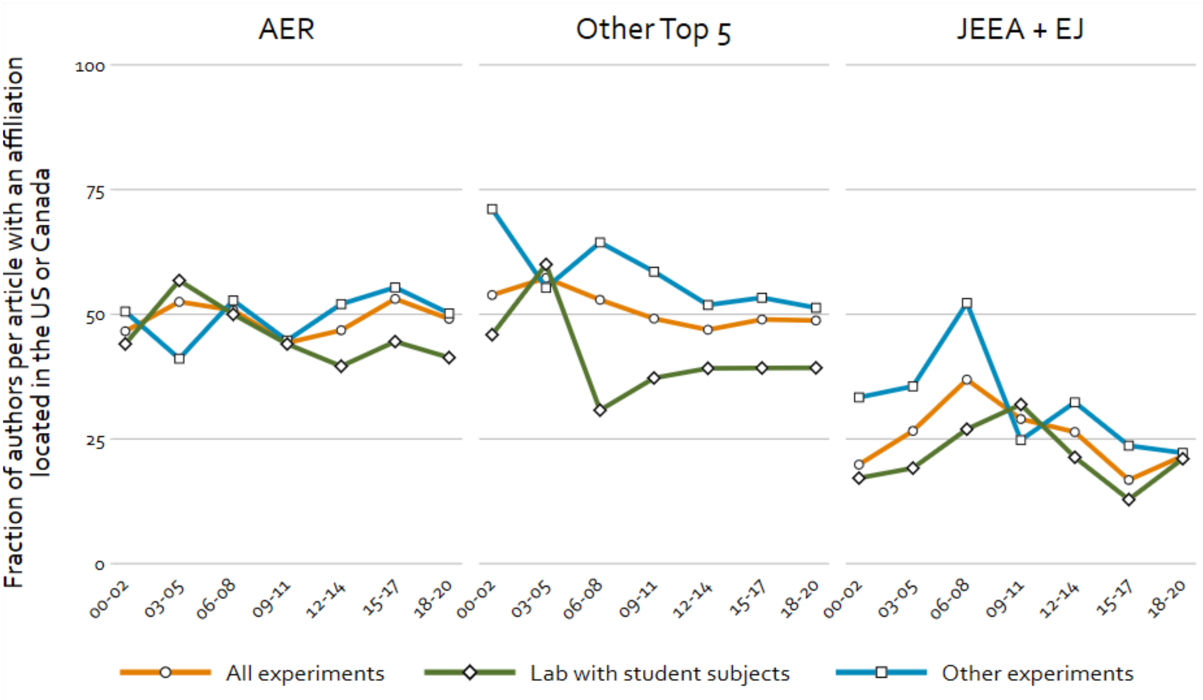

Figure 3 – Fraction of authors affiliated with a university in the US or Canada per article

It is worth noticing that, at AER and the Other Top 5 journals, the fraction of authors affiliated with top 30 departments has not changed much from one decade to the next for either LAB or OTHER experiments (p>0.222). However, the diverging publication trends of LAB and OTHER experiments at AER have increased the overall fraction of authors from top 30 departments publishing experiments at this journal (p=0.091).[6] Seen differently, while in the 2000s, experiments published in AER were less likely to be written by authors from top 30 departments than in the Other Top 5 journals (p=0.004), this is no longer the case in the 2010s (p=0.181).

Next, we turn to the authors' location. Figure 3 depicts the fraction of authors per article whose first affiliation is in the US or Canada. Overall, LAB experiments are less likely to be authored by researchers based in the US or Canada than OTHER experiments. This pattern is most pronounced in the Other Top 5 journals, where LAB experiments have 40.4% of authors located in the US and Canada compared to 55.1% for OTHER experiments (p<0.001). The difference is smaller for experiments published in AER but is growing over time. In the first decade, LAB experiments in AER had a similar fraction of authors from the US or Canada than OTHER experiments (p=0.336), but in the second decade, the former have fewer authors from the US or Canada than the latter (p=0.025). In JEEA+EJ, the opposite trend is observed; there is a lower fraction of authors from the US and Canada in LAB experiments than in OTHER experiments in the first decade (23.9% for LAB and 40.9% for OTHER

[6] Fréchette, Sarnoff, and Yariv (2021) report a similar finding for the Top 5 journals as a whole by looking at the number of articles with at least one author from a top 20 department according to the 2017 US News and World Report rankings.

experiments, *p*=0.005) and similar fractions in the second decade (19.7% for LAB and 24.0% for OTHER experiments, *p*=0.276).

