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Expected effects of an open access policy at a private foundation

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Abstract

The Gordon and Betty Moore Foundation (GBMF) was interested in understanding the potential effects of a policy requiring open access to peer-reviewed publications resulting from the research the foundation funds. To explore this question, we collected data on more than 2000 publications in over 500 journals that were generated by GBMF grantees since 2001. We then examined the journal policies to establish how two possible open access policies might have affected grantee publishing habits. We found that 99.3% of the articles published by grantees would have complied with a policy that requires open access within 12 months of publication. We also estimated the annual costs to GBMF for covering fees associated with “gold open access” to be between $250,000 and $2,500,000 annually.

Introduction

In recent years, science funders have been establishing open access (OA) policies that mandate unrestricted online access to articles published in scholarly journals. OA offers a number of benefits including increased citations counts (Gargouri et al. 2010), accessibility for building research capacity in developing countries (Chan et al. 2005), enhanced visibility of research (Tennant et al. 2016), and decreased financial pressure on academic and research libraries (McGuian and Russell 2008).

Despite this rise in mandates, publisher responses have varied widely, with some interested in providing open access options and others maintaining their more traditional system of subscription-based access (Laakso et al. 2005). As a result, there are three main types of journals: open access, closed access, and hybrid journals. OA journals provide access to all content immediately online. Closed access journals restrict access to their content by requiring that readers log into their website, usually to verify access to an institutional subscription. Hybrid journals are closed access journals that provide authors with the option to opt into OA by paying a fee; only those articles that are designated OA are available online.

Many journals require the author to pay an article processing charge (APC) to make their work OA, generally on the order of $1000-3500 USD. This is often called “Gold Open Access”. Journals also often offer a “Green Open Access” option in which the authors are allowed to

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self-archive a post-refereed copy of their publication on a personal website and/or OA repository. Often there are embargoes on self-archiving in an OA repository so that publishers can maintain exclusive rights to the content for a limited period of time.

Most authors do not select journals based on their level of openness or their policies around self-archiving. Instead, they are often more concerned with publishing in the most relevant, highest impact journal for their field (Priem 2013). This is further complicated by the fact that some of the journals with highest impact factor are closed and do not allow for green or gold OA options. Funder policies around publishing OA would require that researchers more carefully consider their choice of journal to ensure compliance.

In an effort to increase access to the research results it funds, The Gordon and Betty Moore Foundation (GBMF) began considering the implementation of an open access policy all publications produced by its grantees in 2016. GBMF funds research in basic science, environmental conservation, patient care improvements, and preservation of the San Francisco Bay Area. Although the foundation's existing Data Sharing and Intellectual Property Policy generally favors public access to grant outputs, it does not mandate open access and provides no guidance for how grantees may increase access to their articles.

We explored the potential costs of a more prescriptive open access policy for GBMF and how this policy may affect the various types of GBMF grantees. We were most interested in understanding (1) whether grantees would be restricted from publishing in their preferred journals, and (2) the financial ramifications of a policy advocating for and funding Gold OA when available.

Methods

To explore potential impacts of an open access policy at GBMF, we analyzed 2650 publications produced by GBMF grantees between 2001 and 2017. This is not a complete list of publications since the foundation has no standardized way of collecting grantee outputs. The dataset includes publication data obtained from Science program grantee reports, as well as publication data from Crossref's Funding Data Search service[1]. Publications were deduplicated, grouped by journal title, and journal policy metadata was added by searching the SHERPA-RoMEO[2] database of publisher policies on self-archiving and open access.

Based on information found on journal websites and SHERPA-RoMEO, we classified each journal as (1) hybrid, open or closed; (2) whether they allowed authors to archive post-prints; and (3) the length of the embargo period for archiving post-prints. The number of articles per journal is included in this article's corresponding dataset (Strasser and Khare 2017).

[1] http://search.crossref.org/funding
[2] http://www.sherpa.ac.uk/romeo/

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We also calculated an annual estimate of Gold OA costs for 2009-2016. We estimated the costs associated with OA by multiplying the number of articles published in a year by 0.89, which is the percent of articles published in hybrid or open journals and could therefore be made Gold OA. We then estimated the annual cost for making these articles OA by multiplying by a low ($1500) and high ($3500) APC estimate (Solomon 2013).

Results

Our data collection yielded a list of 573 journals used by grantees, in which 2650 articles were published. We were first interested in the percentage of journals chosen by our grantees that are hybrid, open, or closed. We calculated percentages both by journal and by article to ensure that we captured potential effects on authors, however the numbers were quite similar (Figure 1). Moore Foundation grantees tend to publish in hybrid journals (74% of journals; 72% of articles), with open (16% of journals; 17% of articles) and closed (10% of journals; 11% of articles) journals less represented. Although we have no information on the percentage of those articles published in hybrid journals that were published Gold OA, we assume the percentage is low since this was not a requirement for grantees.

