Publish under Pressure – an Empirical Analysis of Academics' Strategic Behavior

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Abstract

The paper investigates the publishing behavior of economics' scholars. Promotion committees relying heavily on publication metrics cause publication pressure and subsequent strategic adaptions. The subjectively perceived publication pressure is heavily dependent on the academic rank and reaches its maximum at the assistant professors without tenure. Furthermore, academics' journal selection strategy and resilience concerning rejections are investigated. Unexpectedly, scholars at German "Excellence Universities" compared to other universities in German-speaking countries do not feel more burdened by the «publish or perish» need, nor do they differ with respect to their journal submission strategy and the resilience to having papers rejected.

Keywords: Publication pressure, academic career, tenure, journals, submission, Excellence Universities.

JEL-Codes: A11, A23, I23, J44, J45

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Acknowledgements:
We are grateful to Karlis Briviba, Deirdre McCloskey, Gerd Folkers, Allan Guggenbühl, Vanessa Kasties, Margit Osterloh, Alois Stutzer, and Arjo Klamer. In addition, we want to thank the participants of the Max-Planck-Institute for Tax Law and Public Finance VIII's Seminar, especially Kai Konrad, Ronnie Schöb and Joachim Weimann for great ideas and constructive feedback. Andre Briviba thanks the René and Susanne Braginsky Foundation for their support.

Declarations of interest:
We declare that this manuscript is original, has neither been published before, nor is it currently being considered for publication elsewhere. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. We wish to confirm that the authors declare no competing interests in either financial or non-financial form related to this work. The manuscript has been read and approved by all named authors.

I. Introduction

Anyone who wants to do a doctorate, achieve an assistant professorship, or aspire to a full professorship eventually, is expected to contribute to scholarly journals (Akerlof, 2020; Heckman & Mocktan, 2020; Osterloh & Frey, 2020). Scholars are induced to publish in international scientific journals considered to be leading in their discipline. In economics, these are often understood to pertain to the "Top Five". The possibility to publish in scientific journals is controlled by editors and reviewers whose assessment of a contribution is final (Hamermesh, 1994; Medoff, 2003; Card & DellaVigna, 2020; Briviba & Frey, 2023). Publication in these leading international journals is not only strongly time-consuming but also very difficult; the rejection rate is high (Conley & Önder, 2014), especially for outsiders. Clubs and networks also play a role (Colussi, 2018; Carrell et al., 2022).

In contrast to approaches measuring publication pressure, such as implemented by Haven et al. (2019), we additionally investigate the extent to which these conditions influence the behavior of scholars in economics and business studies. An extensive survey of university scholars at different stages of their academic careers (doctoral students, post-doctoral students, assistant professors without and with tenure, permanently employed full professors) was conducted in three countries, Germany, Austria, and (German-speaking) Switzerland. The data serve to understand how decisions during the publication process take place and how researchers react to different circumstances. We most importantly analyze how strongly publication pressure is subjectively felt and what its determinants are. Moreover, we study the reactions regarding paper submissions to scholarly journals and the resilience to rejections of submitted manuscripts.

The results of our empirical analysis of the 558 respondents show that post-doctoral students and assistant professors without tenure subjectively feel an urgent pressure to publish in academic journals. The very high proportions among these groups suggest that there exists intensive publication pressure for scholars starting to engage in an academic career. This feeling nowadays applies to some extent even to doctoral students. The pressure to publish across academic positions mimics an inverted U-shape as it increases from being a doctoral student and is highest for assistant professors without tenure and then falls when tenure has been achieved.

The ideal procedure of first engaging in research and to choose a journal later is still prominent among all academic scholars. The extent of subjectively felt publication pressure does not seem to play a role. Nevertheless, one-quarter of assistant professors first want to find out what journal would be suitable to publish in and only thereafter focus on the corresponding research to be undertaken. This implies a strategic adaptation during the most crucial time of an academic career due to the publication requirements for obtaining tenure. Economists employ the strategy of first choosing a journal more often than do business economists. Economists also are more prepared to resubmit a paper more often after a previous rejection than are researchers in business.

Scholars at German "Excellence Universities" do not feel more burdened by the «publish or perish» situation than are scholars at other universities, nor do they differ regarding their journal submission strategy and the resilience to having papers rejected. Administratively determined «excellence» does not seem to have a strong impact on academia with respect to publications.

Section II provides an overview of the existing literature on the subject. The following section III describes the methodological approach to the survey. The theoretical hypotheses are developed in section IV. The following section contains the analyses and results, which are presented in section V. The final section VI puts the results into a larger context.

II. Related Literature

The organization and functioning of science at universities is the subject of a large number of contributions, including in the field of economics (e.g. Colander & Kramer, 1987; Hamermesh, 2013, 2015; Stock & Siegfried, 2014; Lanteri & Vromen, 2014; Haucap & Muck, 2015; Osterloh & Frey, 2020; Harvey & Hirshleifer, 2020; Kasy, 2021; Briviba & Frey, 2023; Zantout et al., forthcoming). For some time now, in addition to detailed presentations and discussions (e.g., Harley et al., 2004; Stock & Siegfried, 2014; Haucap et al., 2021), various authors have come down hard on the publishing system prevailing in economics. Hirshleifer (2014) states that the reviewers' reputation-building incentives may suppress innovative research (see evidence in Hadavand et al., 2020). A shortcoming is the increased number of revisions, robustness checks, and extensions, leading to "extensive reviewing". "[…] for many researchers, the only research questions and

projects that appear viable are those that can meet the demands of scoring well in terms of metric performance indicators […] in relatively short amount of time". (Müller & de Rijcke, 2017, p. 165). Nobel laureate James Heckman also harshly criticizes this situation: The existing system "incentivizes careerism rather than creative scholarship" and is a "tyranny" (Heckman & Moktan, 2020, p. 464). It has, for instance, been pointed out that Nobel Prize winner William Vickrey published his contributions in "obscure" journals (Colander, 2014, p. 156). According to Harvey (2017, p. 1434) there is a "[…] proliferation of papers that are technically well executed but that advance our knowledge only marginally". According to Zanout et al. (forthcoming), the same hold for economics, though to a somewhat smaller degree than in finance (see also Ghoshal, 2005; Adler & Harzing, 2009; Andrew et al., 2020; Reed et al., 2021). Hopwood (2007) points out that the existing individual careerism encourages "conservatism and conformity" (see Starbuck (2007) in organization studies and Alvesson and Sandberg (2013) for the negative consequences of gap-spotting research). Similar views about the system have been uttered in Europe. For example, the journal Horizonte of the government Swiss Council of Science and Humanities states (Hochstrasser, 2021, p. 14): "Those who do not publish their research do not exist", and describe this as a "merciless law" and "absurdity".