In summary, we see clear differences in the ranking and location of the departments of authors of LAB and OTHER experiments. Authors of LAB experiments are more likely to come from departments that are lower ranked and outside the US and Canada than those of OTHER experiments.[7] However, while these differences are interesting on their own, the fact that they have not changed substantially over time suggests that they are not related to the increasing popularity of OTHER experiments and the publication trends we observed for LAB experiments.

Citations

We next analyze the citations of experimental articles. Figure 4 depicts the average number of citations experimental articles attain in the three years after their publication. The figure also contains the mean 3-year impact factor of each journal category on the righthand axis to display the general citation trend of these journals. Unfortunately, Google Scholar does not produce journal impact factors, and hence we cannot say whether experimental articles are cited more or less than other articles in these journals.[8]

We observe different trends across the different journal types. Comparing the first and second decades for articles published in AER, we find that 3-year citations have increased for both LAB and OTHER experiments (*p*<0.024). The same is true for OTHER experiments published in the Other Top 5 journals (*p*=0.001), but not LAB experiments, which are cited similarly across decades (*p*=0.498). Lastly, we see the reverse pattern in JEEA+EJ, where the 3-year citations of OTHER experiments have not changed over time (*p*=0.395) while those of LAB experiments have been increasing (*p*=0.033). It is also worth noting that the increases in citations seem to follow the same trend as the journals' impact factors, which have consistently increased in all the journal categories.

If we compare 3-year citations of LAB experiments to OTHER experiments, we see a clear pattern. LAB experiments receive fewer 3-year citations in all three journal categories. In AER, on average, LAB experiments receive 76.4 3-year citations while OTHER experiments receive 145.03 (*p*<0.001). LAB experiments published in Other Top 5 journals receive 69.38 citations compared to 135.23 by OTHER experiments (*p*<0.001). Finally, in the JEEA+EJ, LAB experiments receive 34.87 citations while OTHER experiments receive 61.96 (*p*=0.003). Given that the distribution of citations can be highly skewed, we checked whether outliers drive this result by running quantile regressions. We find that, for the

[7] Baghestanian and Popov (2014) have separately documented that researchers with a field of experimental economics tend to receive their PhDs from, and are employed by, a broader set of departments than the Top 30 or Top 50.

[8] Fréchette, Sarnoff, and Yariv (2021) report that experiments tend to be cited more than the average article in Top 5 journals.

