Replications and Research Data: Evidence among Economic Journals

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Abstract

The primary rationale for sharing research data in economics is to foster replications. Nevertheless, no study thus far has analyzed whether articles from journals with a research data sharing policy are indeed more frequently replicated. One explanation for the absence of such analysis is that there is no larger scale documentation of research data policy adoptions by economic journals. In this paper, we address both gaps by first providing a chronological overview of research data policy adoptions among the 110 top journals in economics, business, and finance, combining a variety of sources and aiming for high precision in terms of policy introduction years and policy strengthening. Subsequently, using a panel regression framework, we quantify the effect of these policies on the number of replicated articles. Our baseline estimate finds that the research data policy leads, on average, to an additional replicated article every five years. The effect is larger for mandatory policies, higher-ranked journals, and journals with high levels of policy compliance.

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1 Introduction

The idea of sharing research data has long been propagated in the field of economics (Frisch, 1933; Feige, 1975; Feigenbaum and Levy, 1993). Academic economists view the facilitation of replications as the principal reason of such sharing (Bernanke, 2004; Desai, 2013; Stodden et al., 2018). Nowadays, data sharing has been frequently framed as part of journal's editorial policy describing the way in which data and the code necessary to replicate the empirical results of published papers is published (e.g., Dekel et al., 2006; Beugelsdijk et al., 2020). More replications of previously published results provide information on the robustness of original results, reduce misconduct, and strengthen the accountability of academic research (Dewald et al., 1986; King, 1995; McCullough et al., 2006; Hamermesh, 2007; Ditzen and Elhorst, 2022).

Replications are not easy to perform due to, among other reasons, the difficulties of accessing original data. Such evidence is mainly based on specific journals or specific sets of papers. Dewald et al. (1986) probe an early policy of sharing research data run by the *Journal of Money, Credit, and Banking* (JMCB) from 1982 to 1984, requesting authors of published or forthcoming papers to submit their underlying data and code. Only 8 out of 54 submitted datasets were found to be in satisfactory format for replication. McCullough et al. (2006) documents archiving success in only 57% empirical articles of the later JMCB archive (1996–1999). Research data from articles in top journals are not much easier to access for replications. McCullough and Vinod (2003) could not replicate, due to authors' ignorance in delivering the data, half of the articles in the 1999 June issue of *American Economic Review* (AER). The situation has improved over time, but even more recently Pütz and Bruns (2021) could not replicate results from 37 articles published from 2005 to 2011 by top-three economic journals as the underlying data were not provided. Data sharing plays a role in organizing of, to date, the largest replication exercise, which reached for 110 original articles in economics and political science, targeting journals enforcing a data sharing policy (Brodeur et al., 2024).

Regardless of success or failure, replication is a sought-after outcome of research data policy

(e.g., Desai, 2013).[1] However, no study so far has systematically investigated whether journals adopting such policies, have their papers more frequently replicated. One reason for this is the absence of a larger scale documentation on the adoption of research data policies that either encourage or mandate the sharing of research data among journals in economics.[2] Thus in this paper we first construct a 1975–2022 timeline of policy adoptions, its variants, and possible policy strengthening for the top 110 journals in economics, business, and finance. Starting with the first instance of research data policy adoption in 1975 by *Journal of Political Economy* (JPE), we identify the exact timing of policy adoptions for our set of journals. We end the timeline in 2022 a year in which 85 journals have a policy in place. During data collection, we rely on a variety of objective sources, including journal front/end matters, submission guidelines, editorials, articles, and two tailored surveys for editors. We carefully document the sources of ultimate information for each policy adoption year.

We match our collection of research data policy adoption years with a community-supported database that lists published replications of economic articles. In the subsequent analysis, we estimate the effect of research data policies, whether encouraging or mandating, on the number of replicated articles from these journals. To achieve this, we set up our data into a panel format—on journals and 5-year period level—with the number of replicated articles set as our dependent variable. This format allows us to control idiosyncratic journal effects and identify the effect of the two policy treatment dummies in a difference-in-difference framework. Our baseline estimate indicates a modest increase of one additional replicated article occurring every five years due to research data policy. This effect is largely driven by journals shifting to mandatory policies. When we restrict the journals in the treatment and control groups to those with comparably high quality rankings, the research data policy effect become more pronounced. Similarly, the baseline effect on replicated articles is much larger among journals with high policy compliance

[1] Also many Elsevier journals explicitly accompany their research data sharing policy with a statement: *To facilitate reproducibility and data reuse...*

[2] The term *research data* policy is used by Elsevier to refer to a journal's rules on how the data and code should or can be shared once a paper is accepted for publication in that journal. We use this term throughout the paper. However, the naming of the policy is not codified, and other terms are in circulation, e.g., data-sharing policy (Christensen and Miguel 2018); data and code availability policy (all *American Economic Association* (AEA) journals); data availability policy (JPE, *Review of Economic Studies*).

and among older journals. The policy effect is largest for high-ranking journals: among the top 15 journals, any policy brings on average three additional replicated articles, whereas among the top five journals, the effect is almost 7 additional replicated articles in five years. Lower ranked journals gain a significant amount of replicated articles, but only when they adopt a mandatory policy.

Our study contributes to the literature on the documentation of research data policies in academic journals. In the field of economics and business, we extend two past studies on research data policies in economic journals (Vlaeminck, 2013; Vlaeminck and Herrmann, 2015) that report on status quo of journal policies on research data in economic journals in 2011 and 2013. We also sizably extend previous efforts to collect the exact timing of the policy adoptions by previous authors who consider much smaller sets of journals (Christensen and Miguel, 2018; Mueller-Langer et al., 2019; Askarov et al., 2023; Brodeur et al., 2024). Substantial effort in documenting research data policies at particular points in time has occurred in disciplines other than economics, such as political science (Gherghina and Katsanidou, 2013), sociology (Zenk-Möltgen and Lepthien, 2014; Zenk-Möltgen et al., 2018), and statistics (Stodden et al., 2013).

We extend the literature on the effects of research data policies on variety of outcomes. Zenk-Möltgen et al. (2018); Tedersoo et al. (2021) investigate the effect of research data policy on actual data sharing and find results that are not overly optimistic. Less than half of empirical articles actually share their data, 36%–52% in political science and only 12%–31% in sociology, but the share increases over time (Zenk-Möltgen et al., 2018). Tedersoo et al. (2021) document a large variation in research data sharing within the two top general science journals (*Nature* and *Science*) distinguishing by disciplines and call for a unified and mandating type of research data policy. Using survey responses among researchers in psychology, Houtkoop et al. (2018) show that a mandating data sharing policy is the strongest precondition for actual data sharing. Conversely, Christensen et al. (2019) evidence that articles from journals with a mandating research data policy are not more cited than articles from journals without it; however, articles that actually share their data have, on average, 97 more citations than empirical articles without shared data. Askarov et al. (2023) explore whether policies have an impact on significance inflation,

finding only a reduction in extreme t-values. Brodeur et al. (2024) identify no research data policy effect on publication bias. Mueller-Langer et al. (2019) find that the policy has a positive effect on probability that a paper becomes replicated.

In the next section, we provide an overview of the historical timeline of research data policy introduction and describe our efforts to collect data on the timing of the policy adoption across our set of journals. In Section 3, we discuss the descriptive properties of research data policies and our additional data sources—replication incidence and compliance measures. Section 4 reports our empirical results, assessing the effect of the policy on replicated articles, while Section 5 concludes and discusses underlying policy perspectives based on our findings.

2 Research data policies across economic journals

2.1 Early beginnings 1933–2006

Almost a century ago in 1933, the editor of the freshly established *Econometrica* journal, Ragnar Frisch states, in his editorial note, that: *"... the original raw data will, as a rule, be published, unless their volume is excessive."* This is the first verifiable evidence of a research data encounter in the field of economics (Vilhuber, 2020). Since then, not much has been done until 1975, when following an appeal of Feige to establish a minimum standards for reporting of procedures and data, *Journal of Political Economy* (JPE) obliged authors of published papers to provide data to other scholars should they request them. At the same time, JPE editors expressed their willingness to leave space for replications and confirmations of past studies.[3]

The first attempt to physically store data from empirical papers was undertaken from 1982 to 1984 by the *Journal of Money, Credit, and Banking* and was coined a *JMCB data archive*. The quality of the submitted data and underlying replication efforts of the archive are described by Dewald et al. (1986). JMCB reintroduced the data archive only in 1996, and it continues until today. The collection and replication effort taking place in the more recent period, 1996–2003,

[3]Even if the R. Frisch with his 1933 note definitely stands at the beginning of the research data policy timeline, we assign as the earliest research data policy the JPE 1975 data-on-request policy. It is the first policy which openly appeals on authors to share their data for the purposes of replication.

is summarized in McCullough et al. (2006).

As a reaction to the 1982–1984 JMCB data archive project, and even more so due to related perils, the AER, as the leading economic journal, introduced in 1986 a data availability policy, requesting from authors that data necessary to replicate any AER-published empirical study must be supplied to interested researchers upon their interest (Ashenfelter et al., 1986). In 1986, *Journal of Applied Econometrics* (JAE) was established, having a data-on-request policy in its guidelines from the onset. The journal also announced that it *"... will also feature an occasional section of short papers re-evaluating previously published papers"*. In 1995, JAE tightened this policy making it conditional, i.e. the authors of accepted empirical papers had to submit their data prior to publication to the journal data archive.[4] In 1990, *Industrial and Labor Relation Review* (ILRR) and *Journal of Human Resources* (JHR) introduced a *data-availability footnote* measure and authors were requested to state the underlying data availability in the acknowledgment footnote (Hamermesh, 2007). We denote this measure as an encouraging one. Both journals strengthened their policy to mandatory in 2018.

Taking the example of AER, McCullough and Vinod 2003 demonstrate that the data-on-request policies are not overly effective. From a randomly picked June issue of the 1999 volume, half of the empirical articles could not be replicated due to either non-delivery or incompleteness. As a response to the McCullough and Vinod (2003) findings, the AER strengthened its data-on-request policy. From the first issue of 2005, the policy required all data and code of empirical papers to be physically stored at the journal website, and the submission was a necessary condition for a paper to be ultimately published at the AER (Bernanke, 2004). *Econometrica* started directly with a mandatory policy in 2005 and JPE strengthened ith policy one year later, in 2006.[5] From the onset of its data and code availability policy in 2005, AER has been quite transparent in reporting its standing vis-à-vis the policy through a special section, *Data posting*

[4] See front matter of the first issue of the JAE from 1986 as well as authors guidelines in vol. 10 (pp. 217–218).

[5] See back matter of vol. 73(2) of *Econometrica* and front matter of vol. 113(4) of the JPE for the first appearance of the mandatory research data policy in these journals. Christensen and Miguel (2018) claim the policy at *Econometrica* started in 2004; however we find the first evidence thereof only in the back matter of the 2nd issue of 2005 (73) volume. JPE announced its data availability policy in the middle of 2005. To start from the full policy year, our analysis assumes the year 2006 as the policy onset.

policy, in the annual report of the editor.[6] Moreover, the report by Glandon (2010) indicates that from the randomly picked empirical papers of the 2006–2008 AER issues, 79% can be replicated without contacting the original author—a striking success of the physical data storage compared to the on-demand-policy. We depict the relevant historical milestones in our research data policy timeline (Figure 1).

2.2 Policy strength

In the policy's early beginnings, a clear dividing line between two policy variants was already evident. The 1975 policy at JPE, 1986 at AER and JAE, and the 1990 data footnote policy pursued by ILRR and JHR are clearly weaker variants of research data policies. Namely, they have a non-mandating character. Authors of empirical papers were either simply asked to agree with sharing of their data (and eventually code) for the purposes of replication, but only if someone was interested to do so. No actual data must have been provided at the publication time. We refer to this type of policy *encouraging*, as this is the precise wording currently used by many Elsevier journals.[7] The most distinctive feature of this policy is that it encourages the publishing of data/code that could facilitate replication; however, it does not mandate it, nor does condition the article publication by a presence of data/code.[8] Conversely, research data policies that require authors to publish their data and/or code as their paper is accepted for publication in the journal, ~~are referred to here~~ as *mandatory*.

Journal policies are verbally framed in a number of ways. This framing helps us differentiate between encouraging and mandating policies. In the first two rows of Table 1, we provide an overview of the archetypal wording of the research data policies by type. The encouraging policy wording is of an inviting nature; at its weakest end, it formulates a non-binding *data dissemination* practice of the journal. At its strongest end, it *strongly encourages* authors to publish their data. Policies are considered mandatory when an imperative is included in the

[6] See the first report, which includes such a section in Moffitt (2006).

[7] Several *Elsevier* journals uses following wording: "This journal encourages and enables you to share data...", e.g. see authors' guidelines of *Energy Economics* or *Journal of Economic Dynamics and Control*.

[8] Vlaeminck and Herrmann (2015) refer to the weaker variant of the policy as *author responsibility policy*, which correctly subsumes that the issue is ultimately at author's discretion.

policy wording using either verbs such as *must provide* or *require*.

Unlike in the editorial of Ragnar Frisch from 1933, the current research data policies of journals precisely specify how data, used in an empirical study being published in that journal, must be shared. This includes the data and—in most cases—code used to yield the reported empirical results. The remaining three panels of Table 1 lists the details of the research data policy in terms of subject matter, location of the data and code, and when policy exemptions could be granted. Research data policies always expect authors to publish their data; however, most journals frame the policy more extensively and encourage or mandate the publishing of code, algorithms, or any *other details of the computations sufficient to permit replication* (Table 1, third row). As for location, journals either request authors to publish the research data on the journals' websites or at a public repository with a possibility to interlink the original paper and the repository location. The handling of exemptions is the most vague part of these policies. While the *American Economic Association* (AEA) formulation of security and confidentiality exceptions is largely clear and agrees with King (1995)'s early norms on facilitating replications, other reasons for exemptions, such as *ethical feasibility* or decisions *at the discretion of the editor*, are far less transparent and could allow the handling of exemptions in more flexible ways (Table 1, last row).