Nobel Prize laureate Akerlof (2020, p. 411, 409) emphasizes in an important contribution: "The market for academic research which is the economics journals, leaves researchers with no choice but to foresee the dictates of the editors and referees" and "... tenure and promotion committees are increasingly relying upon journal metrics to make decisions, with the number of "Top Five" publications given particular weight". The "leading scientific journals" are clearly defined for the discipline of economics: *American Economic Review, Quarterly Journal of Economics, Journal of Political Economy, Econometrica* and *Review of Economic Studies* (Card & DellaVigna, 2013; Hamermesh, 2013). Anyone who publishes in one of these five journals strongly promotes his or her academic career. In the United States, the probability of those with one such publication to get tenure increases by 80 per cent, and the chances of those who have two such publications increase by as much as 230 percent, always compared to those individuals who have the same number of publications in scientific journals outside the "Top Five" (Heckman & Mocktan, 2020). For this reason, there is a strong incentive for those who want to pursue an academic career to publish in such leading international journals.

As empirically shown (Ellison, 2002a, 2002b; Cotton, 2013), the publication process in economics has slowed down over time. Many months, if not years, pass between the first submission, various revisions, and final acceptance. This delay is very stressful for young scholars who want to pursue an academic career because their employment conditions are quite precarious and often extend over only three or perhaps four years. Accordingly, they have to decide whether to submit an article to one of the top journals where a decision is slow and the probability of acceptance is low or whether it is better to submit to a less well-regarded journal, but where the decision is expected to be faster, and the probability of acceptance is higher.

III. Data and Survey Methodology

To investigate the perspectives of academics in the field of economics and business administration regarding the publication process, a survey was considered most suitable. One major reason is the difficulty of obtaining information from journals or publishers, mainly based on an unwillingness to provide corresponding data for scientific purposes. For instance, the PEERE initiative ceased to exist recently. Its goal was to improve the transparency and accessibility of data about the scientific peer-review process. Our survey was sent out to economics and business administration academics employed at a university between 11 October 2021 and 30 November 2021. Our geographical region of interest is the German-speaking region (Germany, Austria, and the German-speaking part of Switzerland). After excluding all technological and pedagogical universities, our sample of universities consists of all remaining universities in Austria (6) and Switzerland (6). For Germany, all eight so-called "Exzellenz Universitäten" (excellence universities) were selected along with eight randomly chosen universities as a comparison group. This comparison was implemented to investigate the potential differences between these groups of universities.

In total, our sample consists of 26 universities[1]. Among the universities, economics and business administration faculties were differentiated and received - with one exception -

[1] The Excellence Universities are Rheinische Friedrich Wilhelm University Bonn, Free University of Berlin and Humboldt University of Berlin, University of Hamburg, Ruprecht Karl University of Heidelberg, University of Constance, Ludwig Maximilian University Munich, Eberhard Karl University of Tübingen. The two universities in Berlin that have joined together to form an excellence network are treated separately; the other universities in Germany included in our sample are University of Bochum, Duisburg-Essen, Rostock, Bayreuth, Passau, Kassel, Magdeburg, and Ulm. The Swiss universities in our sample are the

the same questions in the survey. Only one question was slightly modified due to the particularity of the Top Five journals in economics (the survey questions are shown in the Appendix). A further reason for the differentiation between economics and business studies are the varying standards and customs, also with respect to publishing.

In order to qualify for the survey, an academic in the sample must hold either a doctoral, post-doctoral, assistant professor or full professor position at a university. While professors are usually labelled clearly on university websites, the same does not hold true for doctoral and post-doctoral academics. Therefore, the sample of academics was restricted to the positions ex-ante, whenever the university website labelled the positions in a clearly identifiable way. However, some universities would list all their staff, which are not employed as professors as "scientific employees". In these cases, everyone was included, and the correct identification of a position relies on truthful self-reporting of the respective position in the survey. However, the differentiation by the respective academic titles allowed us to ensure approximate conformity. The sample was then accurately filtered ex-post. The detailed sample is depicted in Table I. A further criterion to complete the survey was the necessity of having at least one scientific publication.

Table I. Sample of all invited academics vs. sample of all valid responses. Percentages by country are reported in paratheses

		Gender			Discipline	
Country	N	Females	Males	No answer	Business	Economics
Invited						
Total	4166	1542	2624	.	2264	1902
	(100.00)	(37.01)	(62.99)		(54.34)	(45.66)
Austria	1515	617	898	.	947	568
	(100.00)	(40.73)	(59.27)		(62.51)	(37.49)
Switzerland	826	285	541	.	326	500
	(100.00)	(34.50)	(65.50)		(39.47)	(60.53)
Germany	1825	640	1185	.	991	834
	(100.00)	(35.07)	(64.93)		(54.30)	(45.70)
Responded						
Total	558	157	394	7	270	288
	(100.00)	(28.14)	(70.61)	(1.25)	(48.39)	(51.61)
Austria	224	79	143	2	130	94
	(100.00)	(35.27)	(63.84)	(0.89)	(58.04)	(41.96)
Switzerland	134	31	101	2	52	82
	(100.00)	(23.13)	(75.37)	(1.49)	(38.81)	(61.19)
Germany	200	47	150	3	88	112
	(100.00)	(23.50)	(75.00)	(1.50)	(44.00)	(56.00)

following: University of Zurich, Bern, Fribourg, Luzern, St. Gallen, and Basel. The University of Graz, Innsbruck, Krems, Klagenfurt, Linz, Wien, as well as the WU Wien are located in Austria.

The survey was designed for academics in the German-speaking region and was constructed on the platform SoSci Scientific Survey. This platform is established in the scientific community for this purpose and has been widely used for comparable endeavors (Leiner, 2019; Sieweke et al., 2014). The participants could choose to answer the survey in either German or English. 27 percent chose to answer the survey in English. After executing a pretest, the number of questions was restricted to 8 questions and 5 demographic questions.

