

Ending profiteering from publicly-funded research

Tackling the academic publishing oligopoly

Academic publishing houses are among the most profitable businesses in the world. They charge exorbitant fees for access to research that the public funds. The global momentum toward a free open access model is gaining traction, but Australia lags behind. This paper looks at several changes that could stop public funds from being funnelled to the oligopoly of academic publishers.

Discussion paper

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Summary

Free and unrestricted access to scientific knowledge is a human right recognised by the United Nations. But access to much of the world's scientific knowledge is controlled by a handful of private companies that dominate the global market for academic publishing. By charging exorbitant journal subscription and access fees, these companies restrict access to the research that is funded by the public. In the 'post-truth' world of conspiracy and political polarisation, access to the best research is essential to informed public debate. But the issues rife within the academic publishing industry extend far beyond access.

Academic publishing is one of the most profitable industries in the world. Large publishing houses generate profits approaching 40% – which is on par with tech giants like Google and Apple. Academic publishers achieve these exorbitant returns on the backs of taxpayers all over the world. Many countries have adopted 'open science' policies, which require these publishers to make the publicly-funded research they publish freely accessible. But academic publishers have responded by instead charging research institutions and academics excessive fees to publish their work. Public funding intended for research is funnelled into the pockets of academic publishers, creating a situation in which the public indirectly subsidises publishers. The sizeable portion of public money that goes towards the extortionate cost of open access publication would be better used to support researchers and institutions to innovate and make breakthrough discoveries.

In Australia, research institutions and universities spend over \$300 million annually on journal subscriptions. With additional fees and charges, it is estimated that Australia is funnelling as much as \$1 billion into the pockets of academic publishers each year.

Australian funding bodies have recognised the negative impacts of the privatised academic publishing market and have taken steps to address the knowledge-sharing crisis it has wrought. Australia's two main research funding bodies, the National Health and Medical Research Council (NHMRC) and the Australian Research Council (ARC) have recently introduced open access policies. These policies require that the research they fund be 'open access' (freely available) within 12 months for ARC-funded research, and immediately upon publication for NHMRC-funded research. But is this enough to prevent academic publishers from claiming an undue share of the funding?

Disruption of the academic publishing industry is needed so the public can immediately access the results of the research they fund, and to stop publishers from unfairly claiming an undue share of public funding through unreasonable publishing fees. Reforming Australia's approach to the academic publishing model will ensure that scientific and academic knowledge will benefit those who pay for it. This paper explores ideas that will prevent the transfer of public funds into the hands of multinational publishing houses and ensure all

Australians are able to access the research they fund. The following changes would help increase access to Australia's wealth of research:

- Revising grant criteria to reward publication in open access journals that charge commensurate article processing fees;
- Introducing a lottery-based system for the allocation of grants to reduce the emphasis of publication in grant applications;
- Introducing grants specifically for researchers committed to publishing exclusively in open access journals;
- Encouraging the rapid publication of research results through preprint servers;
- Encouraging the development of institutional repositories focused on publishing original research.

Introduction

Academic publishing is one of the most profitable industries in the world, in large part because of the substantial revenue generated by their inflated access and publication fees. The market is dominated by five major publishing houses – Elsevier, Black & Wiley, Taylor & Francis, Springer Nature and SAGE – which together control 50% of the market internationally.¹ Of these, Elsevier is the largest, and claims to publish 18% of the world’s scientific papers.² In 2022, Elsevier reported a profit markup of 37.3%,³ rivalling those of Apple and Google.⁴ The total global revenue of the academic publishing industry exceeds US\$19 billion annually.⁵ This makes it about the same size of the recording and film industries, but it is considerably more profitable.⁶ Over the last decade academic publishing has emerged as the fastest-growing sub-industry within the media sector.⁷

Articles in academic journals are primarily accessed via university or institutional libraries. These libraries spend millions on journal subscriptions to provide their staff and students access to the latest academic publications. In 2021, Australian institutions and universities spent more than \$332 million a year on journal subscription fees.⁸ But even with a university library login, accessing certain articles depends on whether the library has purchased a subscription to a specific journal or publisher. Without a subscription, academic publications remain trapped behind paywalls. One-off access for a single article can cost anywhere from AU\$30 to AU\$500.⁵

¹ Hagve (2020) *The money behind academic publishing*, <https://tidsskriftet.no/en/2020/08/kronikk/money-behind-academic-publishing>

² Fazackerley (2023) 'Too greedy': mass walkout at global science journal over 'unethical' fees', *The Guardian*, <https://www.theguardian.com/science/2023/may/07/too-greedy-mass-walkout-at-global-science-journal-over-unethical-fees>

³ RELX (2022) *Annual Report 2022*, <https://reports.relx.com/2022/esef-ar-nl/549300WSX3VBUFFJOO66-2022-12-31-nl.html>; Markup is calculated as the percentage of income before tax over the cost of generating revenue, where income before tax is revenue minus the cost of generating revenue.