2.3 Policy takes off

Our historical timeline (Figure 1) begins with an early discourse on publishing research data within *Econometrica* journal and ends 70 years later with the introduction of the mandatory research data policy therein. The policy timeline does not end here; instead, it properly takes off. Prior to 2006 there were just 10 journals with such a policy in place; since then, however, new journals have adopted mandatory policies every year. Figure 2 depicts a cumulative course of research data policy introductions. While not much changed from 2006 to 2008, there is a greater jump in 2009, due to establishing of four additional AEA journals that automatically adopted the mandatory policy of the AER. As of 2010, the number of economic journals adopting this policy gradually increased by about four additional adoptees on average per year. By the end of 2022,

85 journals had research data policies in place: 49 with a mandatory policy and 36 with an encouraging one.

Table 2 lists research data policy introduction years for all 85 journals in which such a policy exists in 2022. To assess the current status quo of the policy, we study the authors' guidelines for each journal. In most cases, research data policies are distinguished by a separate section.[9] Assessing the introduction year of the policy and, if applicable, the timing of the policy strengthening as precisely as possible was a relatively difficult part of our data collection. Information on policy introduction years were sourced in multiple ways: journal front/back matters, editorials, academic articles with an explicit mention of a policy introduction, or journal websites. However, in many cases, none of the above sources was available to determine the exact policy adoption year. In these cases we tried to approximate the policy introduction by the presence of data or replication packages next to empirical papers.

To further identify missing or imprecise policy years, we designed two tailored surveys for current editors of the journals and run them in December 2021 and May 2024. In more than half of these cases, the answers provided by the editors helped us either confirm our early proxy on policy adoption year or adjust it accordingly. Interestingly, in several cases the responding editors themselves were unsure about the policy adoption year at their journals, and some did not responded.[10] In sum, the introductions of the research data policies of 63 journals (74%) were identified objectively, i.e. by having a clear policy adoption year reference or an editor's response. For the remaining 22 journals, we only approximate the policy introduction year by identifying the year in which a clear presence of data/code along empirical articles in the journal began to take place. For each journal, we indicate the source of the introduction year(s) information in the last column of Table 2.[11]

From the 49 journals with a mandatory research data policy in 2022, most were found (33)

[9] Information on data sharing is handled in guideline sections such as "Research Data" (most frequently), "Data Sharing", "Data Access", "Data Availability", "Supplementary Materials", etc.

[10] For a detailed account of both surveys' design and responses, see Appendix A.

[11] We screened research data policies used by journals in the summer of 2021 and again in December 2022. Three journals introduced a policy in between the two screening times, and the introduction year for these journals was set to 2022.

to have adopted the policy directly after having no policy. The remaining 16 journals had an encouraging variant in place earlier. Within this subset, the switch to mandatory policy occurred after 12 years, on average. However, this high average is driven by several outliers—the median journal strengthens its policy after nine years.

2.4 No-policy journals

For the 25 journals without this policy, we list the most approximate alternative to a research data policy mentioned in the publishing guidelines (Table 3). The rule that authors should make data available upon request but only to the journal editor is the closest to an actual research data policy. Three journals have such policy. Many journals request authors to provide a data appendix with a complete description of all data sources. Some journals have an explicit supplementary material policy, which covers additional tests, figures, robustness checks, or data descriptions. All American Accounting Association journals have an explicit set of guidelines for experimental papers, including necessary RCT preregistration and reporting standards for decimal places, degrees of freedom, and statistics. Two journals simply remind authors to follow proper scientific conduct and the principles of scientific ethics. The *no mention* category just marks six journals in which we find no reference to data-related conduct in their current guidelines.

Policy adoption is somewhat faster in economics compared to the neighboring disciplines of political science and sociology. Gherghina and Katsanidou (2013) find that in 2011, 18 out of 120 political science journals adopted a data availability policy. In sociology, Zenk-Möltgen and Lepthien (2014) indicate that seven out of 122 English-language journals had an explicit data policy in place in 2014. An update of research data policies four years later indicates that 53 journals in political science and 16 in sociology had adopted policies (Zenk-Möltgen et al., 2018). In economics, the number of journals with policies in 2011 was 26, 40 in 2014, and 58 in 2018. Concurrent numbers are larger in statistics: out of 170 journals in the field, 59 had a mandatory or encouraging data sharing policy in place in 2012 (Stodden et al., 2013).

3 Empirical setting

3.1 Set of journals

The starting point of our economic journal database are two consecutive studies on data management in scholarly journals in economics. Vlaeminck (2013) examines 141 economic journals and identifies 29 journals with a research data policy in place, of which 24 are mandatory. Two years later, Vlaeminck and Herrmann (2015) extend their earlier analysis and examine 346 journals in economics and business, finding that this set contains 71 journals with a data policy in place, of which 49 are mandatory. We take these 71 journals and complement them in order to have all top 100 journals in *Economics, Econometrics and Finance* subject area by 2021 Scimago Journal Rank (SJR). This leads to a set of 108 journals. Furthermore, inspired by Heckman and Moktan (2020), we add five additional journals in order to have all tier-A field journals in our set.[12] Finally, we include three top general science journals, *Nature*, *Science*, and *Proceedings of the National Academy of Sciences (PNAS)* that frequently publish articles on economic themes.[13] From this intermediary set of 116, we exclude six journals that publish only solicited articles. Solicitation creates a different set of incentives than regular published articles, which must be approved by referees and editors. Moreover, solicited articles are mostly of review-style papers, are longer in size, and very often do not include any new empirical investigations.[14] Our final journal set thus consists of 110 high-quality journals in economics, business, and finance.

To refine the concept of journal quality throughout our descriptive and regression analyses, we use top journal recognition and the *Scimago Journal Rank* (SJR) index.[15] The top journal dummy equals one for 15 journals, including the top five economics journals—AER, JPE, *Quarterly Journal of Economics* (QJE), *Econometrica*, and the *Review of Economic Studies*.

[12] These five journals are: *Journal of Economic Theory, Games and Economic Behavior, Journal of Health Economics, Health Economics*, and *Journal of Industrial Economics*

[13] From these general science journals, we only consider, in our empirical analysis, replicated articles in the field of economics.

[14] These six journals are *Journal of Economic Literature*, *Journal of Economic Perspectives*, *NBER Macroeconomics Manual* and *Foundations and Trends in Finance*. We also exclude the *Annual Review of Economics* and *Annual Review of Financial Economics*, which both invite established economists to submit a review style article in a single annual issue.

[15] The SJR index has existed since 1999: cf. https://www.scimagojr.com/journalrank.php

Furthermore it includes the two top general science journals *Nature*, and *Science*. Lastly, it equals one for the highest quality journals in the fields of accounting, finance, management, and marketing—*Journal of Finance*, *Review of Financial Studies*, *Management Science*, *Marketing Science*, *Journal of Financial Economics*, *Journal of Accounting and Economics*, *Journal of Management*, and *Journal of Marketing*.

3.2 Policy compliance

For the policy compliance variable, we count all empirical papers and mark how many of them have a replication package or a dataset accompanying them. Policy compliance is then the fraction of the two sums. We use the first issue of the year 2022 for this exercise.[16] An empirical paper was coded as policy compliant, not only if the dataset was physically available, but also if the paper was officially exempted from publishing the data and encompassed a code to reproduce the results and a description how to access the data. Under the policy definition, the compliance of mandatory policy journals shall be one. However taking the 46 mandatory policy journals at the end of 2021, we find only 22 journals fully compliant, another nine had 50%—68% compliance, six had 5%-–30% compliance, and the remaining nine journals simply had a compliance of 0%. No or partial compliance has been revealed for other sets of journals or other disciplines as well. Depending on the discipline, Tedersoo et al. (2021) document compliance with data availability policy for *Science* and *Nature* to be 70%–83%. Brodeur et al. (2024) show in their sample of top 10 journals in economics that compliance is about 80%.

In Figure 3, we visualize the 2022 compliance shares by type of policy, journal quality measure, length of policy exposition, and subfield. The share of available data is very small for journals without any policy (4.5%) and for journals with an encouraging research data policy (13%).[17] Regardless of quality, the compliance shares of journals with mandatory policy are significantly larger. Using SJR index in 2021, we further divide them by its average within our set of 110. For journals with below-average SJR levels, compliance averages at 50% and it is 79%

[16] If the first issue was a *special issue*, we took the next regular issue.

[17] For journals with encouraging policy or no policy, it is not entirely fair to speak about policy compliance, as publishing data is not a requirement for publication. But for simplicity, we use this term for all journals.

for journals with above-average levels. The difference is significant ($P < 0.017$). The length of policy exposition is relevant to thereof adherence (Figure 3, Panel B). Journals exposed to it for less than five years show compliance of only 12%. Journals engaging with the policy for more than five years show significantly larger levels of compliance—between 57% and 65%.[18] Finally, when inspecting policy journals by subfields, economic outlets were found to have significantly higher compliance than journals in finance or business economics (Figure 3, Panel C). This is, however, partly due to longer exposition with the policy among purely economic journals.

Journal compliance is, to a large extent, associated with the mandatory policy dummy. In Table 4 we report some descriptive evidence of the relationship. Mandatory policy alone increases compliance by up to 50 pp (column 2) and it explains the largest portion thereof variation. It takes five policy years for journals to significantly increase compliance (column 3). Encouraging policy increases compliance only by less than 10 pp, moreover, this effect vanishes when we include measure of journal quality (columns 4–6). There are some subfield differences in compliance but contribute only marginally to explaining total variation (cf. R^2 in different columns).

3.3 Replication incidence

The replication incidence of articles published by journals in our set of 110 we designated as the policy outcome. To create this variable, we utilized, the perpetually updated Replication Network database that collects all published replications of studies in the field of economics and is community supported.[19]. We used the full list of replications available in December 2023, when it contained 604 replication studies. To study whether articles from journals with a research data policy are more frequently replicated, we tracked back all original studies. From the 604 replication studies arose 672 replicated (original) articles. The number of replicated articles exceeded the total replications because in several cases a single replication replicated more than

[18] A similar contingency of policy compliance on policy exposition length was identified by Zenk-Möltgen et al. (2018) for journals in political science and sociology.

[19] https://replicationnetwork.com/replication-studies/. The Replication Network database is based on a more complex replication data project (ReplicationWiki) initiated by Jan H. Höffler (see Höffler 2017)

one original study. We then match the replicated studies with our journal policies dataset.[20]

Our journals are strong leaders in terms of sources of original studies for replication. Namely, more than three quarters of all replicated articles (525 of 672, 78%) stem from our set of journals. The distribution of replicated articles within our journals is highly skewed. Unsurprisingly, three top-five journals lead the list: AER with 123, QJE with 51, and JPE with 41 replicated articles. These are followed by *Journal of Applied Econometrics* with its 32 replicated articles and *Review of Economics and Statistics* with its 28. The middle category is comprised of 39 journals with 2–18 replicated articles. *Econometrica* is ranked 8th and cumulatively has 16 replicated articles, just on a par with *Journal of Finance* (18) and *Journal of Financial Economics* (17). Nineteen journals had just one replicated study each. From the remaining 47 journals, no original article published therein was replicated until 2023, according to the Replication Network data source.[21] In terms of first-ever replications, the journals are likewise very unevenly distributed. The earliest replicated studies, published from 1962—1981, $(N = 17)$, stem from only six different journals. Alone eight of them are from JPE—the first journal to introduce a research data policy in 1975.

In Figure 4, we visualize the average total numbers of replicated articles by the type of policy crossed with journal quality, by policy compliance, by the length of policy exposition, and by subfield groupings. Articles from journals without policies are hardly replicated, while articles originating in journals with encouraging policies are slightly better off. On average, 2–4 articles were replicated over this observation period. Articles originating in journals with above-average SJR index and with mandatory policies are replicated most, reaching an average number of eight (Panel A). Policy compliance plays a significant role in the total number of replicated articles. Journals with a high compliance share ($> 50\%$) cumulate on average five more replicated articles than journals with zero or low compliance (Panel B). This difference is significant ($P < 0.033$). Longer policy expositions, of more than five years, naturally deliver more replicated articles

[20] A handful of original papers were replicated more than once. In this case, we count them as many times as published replications of them exist.

[21] One explanation for the striking disparity between journals, as sources of studies for replication, is stronger competition for publishing space in higher ranked journals. In their model of replications, Maniadis et al. (2017) show that the parameter measuring competition among research teams and publication pressure, increases number of replications.

(Panel C). Articles in the field of business economics are less frequently replicated than in finance and economics (Panel D). In general, journals in each subcategory exhibit a large variance in terms of the total number of replicated articles, leading to many insignificant differences.

Figure 4 ignores the publication dates of the replicated articles. Many replicated articles were published before any policy introductions. QJE adopted its first policy—directly a mandatory policy—only in 2016; however, 45 articles published before have nonetheless been replicated. In Figure 5, we show that this is not the general case by comparing the annual average number of replicated articles before any policy, and after a mandatory policy. Figure 5 only includes a subset of 45 journals that adopted a mandatory policy before 2022. Even before any policy, top journals have, on average, more replicated articles than other journals. Despite this, both journal groups experience increases in articles replicated in the years following the policy.