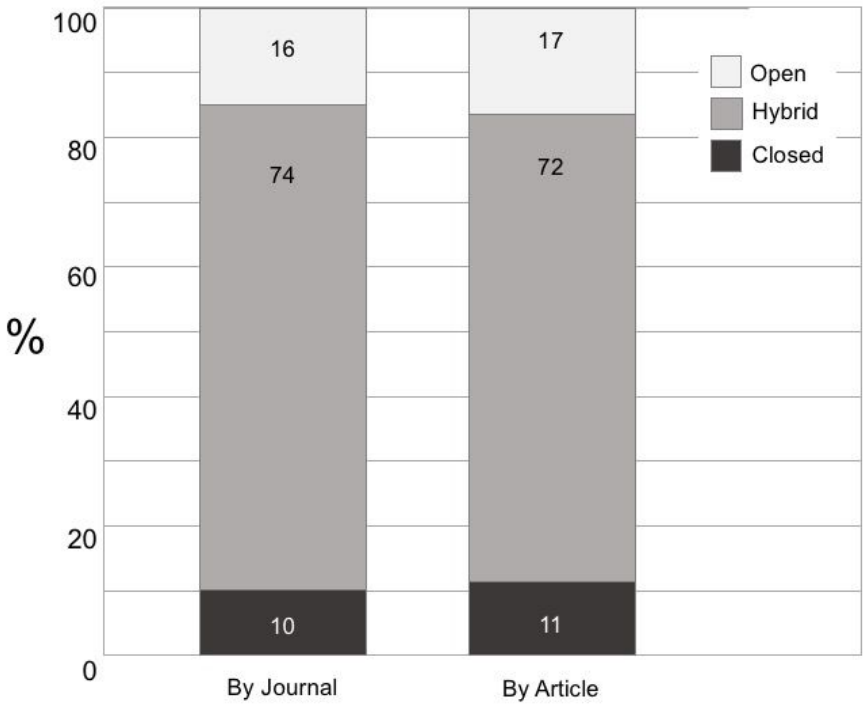

Figure 1. Breakdown of journal type (open, hybrid, or closed) used by GBMF grantees for the 2650 articles (left) published in 573 journals (right).

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We were also interested in whether a grantee's journal choice would be impacted by two possible OA policies being considered. We examined this question with two potential policies in mind. Policy 1 would require OA within 12 months of publication, either via the Green or Gold route. This excludes journals that are closed and restrict self-archiving for longer than 12 months. Policy 2 would require immediate access at the time of publication (Gold OA). This excludes journals that are closed and restrict self-archiving.

Based on these proposed policies, we calculated that the percentage of articles not compatible with Policy 1 is 0.7 - that is, 99.3% of articles would have been compatible with Policy 1. The journals not compatible with Policy 1 were were exclusively from the family of "Annual Reviews." These journals are not typical; there are 46 review series in specific disciplines in science and social science; each review series contains 12 to 40 authoritative comprehensive review articles, covering the major journal articles on a specific topic during the preceding few years.

For Policy 2, 8.3% of articles are not compatible. These are primarily high impact journals with no Gold OA option that restrict post-print archiving for some period of time. Journals that do not comply include the family of *Nature* journals (except *Nature Communications*) and AAAS' *Science*.