⁴ Yup (2023) 'How Scientific Publishers' Extreme Fees Put Profit Over Progress', *The Nation*, <https://www.thenation.com/article/society/neuroimage-elsevier-editorial-board-journal-profit/>

⁵ Cassidy (2024) 'Australia's chief scientist takes on the journal publishers gatekeeping knowledge', *The Guardian*, <https://www.theguardian.com/australia-news/2024/mar/10/australias-chief-scientist-is-taking-on-the-journal-publishing-monopoly-gatekeeping-knowledge>

⁶ Buranyi (2017) 'Is the staggeringly profitable business of scientific publishing bad for science?', *The Guardian* <https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science>

⁷ Forgues & Liarte (2013) 'Academic Publishing: Past and Future', *M@n@gement* <https://doi.org/10.3917/mana.165.0739>

⁸ Foley (2021) *Unlocking the academic library: Open Access*, <https://www.chiefscientist.gov.au/news-and-media/unlocking-academic-library-open-access>

Academic publishing houses generate astounding profits through a business model that is contingent on public subsidies and the ability to dodge many of the costs associated with traditional commercial publishing. Much of the income ultimately comes from competitive grants and other types of government funding given to individual academics or research institutions. Academic publishers can depend on a reliable stream of researchers who must publish if they want to advance their careers, and who use their grant money to produce publications that academics publishers can then sell. In addition, academic publishing ‘services’ are done at little to no cost to the journal. Authors are not paid (in fact, they are often required to pay the journal for the privilege of being published), referees or ‘peer-reviewers’ are not paid, copy-editing and typesetting costs are falling, and printing costs are minimal as journals have largely transitioned online.⁹ This has allowed academic publishers to avoid the kind of ‘disruption’ that has beset most other forms of publishing.

When applying for a competitive grant from Australia’s two major public grant bodies – the Australian Research Council (ARC) and National Health and Medical Research Council (NHMRC) – academics are required to provide their publication track record, ostensibly to highlight the ‘quality’ and ‘impact’ of their research. This places a premium on researchers who have published in ‘prestigious’ journals, which only perpetuates the role of private academic publishers in the academic workflow. Including track record in grant evaluation criteria only further entrenches the position of for-profit publishers within academia. The ARC has recently undergone an independent review to assess its role and purpose.¹⁰ Neither the final report nor the resulting Bill attempt to address any of the issues inherent within the academic publishing model.¹¹

In addition to enhancing their competitiveness for receiving grants, many academics seek the status brought by publishing in ‘top’ journals. In fact, academic promotion can often depend on how much a researcher has published, and in which journals. Like all other professionals, academics seek and rightfully deserve acknowledgment for their accomplishments. But the requirements of grant bodies and hiring committees have created perverse incentives in which prestige can only be attained through being published in the most ‘prestigious’ journals. Until grant conditions – which are largely determined by Commonwealth grant bodies – and academic institutions offer researchers alternative avenues to attain prestige and receive promotion, private publishers will continue to benefit. Private publishing companies have become an entrenched part of academia, and public research has become a private commodity. As disinformation becomes an

⁹ Foley (2021) *Unlocking the academic library: Open Access*

¹⁰ Sheil, Dodds, & Hutchinson (2023) *Trusting Australia’s Ability: Review of the Australian Research Council Act 2001*, <https://www.education.gov.au/higher-education-reviews-and-consultations/resources/trusting-australias-ability-review-australian-research-council-act-2001>

¹¹ *Australian Research Council Amendment (Review Response) Bill 2023* (Cth), https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bId=r7130

increasingly significant problem, it is essential that scientific information be freely available to the public, especially if they have paid for it.