The differences in terms of subcategories show comparable tendencies for both, compliance measure and number of replicated articles (cf. Figure 3 and Figure 4). The variance is much larger for replicated articles than for compliance. We quantify this in descriptive regressions for total number of replicated articles per journal (Table 5). Unlike for compliance, policy dummies, even if significant, explain only a small portion of the variation in the number of replications (cf. R^2 in columns 1 to 3). High compliance increases the number of replicated articles but does not explain much of the variation (column 4). Due to its high correlation with the mandatory dummy, its effect remains imprecise.

On average, journals with such policies have about six more replicated articles than journals without such policies (column 1). The majority of this effect is due to the mandatory policies (column 2). Replicated articles accumulate with the length of policy exposition (column 3). Articles from top journals are replicated the most (column 5). Including the more precise journal quality measure, SJR, strongly increases the explanatory power of the model but diminishes policy dummies' role (columns 6–8). There does not seem to be a significant difference between economics and finance journals; however, there are on average less replicated articles in the business economics field (columns 7 and 8). Excluding AER, a clear outlier in terms of the number of replicated articles, improves the explanatory power of the replication regression model

(column 8).

Our descriptive analysis suggests that policies play a vital role in the willingness of authors to replicate studies from such journals. Despite this, once journal quality is included, the variable largely overtakes the relevance of replication incidence. Large standard errors of the point estimates signal extensive variance even within any significant determinants of replicated articles. It appears that idiosyncratic journal factors, such as longer policy experience coupled with subfield replication culture, and particular prestige of papers from certain journals compared to others contribute to the overall noise. This calls for a panel regression framework that can control for journal-specific effects in replicated articles.

3.4 Panel framework

Articles are rarely replicated. Mueller-Langer et al. (2019) find that from all articles published in top-50 journals over 1974–2014 only 0.10% are replication studies. In our set of 110 journals, the median number of replicated articles per year is always zero and the largest journal-year averages are only between 0.2-0.3 over the 2003–2015 interval (Figure 6). Articles are also replicated for reasons that are not easily observable. Citations, length, type of data, or funding explain very little from the probability of an article being replicated (Mueller-Langer et al., 2019). Our panel analysis ideally requires that the outcome measure varies at the article-year level (i.e., the level of changes in research data policy). However, the scarcity and idiosyncrasy of replication studies require smoothening the variable.[22]

To replicate an article and write a publication about such replication takes time. In our replicated articles–replication dataset, we find that the median gap between publication years of the original article and that of a subsequent replication is six years. Indeed, Figure 6 depicts a strong drop in the average number of replicated articles from 2016 onward. This is unlikely to reflect a reduced interest in replicating papers from the most recent period. Based on the gap from original article to replication, replication potential seems to only partly be exhausted, and additional

[22]We deliberately do not include the 110 replicated articles by Brodeur et al. (2024) project, even if it could increase frequency of our dependent variable, because one of the selection criteria was that the original journal has a mandating policy in place.

studies from this period will be replicated in the years to come. Corroborating this perspective our analysis evidences a stronger policy effect when excluding the last period.

To smooth our outcome variable we rebuild the journal-year dataset into a journal-period format by summing for each journal all published articles within a five-year interval of which replication have been published and recorded by Replication Network data until December 2023. Starting with the last year, when any original article is replicated, the last five-year period is 2016–2020, and we roll down in five-years blocks to the first 1976–1980 period.[23] The outcome measure, the number of replicated articles per period $y_{i\tau}$, is then defined for nine periods, $\tau = 1, \cdots, 9$, albeit only for the 62 journals that existed throughout the entire 1976–2022 study period. The remaining 48 were established from 1977–2014 and are included only in periods in which they have existed the full five years, as no replication can materialize before the journal establishment date.[24] This procedure led to an unbalanced panel of 798 journal-period observations.

Figure 7 illustrates the construction of our policy outcome variable, the number of replicated articles per period $y_{i\tau}$, and the two policy dummies indicating the existence of any policy, $D_{i\tau}^{any}$, and mandatory policy, $D_{i\tau}^{m}$ in the nine-period framework. We show it for *Journal of Human Resources*, from which 14 articles, published over 1976–2020, have been replicated (indicated by X). The underlying nine-period counts ($y_{i\tau}$) range from 0 to 4. The journal introduced its encouraging policy in 1990; thus, any dummy switches to 1 in the fourth period. It introduced its mandatory policy in 2018; thus, the mandatory treatment dummy ($D_{i\tau}^{m}$) is always zero. For a journal with only an encouraging policy, $D_{i\tau}^{m}$ is always zero, and for a journal that introduces directly mandatory policy the $D_{i\tau}^{any} = D_{i\tau}^{m}$. Note that when both dummies are included, $D_{i\tau}^{any}$ automatically represents the effect of encouraging policy.

[23] We ignore the two original articles from year 2021, that have already been replicated and published by 2023. The original articles are both from QJE.

[24] We indicate the journal establishment year next to the journal name in Table 2 and Table 3.

4 Effects of research data policy on replicated articles

This section presents our regression results on how the research data policy affect the number of replicated articles using random effect panel estimation.[25] Our exposition evolves in three consecutive steps. We start by the baseline set of results to settle the benchmark effect of policy using the full set of journals while considering variations in the group of control journals (Section 4.1). We continue by studying the heterogeneity of the effect considering relevant breakdowns as follows: early vs. later periods, high vs. low complying journals, and older vs. more recently established journals (Section 4.2). The next portion of our results explores the relevance of journal quality in the policy effect (Section 4.3). We also discuss the effect dynamics using event analysis for all journals and subgroups of journals. We finish the results section by discussing robustness of our baseline results employing alternative approaches (Section 4.4).

4.1 Baseline effects

We present the results of the random effects panel estimation in Table 6 using five-years period counts of replicated articles per journal over 1976–2020. Research data policies of any type accounts for about one more replicated article per follow-up period on average, compared to journal without such policies (column 1). Once we distinguish between mandatory and encouraging policy, the effect is overtaken by mandatory policy, leaving the effect of encouraging-only policies to be around one paper every 10 years (column 2). The baseline effect of one additional replicated article per period is likely to be a lower bound. Figure 6 indicates that the stock of replicated articles published during the last period (2016–2020) is not complete. When we exclude the last period, the policy effect doubles: there are two more replicated articles per period after any policy adoption and three more for journals adopting a mandatory policy (cf. columns 3 and 4).

We further explore the role of control group in the assessment of the policy effect. Research data policies can evolve in three distinct ways: journals remain without any policy, switch to

[25] In most cases, the Hausman test supports the use of a more efficient random effect estimator.

encouraging status and stay there, switch to mandatory with an interim step of encouraging policy for some time, or directly adopt mandatory policy. Due to the variants, identifying an appropriate control group is not straightforward. In the final three columns of Table 6, we explore the size of the effect for different subset of journals by their policy adoption trajectory until 2016. In column 5, we estimate the effect of a switch to mandatory policy from an encouraging policy to be about two additional replicated articles per period compared to journals that did not adopt any policy. When comparing journals that only adopted an encouraging policy to no-policy journals, we find no effect (column 6). Finally, the effect of mandatory policy is about two additional replicated articles when the control journals are solely encouraging policy adopters (column 7).

The leads and lags of the policy adoption threshold are used to study the effect dynamics around the policy adoption year (Figure 8, Panel A). The effect of both policies is significant already in the initial period of policy treatment. There is no pretrend in replicated articles outcomes for the first policy adoption (left), while a visible pretrend is found in the last two pre-periods for the mandatory policy (right). The pretrend is driven by journals with encouraging policies prior mandatory ones. For any policy effect (left), we evidence an additional jump by four additional replicated articles in period 3. This substantial effect is driven by a handful of journals that have over 15 years experience with the policy, when most of whom strengthened to mandatory policy.

4.2 Heterogeneity considerations

The considered time interval can be divided into two spells according to the type of research data policy adoptions taking place. During the earlier four periods (1976–1995), only adoptions of encouraging policies occur. In the later periods (1996–2015), both types of adoptions occur: no-policy journals adopt an encouraging policy, or both encouraging-policy journals and no-policy journals adopt a mandatory policy. Our first heterogeneity exercise breaks down the data into an early period and a late period (Table 7, column 1 and 2). The encouraging policy effect exists in the earlier period but is overtaken by the even stronger effect of mandatory policy in the later four periods (1996–2015).

High compliance with research data policy leads to, on average, almost two more replicated

articles over over a five-year period for journals switching to encouraging or to mandatory policies (column 3). Even if our measure only approximates the overall compliance behavior of journals by its compliance measured in 2022, this suggests that highly compliant journals may induce replication efforts even without a mandatory variant. For low-compliance journals, only the mandatory policy results in one more replicated article every 10 years (Table 7, column 4).

The last pair of heterogeneity exercises investigate the effect differences by journal age. We divide the journals in two groups: those established before and established during our observation window (i.e. after 1976). Older journals have an advantage in terms of replicated articles no matter which policy they adopt, while articles from relatively newer journals manage to increase such incidence only when adopting stronger research policy variants (Table 7, columns 5 and 6).

4.3 Journal quality considerations

Adoptions of research data policies are linked to journal quality—the crude correlation of mandatory policy dummy with SJR index in 2021 is 41%. Similarly, our policy adoption table (Table 2) shows that many highly recognized journals were the first to adopt policies. In this section we explore the policy effects for distinct set of journals in terms of their quality and recognition.

We divide our set of 110 into highly recognized journals and other journals. We do this by using a top-15 dummy and above/below SJR 2021 average dummy. Regardless of the used division rule, we estimate a similar pattern. For highly recognized journals, there is in both cases a strong policy effect that exists when adopting an encouraging policy. The effect is three more replicated articles for top-15 journals and about two more replicated articles for the 40 above-average SJR journals per period (Table 8, columns 1 and 3). For less recognized journals, the effect is slightly smaller than the baseline effect of one more replicated article per period, but this only effective for journals adopting a mandatory policy (columns 2 and 4). When including the SJR 1999–2020 index into the regression, we are only left with the encouraging policy effect and no effect of journal quality. There are, however, two differences from the main analysis: we only have a later period, and the identification of the SJR effect is based on its variation within journals. As journal quality is relatively stable over time, the variations are small, what likely

explains insignificance of the coefficient.

We repeat our event analysis for top-15 and other journals separately (Figure 8, Panels B and C). We observe similar patterns in pretrends and policy leads as when considering all journals. However, both cases exhibit different effect sizes. The policy effects within the top-15 journals are large, ranging between two and 10 replicated articles per period, but the effect is imprecise. The effect for remaining 95 journals is measured at around one additional replicated article per period, starting in the third period for the encouraging policy and starting immediately in the first policy period for the mandatory policy.

There is a possibility to obtain even cleaner policy effects for the group of top-5 economics journals (Table 8, columns 5 and 6). The QJE adopted its mandatory policy quite late, in 2016, without having any encouraging variant before; thus, it can serve as an ideal control group for the remaining four journals in the pack, at least for the first eight periods in which the QJE was not treated. The remaining journals had earlier experience with the policies. AER and *Econometrica* adopted mandatory policies in 2005. AER had an earlier experience with the encouraging policy, but *Econometrica* did not. *Review of Economic Studies* adopted its encouraging policy in 2006. Finally, JPE had an encouraging policy, which was converted to mandatory in 2006.

Column (6) of Table 8 shows the effect of any policy. Here, the JPE is always treated and the QJE is never treated, building together the control group for the three journals entering treatment in period 3 (AER) and period 7 (*Econometrica*, *Review of Economic Studies*). Finally, in column (7), we explicitly study the effect of a mandatory policy treatment. Here the *Review of Economic Studies* and QJE build a control group and the remaining three journals begin their mandatory policy treatment in period 7. Both effects are significant and large. Top journals with policies add further 7–9 additional replicated articles per period.

4.4 Robustness analyses

In the last piece of our analysis, we detail results from alternative estimations demonstrating the extend of robustness of our baseline estimate. In the first column of Table 9, we duplicate the baseline estimate for ease of comparison. Using fixed effects instead of the more efficient random

effect estimator hardly changes the effect size of mandatory policy but the average effects are less precise (column 2). In the third column, we estimate the both policy effects using left-censored random effect Tobit estimator. Our outcome, the number of replicated articles, is effectively a zero-inflated variable. Tobit estimates an average effect of about two additional replicated articles per period for any type of policy. Note, however, that this effect is conditional on nonzero outcomes; thus, it provides an estimate for journals' with replicated articles before policies.

We also estimate the average treatment effect (ATT) using the Borusyak et al. (2024) imputation approach, which takes into account the journals' staggered introduction of policies and heterogenous treatment dynamic effects. This method allows the estimation of only one effect at a time. We estimate, albeit less precisely, an ATT of 1.23 additional empirical article per period when journals treated by any research data policy. This result is comparable to our baseline effect of 1.14 (Table 6, column 1). The ATT of mandatory policy is 1.43, the equivalent estimate using random effect model is 1.6 (not reported).

Our baseline estimate uses the period-smoothed data. For the last column in Table 9 we instead smooth the data using forward-looking moving averages of five years. The replicated article count of for the year t is thus average of replicated articles over $t, t+1, \cdots, t+4$. In this way we obtain 41 year observations at most, for each journal. The estimated policy effects are smaller in magnitude because they represent average annual effects on replicated articles. Multiplying by five, we obtain effects of 0.4 for encouraging, and 1.6 for mandatory policy, comparable to the baseline. Using moving averages secures larger statistical power and, accordingly, the estimated effects are more precise. The explanatory power of the model however remains about the same.