Overall, 4,166 surveys were sent to the doctoral students, post-doctoral students, assistant professors without and assistant professors with tenure, and professors. The invitation included a personalized invitation link to rule out the possibility of multiple responses from the same person. In addition, a reminder was sent one week later (following Dillman, 2000). The survey was available for two weeks, from 1 December 2021 to 15 December 2021. After excluding non-deliverable emails and the cases of longer parental leave or non-availability of academics, the adjusted overall response rate is 14 percent (calculated in accordance with Kent & Brandal, 2003). Reasons for non-availability were parental leave, holidays, and absence due to illness. In comparison to response rates of online surveys, this outcome is typical (Sauermann & Roach, 2013).

i. Sample description

Table I illustrates the composition of invited academics and the actual respondents. This allows us to approximately confirm the representativeness of our sample with the population of academics. The different response rates across countries, ranging from 11% to 16%, are not substantial. They might be due to varying schedules of academics concerning exams, coursework, and other duties across the three countries. Lundberg and Stearns (2019) investigate the share of women in US elite economics departments over time. In 2017, the share of female PhDs was slightly above 30%, while the share of female assistant and associate professors was around 23%. In line are the results from Friebel et al. (2021), where they report a share of females in the economics departments across Germany of 29.2%. In addition, they report a similar share of women in academia in Austria and the German-speaking part of Switzerland. As such, the total share of female respondents in our sample, 28%, seems to reflect well the actual distribution in academia.

Comparing the response rates by discipline, the differences between business, 12%, and economics, 15%, are small.

Table II offers information about the composition of career positions in our sample. Overall, 558 academics responded fully to the survey. In contrast to our sample, the share of doctoral students at Germany's economics faculties is about 50% (Friebel et al., 2021). However, due to the requirement of having published at least one paper in a scientific journal, the share of doctoral students eligible for the survey decreases significantly.

Table II. Academic positions among valid responses. Percentages of the total are reported in paratheses

Country	N	Doctoral Student	Post-Doctoral Student	Ass. Prof. without tenure	Ass. Prof. with tenure	Professor
Total	558 (100.00)	104 (100.00)	112 (100.00)	50 (100.00)	60 (100.00)	232 (100.00)
Austria	224 (40.14)	33 (31.73)	38 (33.93)	26 (52.00)	38 (63.33)	89 (38.36)
Switzerland	134 (24.01)	21 (20.19)	35 (31.25)	6 (12.00)	14 (23.33)	58 (25.00)
Germany	200 (35.84)	50 (48.08)	39 (34.82)	18 (36.00)	8 (13.33)	85 (36.64)

ii. Methodology

To determine the influence of the independent variables on publication pressure, the journal selection strategy and the resilience of academics, we apply an ordinary least squares (OLS) regression strategy. The regressions are computed using Stata 17, controlling for robust standard errors. To further control for robustness, regressions where outliers with a Cook's Distance greater than one were excluded, and remaining observations are iteratively weighed according to their residuals up to predefined tolerance. However, the results change to such a small degree that those regressions are not reported.

All independent variables are dummy variables, and concerning the academic positions, participants of our survey with the title Professor are the omitted baseline. The following regression shows the determinants for publication pressure:

$$PubPressure_i = \alpha + \beta_1 * Doctoral\ Student_i + \beta_2 * Post\ Doc_i + \beta_3 * Ass.\ Prof.\ without\ tenure_i + \beta_4 * Ass.\ Prof.\ with\ tenure_i + \beta_5 * Others_i + \beta_6 * Economics_i + \beta_7 * Austria_i + \beta_8 * Switzerland_i + \beta_9 * Male_i + \beta_{10} * Respondent\ in\ English_i$$

Similarly structured equations are estimated for the dependent variables journal selection strategy and resilience of academics.

iii. Limitations

The manually collected contact data is complete to the authors' best knowledge. However, one limitation is that contact details of academics were sporadically not publicly available. The only systematic lack of data was most commonly observed for the position of external doctoral students. Thus, we cannot infer robust results for this group of academics and therefore do not analyze this group in depth. Furthermore, lecturers are excluded as publishing is not their primary activity. We do not find any substantial reason for a survey bias for all other academic positions of interest.

The survey method inherently imposes limitations, such as that we were unable to collect contact information whenever this information was not made publicly available for a given university. This inevitably means that a small share of academics employed at universities was likely missed in our sample and was not invited to participate in the survey. This could especially be the case for newly hired staff, where the contact information was not yet updated but also for academics, where we could observe bugs in the information system (e.g. redirecting to different staff). A potential limitation is a self-selection of responding academics who have a critical view of the publishing process. This would systematically bias the results of the analysis. However, the neutral formulation of our initial description and invitation to participate in the survey did not indicate any intended direction.

As the likelihood of participating in a survey decreases with its length, the authors restricted the number of questions (Deutskens et al., 2004). However, this trade-off imposes another limitation as the number of explanatory variables is limited. Overall, the limitations mentioned should be considered but do not suggest a biased sample or results.

IV. Theoretical Hypotheses

The empirically testable hypotheses proposed are based on the rational choice approach. The more costly an action is, the less it is pursued, and instead, individuals resort to an alternative. Individuals intending to engage in an academic career adjust their behavior to the requirements (Osterloh & Frey, 2014). With regard to publication behavior in academia, six theoretical hypotheses are derived:

Determinants of publication pressure

As reputation, salary, and job security are mainly tied to the career position in academia, the position is likely to be a strong determinant for publication pressure. Scholars across career positions focus their activity on writing papers, a metric easily observable, rather than on teaching, administrative tasks, or leisure. The pressure to publish is the highest when the publication requirement is the most stringent. This occurs when a scholar has reached an assistant professorship but not yet with tenure. It is well known that to get tenure, the most important factor is the number and quality of publications (Graber & Wälde, 2008, Müller & de Rijcke, 2017). In contrast, scholars with tenure can afford to publish less; they can follow more easily their intrinsic motivation to make their research known to outsiders. Brogaard, Engelberg and Van Wesep's (2018) findings support the claim that following tenure, researchers in economics publish less (15%) and obtain lower citation rates. Doctoral students are also under lower publication pressure because they still have time to produce publications, and the requirements for a post-doctoral position are less demanding in comparison with a professorship. At many universities, to get a doctorate, one must produce two or three papers that are either published or are, according to the dissertation committee, considered to be «publishable». The latter reduces the publication pressure. However, this seems to be a relatively recent development in German-speaking universities, as in the past, it was not typical for a doctoral student to publish but rather to use the dissertation as a basis for thereafter publishing in a journal. Thus, we derive the following hypothesis and expect substantial differences in perceived publication pressure depending on the career position.