Australia has made some headway in addressing the knowledge-sharing crisis and saving researchers, their institutions, and the public from paying excessive subscription, access and publication fees to journals. In 2021, Australia's Chief Scientist Dr Cathy Foley announced a possible model for open access in Australia. The model, recently finalised for the federal government and currently under departmental consideration, would create a central implementing body to negotiate a national agreement with publishers using the collective bargaining power of Australian research institutions.¹² The body would ask publishers to provide their entire forward and back catalogues to all Australians, creating a centralised digital library that people could access through their MyGov account, free of charge.¹³ The body would oversee a pool of funds to cover fees required by journals for open access publication, sparing researchers and institutions from forking out their own money. This plan is ambitious in terms of giving people access to the research they fund, and will not cost more than is currently being spent on research publishing.¹³ While the financial burden will shift from individual researchers and institutions to the central implementing body, these funds ultimately come from taxpayers who will continue to bear the cost for open access and library subscriptions fees. Although this model promises considerable improvements over the current system, it should be implemented alongside additional strategies to prevent gratuitous profiteering by academic publishers.

Other countries have taken various approaches to counter the knowledge gate-keeping and profit-driven practices of academic publishers. Several international research funding bodies now require that their funded research be published with immediate open access – like the approach taken by the NHMRC – and advocate for publication in fully open access journals that charge significantly lower publication fees. Others have taken collective action to strike deals with publishers and secure discounts on library subscription costs. Where these negotiations have been unsuccessful, some countries have boycotted journals completely and cancelled subscriptions across libraries nationwide. While many of these initiatives have freed academic work from behind paywalls, in many cases, public funding still gets unnecessarily channelled to publishing houses.

These diverse strategies show that Australia could be doing more to foster the adoption of open science practices and to ensure scarce research funding is effectively allocated. This paper considers ways to increase equitable access to the research funded by Australian

¹² Foley (2020) *An Australian Model for Open Access*, https://oa2020.org/wp-content/uploads/POSTER_12_OpenAccessForAustralia_poster_DrCathyFoley.pdf; Cassidy (2024) 'Australia's chief scientist takes on the journal publishers gatekeeping knowledge'

¹³ Brookes (2022) *Chief Scientist plan for free research access for all*, <https://www.innovationaus.com/chief-scientist-plan-for-free-research-access-for-all/>; Cassidy (2024) 'Australia's chief scientist takes on the journal publishers gatekeeping knowledge'

tax-payers while preventing the misallocation of taxpayer funds to multinational publishing giants.

INDIRECT TAXPAYER SUBSIDIES

Public money subsidises academic publishers at multiple stages of the publication process. It covers the salaries of researchers who write the articles for the publisher, and the academics who peer-review manuscripts for the publisher. Public funds are also used to pay the subscription fees that journals charge to university and institutional libraries for staff and student access to their publications. It also pays the article processing charge (APC) required for an article to be published with open access.⁶ APCs can cost tens of thousands of dollars for a single article. For instance, in the ‘prestigious’ science journal *Nature*, the current APC is US\$12,290 (around AU\$19,000).¹⁴

In Australia, researchers and academic institutions use research grants to cover APC fees, a large portion of which comes from taxpayer money.¹⁵ The lion’s share of competitive research grants come from the ARC (which funds inter-disciplinary research), and the NHMRC (which funds health and medical research). These funding bodies award competitive research grants to academics so that they can conduct research and disseminate their findings in academic journals. In 2022-2023, the ARC awarded \$845 million in grants¹⁶ and the NHMRC provided \$898.1 million, in addition to \$626.5 million from the Medical Research Future Fund (MRFF).¹⁷

Besides competitive grants, the Australian Government supports university research through research block grants like the Research Support Program (RSP), which is designed to cover the indirect costs of research that competitive research grants do not. These systemic research costs include equipment, staff salaries, information technology services, and notably, library subscriptions.¹⁸ This transfer of funds from government to researchers and institutions, and subsequently to publishers, is the mechanism through which taxpayers indirectly finance the operations of academic publishers.

¹⁴ Nature (2024) *Publishing options*, <https://www.nature.com/nature/for-authors/publishing-options>

¹⁵ ARC (2021) *Open Access Policy*, <https://www.arc.gov.au/about-arc/program-policies/open-access-policy>; NHMRC (2022) *Revised Open Access Policy released*, <https://www.nhmrc.gov.au/about-us/news-centre/revised-open-access-policy-released>

¹⁶ Australian Research Council (2023) *Annual Report 2022-2023*, p. 6, <https://www.transparency.gov.au/publications/education/australian-research-council/australian-research-council-annual-report-2022-23>

¹⁷ National Health and Medical Research Council (2023) *Annual Report 2022-23*, p. xi, <https://www.nhmrc.gov.au/about-us/publications/annual-report-2022-23>