5 Discussion and conclusions

In 1975 editors of *Journal of Political Economy* introduced the first variant of the research data policy, responding to an appeal by Feige (1975). After almost five decades many journals have followed the JPE's example. By the end of 2022, of the top 110 journals in economics, 85 have

adopted some form of research data policy. We precisely document this evolution—policy adoption year and policy strengthening—using multiple objective sources. Furthermore, we comprehend the collected information with responses, obtained from editors of economic journals via two tailored surveys. In line with numerous earlier pledges that encouraging policy is ineffective for actual data sharing (e.g. Dewald et al., 1986; Andreoli-Versbach and Mueller-Langer, 2014), most journals (49) adopted a mandatory policy. Cross-disciplinary comparisons have revealed that economics stands better or on par with other disciplines using empirical methods (e.g. Stodden et al., 2013; Zenk-Möltgen et al., 2018). However, most business economics journals have just begun to follow the trend recently (c.f. Table 2 vs. Ryan and Tipu, 2022).

In a subsequent empirical analysis we investigate, within a journal-period panel regression framework, the effect of research data policies on the number of replicated articles. On average we estimate a modest increase of one additional replicated article every five years for journals with a policy in place. The effect is largely driven by journals switching to mandatory policy. Having a mandatory policy leads to a similar effect when the control group consist of journals adopting only an encouraging policy. Conversely, when we estimate the effect among journals adopting only an encouraging policy with no-policy journals being the control group, we find no significant difference in replicated articles. Our results also emphasize the role of policy compliance. The group of highly policy-compliant journals gain about two more replicated articles every five years after adopting any policy. Our results regarding the relevance of mandatory policy and high policy compliance validate the recommendation of McCullough et al. (2008) articulated during the early stages of journal data archiving almost 20 years ago: successful replication requires that journal editors do not fail to enforce the requirement that replication data be actually archived.

We also show that the actual policy effect is likely stronger than our baseline effect. Namely, the replication potential of more recently published articles has not yet been fully exhausted. When excluding the last observation period, the policy effect increases notably to two additional replicated articles every five years. However there are additional reasons to believe our baseline effect is only a lower bound. The community-supported replication network database we use, is

not exhaustive. While it very likely contains the majority of self-standing published replications, some replications are embedded within original studies as a side result or a baseline treatment (Coffman et al., 2017; Maniadis et al., 2017). Some articles have been replicated but have not been successfully published and may have ended up in a file drawer (Franco et al., 2014). All these replication activities are not systematically documented. Hamermesh (2007) asked authors of published articles, in two encouraging policy journals, on the frequency of data requests and found that more than half of the authors never received any requests. Even if this early evidence on possible informal replication activities points to low activity, teaching replication as coursework for master and PhD students is gaining importance (Schwab et al., 2023), thereby increasing the utility of research data.

Journal and original article quality play a strong role in incentives to replicate. Indeed, most replicated articles originate in top journals, and many are highly cited (e.g., Duvendack et al., 2015; Hamermesh, 2017). Simultaneously, top journals have been leading the process of research data policy adoptions and policy strengthening. Prior to 1995, only a handful of journals had an encouraging policy but we show that such a policy had a significant impact on the number of replicated articles. The policy impact might have been indirect, caused by increasing awareness of replication possibilities and importance (Dewald et al., 1986; King, 1995)—a mechanism we cannot disentangle. Incentive considerations can also be a reason behind the stronger policy effect for older journals compared to journals established more recently. The policy effect is strongest for top journals. Among the above-average ranked journals, the adoption of any policy brings two additional replicated articles; among top-15 journals, the adoption of any policy results in three additional articles compared to no-policy journals from the underlying quality categories. The effect is strongest in the group of top-5 journals, where both control and treatment journals are justifiably comparable in reputation: any policy leads to almost seven additional replicated articles every five years. The strong estimated policy effects among more established journals highlight the importance of research data policies, even for this category of journals, for further increasing the replication activity.

Our analysis shows that in order for policies to be effective outside top journals, lower-ranked

journals should impose a mandatory research data policy and maintain high compliance rates. While top journals are, by nature, of general interest, all journals regardless of rank, especially field journals, communicate highly relevant findings from their research areas. Thus, journals may try to improve awareness in replication importance by, for example, making a replication call or opening a replication section inviting researchers to submit replications of relevant findings within their fields (Tol, 2019; Ditzen and Elhorst, 2022). Many journals cannot often keep track of the policy compliance in the same extent as top journals often do by installing a data editor role responsible for policy accountability (e.g., Duflo and Hoynes, 2018). Funding agencies could partly replace the accountability function for journals by explicitly requiring articles published via their grant to comply with research data policies (Haeussler et al., 2014).

Most research data policies have been adopted in more recent years; thus, we could not quantify their effects in this study. This warrants an extension of our analysis in few years' time. With increasing documentation effort for replications, such analysis may perhaps include unpublished replications as well. Our analysis only covers the field of economics; nevertheless, the incentives to share and replicate are likely to be similar across the scientific fields (Stodden et al., 2013, 2018) thus our results indicate external validity. Our study shows that while research data policy is beneficial in increasing replications, it is not the ultimate cure for its low usage. Researchers replicate for many other reasons; for example, the original papers are controversial, the replication will likely reject the original paper, the original papers are highly cited (e.g., Galiani et al., 2017), or they stay in competition with authors of replicated articles (Maniadis et al., 2017). Funding agencies and tenure committees may place additional weight to the value of replication, thereby boosting replication activity among researchers beyond these policies.

Declaration of competing interest

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

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Data availability

Data will be made available upon publication in a public repository.

References

Andreoli-Versbach, P. and F. Mueller-Langer (2014). Open access to data: An ideal professed but not practised. *Research Policy 43*(9), 1621–1633.

Ashenfelter, O., R. H. Haveman, J. G. Riley, and J. T. Taylor (1986). Editorial statement. *American Economic Review 76*(4), v.

Askarov, Z., A. Doucouliagos, H. Doucouliagos, and T. Stanley (2023). The significance of data-sharing policy. *Journal of the European Economic Association 21*(3), 1191–1226.

Baltagi, B. H. and Z. Wang (2007). Testing for cointegrating rank via model selection: evidence from 165 data sets. *Empirical Economics 33*, 41–49.

Bernanke, B. (2004). Editorial statement. *American Economic Review 94*(1), 104.

Beugelsdijk, S., A. van Witteloostuijn, and K. E. Meyer (2020). A new approach to data access and research transparency (DART). *Journal of International Business Studies 51*, 887–905.

Borusyak, K., X. Jaravel, and J. Spiess (2024). Revisiting event-study designs: robust and efficient estimation. *Review of Economic Studies*, rdae007.

Brodeur, A., N. Cook, and C. Neisser (2024). P-hacking, data type and data-sharing policy. *The Economic Journal 134*(659), 985–1018.

Brodeur, A., D. Mikola, and N. Cook (2024). Mass reproducibility and replicability: A new hope. Discussion paper, I4R DP Series, No. 107, Institute for Replication (I4R), s.l.

Chandy, R. K., G. V. Johar, C. Moorman, and J. H. Roberts (2021). Better marketing for a better world: Editorial. *Journal of Marketing 85*(3), 1–9.

Christensen, G., A. Dafoe, E. Miguel, D. A. Moore, and A. K. Rose (2019). A study of the impact of data sharing on article citations using journal policies as a natural experiment. *PloS one 14*(12), e0225883.

Christensen, G. and E. Miguel (2018). Transparency, reproducibility, and the credibility of economics research. *Journal of Economic Literature 56*(3), 920–80.

Coffman, L. C., M. Niederle, and A. J. Wilson (2017). A proposal to organize and promote replications. *American Economic Review 107*(5), 41–45.

Dekel, E., D. Levine, C. Meghir, W. Newey, and A. Postlewaite (2006). Econometrica: Back matter. *Econometrica 74*(1), 311–321.

Desai, P. S. (2013). Editorial: *Marketing Science* replication and disclosure policy. *Marketing Science 32*(1), 1–3.

Dewald, W. G., J. G. Thursby, and R. G. Anderson (1986). Replication in empirical economics: The journal of money, credit and banking project. *American Economic Review*, 587–603.

Ditzen, J. and J. P. Elhorst (2022). Introducing the replication studies section. *Spatial Economic Analysis 17*(1), 7–9.

Duflo, E. and H. Hoynes (2018). Report of the search committee to appoint a data editor for the AEA. In *AEA Papers and Proceedings*, Volume 108, pp. 745–745.

Duvendack, M., R. W. Palmer-Jones, W. R. Reed, et al. (2015). Replications in economics: A progress report. *Econ Journal Watch 12*(2), 164–191.

Feige, E. L. (1975). The consequences of journal editorial policies and a suggestion for revision. *Journal of Political Economy 83*(6), 1291–1296.

Feigenbaum, S. and D. M. Levy (1993). The market for (ir) reproducible econometrics. *Accountability in Research 3*(1), 25–43.

Franco, A., N. Malhotra, and G. Simonovits (2014). Publication bias in the social sciences: Unlocking the file drawer. *Science 345*(6203), 1502–1505.

Frisch, R. (1933). Editor's note. *Econometrica 1*(1), 1–4.

Galiani, S., P. Gertler, and M. Romero (2017). Incentives for replication in economics. Working paper, NBER WP No. 23576.

Gherghina, S. and A. Katsanidou (2013). Data availability in political science journals. *European Political Science 12*(3), 333–349.

Glandon, P. (2010). Report on the American Economic Review data availability compliance project. *Vanderbilt University. https://aeaweb. org/aer/2011_Data_Compliance_Report. pdf*.

Haeussler, C., L. Jiang, J. Thursby, and M. Thursby (2014). Specific and general information sharing among competing academic researchers. *Research policy 43*(3), 465–475.

Hamermesh, D. S. (2007). Replication in economics. *Canadian Journal of Economics/Revue canadienne d'économique 40*(3), 715–733.

Hamermesh, D. S. (2017). Replication in labor economics: Evidence from data and what it suggests. *American Economic Review 107*(5), 37–40.

Heckman, J. J. and S. Moktan (2020). Publishing and promotion in economics: the tyranny of the top five. *Journal of Economic Literature 58*(2), 419–70.

Höffler, J. H. (2017). Replicationwiki: Improving transparency in social sciences research. *D-Lib Magazine 23*(3), 1.

Houtkoop, B. L., C. Chambers, M. Macleod, D. V. Bishop, T. E. Nichols, and E.-J. Wagenmakers (2018). Data sharing in psychology: A survey on barriers and preconditions. *Advances in methods and practices in psychological science 1*(1), 70–85.

King, G. (1995). Replication, replication. *PS: Political Science & Politics 28*(3), 444–452.

Maniadis, Z., F. Tufano, and J. A. List (2017). To replicate or not to replicate? Exploring reproducibility in economics through the lens of a model and a pilot study. *Economic Journal 127*, F209–F235.

McCullough, B. D., K. A. McGeary, and T. D. Harrison (2006). Lessons from the JMCB archive. *Journal of Money, Credit and Banking 38*(4), 1093–1107.

McCullough, B. D., K. A. McGeary, and T. D. Harrison (2008). Do economics journal archives promote replicable research? *Canadian Journal of Economics/Revue canadienne d'économique 41*(4), 1406–1420.

McCullough, B. D. and H. D. Vinod (2003). Verifying the solution from a nonlinear solver: A case study. *American Economic Review 93*(3), 873–892.

Moffitt, R. A. (2006). Report of the editor. *American Economic Review 96*(2), 497–509.

Mueller-Langer, F., B. Fecher, D. Harhoff, and G. G. Wagner (2019). Replication studies in economics—how many and which papers are chosen for replication, and why? *Research Policy 48*(1), 62–83.

Nature (2014). Data-access practices strengthened. *Nature 515*, 312.

Pütz, P. and S. B. Bruns (2021). The (non-) significance of reporting errors in economics: Evidence from three top journals. *Journal of Economic Surveys 35*(1), 348–373.

Ryan, J. C. and S. A. Tipu (2022). Business and management research: Low instances of replication studies and a lack of author independence in replications. *Research Policy 51*(1), 104408.

Schwab, A., H. Aguinis, P. Bamberger, G. P. Hodgkinson, D. L. Shapiro, W. H. Starbuck, and A. S. Tsui (2023). How replication studies can improve doctoral student education. *Journal of Management Scientific Reports 1*(1), 18–41.

Stodden, V., P. Guo, and Z. Ma (2013). Toward reproducible computational research: an empirical analysis of data and code policy adoption by journals. *PloS one 8*(6), e67111.

Stodden, V., J. Seiler, and Z. Ma (2018). An empirical analysis of journal policy effectiveness for computational reproducibility. *Proceedings of the National Academy of Sciences 115*(11), 2584–2589.

Tedersoo, L., R. Küngas, E. Oras, K. Köster, H. Eenmaa, Ä. Leijen, M. Pedaste, M. Raju, A. Astapova, H. Lukner, et al. (2021). Data sharing practices and data availability upon request differ across scientific disciplines. *Scientific data 8*(1), 192.

Tol, R. S. (2019). Special issue on replication. *Energy Economics 82*, 1–3. Replication in Energy Economics.

Vilhuber, L. (2020). Reproducibility and replicability in economics. *Harvard Data Science Review 2*(4), 1–39.