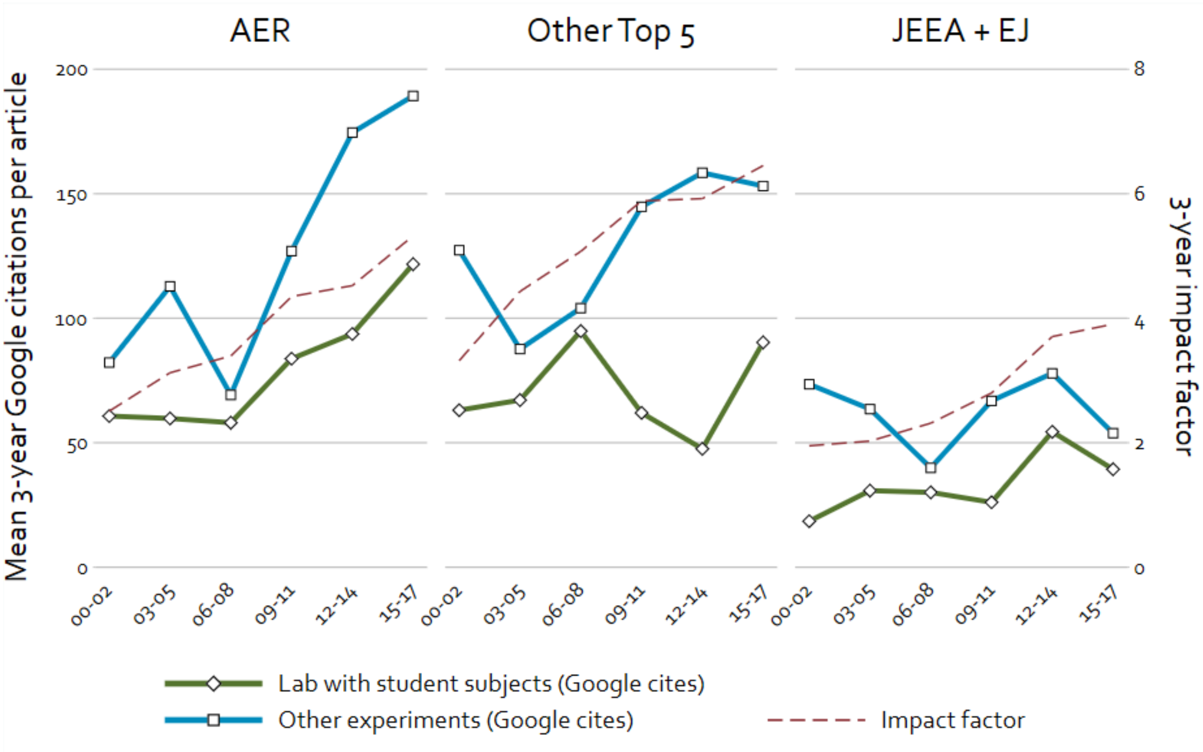

Figure 4 – Average 3-year citations per article

Note: The 3-year citation data were collected at the start of 2021 using the "cited by" feature of Google Scholar. The impact factors were collected from the SCImago Journal Rankings.

three journal categories, LAB experiments receive fewer 3-year citations than OTHER experiments at the 25th quartile (p<0.020), the median (p<0.001), and the 75th quartile (p<0.001).

We also test whether the difference in citations is driven by the differences in the author characteristics identified above. To do so, we rerun the linear regressions, but in addition to the journal type × experiment type dummies, we also include interactions for the journal type × fraction of authors in the top 30 departments, journal type × fraction of authors in the US or Canada, and journal type × number of authors. We find that articles with more authors, particularly from the top 30 departments, receive more citations, but these variables do not affect the gap between LAB and OTHER experiments.

Although we find a robust difference between the number of 3-year citations accrued by LAB and OTHER experiments, this gap does not seem to explain the publication patterns. For instance, in AER, we see that the fraction of LAB experiments has decreased over the last decade while the citations of these articles have been increasing. By contrast, in JEEA+EJ, we see increasing trends in both the publication and citations of LAB experiments.

III. Discussion

We document trends in the publication of experimental research over the past two decades across seven prominent, general interest journals in economics. Our analysis shows that the decline in the fraction of experimental articles published in AER is limited to laboratory experiments with student samples. While we consider this decline worrying, we should note that the rate at which laboratory experiments are published in AER is now in line with that in the other Top 5 journals. In this respect, AER might have converged to the norm of the other Top 5 journals. On the bright side, lab experiments seem to be thriving at the other general-interest journals we consider, JEEA and EJ. Beyond lab experiments, it is encouraging to see that the fraction of other experiments has increased in all journals.

Turning to the rest of our data, we find that laboratory experiments are less likely to be written by authors affiliated to the top 30 departments and located in the US and Canada compared to other types of experiments. Laboratory experiments are also cited less than other types of experiments. However, none of these differences are associated with the different publication patterns of the different types of experiments.

Do these results have implications for the priorities that ESA and its members should have over the coming years? If we have concerns about the state of experimental methods in economics, are these driven primarily by the trajectory of the types of experiments typically run by ESA members? Although the analysis needed to answer these questions satisfactorily is beyond the scope of our data, we can make two observations we believe are relevant to the discussion.

First, the fraction of experiments that were run in laboratories using student subjects has dropped dramatically in the Top 5 journals, but not so in the ESA's flagship journal *Experimental Economics* (EE). Specifically, we used the same classification to classify the articles in EE as either LAB or OTHER experiments in two time periods: 2000-2004 and 2016-2020. We find that the fraction of EE articles classified as LAB experiments equaled 84.9% in 2000-2004, which is not very different from the fraction in 2016-2020, 80.8% (p=0.408). By contrast, the fraction of experiments classified as LAB in the Top 5 journals fell from 62.9% to 16.9% in AER and from 57.6% to 22.5% in the Other Top 5 journals (p<0.001). In JEEA+EJ, the fraction of experiments classified as LAB has not changed (it went from 59.4% to 55.7%, p=0.712) but is still noticeably smaller than in EE.