¹⁸ Universities Australia (n.d.) *Research funding*, <https://universitiesaustralia.edu.au/policy-submissions/research-innovations/research-funding/>; Department of Education (2023) *Research Support Program*, <https://www.education.gov.au/research-block-grants/research-support-program>

COLLECTIVE ACTION

In 2018, research agencies and funding bodies from several nations banded together to form “cOAlition S”, a consortium dedicated to achieving full and immediate open access to research publications.¹⁹ Members have devised a comprehensive roadmap to open access publishing called ‘Plan S’, the aim of which is to ensure that all publicly-funded research is published in open access journals or platforms. Plan S has been embraced by 21 national funders, seven charities and research organisations, as well as the European Commission.²⁰ Its impact is already being felt, with hybrid journals – journals that charge APCs for an individual article to be published with open access in an otherwise subscription journal – citing Plan S as one of the reasons for their transition to full open access.²¹

However, some nations have refused to join cOAlition S because they are concerned that while it may achieve open access, there is no evidence to suggest the price of library journal subscriptions will decline.²² They’ve also raised concerns that smaller institutions with limited bargaining capacity may struggle to negotiate fair subscription discounts.²³ Some of these nations have established their own consortiums to negotiate with large publishers. Consortiums from Germany (Projekt DEAL)²⁴ Finland (FinELib),²⁵ France (Couperin),²⁶ Norway (SIKT),²⁷ Sweden (Bibsam)²⁸, the University of California’s (UC) Libraries,²⁹ and even Australia (CAUL),³⁰ have negotiated transformative ‘read and publish’ agreements with various academic publishers. These details secure discounts on subscriptions or APC fees for researchers from affiliated organisations.

¹⁹ Plan S (2023) *About: What is cOAlition S?*, <https://www.coalition-s.org/about/>

²⁰ Plan S (2023) *Organisations endorsing Plan S and working jointly on its implementation*, <https://www.coalition-s.org/organisations/>

²¹ Pulverer (2023) *Open Access*, <https://www.emboPress.org/doi/10.15252/embr.202357638>

²² Hagve (2020) *The money behind academic publishing*

²³ Liverpool (2023) *Open-access reformers launch next bold publishing plan*, <https://doi.org/10.1038/d41586-023-03342-6>

²⁴ Allianz der Wissenschaftsorganisationen (2023) *About the Alliance*, <https://www.allianz-der-wissenschaftsorganisationen.de/en/about-the-alliance/>

²⁵ FinELib (n.d.) *Negotiations*, <https://finelib.fi/negotiations/negotiations/>

²⁶ Couperin (n.d.) *Couperin*, <https://www.couperin.org/>

²⁷ Kunnskapssektorens tjenesteleverandør (SIKT) (2023) *Current consortia agreements*, <https://www.openscience.no/en/tilgang/konsortielisenser/informasjon/avtalene>

²⁸ The National Library of Sweden (2023) *Open access in the Bibsam agreements*, <https://www.kb.se/samverkan-och-utveckling/oppen-tillgang-och-bibsamkonsortiet/bibsamkonsortiet/oppen-tillgang-i-bibsamavtalen.html>

²⁹ The University of California (n.d.) *OA Publishing Agreements and Discounts*, <https://osc.universityofcalifornia.edu/for-authors/publishing-discounts/>

³⁰ Council of Australian University Libraries (2023) *Read & Publish Agreements Negotiated by CAUL*, <https://caul.libguides.com/read-and-publish/home>

In instances where consortiums have failed to strike a fair deal with publishers, some have cancelled their subscriptions, leaving their researchers without access to thousands of subscription articles.³¹ These decisions have received mixed reactions, with some university directors saying that researchers expressed overall support for the cancellation, as researchers were able to access the information they needed through inter-library loan services, or by emailing authors, finding earlier versions on preprint servers, or buying individual papers.³² After boycotting Elsevier for two years, UC negotiated a deal that provided public access to all UC research, and most of Elsevier's titles to UC researchers.³³ In return, Elsevier would charge UC researchers APCs, partially subsidised by UC. While of great gain to the public, the deal perpetuated the hybrid journal model, because UC-authored articles appeared alongside paid articles in the same journals. This allowed publishers to collect revenue from both APCs and library subscriptions. Ultimately, UC libraries ended up paying Elsevier the same amount as before the deal, around US\$13 million.