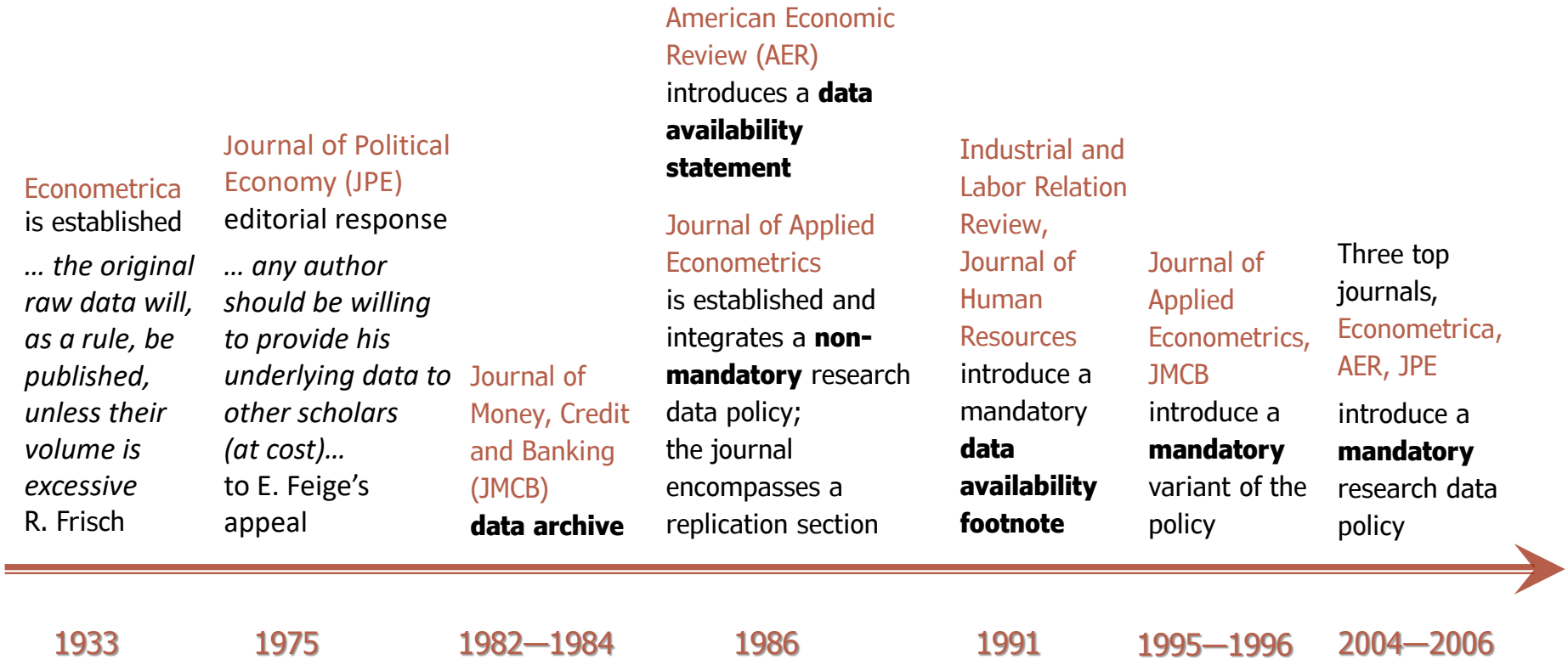
Vlaeminck, S. (2013). Data management in scholarly journals and possible roles for libraries–some insights from EDaWaX. *Liber Quarterly 23*(1), 48–79.

Vlaeminck, S. and L.-K. Herrmann (2015). Data policies and data archives: A new paradigm for academic publishing in economic sciences? In B. Schmidt and M. Dobreva (Eds.), *New Avenues for Electronic Publishing in the Age of Infinite Collections and Citizen Science. Proceedings of the 19th International Conference on Electronic Publishing*, pp. 145–155. IOS Press, Amsterdam.

Zenk-Möltgen, W., E. Akdeniz, A. Katsanidou, V. Naßhoven, and E. Balaban (2018). Factors influencing the data sharing behavior of researchers in sociology and political science. *Journal of documentation 74*(5), 1053–1073.

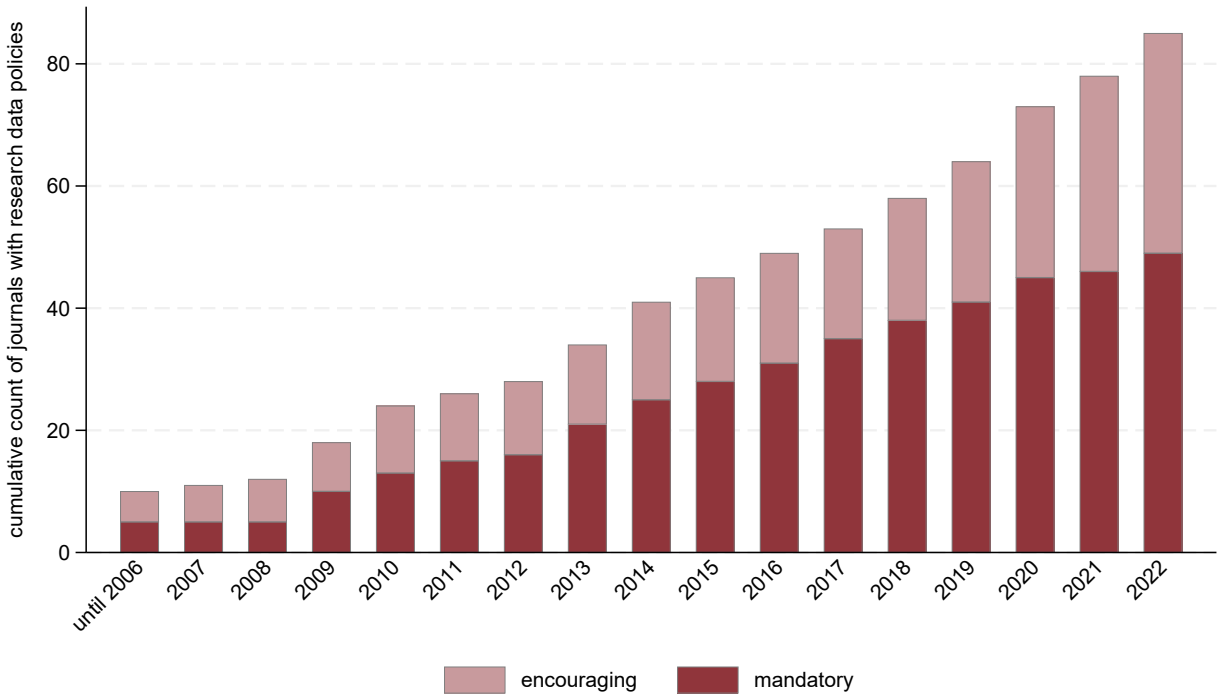
Zenk-Möltgen, W. and G. Lepthien (2014). Data sharing in sociology journals. *Online Information Review 38*(6), 709–722.

Figures and Tables



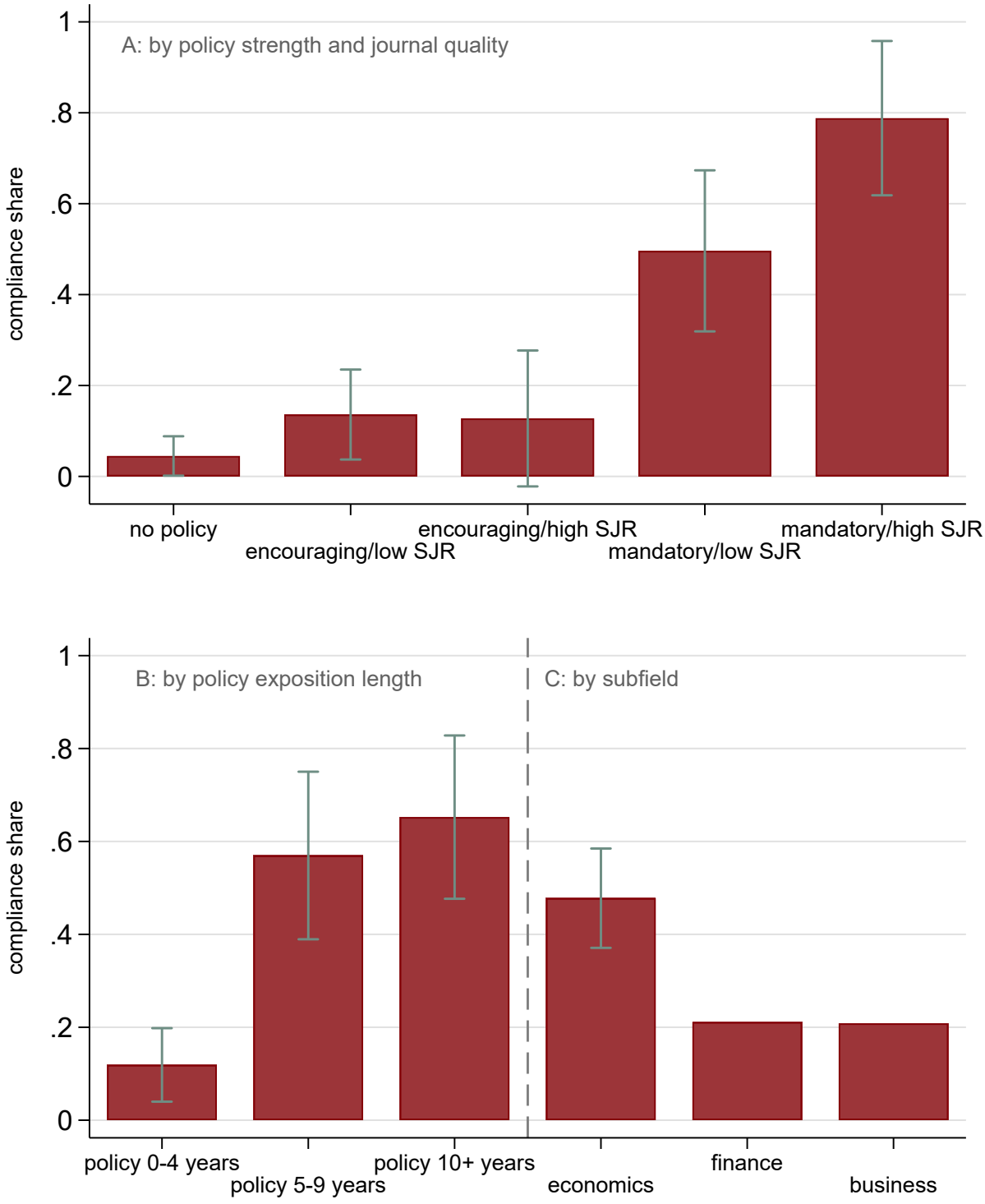
Notes: Self-depiction based on compiled information from variety of sources. See discussion in Section 2.

Figure 1: Timeline of historical milestones of research data policies (1933–2006)



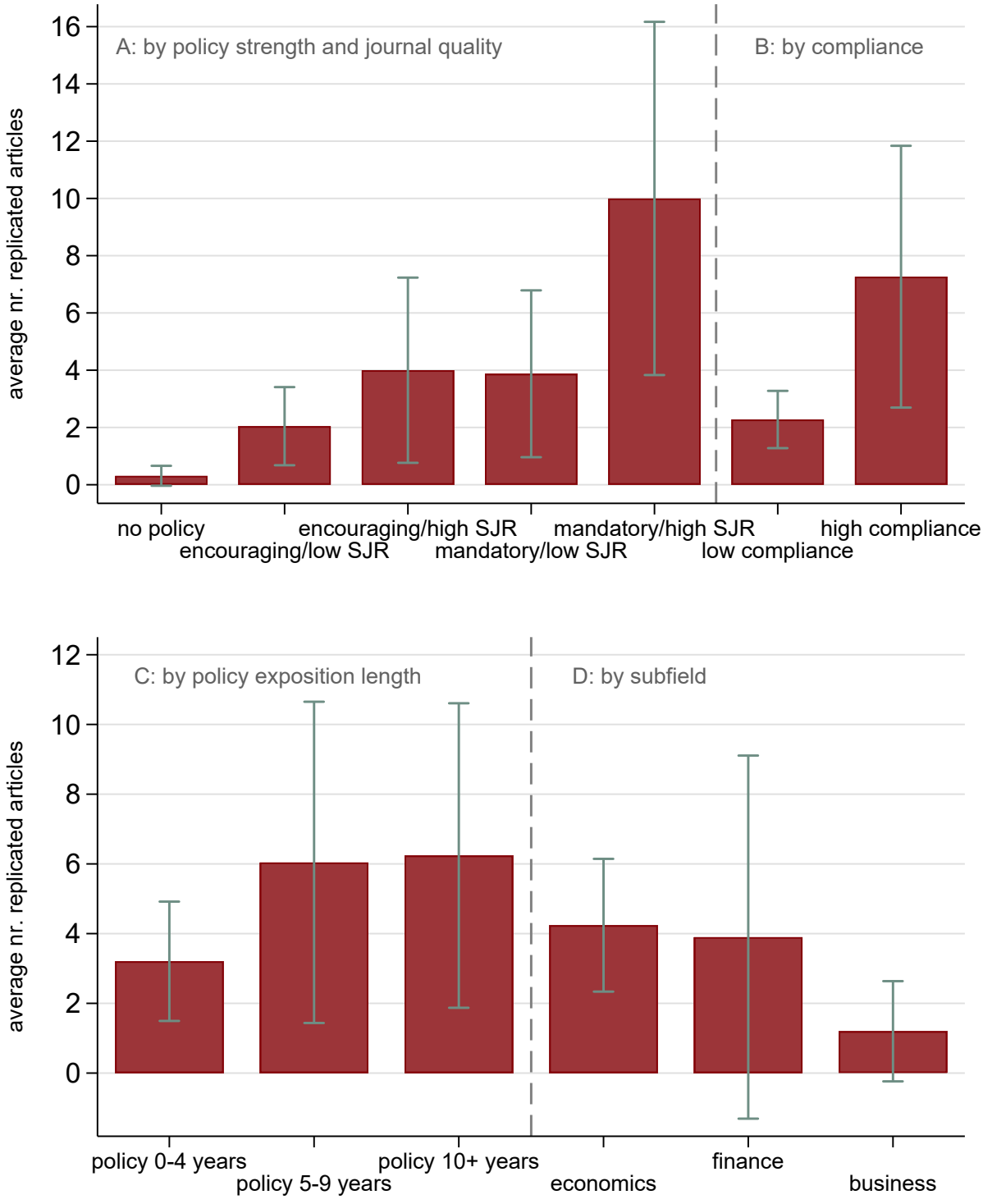
Notes: Self-depiction of self-collected data on research data policies adoption over 2007–2022. Policy introduction years are collected from various sources (see Table 2). No journal has discontinued or weakened their policies after adopting or strengthening them.

