

City University London

**The Transition to Open Access: To What Extent Can
Research Funders Influence the Market for APCs?**

Daniel van Strien

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Supervisor: Dr Ernesto Priego

This dissertation assesses the extent to which research funders can influence the market for APCs. This question is tackled through the use of case studies, particularly the Wellcome Trust and the Austrian Science Fund (FWF). The dissertation assesses the secondary literature, policy documents and APC data. This is supported through interviews with the Wellcome Trust and FWF. In addressing the extent to which research funders influence the market for APCs a number of issues are explored. The role of policy in shaping open access is analysed. Chapter two outlines the motivations government and research funders have in supporting open access. In particular, this chapter assesses the recommendations of the Finch Report (2012) and the requirements for the next Research Excellence Framework (REF 2020) exercise. Following this, the market for Article Processing Charges (APCs) is explored in chapter three. This focuses on assessing the current size of the market and the average price of APCs. It also seeks to understand the extent to which the market for APCs fits the definition of a monopolistic market. Chapter four compares the current policies of the Wellcome Trust and FWF, outlining the extent to which their policies aim to influence the market and the mechanisms used. Price caps are identified as a major difference in policy and subsequently discussed in detail. The dissertation concluded that, although research funders influence the market for APCs, this influence is constrained by a number of factors: research funders may primarily intend their open access policies to ensure the research they fund is available open access while external factors limit the extent to which research funders can, independently, influence the market for APCs.

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Introduction

Open access is increasingly being accepted as an important aspect of future scholarly practice in the UK. The publication of the Finch Report (2012), the requirement for submissions to the next REF (2020) to be open access, and the adoption of mandates by research funders have all been significant factors in shifting open access from a movement driven by academics and librarians to a major and growing institutional consideration. Institutions, ranging from small charities to national governments, are increasingly accepting and promoting arguments in favour of open access. This increased institutional support raises new questions about the implementation of open access. This dissertation seeks to consider and engage with this important issue.

The Wellcome Trust introduced an open access mandate in 2005, followed by other research funders. Associated with these mandates, the Wellcome Trust and other research funders are increasingly contributing towards the payment of Article Processing Charges (APCs) as a means of supporting open access. APCs have emerged as an increasingly common, though not the only, method of financing open access journals and articles.

With the payment of APCs research funders are able to financially support open access, though this raises a number of issues and problems, which will be explored in this dissertation. These include the high costs of APCs and the potential for 'double dipping' in hybrid journals. An overarching concern identified by research funders is the lack of a relationship between the price of APCs and the services offered by publishers. Many of these problems relate to the current functioning of the markets for open access. In response to this, research funders have taken different approaches to the payment of APCs. There is an open question about the extent to which these policies may seek to influence the market for APCs. This dissertation will explore these issues through case studies of the Wellcome Trust and the Austrian Science Fund (FWF), setting the policies of these organisations within the wider context in which they operate.

The central question underlying this dissertation is: can research funders use their APC payment policies to influence the market for APCs? To address this, a number of related issues will be tackled:

- What role does government play in supporting academic research and how does this relate to open access?
- What impact do the policies of government and research funders have on the market for scholarly journals and APCs?
- In response to this market, how are research funders implementing policies in relation to the payment of APCs?

A short chapter will describe the research methodology and sources used in this dissertation.

The growing body of literature around open access will be assessed in the literature review (chapter one). The relevant literature comprises academic research, articles, blog posts, and commentaries on open access, as well as institutional policies and reflections. The literature review will summarise this literature, though, given the restrictions of space, it will not claim to do so in a comprehensive way.

Chapter two will outline the role of government and research funder policy on open access. It will consider the reasons why governments support science funding and how open access has increasingly been understood as a means of better achieving this aim. This will be accomplished largely by assessing the aims and recommendations of the Finch Report. The recommendations of the Finch Report will be contrasted with the requirements for open access in the next REF submission, and the approaches of research funders who have implemented APC payments as a means of supporting open access.