A number of these agreements also contradict the principles of Plan S. Some have diverged from the immediate open access principle to secure deals, while others persist in offering financial support to hybrid model journals by mandating open access publishing, which necessitates the payment of inflated APC fees.³⁴ This is the case in Australia. In September 2022, Australia's own NHMRC announced its decision to join cOAlition S. But to adhere to Plan S, Australia would need to define a clear timeframe in which it ceases to support hybrid journals and transition to supporting only open access journals. This came at the same time as the announcement of its new Open Access Policy, which states that "all peer-reviewed publications arising from NHMRC-funded research must be made available immediately upon publication, removing the 12-month embargo period."³⁵ The NHMRC has not offered additional funding to researchers or institutions to cover the APC costs of publishing open access articles in hybrid journals.

While the enforcement of open access publishing is a positive development, it unfortunately has perverse outcomes. Publishing houses retain immense price-setting power as open access policies do nothing to reduce demand for their services. In the absence of prestige-linked alternatives to disseminate research, publishers can continue to raise APC

³¹ Electronic Information Service National Programme (EISZ) (2018) *Hungarian Consortium terminates negotiations with Elsevier*, <https://eisz.mtak.hu/index.php/en/283-hungarian-consortium-terminates-negotiations-with-elsevier.html>; Fox & Brainard (2019) 'University of California takes a stand on open access', *Science*, <https://doi.org/10.1126/science.363.6431.1023-a>

³² Matthews (2018) 'German and Swedish libraries shrug off Elsevier shutdown', *Times Higher Education*, <https://www.timeshighereducation.com/news/german-and-swedish-libraries-shrug-elsevier-shutdown>

³³ Darnton (2023) *The Dream of a Universal Library*, <https://www.nybooks.com/articles/2023/12/21/the-dream-of-a-universal-library-athena-unbound-peter-baldwin/>

³⁴ Rabesandratana (2019) *Elsevier deal with France disappoints open-access advocates*, <https://www.science.org/content/article/elsevier-deal-france-disappoints-open-access-advocates>

³⁵ NHMRC (2022) *Revised Open Access Policy released*

fees for open access articles. As the bulk of these fees ultimately come from public funding, the increasing cost burden is shifted onto taxpayers. Unfortunately, open access policies function like a tax on grants, and costs are rising as journals capitalise on the growing prevalence open access mandates. Open access policies ultimately strengthen the profits of academic publishers.

Fixing the academic publishing model

The NHMRC and ARC have attempted to address the knowledge-sharing crisis imposed by the dominant academic publishing houses by implementing policies which mandate that articles must be available freely through open access either upon publication (in the case of the NHMRC), or within 12 months (in the case of the ARC).³⁶ A similar approach has been adopted by the European Union's key funding programme for research and innovation, Horizon Europe, which places a mandatory open access condition on its grants.³⁷ The US is set to follow, with the Biden administration announcing that federally-funded research must be made immediately available to the American public by the end of 2025.³⁸

This is a step in the right direction as it will make research supported by these funding bodies open to the entire world. But not all Australian research is funded by the ARC or NHMRC. Projects can be funded by philanthropic organisations or private companies. And research may continue even after direct ARC or NHMRC funding has ceased, in which case universities can shoulder the cost of research. Academics who have not secured an ARC or NHMRC grant and either work at one of the fifty percent of Australian universities without an open access policy, or who are not affiliated with an academic institution at all, are exempt from open access publication mandates.³⁹ This allows them to publish with closed-access and avoid APC fees, which contributes to the sixty percent of Australian papers that are published behind a paywall.³⁹

Additionally, NHMRC and ARC open access policies won't stop taxpayer funds ending up in the pockets of academic publishers, because researchers and institutions are still required to cover their own APCs.³⁶ Dr Cathy Foley's plan would go a long way to addressing the issues around APC fees and establish a standardised open access policy across Australia. However, despite these reforms, private publishers would still pocket significant amounts of taxpayer money. More could be done to disincentivise publishing in for-profit academic journals that charge excessive subscription and access fees, and to instead incentivise publication in not-for-profit open access channels that do not rely on public funding.