Figure 2: Cumulative adoption of research data policies by economic journals



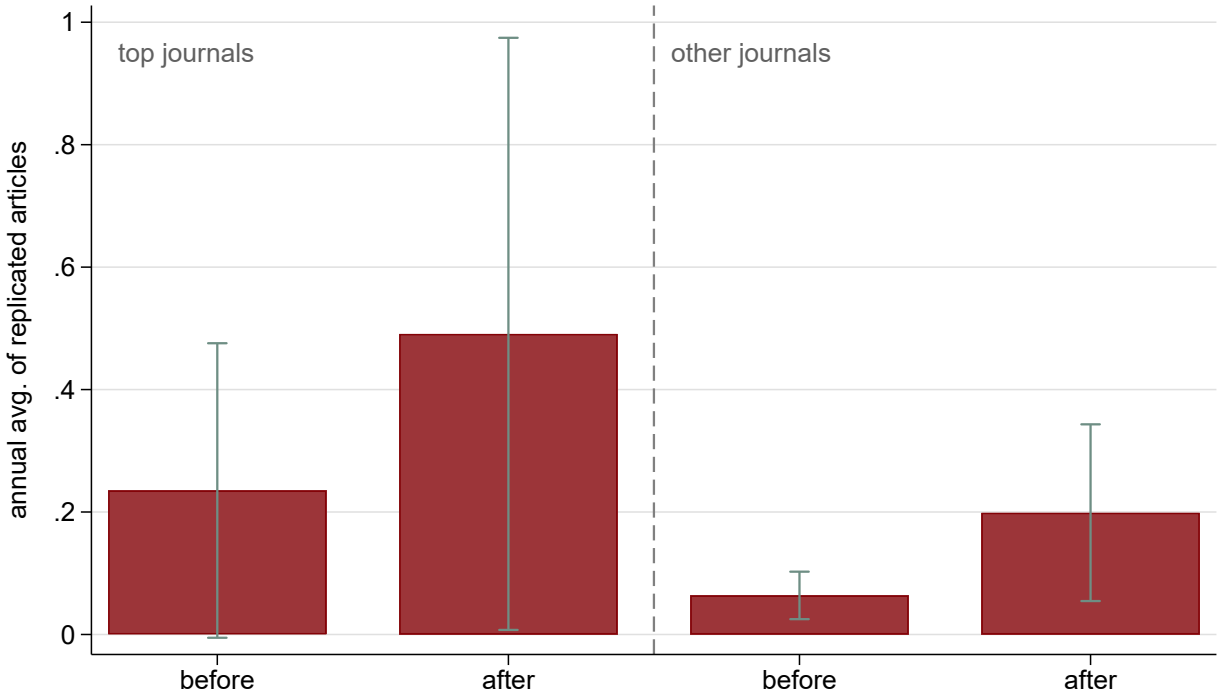
Notes: Compliance refers the share of empirical articles with available research data to all empirical articles published in the first issue of the 2022 volume of each journal (see discussion in Section 3). We do not plot whiskers for the finance and business subfields as they are excessively long. Except for the first bar in Panel A (no policy), all bar plots include only journals with a policy.

Figure 3: Journals' compliance with research data policies by different categories



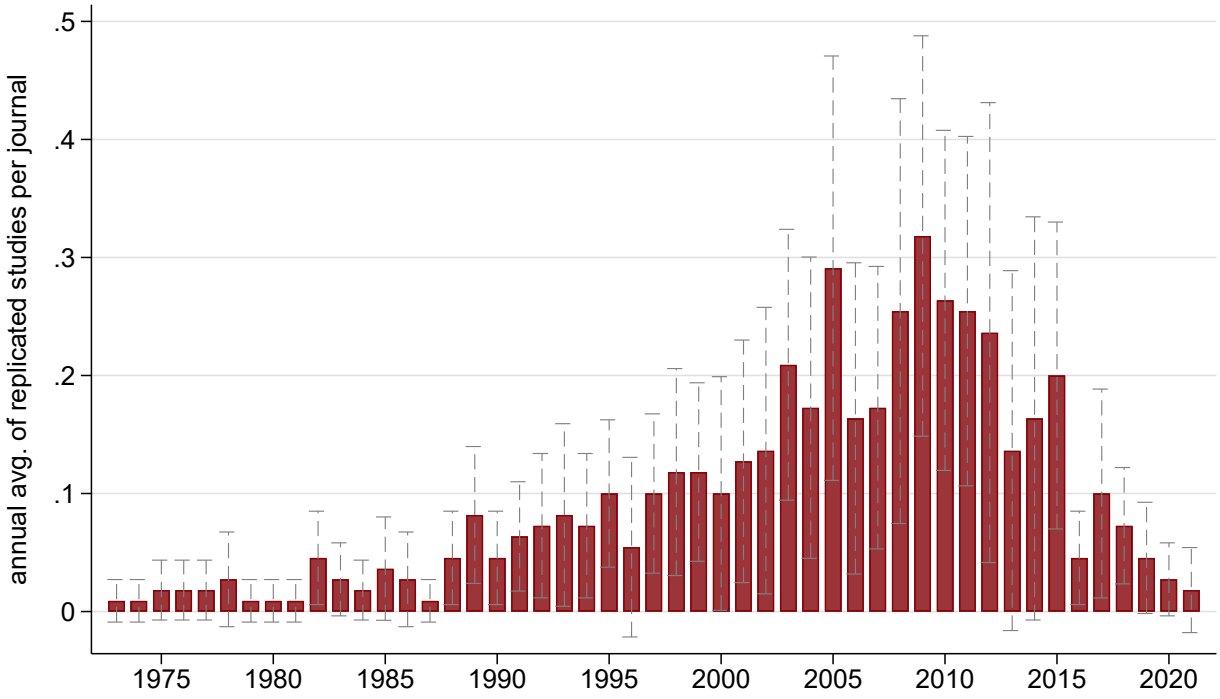
Notes: Replicated articles published over 1975--2021 based on a database of their published replications (https://replicationnetwork.com/replication-studies/; last accessed in December 2023). Each average is equal to the average number of replicated articles from all journals belonging to the underlying category. The figure excludes *American Economic Review* as it causes the whiskers to be excessively long. The high SJR category includes journals with an above-average SJR index. High compliance covers cases in which compliance share is larger than 50%.

Figure 4: Average number of replicated articles in journals of different categories



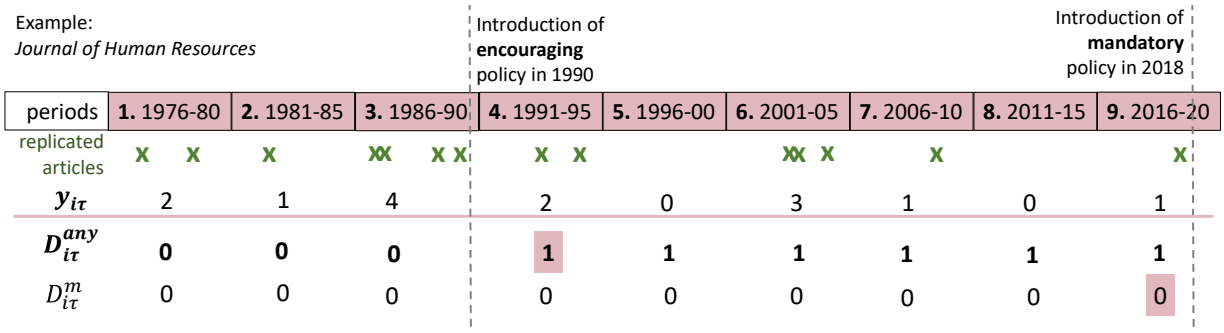
Notes: Replicated articles published over 1975-–2021 based on a database of their published replications (https://replicationnetwork.com/replication-studies/; last accessed in December 2023). The top journals category is comprised of 11 journals: the top five economic journals (except *American Economic Review* due to being a large outlier in the number of replicated articles), *Management Science*, *Marketing Science*, *Journal of Finance*, *Review of Financial Studies*, *Journal of Financial Economics*, *Nature* and *Science*. Thirty-four journals that adopted a mandatory policy in 2021 at the latest without a top recognition make up the other journals category.

Figure 5: Replicated studies by policy threshold and top recognition



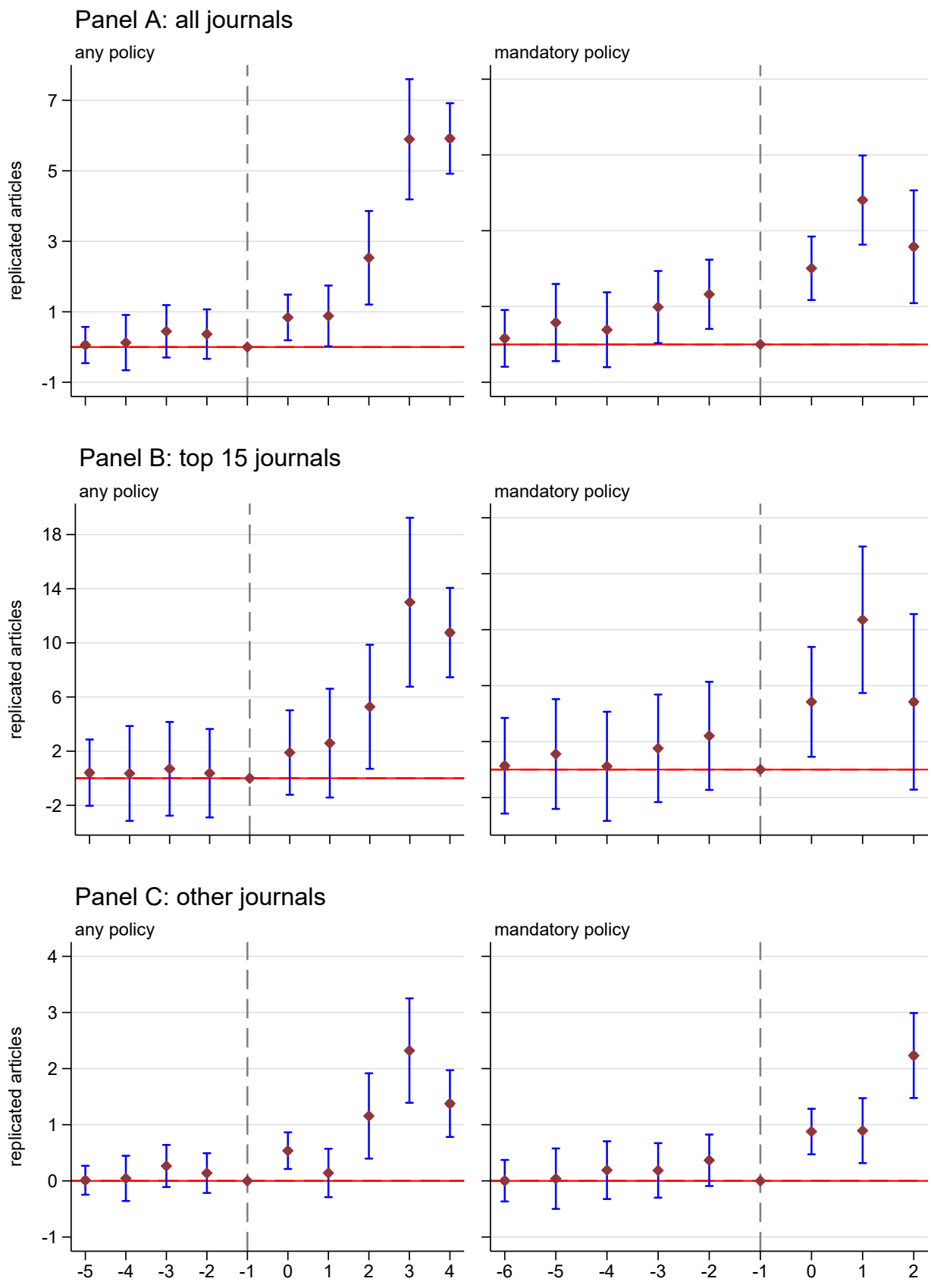
Notes: Replicated articles published over 1973–2021 based on a database of their published replications (https://replicationnetwork.com/replication-studies/; last accessed in December 2023).

Figure 6: Average replicated studies per journal and year



Notes: *Journal of Human Resources* is used here to visualize the building of our outcome variable, number of replicated articles per period $y_{i\tau}$, and policy dummies $D_{i\tau}^{any}$, $D_{i\tau}^{m}$. Replicated articles are based on the database of their published replications (https://replicationnetwork.com/replication-studies/; last accessed in December 2023). Policy dummies are based on our self-collected database of policy introduction years (see Table 2).