> Hypothesis 1: *The subjectively felt publication pressure is highest among assistant professors without tenure, and lower for full professors and doctorates.*

Our survey was available in both German and English. English speaking respondents to the survey are taken to come from academic systems outside the German-speaking universities. They are likely foreigners and dispose of a smaller local professional framework and fewer informal connections than German-speaking scholars. Therefore, they are assumed to have to rely more on publications than the locals.

It has been shown extensively that migrants face disadvantages in the German labor market, especially once the human capital characteristics are accounted for (Kalter & Granato, 2007). These disadvantages, e.g., reflected in a lower likelihood of being invited to an interview, are even documented for the second generation of immigrants for the German-speaking region (Zschirnt, 2020; Auer and Fossati, 2019). We assume a similar effect for academia as foreign academics have to outperform local scholars to obtain the same career trajectory. This should be reflected in a higher subjectively perceived publication pressure. We derive the following hypothesis:

> Hypothesis 2: *English-speaking survey respondents are subject to higher subjective publication pressure than local scholars.*

Determinants of journal selection strategy

In view of the publication pressure, scholars may decide whether first to undertake research and thereafter choose where to submit the respective paper, or may first choose a professional journal in which to publish and adjust the research such as to maximize their publication prospect. In a moderate way, this can be interpreted as "game-playing" (Frey & Eichenberger, 1992, 1993), or in the extreme, this may be called "prostitution" (Frey, 2003). The publication requirement may lead to a crowding-out effect (Frey, 1997) by pushing out the intrinsic interest in engaging in research topics one finds relevant.

> Hypothesis 3: *The stronger the publication pressure, the more scholars first choose the journal in which they want to publish rather than intrinsically interesting research.*

Discipline

The strong focus on publishing in German-speaking countries first started in economics and only later spilled over to business studies. It may well be that the subjectively felt

publication pressure is still lower for business scholars, a reason being that they have more attractive opportunities outside academia than economists.

> Hypothesis 4: *Economics scholars feel more publication pressure than scholars in business do*.

Resilience to rejected papers

As publications are crucial for an academic career, scholars must decide how often they resubmit a paper that has been rejected by a previous journal they submitted it to. We expect that economists are prepared to submit the paper more often than are business scholars. Economists are more focused on an academic career, while business students are aware that they have better outside opportunities.

> Hypothesis 5: *Economics scholars resubmit a rejected paper more often than do scholars in business.*

The case of Excellence Universities

The Excellence Universities created in Germany by political fiat aspire to achieve a great international standing which heavily depends on publications as a metric. Therefore, scholars at Excellence Universities are expected to be under heavier pressure to publish than scholars at other German universities. A potential reason includes top-down pressure that is exerted from the political sphere to rectors, deans, professors and other academics. As the standing of an excellent institution is directly linked to higher monetary benefits and prestige, the stakes are high to retain the status.

> Hypothesis 6: *Scholars at German Excellence Universities experience heavier publication pressure than scholars at other German universities.*

Furthermore, we investigate the effect of the exogenously assigned "Excellence" status on the other two dependent variables as well as hypotheses one to three. They are expected to be more pronounced in the case of Excellence Universities in comparison to the other German Universities. However, we refrain from formulating specific hypotheses as the existing literature does not offer enough guidance in this respect.

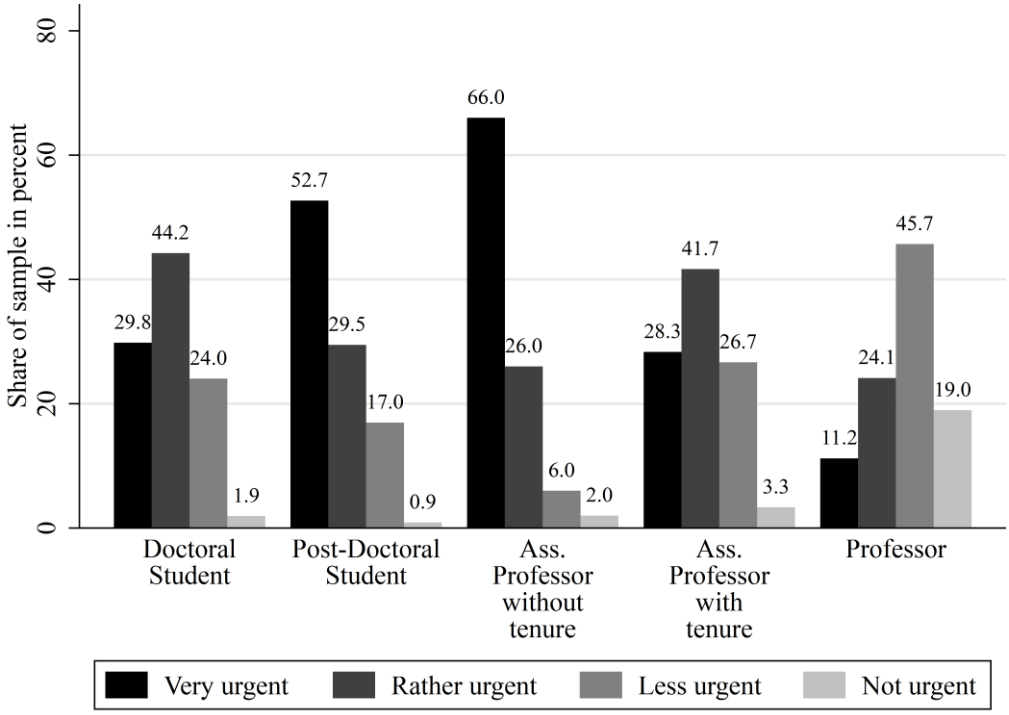
V. Results

Publication Pressure

This section provides an empirical analysis capturing the expressed subjective feeling of scholars ranging from doctoral students to full professors based on the extensive survey undertaken.