³⁶ NHMRC (2022) *NHMRC Open Access Policy* ; ARC (2021) *Open Access Policy*

³⁷ Horizon Europe (2023) *Horizon Europe*, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

³⁸ White House Office of Science and Technology Policy (2022) *OSTP Issues Guidance to Make Federally Funded Research Freely Available Without Delay*, <https://www.whitehouse.gov/ostp/news-updates/2022/08/25/ostp-issues-guidance-to-make-federally-funded-research-freely-available-without-delay/>

³⁹ Cassidy (2024) 'Australia's chief scientist takes on the journal publishers gatekeeping knowledge'

REVISING GRANT CRITERIA

When Australian grant bodies assess applications, publications carry significant weight. For example, according to the NHMRC Investigator Grant guidelines, consideration of a researcher's publication 'track record' is written into the assessment criteria. Publications count for 35% of the overall score of an application.⁴⁰

Publications in journals with high 'impact factors' are considered more prestigious. Impact factor is, ostensibly, a measure of a journal's quality and influence. Journals with the highest impact factors are extremely selective and only publish what they consider to be 'ground-breaking' discoveries. For example, only about 8% of submitted manuscripts are accepted for publication in the science journal *Nature*,⁴¹ 6.1% in *Science*,⁴² and a meagre 5% in the medical journal *The Lancet*.⁴³ Publishing in these 'high prestige' journals is extremely difficult and competitive.

The NHMRC explicitly states that the use of journal impact factor is inappropriate when assessing applications.⁴⁴ Instead, assessors must only consider "up to ten of the applicant's top publications" and "the overall impact, quality and contribution to the field of the published journal articles ... not just the standing of the journal in which those articles are published". If journal impact factor is not used to assess grant applications, what metric is being used to measure quality and impact, or to decide which publications make it to a researcher's list of top ten publications?

The reality is that the continued reliance on publication record means that the more papers a researcher publishes in 'prestigious' journals, the more competitive their application. This places a premium on a researcher's record of publication rather than on the intrinsic merit of their proposed project. Researchers who publish articles in high prestige journals are more likely to receive grants than researchers who have published in lower-ranked journals (which at this stage, includes the majority of open access journals). As a result, grant guidelines indirectly contribute to the profits of multinational publishing houses by perpetuating a feedback loop in which researchers' prospects for funding are tightly linked

⁴⁰ NHMRC (2023) *Investigator Grants 2024 Guidelines*, https://www.grants.gov.au/Go/DownloadDocument?objectUuid=3bec25e9-01b0-4842-9f9e-794a4cc079e6&documentType=GO&fileName=Investigator%20Grants%202024%20Guidelines_v1.0.pdf

⁴¹ Nature (2023) *Editorial criteria and processes*, <https://www.nature.com/nature/for-authors/editorial-criteria-and-processes>

⁴² Science (2022) *Journal metrics*, <https://www.science.org/content/page/journal-metrics>

⁴³ The Lancet (2023) *Information for Authors*, <https://www.thelancet.com/pb/assets/raw/Lancet/authors/tl-info-for-authors-1690986041530.pdf>

⁴⁴ NHMRC (2023) *Investigator Grants 2024 Peer Review Guidelines*, https://www.grants.gov.au/Go/DownloadDocument?objectUuid=3bec25e9-01b0-4842-9f9e-794a4cc079e6&documentType=GO&fileName=Investigator%20Grants%202024%20Peer%20Review%20Guidelines_v1.0.pdf

to their publication records. The emphasis on ‘quality publications’ incentivises academics and their institutions to prioritise these output-driven metrics, which disincentivises researchers to adopt open access practices as they are not closely associated with prestige.⁴⁵

But this doesn’t have to be the case. Many other countries have adopted alternative methods to evaluate grant applications that are fairer and more equitable. Reforming the criteria grant bodies use to assess applications could go a long way to stopping the unnecessary flow of money to academic publishers, ensuring it is instead invested in the public interest. The rest of this paper looks at possible ways that this could be achieved.

Modified lottery

In 2013, The Health Research Council of New Zealand became the first major government funding agency to employ a lottery system to allocate research funding for their Explorer Grant scheme.⁴⁶ In its ‘modified lottery’ model, short grant applications are first screened for eligibility, and to remove weak applications. Grants are then awarded randomly to applicants considered to be equal on other criteria.⁴⁷ In a 2020 survey of applicants involved in the scheme, 63% favoured the system.⁴⁶ More recently, funding bodies in the UK, Germany, Austria, and Switzerland have also implemented lottery systems to decide between certain grant applications that pass a quality threshold.⁴⁸ These modified lottery systems reduce the emphasis on a researcher’s publication record. This frees them to publish in open access journals without the need to focus on building a ‘prestigious’ publication record, and this undercuts the business model of traditional academic journals.