Figure 7: Construction of outcome variable and policy dummies



Notes: Whiskers denote 95% confidence intervals.

Figure 8: Event analysis of research data policy on replicated articles

Table 1: Wording of the research data policies in the journals' guidelines

encouraging	*journal* **disseminates** ...
policy	**we encourage** research data to be archived ...
	journal **encourages and enables** you to share ...
	authors of accepted papers are **encouraged to submit** ...
	authors will normally be **expected to submit** ...
	authors **are expected** to make available ...
	journal **strongly encourages** authors to submit ...
mandating	authors of accepted papers that contain empirical work, simulations, or experimental
policy	work **must provide** ... prior to publication
	all *journal* authors **are required to provide** their data ... after their paper has been accepted
	journal **editors require** that all authors submit
	This journal **requires and enables** you to share data
subject matter	always: data set(s);
	but also: software, programs/codes, information on empirical analysis, experiments, algorithms, simulations, models, protocols, methods, electronic multimedia files
	general formulation: other details of the computations sufficient to permit replication; anything which supports your paper
location	on the *journal* **website**
	accessed through the 'supplementary **data' link**
	deposited in a **public repository**
	in a recognized data repository with a persistent **digital identifier**
exemptions	... for reasons of security or confidentiality exceptions **may be granted**
	should not submit ... if publication would breach the rights of a third party
	if you are not able to provide the files, ... **editors can consider** your request and decide
	data should only be shared if it is ethically correct to do so
	... may be made at the **discretion of the handling editor**
	... should submit only where ethically feasible
	unless there are good reasons (confidentiality or excessive size) for not doing so

Notes: Wording variants across economic journals' encouraging or mandating research data policies.

Table 2: Research data policy introduction years across economic journals (85)

Journal [established]	Introduction year encouraging	mandatory	Policy introduction year: source
Journal of Political Economy [1892]	1975	2006	Feige (1975), journal front matter
Journal of Money, Credit and Banking [1969]	1982	1996	Dewald et al. (1986) and McCullough et al. (2006)
Journal of Applied Econometrics [1986]	1986	1995	changes in journal front matter
American Economic Review [1911]	1986	2005	Ashenfelter et al. (1986) and Bernanke (2004)
Industrial and Labor Relations Review [1947]	1990	2018	Hamermesh (2007), survey 2
Journal of Human Resources [1965]	1990	2018	Hamermesh (2007), journal front matter
Studies in Nonlinear Dynamics and Econometrics [1996]	2002		presence of data/code since
Econometrica [1931]		2005	change in journal back matter
Journal of Development Economics [1974]	2005	2013	survey
Review of Economic Studies [1933]	2006	2019	survey
Empirical Economics [1976]	2007		first replication data: Baltagi and Wang (2007)
Canadian Journal of Economics [1967]	2008	2020	journal website
Journal of Labor Economics [1983]		2009	AEA Data availability policy since 2009
AEJ: Applied Economics [2009]		2009	Since inception: AEA Journal
AEJ: Economic Policy [2009]		2009	Since inception: AEA Journal
AEJ: Macroeconomics [2009]		2009	Since inception: AEA Journal
AEJ: Microeconomics [2009]		2009	Since inception: AEA Journal
International Economic Review [1960]	2009	2022	journal website
American Journal of Agricultural Economics [1919]	2010		presence of data/code since, survey 2
CESifo Economic Studies [1955]	2010		survey
Economic Record [1925]		2010	survey
Proceedings of the National Academy of Sciences of the USA [1915]		2010	presence of data/code since
Quantitative Economics [2010]	2010	2011	survey
Review of Economics and Statistics [1919]		2010	survey 2
Journal of Economic Dynamics and Control [1979]	2011		presence of data/code since
Science [1880]		2011	Stodden et al. (2018)
Experimental Economics [1998]		2012	presence of data/code since
Journal of Business and Economic Statistics [1983]	2012		presence of data/code since
Energy Economics [1979]		2013	Tol (2019), survey 2
European Economic Review [1969]		2013	presence of data/code since, survey 2
Journal of Accounting Research [1963]	2013		journal website: online supplements and datasets
Management Science [1954]	2013	2019	Beugelsdijk et al. (2020) and journal website
Marketing Science [1989]		2013	Desai (2013)
Nature [1869]		2013	Nature (2014)

Table 2: Research data policy introduction years across economic journals (85), continued

Journal [established]	Introduction year encouraging	mandatory	Policy introduction year: source
Econometrics Journal [1998]		2014	presence of data/code since
Jahrbücher für Nationalökonomie und Statistik [1863]	2014	2017	survey
Brookings Papers on Economic Activity [1970]		2014	survey
Applied Economics [1969]	2014		presence of data/code since
Journal of the European Economic Association [2003]		2014	presence of data/code since, survey 2
Economic Journal [1891]		2014	presence of data/code since, survey 2
Ecological Economics [1989]	2014		presence of data/code since
Economic Policy [1985]		2015	presence of data/code since
Explorations in Economic History [1963]	2015		presence of data/code since
Journal of Law and Economics [1958]		2015	presence of data/code since
International Organization [1947]		2015	survey
Review of Financial Studies [1988]	2016	2020	survey
Quarterly Journal of Economics [1886]		2016	Christensen and Miguel (2018)
Journal of Finance [1946]		2016	survey
Journal of the American Statistical Association [1888]		2016	journal website
Journal of the Association of Environmental and Resource Economists [2014]		2017	survey
Journal of Economic Growth [1996]		2017	presence of data/code since, survey 2
Journal of Law, Economics and Organization [1985]		2017	presence of data/code since
Journal of Marketing Research [1964]	2017	2023	first data in a repository, survey 2
Journal of Environmental Economics and Management [1974]		2018	presence of data/code since
Journal of Health Economics [1982]	2018		presence of data/code since
Review of Finance [2003]	2018	2022	website & presence of data/code since, survey 2
International Journal of Forecasting [1985]	2018	2023	presence of data/code since, survey 2
Journal of Public Economics [1972]	2018		presence of data/code since
Australian Economic Review [1968]		2019	journal website
Energy Policy [1973]	2019		presence of data/code since
Journal of Consumer Research [1974]	2019		presence of data/code since, survey 2
Journal of Econometrics [1973]	2019		presence of data/code since
Journal of Public Policy and Marketing [1979]	2019		presence of data/code since, survey 2
Organizational Behavior and Human Decision Processes [1966]	2019		presence of data/code since

Table 2: Research data policy introduction years across economic journals (85), continued

Journal [established]	Introduction year encouraging	mandatory	Policy introduction year: source
Economics – The Open Access Journal [2006]	2020		survey 2
Games and Economic Behavior [1989]		2020	presence of data/code since, survey 2
Health Economics [1992]	2020		presence of "open research" section, survey 2
Journal of Accounting and Economics [1979]	2020		presence of data/code since, survey 2
Journal of Economic Theory [1968]	2020		presence of data/code since, survey 2
Journal of International Economics [1971]		2020	presence of data/code since, survey 2
Journal of Monetary Economics [1975]	2020		presence of data/code since, survey 2
Journal of Urban Economics [1974]	2020		presence of data/code since, survey 2
World Development [1973]	2020		presence of data/code since, survey 2
Business Research [2008]	2021		presence of data/code since
Journal of Financial Intermediation [1990]	2021		presence of data/code since, survey 2
Journal of Financial Economics [1974]		2021	presence of data/code since
Journal of International Business Studies [1970]	2021		Beugelsdijk et al. (2020)
Journal of Marketing [1936]	2021		Chandy et al. (2021)
British Journal of Industrial Relations [1963]	2022		change in the policy between 2021/22
Journal of Industrial Economics [1952]	2022		earliest change in policy from web.archive.org
Journal of International Marketing [1993]	2022		change in the policy between 2021/22
Journal of the Operational Research Society [1950]	2022		journal website
Public Choice [1966]	2022		presence of "data availability statements"
Review of Asset Pricing Studies [2011]		2022	explicitly stated in the policy
Structural Equation Modeling [1994]	2022		change in the policy between 2021/22

Notes: This table lists the 85 journals we find to have a research data policy in place by the end of 2022. Journal establishment years are in brackets. The journals are ordered chronologically by the year of their first policy introduction. Of the 85 policy journals, 36 introduced encouraging policies, 33 switched from no policy directly to mandatory policies, and 16 adopted mandatory policies with an intermediary, encouraging policy, step. Highlighted in bold are the top 15 journals in the field of economics: top five, and top two of finance, marketing, management, and accounting, *Science*, and *Nature*. *International Journal of Forecasting* and *Journal of Marketing Research* declared a switch to a mandatory policy in 2023, in the course of survey 2. We incorporate this into the overview table, but we do not provide a full account of 2023 changes in research data policies across all journals. Above the horizontal dashed line are journals (49) that adopted any policy (encouraging or mandatory) until 2016. These journals have a nonzero policy dummy in at least one period of our period-journal panel framework.

Table 3: No policy journals (25)

Journal [established]	Alternative
Accounting Review [1926]	reporting guidelines
American Journal of Public Health [1911]	registration
Auditing: A Journal of Practice and Theory [1981]	reporting guidelines
Behavioral Research in Accounting [1990]	reporting guidelines
Cambridge Journal of Economics [1977]	supplementary material
Entrepreneurship Theory and Practice [1976]	supplementary material
European Accounting Review [1992]	supplementary material
Geneva Papers on Risk and Insurance: Issues and Practice [1976]	*no mention*
Jahrbuch für Wirtschaftswissenschaften / Review of Economics [1950]	on request
Journal of Asset Management [2001]	*no mention*
Journal of Consumer Psychology [1992]	on request
Journal of Financial and Quantitative Analysis [1966]	*no mention*
Journal of International Accounting Research [2002]	reporting guidelines
Journal of Management [1975]	on request
Journal of Management Accounting Research [1989]	reporting guidelines
Journal of Real Estate Research [1986]	*no mention*
Journal of the Academy of Marketing Science [1973]	reporting guidelines
Journal of the American Taxation Association [1979]	reporting guidelines
Land Economics [1925]	on request
Oxford Review of Economic Policy [1985]	supplementary material
RAND Journal of Economics [1970]	scientific conduct
Review of Corporate Finance Studies [2012]	scientific conduct
Review of Environmental Economics and Policy [2007]	*no mention*
Southern Economic Journal [1933]	data appendix
Strategic Entrepreneurship Journal [2007]	*no mention*

Notes: This table lists 25 journals without any research data policy by the end of 2022. These journals are ordered alphabetically. Journal establishment years are in brackets. *Journal of Management* is highlighted in bold because it is a top 15 journal. The column *Alternative* reports a closest concept of research data or code handling by the journal:
on request: Authors should make their data files available upon request (to editors, or to any researchers).
data appendix: Authors should provide an appendix containing a complete description of all their data sources.
supplementary material: Supplementary material policy (i.e., additional tests, figures, robustness checks, data description, etc.).
reporting guidelines: Reporting guidelines for empirical results (decimal places, stars, degrees of freedom etc.). These are primarily journals from the American Accounting Association (AAA).
scientific conduct: Awareness to proper scientific conduct and principles of scientific ethics, etc.
registration: Only RCT registration is required for experimental studies.

Table 4: Descriptive regressions explaining policy compliance

	Policy dummies			Journal quality		Field
	(1)	(2)	(3)	(4)	(5)	(6)
Any policy	0.385***	0.088**		0.083*	0.074	0.035
	(0.053)	(0.044)		(0.046)	(0.046)	(0.045)
Mandatory policy		0.502***		0.471***	0.425***	0.393***
		(0.073)		(0.078)	(0.078)	(0.080)
Policy experience 0–4 years			0.074*			
			(0.044)			
Policy experience 5–9 years			0.525***			
			(0.089)			
Policy experience 10+ years			0.607***			
			(0.088)			
Top journal				0.158		
				(0.105)		
SJR index 2021					0.021***	0.025***
					(0.006)	(0.006)
Business / management						-0.112**
						(0.051)
Finance						-0.230**
						(0.096)
R^2	0.185	0.448	0.436	0.464	0.502	0.530

Notes: OLS regression. Dependent variable: research data policy compliance, i.e., the share of empirical articles accompanied by data and code, or by data exemption and code, in all empirical articles published by the first regular issue of the 2022 volume. The number of observations is 110. Robust standard errors in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Descriptive regressions explaining the number replicated articles

	Policy dummies			Compliance	Journal quality		Field	No AER
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any policy	6.226***	2.344***		2.071***	1.886**	1.202	0.137	1.111
	(1.822)	(0.663)		(0.784)	(0.946)	(1.074)	(1.310)	(0.861)
Mandatory policy		6.583**		4.047*	3.678**	0.604	-0.387	0.200
		(3.060)		(2.044)	(1.853)	(1.448)	(1.491)	(1.385)
Policy experience:								
0-4 years			2.894***					
			(0.854)					
5-9 years			5.731**					
			(2.220)					
10+ years			10.380**					
			(4.930)					
High compliance				4.371				
(share > 0.5)				(3.554)				
Top journal					14.642*			
					(7.828)			
SJR index 2021						1.629**	1.724**	1.032***
						(0.626)	(0.670)	(0.330)
Business /							-3.747**	-2.247**
management							(1.805)	(1.075)
Finance							-5.653	-2.441
							(3.554)	(2.022)
R^2	0.043	0.083	0.081	0.095	0.205	0.362	0.380	0.435