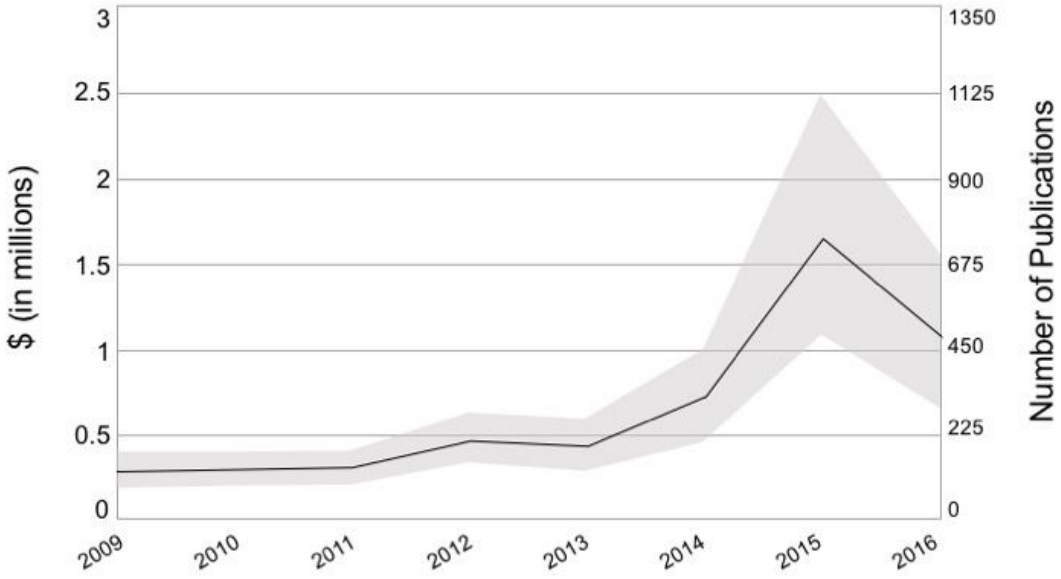

Figure 2. Estimated annual costs for OA fees associated with GBMF grantee publications. The shaded region indicates the possible range of costs (left axis); the solid black line corresponds to the number of publications we located for a given year (right axis).

The potential costs to GBMF for Gold OA publishing were of interest, regardless of the policy chosen. This would be particularly relevant if GBMF chose to adopt Policy 2. We show data in Figure 2 only for 2009 - 2016, since these are the years where we have data for more than 100 articles. We identified more than 800 publications in 2015 (compared to approximately 300 and

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500 in the years before and after, respectively). This increase in the number of publication resulted from 2015 being the first year that the Data-Driven Discovery Initiative began systematically collecting data from grantees about publications. Highest estimates were $2.5M in annual fees for for 2015.

Discussion

Implementing an OA policy at a private foundation has potential implications beyond ensuring grantees make their work OA. It also serves to advocate for a position of openness in research outputs. Based on the data reported here, the OA policies considered by GBMF were unlikely to significantly impact the majority of journal choices for grantees. This is particularly true for proposed Policy 1 (Green or Gold OA within 12 months). Only 0.7% of articles published by grantees would not have complied with this policy. If the Gold OA policy option were enacted (Policy 2), some journals that restrict access to all of their content for up to 12 months after publication would not be permissible. Only 8.3% of articles published by grantees would not have complied with this policy.

The potential financial ramifications of fully funding Gold OA were estimated to be between $250,000 and $2,500,000 per year. There are several unknown factors that might influence what amount within this range is likely to be correct for GBMF, most critically how many publications are generated each year by grantees. Our estimates of number of publications per year (and therefore estimated OA costs) rely on either the grantee self-reporting to the foundation, or the grantee including GBMF in manuscript acknowledgements that can be harvested by Crossref. Our range of costs is therefore likely an underestimate for some years (low end). Potential overestimates at the higher end of the range would result from assuming GBMF would incur costs for all publications generated by grantees. In fact, many grantees may have university funds available for publication fees, or may have co-authors that are willing to cover fees.

In part based on the results described here, GBMF announced a new Open Access Policy in 2017. The new policy states that

> *The foundation requires that a final (post-print) version of all peer-reviewed articles produced as a result of research supported, either in entirety or in part, by the foundation's funding, be made publicly and freely available (open access, or OA) within 12 months of publication. Grantees can accomplish this either by publishing the article OA, by ensuring that the publisher will make the content OA within 12 months, or by depositing a post-print version of the manuscript in an OA repository within 12 months.*[3]

GBMF funds a wide breadth of research, and not all grantees will be impacted by an OA policy in the same way. The Environmental Conservation Program and the Science Program both are likely to have grantees that produce peer-reviewed publications, and are likely to be impacted

[3] https://www.moore.org/docs/default-source/Grantee-Resources/open-access-policy-2017.pdf?sfvrsn=2

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by the OA policy. However even within these two Programs, there are a diversity of disciplines represented that may require different amounts of behavioral changes in publishing habits to comply with the policy. The new policy at GBMF will serve to "level up" the different groups, ensuring that the public can access all peer-reviewed publications generated by its grantees.

GBMF plans to revisit the efficacy and impact over time for the newly implemented policy. There are several variables that can be altered to potentially strengthen the OA policy. These may include (1) restricting embargoes on archiving OA versions to six months (compared to 12 months); (2) requiring CC-BY licenses for all publications; (3) setting aside funds for covering grantees' OA fees (independent of their grant funds); (4) mandating particular repositories for OA archiving; or (5) expanding the policy to include outputs other than peer-reviewed journals (e.g., data, software, books, etc.).

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