Figure I presents the data. Scholars in two positions, post-doctoral students and assistant professor without tenure, feel an urgent pressure to publish in academic journals. No less than 82% of the post-docs feel a "very urgent" or "urgent" pressure to publish. In the case of assistant professors who have not yet reached tenure, even 92% feel such urgent pressure. These are very high shares and strongly suggest that there exists intensive publication pressure for those scholars who start to engage in an academic career. This nowadays even applies to doctoral students. Three quarters (74%) feel "very strong" or "strong" pressure to publish.

Figure I. Publication pressure by academic positions



Publication pressure, not surprisingly, is lower once assistant professors have got tenure. More than one quarter (30%) feels their respective publication pressure to be "less urgent" or "not urgent". Full professors feel a much lower pressure to publish in academic journals. 65% responded that they do not experience much pressure to publish; 19% even

state that such activity is “not urgent” to them. As the figure shows, this is an exception compared to the scholars below the full professorial rank. Only six respondents in lower ranks indicated that they feel “no urgent” publication pressure.

Table III shows various potential determinants of the subjective publication pressure scaled from 1 (“not urgent”) to 4 (“very urgent”)[2]. The share of the variance attributed to the determinants is satisfactory as our study seeks to explain individual behavior (the adjusted R^2 is somewhat more than 24%). The estimated coefficients indicate the pressure felt by various positions relative to professors. The effects of a successively higher academic position turn out to follow an inverted U-shape, which corresponds well to ex-ante expectations: The pressure increases from being a doctoral student and is highest for assistant professors without tenure. The latter are intensely aware that they can only get a position with tenure if they have published in recognized professional journals. Once having tenure, the subjectively felt pressure is reduced. These results are consistent with *Hypothesis 1.*

The differences between the coefficients across positions are sizeable and statistically significant. They start with a size of 0.74 scale points for doctoral students, rise up to 1.3 for assistant professors without tenure, and are 0 for full professors.

[2] The collected data on publication pressure are assumed to represent an interval scale.

Table III. Determinants of subjectively felt publication pressure

	(1) Publication urgency	(2) Publication urgency	(3) Publication urgency	(4) Publication urgency
Doctoral Student	0.743***	0.742***	0.737***	0.708***
	(7.64)	(7.62)	(7.57)	(7.08)
Post-Doc	1.063***	1.063***	1.060***	1.018***
	(11.18)	(11.17)	(11.11)	(10.60)
Ass. Prof. without tenure	1.284***	1.292***	1.303***	1.262***
	(11.13)	(11.12)	(11.14)	(10.95)
Ass. Prof. with tenure	0.674***	0.672***	0.689***	0.666***
	(5.51)	(5.50)	(5.61)	(5.54)
Economics		-0.0523	-0.0638	-0.0825
		(-0.74)	(-0.88)	(-1.15)
Austria			-0.0700	-0.0793
			(-0.84)	(-0.95)
Switzerland			0.00237	-0.0571
			(0.03)	(-0.62)
Male				-0.0932
				(-1.18)
English respondent				0.354***
				(3.89)
Constant	2.276***	2.303***	2.335***	2.372***
	(38.51)	(33.44)	(27.03)	(21.97)
Observations	558	558	558	558
Adjusted R^2	0.249	0.249	0.247	0.269

t statistics in parentheses
Publication urgency: 1 = Not urgent, 4 = Very urgent
Economics: 1 = Economics, 0 = Business
Austria: 1 = Austria
Switzerland: 1 = Switzerland
Male: 1 = Male
English respondent: 1 = English respondent
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The additional potential determinants introduced in estimates (2) and (3) turn out not to be statistically significant, and their absolute sizes are small. The effects on subjective publication pressure are shown to be independent of whether a scholar is in economics or business studies or whether he or she works in Germany, Austria, or (German-speaking) Switzerland. Gender also does not have an effect on the level of subjectively felt publication pressure.

However, in regression (4), the variable "English respondent" is statistically significant. Scholars answering the survey in English come from outside German-speaking countries. They are more aware of the need to publish for an academic career, not least because they generally have fewer personal connections, which would be helpful to rise to a higher academic position. This result is consistent with *Hypothesis 2.*

The results are quite robust. The size of the estimated coefficients with respect to position changes little when additional determinants are added in equations (2), (3), and (4). A binary estimate (shown in the Appendix) in which the publication pressure is split into weak («not urgent» or «less urgent») and strong («urgent» or «very urgent») shows very similar results as do the estimates shown in Table III. It again reveals an inverted U-shaped subjectively felt publication pressure with a higher position. English-speaking respondents are again shown to be subject to additional publication pressure.

A potential interaction between academic position and discipline was investigated by calculating a separate regression with corresponding interaction terms. However, they were not statistically significant and were of low magnitude while controlling for language and gender.

Journal selection strategy

Scholars subject to varying degrees of publication pressure may respond in several different ways. A quite straightforward procedure is to first select a professional journal and adjust the research and its formulation accordingly, rather than proceeding in the traditional way of first engaging in a particular research topic and afterward selecting a journal assumed to be suitable. About 15% of the respondents of our survey first choose a journal quite in opposition to the traditional view suggesting that the research undertaken should be chosen independently of the publication issue. Strategic behavior is more prevalent in business studies (~21%) than in economics (~10%). The variable journal selection strategy is a dummy variable, where one represents the journal selection behavior and two the writing prioritization.

Figure II shows the responses by position. It shows that first engaging in research and choosing a journal later is still prominent among all academic scholars. Among full professors, 87%, and among assistant professors with tenure, 82% choose to first do the

research and then to consider a publication outlet. It is nevertheless important to notice that among untenured assistant professors, almost one quarter (22%) first wish to find out what journal would be suitable to publish in and only thereafter focus on the corresponding research to be undertaken.