Inclusion of open science engagement in grant evaluation criteria

Rather than including ad hoc measures of publication quality and impact in grant evaluation criteria, grant bodies could instead reward contributions to open access journals. This could be achieved by incorporating assessment criteria that quantify the number of open science publications by a given researcher. This shift would help diminish the prestige of traditional and hybrid journals. Reduced demand for publishing in expensive subscription journals

⁴⁵ Eger & Scheufen (2021) *Economic perspectives on the future of academic publishing: Introduction to the special issue*, <https://doi.org/10.1002/mde.3454>

⁴⁶ Liu et al. (2020) ‘The acceptability of using a lottery to allocate research funding: a survey of applicants’, *Research integrity and peer review*, <https://doi.org/10.1186/s41073-019-0089-z>

⁴⁷ Health and Research Council of New Zealand (2023) *2024 Explorer Grants*, <https://gateway.hrc.govt.nz/funding/researcher-initiated-proposals/2024-explorer-grants>

⁴⁸ Nature (2022) ‘The case for lotteries as a tiebreaker of quality in research funding’, *Nature*, <https://doi.org/10.1038/d41586-022-02959-3>

would lower their impact factors, as open access journals would begin to accumulate the citations traditionally associated with ‘prestigious’ subscription journals. This has the potential knock-on effect of lowering the APC fees charged by subscription journals as a viable alternative would be available. This shift would not only save taxpayers from paying excessive APC fees, but would redirect public funds away from profit-driven publishers toward open access journals that actively promote the open access movement.

Open science grants

Similarly, a novel category of grants could be established exclusively for researchers who publish, or commit to publishing, solely in open access journals. By making open access publication a prerequisite for receiving a grant, researchers would be rewarded (and not punished as they currently are) for actively participating in open science. As the number of Australian researchers publishing in open access journals increases, high impact research that might have previously been published in subscription journals would accumulate citations for open access publications. This would increase demand for publication in open access journals, which would boost their impact factors and enhance their prestige. As a result, open access journals would become more appealing to researchers who have not yet adopted open access practices but still seek prestige. While all publications arising from NHMRC and ARC funding must be freely accessible, either immediately (NHMRC) or within 12 months (ARC), publications resulting from open science grants would be instantly accessible to the public and would reduce the amount of public funding being wasted on excessive APC fees.

ADOPTION OF OPEN ACCESS JOURNALS

A growing number of peer-reviewed, open access journals are being created to compete with traditional subscription-based, closed-access journals. All articles published in these open access journals are freely available to the public immediately upon publication. While they still charge APC fees, the costs are typically much less than open access publication in ‘prestigious’ subscription journals.

Some publishers such as the European Molecular Biology Organization (EMBO) have begun transitioning from a hybrid publishing model to a full open access model.⁴⁹ However, because EMBO no longer receives as much revenue from subscription fees, it has raised its APC fees. While more journals are transitioning from hybrid to full open access, excessive profits still go to publishers through rising APCs. The lack of substitutable alternatives will allow publishers to raise APC fees indefinitely, which has the potential to consume an even larger portion of public funding.

⁴⁹ Pulverer (2023) *Open Access*

PREPRINT SERVERS

Preprint servers allow researchers to upload preliminary versions of their papers to online archives before they are submitted to a journal for formal peer review. Both publication on, and access to preprint services is completely free.⁵⁰ Preprint servers and repositories such as arXiv, bioRxiv, medRxiv, ChemRxiv, Peer J Preprints, Zenodo, PsyArXiv, EconStor, GitHub, RePEc, and SSRN enable immediate public access to research, and allows other researchers to build on the scientific record more quickly. While readers may not have access the final article once it's published in a traditional journal (known as the Version of Record), they retain access to the original manuscript shared on the server.

Some preprint servers like bioRxiv have partnered with journals so that once an article has undergone formal peer-review, the reviewers' responses are published on the preprint site.⁵¹ Some journals – such as the open access life sciences and medicine journal eLife – have adopted a 'publish then review' model in which only manuscripts shared on pre-print platforms are considered for publication.⁵² The peer-review function is carried out by a community of researchers who opt-in to the system, and their reviews are posted publicly alongside the final article.

Until 2021, referencing preprints in grant applications and academic assessments was prohibited by the NHMRC, ARC and many universities. This is because these articles do not undergo a formal peer review. Commendably, the NHMRC and ARC have recently revised these policies, and they now allow preprints to be considered in track record assessments, which should encourage more researchers to embrace this option.⁵³

With these funding bodies and institutions enacting policies that incentivise the publication of academic articles on preprint servers, the taxpayer saves on all APC fees. Not only can the public freely and immediately access these articles, but they also have access to additional information like comments, critiques and reviews made by other researchers and to the formal peer review. Preprints also allow readers to bypass paywalls, providing them access to earlier versions of otherwise paid 'Version of Record' articles.