Second, authors of LAB experiments published in general interest journals are much more likely to be current members of the ESA than authors of OTHER experiments. This is clearly seen in Figure 5, which depicts the mean fraction of authors per article classified as ESA members. Overall, in all three journal categories, authors of LAB experiments are considerably more likely to be ESA members than authors of OTHER experiments (p<0.001). Curiously, despite the significant changes in the relative popularity of LAB vs. OTHER experiments at Top 5 journals, the fraction of ESA members in each of these categories has not changed over time. This is a potentially worrisome observation: if OTHER experiments keep gaining popularity and the ESA does not attract these authors as members, its presence in general interest journals might be at risk. In fact, this seems to be already happening at

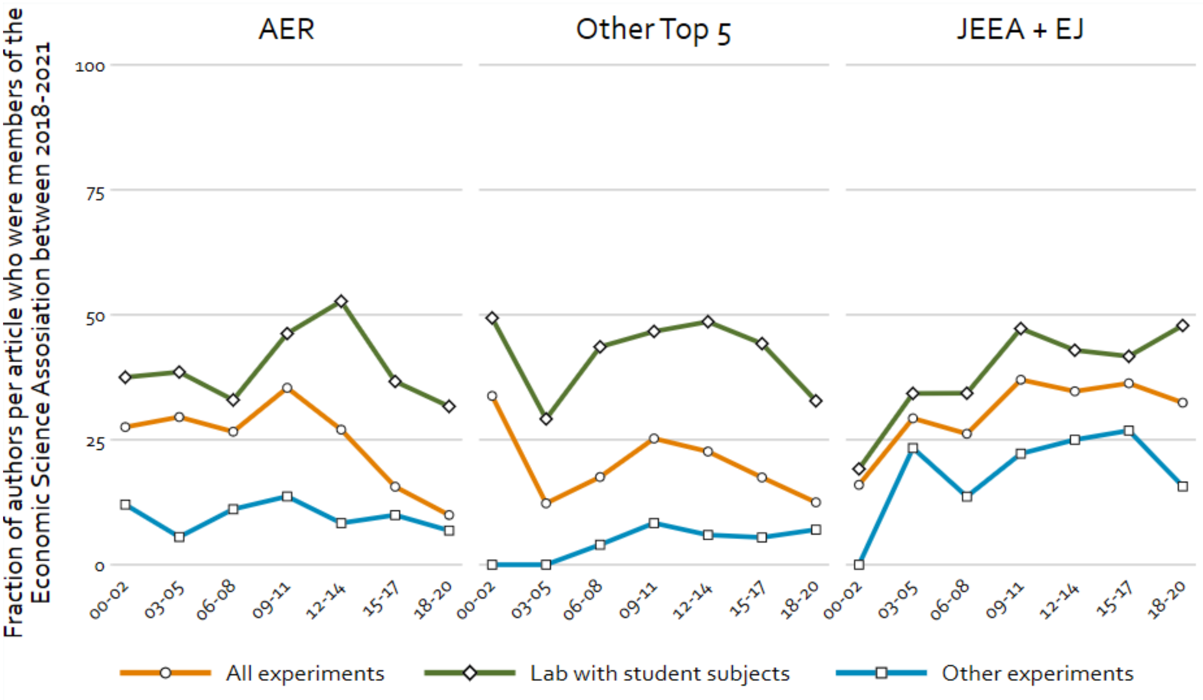

Figure 5 – Fraction of authors who were paying members of the ESA between 2018 and 2021

AER, where the fraction of experiments published by ESA members has been steadily decreasing for ten years.