Figure II. Journal selection strategy by academic position

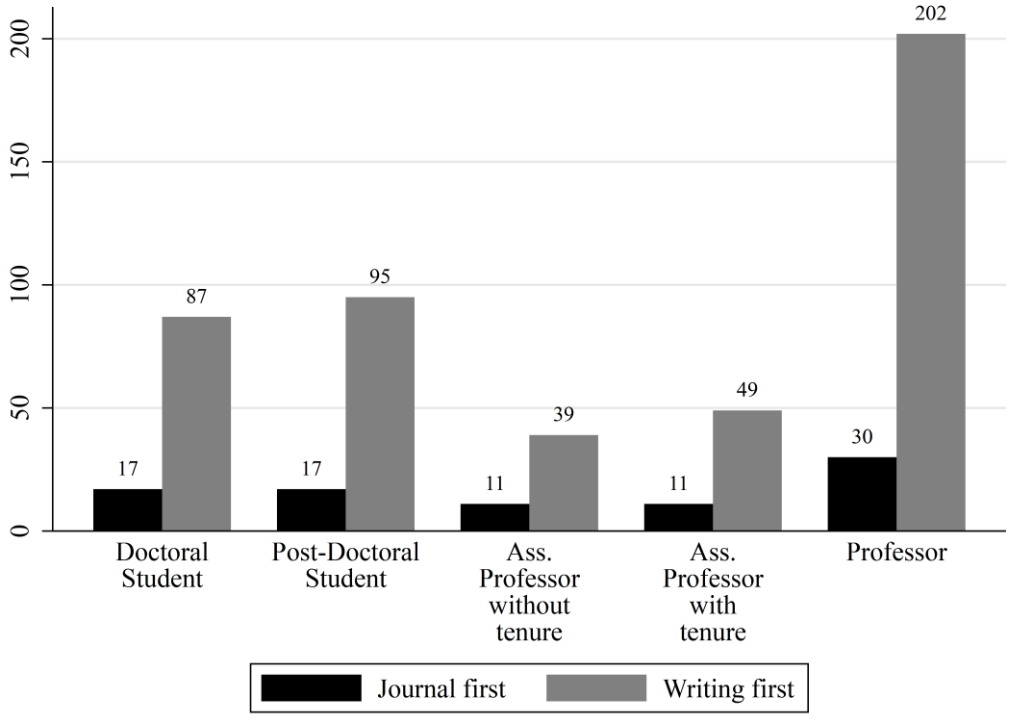


Table IV inquires what the determinants of the publication strategy are. In contrast to our expectations, the extent of subjectively felt publication pressure does not seem to play a role. *Hypothesis 3* is rejected; scholars feeling a higher publication pressure do not deviate more from their intrinsic research interests.

Economists employ the strategy of first choosing a journal less often than business economists. This result is not consistent with *Hypothesis 4,* rather the opposite is the case. This result is surprising as there is no statistical difference between disciplines concerning publication pressure, where Hypothesis 4 is also not consistent. Another statistically significant determinant is revealed for Austria (compared to Germany): Austrian economists are less inclined to first choose a journal and to then engage in the corresponding research. An interpretation of this result could possibly be that the answers to this item relate more to respondents' general views about norms of how to publish and less to the current circumstances of a particular academic.

Table IV. Determinants of journal selection strategy

	(1) Journal selection strategy	(2) Journal selection strategy	(3) Journal selection strategy	(4) Journal selection strategy	(5) Journal selection strategy
Urgent Publication	0.00186	-0.000822	-0.000198	-0.00105	0.0256
	(0.06)	(-0.03)	(-0.01)	(-0.03)	(0.73)
Economics		0.118***	0.117***	0.108***	0.113***
		(3.85)	(3.87)	(3.57)	(3.73)
Male			0.00611	-0.00218	-0.00756
			(0.18)	(-0.07)	(-0.23)
Switzerland				-0.0299	-0.0363
				(-0.81)	(-0.98)
Austria				-0.0804*	-0.0782*
				(-2.32)	(-2.23)
Doctoral Student					-0.0498
					(-1.15)
Post-Doc					-0.0363
					(-0.80)
Ass. Prof. without tenure					-0.117
					(-1.82)
Ass. Prof. with tenure					-0.0403
					(-0.70)
Constant	0.845***	0.786***	0.781***	0.832***	0.849***
	(34.46)	(25.10)	(19.02)	(18.72)	(18.11)
Observations	558	558	558	558	558
Adjusted R^2	-0.002	0.023	0.021	0.027	0.027

t statistics in parentheses
Journal selection strategy: 0 = Journal first, 1 = Writing first
Economics: 1 = Economics, 0 = Business
Austria: 1 = Austria
Switzerland: 1 = Switzerland
Male: 1 = Male
English respondent: 1 = English respondent
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Resilience to rejected papers

Following *Hypothesis 5,* economics scholars are expected to be more resilient than are business scholars and resubmit a paper more often to a new journal. The responses regarding the submission cutoff, after which a respondent discontinues the publication

effort are documented in Figure III. Some respondents opted to answer with something similar to "I never discontinue the publication effort". Other respondents indicated extremely large numbers. However, this poses the challenge of choosing a numeric cutoff indicating the number of submissions deemed to represent that the publication effort is never discontinued. For the graphical illustration, the cutoff was set at 25 submissions. However, the average time frame of a paper that is submitted 25 times, including the associated time to reformat the manuscript according to a journal's specific requirements, exceeds any realistic expectation. Thus, for the regression analysis, we specified a more realistic cutoff at ten submissions as the maximum numeric value. In line with their position, assistant professors without tenure are prepared to submit their contributions to more journals after having been rejected before. The interpretation of the statistical results does not change when the limit is increased from 10 to 15, 20 or even 25 attempts.