⁵⁰ PLOS (n.d.) *Preprints*, <https://plos.org/open-science/preprints/>

⁵¹ Cold Spring Harbor Laboratory (2019) *Transparent review in preprints*, <https://www.cshl.edu/transparent-review-in-preprints/>

⁵² Eisen et al. (2020) 'Implementing a "publish, then review" model of publishing', *eLife*, <https://doi.org/10.7554/eLife.64910>

⁵³ ARC (2021) *Adjustments to the ARC's position on preprints*, <https://www.arc.gov.au/news-publications/media/communiques/adjustments-arcs-position-preprints>; Matchett (2021) *Peak research funding agencies split on pre-prints*, <https://campusmorningmail.com.au/news/peak-research-funders-split-on-pre-prints/>

INSTITUTIONAL REPOSITORIES

Institutional repositories are online archives that contain original articles, dissertations and works authored by researchers affiliated with a specific research institution.⁵⁴ These repositories are maintained by individual research institutions who openly provide original research articles to readers and authors for free. Institutional repositories such as Minerva Access at The University of Melbourne already exist in Australia.⁵⁵ However, their main function with respect to journal articles is re-uploading papers published by their researchers, rather than independently publishing original research. Additionally, open access isn't granted for all articles within their repository.

Repurposing or creating new repositories with in-house editors, type-setters, copy-editors and graphic designers to publish original research would serve as a relatively inexpensive and sustainable route to achieving an equitable publishing system.⁵⁶ These non-profit institutional repositories would bypass *all* fees associated with publishing in for-profit journals, thereby preventing public funds from flowing into the pockets of academic publishers. They would also alleviate the cost burden on institutional and university libraries, saving them from having to purchase expensive journal subscriptions that are quickly outpacing the growth of university and institutional budgets. Institutional repositories would give institutions control over their research output and actively contribute to breaking the monopoly that academic publishers hold over the market.

⁵⁴ Ranasinghe & Chung (2018) 'Institutional Repository based Open Access Scholarly Publishing System: A Conceptual Model', *Library Philosophy and Practice*, <https://digitalcommons.unl.edu/libphilprac/2014>

⁵⁵ The University of Melbourne (n.d.) *Minerva Access*, <https://minerva-access.unimelb.edu.au/communities/719f2e43-479d-5291-b761-3db23ca430d2>

⁵⁶ Bernal & Perakakis (2023) *No-pay publishing: use institutional repositories*, <https://www.nature.com/articles/d41586-023-02315-z>

Conclusion

Academic publishing houses generate astounding profits through a business model underpinned by indirect public subsidisation.

By joining cOAlition S and mandating that all research it funds be published with open access, the NHMRC has begun Australia's journey towards open science. Through these initiatives, the public will at long last be granted immediate access to the health and medical research that they pay for. While it is promising that open and equitable access to science appears to be an area of priority for the NHMRC, a sector-wide policy is needed to reform academic publishing that includes all Australian research, not just projects funded by competitive research grants. Unfortunately, the open access plans being developed by Chief Scientist Dr Cathy Foley clash with the principles of Plan S. The proposed centralised body would not stop the flow of taxpayer money to publishers because the model does nothing to encourage publication in open access journals. Until academics have an incentive to publish in open access journals or other open access platforms, the hugely profitable academic publishing houses will continue to benefit from public research funding.

Another concern is that the Australian Research Council (ARC) – which funds \$803.9 million in research each year – has not made any commitment to ensuring immediate open access for the research it funds. The public still must wait 12 months after it appears in subscription journals to access ARC-funded research.

The global momentum toward a free open access model is gaining traction. Australia has a valuable opportunity to further its commitment to open access and stop the unnecessary funnelling of public funds into the hands of large publishing houses.

Other strategies that would increase access to academic research include:

- Revising grant criteria to reward publication in open access journals that charge commensurate APCs;
- Introducing a lottery-based system for the allocation of grants to reduce the emphasis of publication in grant applications;
- Introducing grants specifically for researchers committed to publishing exclusively in open access journals;
- Encouraging the rapid publication of research results through preprint servers;
- Encouraging the development of institutional repositories focused on publishing original research.