Notes: OLS regression. Dependent variable: total number of published replicated articles per journal until 2023 based on: https://replicationnetwork.com/replication-studies/. Except for column (8), the number of observations is 110. Robust standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Research data policy effect: Baseline regressions

	All journals, all periods		Excluding last period		Switch to M compared to NO	Switch to E compared to NO	Switch to M compared to E
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Any policy	1.138***	0.545*	2.003***	0.656*	2.023***	0.032	
	(0.253)	(0.308)	(0.347)	(0.391)	(0.616)	(0.116)	
Mandatory policy		1.236***		3.433***	0.025		1.885***
		(0.375)		(0.521)	(0.638)		(0.515)
Nr. periods	9	9	8	8	9	9	9
Nr. journals	110	110	108	108	92	79	49
Observations	798	798	688	688	649	580	367
R^2 overall	0.100	0.105	0.136	0.155	0.153	0.035	0.099
R^2 between	0.121	0.078	0.125	0.057	0.155	0.005	0.012

Notes: Random effect regression with period dummies. Dependent variable: count of replicated articles over five-year intervals between (1976–2020) per journal and period. We exclude the last period in columns (3) and (4) to demonstrate that the effect eventually becomes even stronger as the replication potential of more recent publications is not yet fully utilized. In column (5), we consider only journals that eventually adopted a mandatory policy (M); equivalently, in column (6) we consider only journals that eventually adopted an encouraging policy (E). In both cases, the control group is composed of the journals that never adopted any policy (NO). In the last column we report the mandatory policy effect when comparing to journals that adopted at some point an encouraging policy. Conventional standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Research data policy effect: Heterogeneity considerations

	Period		Policy compliance		Journal established	
	1976–1995	1996–2015	high	low	until 1976	after 1976
	(1)	(2)	(3)	(4)	(5)	(6)
Any policy	1.634***	0.067	1.803**	0.209	0.679*	-0.073
	(0.254)	(0.434)	(0.910)	(0.160)	(0.399)	(0.352)
Mandatory policy		2.657***	1.871**	0.515*	1.541***	1.053***
		(0.559)	(0.948)	(0.263)	(0.503)	(0.395)
Nr. periods	4	4	9	9	9	8
Nr. journals	85	108	31	79	62	48
Observations	294	394	211	587	558	240
R^2 overall	0.203	0.125	0.192	0.050	0.126	0.134
R^2 between	0.331	0.078	0.081	0.024	0.265	0.130

Notes: Random effect regression with period dummies. Dependent variable: count of replicated articles over five-year intervals per journal and period. In column (3), we report policy effects only for journals whose policy compliance in 2022 was more than 50% (see Section 3.2). Accordingly, in column (4), we report policy effect for journals whose policy compliance does not exceed 50%. Conventional standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Research data policy effect: Journal quality considerations

	Journal recognition		SJR average		Including	Top five	
	top 15	non-top	above	below	SJR index	journals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Any policy	2.929**	0.015	1.707**	0.017	0.770**	6.882**	
	(1.374)	(0.159)	(0.822)	(0.154)	(0.385)	(2.742)	
Mandatory policy	2.328	0.707***	0.915	0.894***	-0.039		9.334***
	(1.514)	(0.203)	(0.931)	(0.220)	(0.466)		(2.781)
Scimago Journal Rank					0.055		
					(0.044)		
Nr. periods	9	9	9	9	5	8	8
Nr. journals	15	95	40	70	108	5	5
Observations	128	670	283	515	478	40	40
R^2 overall	0.271	0.095	0.152	0.139	0.129	0.149	0.195
R^2 between	0.363	0.094	0.075	0.324	0.193	0.168	0.152

Notes: Random effect regression with period dummies. Dependent variable: count of replicated studies over five-year intervals per journal and period. In columns (1) and (2) we show the policy effect for the top 15 journals and remaining 95 journals separately. The columns (3) and (4) divide the journals by average SJR index from 1999–2021 into above average and below average. In column (5), we add time-varying SJR index into regression, but excluding the first four periods, during which the index did not exist. The last two columns consider only top five journals in economics over the period 1976–2015 (see discussion in Section 4). Conventional standard errors in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 9: Research data policy effect: Robustness analyses

	Baseline (RE)	FE	Tobit RE	Imputation approach		Moving averages
	(1)	(2)	(3)	(4)	(5)	(6)
Any policy	0.545*	0.073	1.700*	1.225		0.072**
	(0.308)	(0.329)	(0.916)	(0.937)		(0.029)
Mandatory policy	1.236***	1.394***	1.881*		1.428*	0.326***
	(0.375)	(0.394)	(1.013)		(0.798)	(0.036)
Nr. periods	9	9	9	9	9	41
Nr. journals	110	110	110	109	109	110
Observations	798	798	798	789	789	3,650
R^2 overall	0.105	0.083				0.102
R^2 between	0.078	0.041				0.063

Notes: Column (1) repeats the random effect regression with period dummies of Table 6 (column (2)). Column (2) shows the fixed effect regression, while column (3) shows the Tobit random effect regression. Columns (4) and (5) report the average treatment effects using the imputation approach of Borusyak et al. (2024) procedure with clustered standard errors on the journal level. In other columns we report conventional standard errors in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Online Appendix

A Two surveys for journal editors

In an effort to increase accuracy of the research data policy adoption years (Table 2), we run two surveys targeting editors where our preliminary assessment was approximated by the presence of research data next to the empirical papers. The first survey took place between mid November and mid December 2021 and went into more details of the policy at each journal. We approached 66 editors. We updated the policy adoption years whenever we have got a response. Furthermore in the late 2022 we repeatedly inspected all journal policy guidelines, front matters, or editorials. Due to the inability to find the policy timing from these sources coupled with non-response in the first survey, in May 2024 we run a second survey for journal editors. This time it was sufficient to approach 49 editors. Both surveys used the *surveyLAB* facilities at the University of Konstanz.[26] We indicate the use of information from the first (second) survey as "'survey (2)' in Table 2.

The primary intention of the first survey was to find out precise year of the policy introduction, or eventual strengthening. But we took the opportunity to ask few further questions related to exemptions, policy compliance, physical location of the research data, and the editors knowledge about the number of replicated papers from their journals. Having in mind the general high workload of journal editors, the survey was brief, encompassing only 6 questions. We show the full survey structure in Section A.1. Each survey question had a simple fill-in option and a possibility for an open answer to facilitate eventual free wording of editors' responses.

The response rate was low, from 66 editors only 13 answered the survey—leading to response rate of 20%.[27] Other social scientists were more successful. When in 2011 Gherghina and Katsanidou (2013) approached per email 102 journals regarding their research data policies, 45 journals responded. Even if we hoped for a higher participation, we gained useful insights related to handling of the policy in individual journals. For 11 journals we could compare the reported policy timing with our prior assessment. In these cases the policy timing differed by only a little, at most by +/- 2 years, thus reassuring our approximation strategy.

The main rationale to run the survey was to learn the precise timing of the research data policy directly from journal editors. But apparently, even journals themselves do not always keep track of changes in their editorial policies. In two cases editors openly admit:

> *I don't know when it came into effect. It predates my editorship.*
>
> *I don't know. It has been in effect for a long time.*

[26] https://www.soziologie.uni-konstanz.de/en/hinz/surveylab/

[27] Altogether 15 editors entered the survey, but useful responses came from 13 of them.

On the other end we encountered journals that gave either a clear answer on policy timing sometimes including a self-criticism. Following answer came from a journal data editor who thoroughly informed us on history and functioning of the policy at their journal:

> *Even though we have had a Data Availability Policy since YYYY, enforcement has only been formal until YYYY+13 when we started reviewing and verifying replication packages in detail. ... We currently do not grant blanket exemptions, only if there are no computational result in the paper (purely theoretical papers). This affects only about 10% of papers. ... Compliance was only minimally enforced, so it is hard to tell for the early years. Currently, compliance is a formal requirement of publication.*

Regarding the compliance, an editor of a journal with an encouraging research data policy self-critically remarked following:

> *The [compliance] share is lower than I would have expected. I am going to discuss with my coeditors whether we should strengthen the policy.*

For the second survey we further reduced the structure, targeting to learn only about the timing of the policy adoption and eventual strengthening. To make the task for editors even easier, we firstly introduced editors with our preliminary assessment upon the policy type and adoption year at their journal. Afterwards we asked them to approve it, to revise it, or to admit no knowledge of the details. Finally, we let them an open box to include a comment, if they wanted to. We show the general structure of the second survey in Section A.2.

Judging from the high response rate (53%), the format of the second survey clearly suit the editors much more than that of the first survey. From the 26 editors that responded, 12 agreed with our preliminary assessment and three admitted *"I do not know any details"*. In both instances we assume our preliminary assessment as valid. In 11 cases we have got a more detailed answer based on which we adapted or amended our preliminary assessment.

A.1 First Survey

Survey on Data and Replication policy for editors of academic journals

Dear Mr./Ms. _____,

We are approaching you as a current editor of the Journal of _____.

We are a team of researchers in the field of higher education from the University of Konstanz in Germany. Currently we are studying the trends of the **Data and Replication policies across academic journals**, i.e. policies encouraging or even mandating authors of empirical papers to make their data and code available upon publication.

From the information provided on the website of your journal, we identified that your journal does have a Data and Replication (D&R) policy in place. Below we would like **to pose you six questions** which would help us to understand more precisely specific issues related to the **policy introduction, strength of the policy, levels of policy compliance and replication incidence** at your journal. To elaborate on each question, you may fill the direct answers, use the open comments space, or both.

You are welcome to send the survey to another person who is more familiar with the issues underlying to the D&R policy at your journal. We kindly ask you to respond until _____.

Your individual link to the survey: _____

Thank you very much for your time to participate on the survey.

Thomas Hinz / Professor of Empirical Social Research with a Focus on Survey Research
& Katarina Zigova / Research Fellow at the QUANT Project
University of Konstanz, Germany
www.soziologie.uni-konstanz.de/en/hinz/research/research-projects

1) How strong is the Data and Replication policy and since when it is effective at your journal?
    a. The policy is encouraging, since _____
    b. The policy is mandated, since _____
    c. Open comments on policy strength and policy introduction year
2) If the policy is mandated at your journal, what is the share of granted exemptions among empirical papers?
    a. The share is ____% in the **first year** of the policy
    b. The share is ____% in the **first five years** of the policy
    c. Open comments on exemptions
3) If the policy is mandated at your journal, what is the share of non-compliance among empirical papers?
    a. The share of non-complying papers is ____% in the **first year** of the policy
    b. The share of non-complying papers is ____% in the **first five years** of the policy
    c. Open comments on non-compliance
4) If the policy is (or previously was) encouraging at your journal, what is the share of empirical papers which provide data and/or code post publication?
    a. The share is ____% in the **first year** of the policy
    b. The share is ____% in the **first five years** of the policy
    c. Open comments on incidence of providing data and/or code
5) How are authors of empirical papers supposed to publish the data and/or code
    a. At the journal website
    b. At an open repository (names): _____
    c. Other publishing options: _____
    d. Open comments on location of data and code
6) How many replications are you aware of since the policy is in place at your journal?
    a. From empirical papers published **during the first year** of the policy, _____ papers have been replicated.
    b. From empirical papers published **during the first five year** of the policy, _____ papers have been replicated.
    c. Open comments on replication incidence

A.2 Second Survey

Common intro

To: *Email* [editor's email]

Subject: Kind request: Research Data policy assessment at *Journal* [journal's name]

Dear *Name* [editor's name],

We are contacting you in your capacity as *Editor* of *Journal*. We are currently assessing **Research Data policies** across economic journals. Specifically, we are interested in the **strength of these policies**—whether they simply *encourage* authors to publish their data and code or require it as a condition of publication (i.e. having a *mandatory* character). Additionally, we aim to determine the **timing of the policy's introduction** and any subsequent strengthening over time.

For *Journal*, we have made the following preliminary assessment of the policy based on the information provided in your submission guidelines:

Type 1 letter

[for journals where we have preliminary assessment of both, policy type and timing]

i. Your policy is *Type*. [encouraging or mandatory]
We did this assessment based on information you provide in your guidelines:

Quote [quotation from the submission guidelines resolving the policy type]

ii. Based on the frequent inclusion of data and code or data statements, it appears that your journal introduced the policy in *Year*. [our preliminary guess for policy adoption year]

iii. . [if in i "mandatory" => ask whether it was encouraging or none before it]

We kindly ask you to confirm, revise, or comment on our assessment by selecting the appropriate option below:

Assessment correct

Or kindly provide a revision or add comments:

Revision	if you believe our assessment is fully or partly incorrect
Further comments	if you want to add further comments on the Research Data policy at *Journal*
I do not know	if you are not aware of any details regarding the policy strength and introduction timing at *Journal*

or, Type 2 letter

[for journals where we have preliminary assessment on policy type but none on timing]

i. Your policy is *Type*.

ii. We did this assessment based on information you provide in your guidelines:

Quote

We kindly ask you to add the year the policy was introduced and, if necessary, comment our assessment by using the options below:

We introduced our current Research Data policy in the year:	**Introduction year**
Further comments	if you want to add further comments on the Research Data policy at *Journal*
I do not know	if you are not aware of any details regarding the policy strength and introduction timing at *Journal*

Common close

Thank you for taking the time to review our assessment.

Thomas Hinz */ Professor of Empirical Social Research with a Focus on Survey Research, University of Konstanz, Germany; www.soziologie.uni-konstanz.de/en/hinz/research/research-projects*
Katarina Zigova */ Assistant Professor in Personnel Economics, University of Zurich, Switzerland https://www.business.uzh.ch/en/research/professorships/personneleconomics2.html*