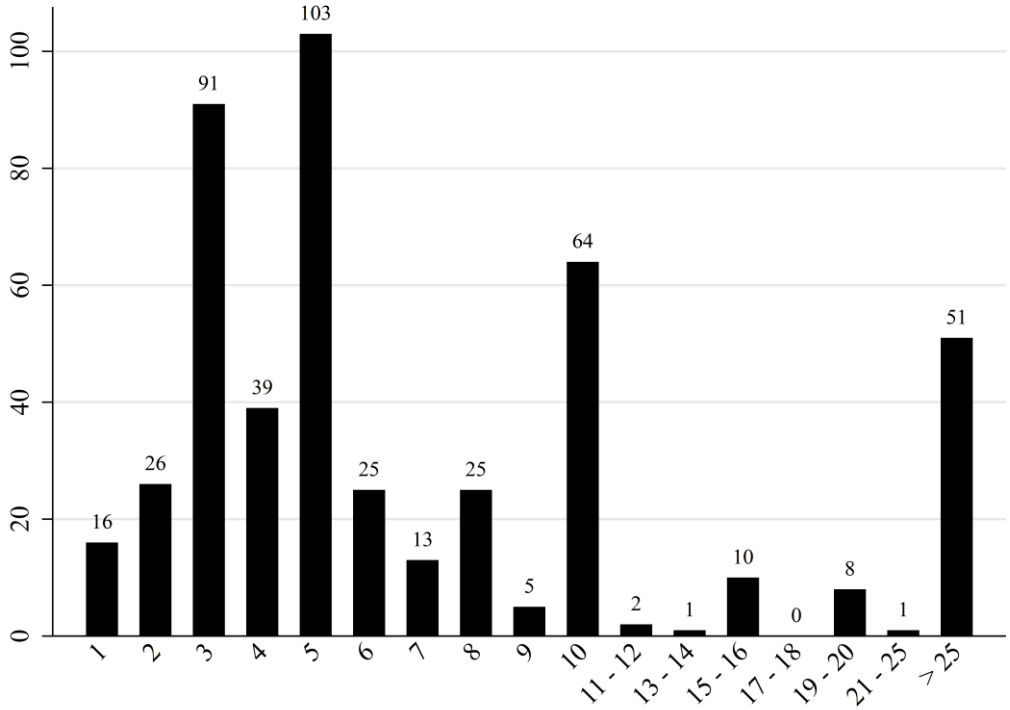
Excluding all entries with a numeric value above 25, the (lower bound) mean of the reported submissions' cutoff is 5.8 with a high standard deviation of 3.7. The median and mode for all observations lies at five. This means that on average, academics apparently are willing to submit their paper to five or six different journals before they give up. This can be interpreted from different perspectives. Firstly, the resilience to rejections is on average quite high, and academics are, for instance, aware of the journals' high rejection rates. At the same time, this implies that academics do not consider the generated effort on the other side in terms of effort and time of editors and reviewers. Whether this tendency can be sustainable over the long-term will have to be seen.

Figure III shows peaks at popular numbers (3, 5, 10, 15, 20). In general, this empirical phenomenon of reported rounded numbers reflects the participants' uncertainty regarding their own estimation's result (Schwarz and Oyserman, 2001). It indicates that respondents opted for a "close enough" estimation rather than an exact answer (Tourangeau et al., 2000). It might well be that participants of the survey (or academics in general) do not determine a specific cutoff for the number of submissions ex-ante. Therefore, the "close enough" estimations are reasonable and foreseeable.

Among the overly optimistic researchers, claiming they either never give up or give up only after 25+ submissions, professors and assistant professors without tenure are overrepresented compared to their sample share (49.0% vs. 41.6% resp. 11.8% vs. 9.0%).

The other groups are underrepresented, doctoral students 11.8% vs. 18.6%, post-docs 17.6% vs. 20.0%, and assistant professors with tenure 9.8% vs. 10.8%. The cause for the gap may differ across groups. Giving up on a publication effort implies sunk costs for the researcher. Researchers in need of publication for the advancement of their career may be inclined to abandon a subjectively unsuccessful project in favor of a new, subjectively more promising project. Professors may less often seek publications to further their career and importantly face less time pressure due to expiring contracts, hence they are less often willing to accept the sunk costs associated with giving up on a publication effort.

Figure III. Distribution of responses of submission cutoff after which publication effort is discontinued



In our analysis we focus on determinants that can explain differences in the submission-threshold after which the publication effort is discontinued. The results are shown in Table V. According to the estimates, economists seem to be more resilient, i.e. they are prepared to more often resubmit a paper after a previous rejection than do researchers in business. Business scholars are therefore less willing to engage in the rather unpleasant exercise to pursue with further submissions. This result is consistent with *Hypothesis 5*.

Table V. Giving up the publication effort (limit: 10)

	(1) Giving up publication efforts	(2) Giving up publication efforts	(3) Giving up publication efforts	(4) Giving up publication efforts
Economics	1.673***	1.663***	1.586***	1.497***
	(6.63)	(6.56)	(6.19)	(5.88)
Male		0.171	0.147	0.138
		(0.58)	(0.50)	(0.46)
Urgent Publication			0.243	0.0540
			(0.92)	(0.18)
Switzerland			0.163	0.127
			(0.49)	(0.38)
Austria			-0.370	-0.567
			(-1.27)	(-1.93)
Doctoral Student				-0.532
				(-1.39)
Post-Doc				0.244
				(0.66)
Ass. Prof. without tenure				1.436**
				(3.03)
Ass. Prof. with tenure				0.754
				(1.73)
Constant	5.674***	5.559***	5.576***	5.672***
	(31.42)	(19.99)	(14.54)	(13.75)
Observations	558	558	558	558
Adjusted R^2	0.072	0.070	0.072	0.094

t statistics in parentheses
Economics: 1 = Economics, 0 = Business
Austria: 1 = Austria
Switzerland: 1 = Switzerland
Male: 1 = Male
English respondent: 1 = English respondent
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The case of German «Excellence Universities»

In Germany, the universities have been formally classified into top universities, called "Excellence Universities", and all other universities. It could be thought that in Excellence Universities the subjective publication pressure is higher because these universities make a great effort to be internationally competitive – which today is strongly connected to the number of publications in top journals (Akerlof, 2020).

Table VI. Results for Excellence Universities in Germany

	(1) Publication urgency	(2) Journal selection strategy	(3) Giving up publication efforts
Doctoral Student	0.791***	-0.0151	-1.598**
	(4.68)	(-0.23)	(-2.82)
Post-Doc	1.210***	-0.00367	-0.425
	(7.17)	(-0.04)	(-0.58)
Ass. Prof. without tenure	1.356***	-0.0641	-0.0677
	(5.78)	(-0.57)	(-0.07)
Ass. Prof. with tenure	0.458	-0.0576	0.477
	(1.26)	(-0.33)	(0.50)
Economics	0.0464	0.0503	1.777***
	(0.35)	(0.98)	(3.98)
Male	-0.124	-0.00514	0.876
	(-0.81)	(-0.09)	(1.60)
English respondent	0.357*	0.160***	0.0749
	(2.34)	(4.25)	(0.11)
Excellence university	-0.192	-0.0327	-0.0606
	(-1.33)	(-0.56)	(-0.13)
Publication urgency		-0.0529	0.351
		(-1.54)	(1.14)
Constant	2.348***	2.010***	4.465***
	(12.57)	(23.30)	(4.50)
Observations	176	176	176
Adjusted R^2	0.302	0.016	0.115

t statistics in parentheses
Publication urgency: 1 = Not urgent, 4 = Very urgent
Economics: 1 = Economics, 0 = Business
Austria: 1 = Austria
Switzerland: 1 = Switzerland
Male: 1 = Male
English respondent: 1 = English respondent
DEU excellence: 1 = University of Excellence
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

However, the results are pretty similar to those for all German-speaking countries. Scholars at German Excellence Universities do not feel more burdened by the «publish or perish» need than scholars at other universities do. This result is not consistent with *Hypothesis 6*. The same holds for the journal submission strategy and the resilience to having papers rejected. These results suggest that administratively determined «Excellence» has no substantial impact on academia with respect to publications. This result is, in various respects, in line with a previous analysis studying the publication requirements for assistant and full professorships (Briviba & Frey, 2023).