Do our findings paint a negative picture for experimental research in economics? We cautiously like to think that they do not. Field experiments are thriving, and even though the heyday for traditional laboratory experiments at AER appears to be in the past, we see the increasing publication of articles using other laboratory-like environments such as online and lab-in-the-field experiments. Time will tell whether this latter increase is large enough to counteract the former decrease; currently, it does not (for further discussion on the use of online experiments, see Fréchette, Sarnoff, and Yariv, 2021). This does not suggest that the concerns shared by many in the field are ungrounded. There can very well be increasing unfriendliness towards experimental methods in areas not captured by analyzing trends in publications. For example, the hiring and promotion of experimental economists might be getting more difficult, or the reasons why experiments are being rejected from top journals might have changed. We hope to be able to collect some of this data to shed light on these areas. Moreover, the face of experimental economics at the top general interest journals is changing, while the composition of ESA's membership might not be. However, a decline in ESA's relevance is not inevitable. The ESA grew around traditional lab experiments at a time when conducting any type of controlled experiment was difficult. It is not just tastes but technology which has made more and different modes of experimentation feasible today than at ESA's founding, and we believe ESA can evolve to be an inclusive association for researchers using all types of experiments.

Nikiforakis and Slonim (2019), picking up on the sharp decline of experimental articles in the AER, conclude their article by writing:

“In 1973, Paul McCartney sang: “*What does it matter to you / when you got a job to do / you got to do it well / you got to give the other fellow hell*” (McCartney 1973). And so, despite these negative developments in our field, we press on. (p. 147)”

We think that a more optimistic quote for the state of experimental research might be appropriate. Hence, we end by paraphrasing Daft Punk (2001):

“Work it harder, make it better / [More experiments], makes us stronger / More than ever, hour after hour / Work is never over.”

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Table 1 – Descriptive statistics

Note: All variables related to the number of characteristics of authors are first calculated for each article and then averaged across articles. Citations are based on Google Scholar searches done in early 2021. Rankings of affiliations are based on the Journal Impact Factor found in the Tilburg University Worldwide Economics Schools Research Ranking.

	AER			Other Top 5			JEEA + EJ		
	2000 to 2008	2009 to 2014	2015 to 2020	2000 to 2008	2009 to 2014	2015 to 2020	2000 to 2008	2009 to 2014	2015 to 2020
Articles classified as LAB									
Percentage of published articles	6.49	7.17	1.75	2.24	3.12	2.27	4.13	5.63	8.73
3-year citations per article (mean)	60.21	83.35	125.10	77.55	58.43	60.72	26.24	39.81	26.43
3-year citations per article (median)	46.38	53.00	118.70	75.35	56.29	58.36	25.97	29.98	20.71
5-year citations per article (mean)	119.72	148.90	127.30	151.16	107.29	68.32	47.82	72.27	28.60
5-year citations per article (median)	90.77	100.41	121.20	152.71	101.90	65.24	45.24	50.24	22.49
Number of authors per article (mean)	2.32	2.81	2.60	2.42	2.64	2.48	2.53	2.75	2.69
Rank of author's first affiliation (mean)	114.16	103.97	57.13	56.45	73.61	66.70	145.12	133.15	170.78
Percentage of authors affiliated to top-30 departments	31.03	29.89	36.67	41.13	35.91	44.73	9.87	19.38	16.54
Percentage of authors affiliated to top-50 departments	43.79	40.74	51.67	54.84	46.03	51.40	26.54	32.32	23.90
Percentage affiliations from U.S. and Canada	49.79	43.70	44.50	47.63	35.48	39.60	21.27	25.11	17.82
Articles classified as OTHER									
Percentage of published articles	2.76	6.60	8.60	2.60	4.68	7.80	2.39	4.10	6.93
3-year citations per article (mean)	88.95	143.41	107.84	102.61	145.05	106.29	59.27	65.70	39.48
3-year citations per article (median)	77.05	121.53	73.12	87.50	145.90	89.24	60.41	56.95	33.52
5-year citations per article (mean)	173.60	251.91	123.51	187.58	268.62	112.40	106.82	121.60	43.15
5-year citations per article (median)	150.35	206.21	83.69	161.11	253.33	94.17	105.18	105.79	37.78
Number of authors per article (mean)	2.15	2.86	2.88	2.50	3.11	3.28	2.09	2.65	3.09
Rank of author's first affiliation (mean)	87.98	54.51	44.65	24.81	40.70	44.86	96.95	98.26	117.87
Percentage of authors affiliated to top-30 departments	47.50	58.71	61.74	73.15	60.68	59.14	33.79	35.08	29.19
Percentage of authors affiliated to top-50 departments	62.50	69.63	72.11	81.94	65.36	64.03	36.06	40.89	38.11
Percentage affiliations from U.S. and Canada	45.92	50.34	52.55	63.66	56.16	50.74	36.74	33.63	22.03