VI. Conclusion

The results of the econometric analysis of the survey among scholars in universities in Germany, Austria, and German-speaking Switzerland do not fully align with the ex-ante formulated theoretical hypotheses. Indeed, two of the six hypotheses are rejected. Our analysis reveals a heavy subjectively felt pressure to publish in scholarly journals. This pressure has often been commented on but has rarely been subjected to an extensive empirical analysis. The "publish or perish" imposition is stronger for economists than for business scholars, presumably because the latter have more attractive opportunities outside academia. They are therefore better able to avoid the utility-decreasing publication pressure. In contrast to what might be expected, the subjectively felt publication pressure does not induce scholars to deviate from what is considered good scientific practice, namely to first engage in research, and only afterward seek a publication outlet.

To the extent academic careers are based on a competition in which the best win, pressure to perform is unavoidable. However, to the extent other factors such as being part of the right network are decisive (as shown by Carrell et al., 2022), a publishing competition does not serve a useful function but lowers the utility of scholars. The academic sphere's output, especially in economics, tends to be almost exclusively determined by human capital and individuals' ideas. Physical capital plays only a subordinate role. Therefore, the quality of the output is fundamentally dependent on self-selection of clever and intrinsically motivated people with an ambition to improve society through academic research. Müller and Rijcke (2017, p. 166) note that "academic research becomes a less attractive workplace for individuals committed to societal relevance and the greater public good." This development is particularly relevant for young persons considering whether to pursue a university career. If academia becomes, as the authors suggest, indeed less attractive to intrinsically motivated candidates, they potentially less often self-select into an academic career.

In addition, alternative mechanisms for academic career selection should be considered. One is to first determine what persons are, in principle, able to academically perform well. This evaluation should not be focused solely on publications in scholarly journals but also on the capability to teach well, to efficiently perform administrative duties within the university, and to communicate successfully with the public community (see e.g.

Colander, 2014). Even a random selection among the persons considered capable might be considered (Osterloh & Frey, 2020). Such a procedure might not only be more adequate for academia but may also reduce the pressure presently imposed on scholars ready to engage in an academic career.

An important aspect of publishing relates to the oligopolistic market. Even though there are a large number of scientific journals in economics, a few publishers dominate the offer. The development in social sciences over the past 20 years is blatant, as the largest five publishing houses' share of all papers increased from 15% in 1995 to 66% in 2013 (Larivière et al., 2015). Recently, there have been various attempts to break this oligopoly. Thus, more open access publications, new journals, and author-friendly review processes have been proposed and developed (e.g., Akst, 2010; Gerring & Pemstein, 2021). An online journal called "Seeds of Science" has just been created. Its reviewers do not - as is customary today - act as negative critics, but see themselves as "gardeners", thus helping to improve a contribution. On the other hand, little attention is paid to the fact that the publication process could be reversed. The authors could offer an article to any number of journals, which then select the contributions they like best. This could take place through an institutionalized setting or via the journals' editorial board, which would gain relatively more importance. As such, the editorial board member suggesting a manuscript would have to emphasize the benefits and to defend it – again reversing the status quo in which the reviewers have a strong tendency to criticize rather than to provide constructive feedback. This procedure would also counter the increasing duration of the publication process as the competition between journals incentivizes swift actions. Especially young scholars suffer from temporary positions and their respective behavioral adaptations. Those strategic adaptations such as less risk-taking concerning topics and stronger orientation towards publication worth research would be weakened, benefiting the whole research community. However today, such an approach is inverse to the incentives of publishers to change to the overall benefit and completely contradicts what is considered "academic ethics".

Appendix

1. Survey questions

1. After the initial formulation of your research question, which behaviour is more likely to apply to you?

- ◯ First, choice of a journal and then writing of a suitable paper.
- ◯ First, writing of the paper and the choice of a suitable journal.

Page 02
Journal

2. Regarding your most recently published paper: Please name the scientific journal of initial submission and the journal of publication:

Initial submission:

Journal of publication:

To how many journals did you submit the published paper in total? (Including initial submission and publishing journal).

Amount:

Page 03
LVLofJou

3. In general, what strategy do you choose when submitting a paper for the first time?

- ◯ Top 5 Journals
- ◯ Leading specialised journals
- ◯ Good general journals
- ◯ Lower rated journals

Page 04
Rev

4. Regarding your last published paper: How many times did you have to revise the paper before it was accepted? (Regarding the journal of publication)

Amount:

5. How many days did you work on the overall revision of your last published paper? (Regarding the journal of publication)

Days

Page 06
RevEffort

6. Estimate the effort of the revision process of your last publication in the following categories as a percentage:

Content adjustments:		%
Methodological adjustments:		%
Formatting:		%
Sum	0	%

Page 07
AccDec

7. Did you ever experience that one of your papers was rejected after you implemented the first revision?

[Please choose]

Page 08
GvUp

8. After how many submissions of the same paper do you abandon the publication effort?

Amount of journals:

Would you please provide us with the following information.

Which position do you hold at your university?

- ◯ Doctoral student
- ◯ Post-Doctoral student
- ◯ Assistant professor without tenure track
- ◯ Assistant professor with tenure track
- ◯ Professor
- ◯ your position

What is your gender?

- ◯ Female
- ◯ Male
- ◯ No answer

How would you rate the urgency of publishing in a scientific journal at the moment?

- ◯ Very urgent
- ◯ Rather urgent
- ◯ Rather not urgent
- ◯ Not urgent at all

What is the name of your university?

Your answers are anonymous and will be used exclusively for research purposes.

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