The market for APCs will be discussed in chapter three. This will attempt to understand how the policies outlined in chapter two influence the functioning of the market for APCs. The chapter will begin by assessing the size and nature of the market. Following on from this, it will seek to explain *why* the market operates in the way it does. The question will be asked: to what extent is the market for APCs monopolistic, i.e. that limited competition exists between publishers? To evaluate this characterisation, the chapter assesses research on author behaviour in choosing where to publish. The behaviour of authors is a necessary consideration in understanding the way in which research funders may try to influence the market for APCs.

The final major chapter (chapter four) compares the policies of two research funders, the Wellcome Trust and the Austrian Science Fund. A comparison will be made of the similarities and differences in approaches to the payment of APCs and the extent to which funders may try to influence the market for APCs.

The conclusion will offer an assessment of the ways in which current government policies shape scholarly publishing and how these potentially create problems in the implementation of open access. An evaluation will be made of the current approaches taken by research funders and potential approaches that could be developed in the future.

Methodology

A number of approaches have been utilised to explore the research questions identified in the introduction which thus far the literature on open access has not fully addressed.

The primary method employed is desk based research an approach that draws upon a large and diverse body of literature. This extensive literature on open access is a measure of its importance as a key issue for research funders, academics and in the provision of library services in recent years. The literature utilised in the dissertation goes beyond material on open access and also comprises author surveys, economic theory and grey literature. This has enabled the development of a multifaceted explanation for the functioning of the market for APCs.

Assessment of the aims of government is achieved primarily by focusing on the recommendations of the Finch Report (2012), a keynote document in the implementation of open access. The approach outlined in the Finch Report is then contrasted with the submission requirements for the next REF (2020). Drawing upon discussions surrounding these approaches highlight the potential benefits and drawbacks of these methods of implementing open access. Author surveys and economic theory are important in establishing how the current market for APCs operates and in assessing how closely the market for APCs matches the definition of a monopolistic market.

The Wellcome Trust and the Austrian Science Fund (FWF) have been taken as key case studies. The Wellcome Trust as a pioneer in funding open access has developed its policy over the last ten years and has received some criticism for its approach to implementing open access. The Wellcome Trust, together with other research funders, commissioned a study into the funding of APCs. This study, 'Developing an effective market for open access article processing charges,'¹ provides research funders with various policy options. What this dissertation aims to do is to contextualise these policy options within the wider research landscape. The approach currently taken by the Wellcome Trust, a major charity and

¹Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges."

research funder, will be contrasted with the FWF, a government funding organisation. However, the two organisations also have similar approaches in funding APCs, the one key difference being the use of price caps. These caps will be a major area of focus in this study, something which has received very little attention in the open access literature.

Alongside desk-based research, the dissertation draws on interviews with representatives of the Wellcome Trust and FWF. Falk Reckling (Head of Strategy - Policy, Evaluation, Analysis at the FWF) responded to a series of questions via email (full list of questions in appendix). Robert Kiley (head of the Digital Services at the Wellcome Trust) was interviewed in person on 21 October 2015. The FWF interview was relatively short but all questions were responded to and Reckling provided links to further details on policy. The Wellcome Trust interview was semi-structured and took around an hour to conduct. It broadly followed a set of questions similar to those asked of the FWF (full list of questions in appendix). The interviews allowed for a more direct comparison of the two organisations and enabled the dissertation to develop a deeper understanding of the ambitions of two key players in open access. The development of their policies and impact are fully investigated, providing further traction on the issues surrounding the payment of APCs and the implementation of open access policies more broadly.

Chapter one: Literature review

Introduction

A range of literature has been drawn on to approach the question of how research funders are able to influence the market for Article Processing Charges (APCs). A valuable starting point is the literature on open access, which has been extensively outlined in an existing literature review by Frosio on open access publishing.² Alongside material published in journals and books, open access is regularly discussed in the press, on social media, at seminars and conferences, and other venues.³ This literature review will not comprehensively cover the wide range of material on open access. Instead, it offers a brief and broad overview of open access literature, before narrowing the focus to areas which are particularly relevant to the questions posed by this dissertation: the economics of open access, open access publishing models, APCs, and the role of research funder policies.

What is Open Access?

Considering the definition of 'open access', the term is used interchangeably to describe a particular method of disseminating (primarily) published research outputs and also as a movement which promotes the benefits of this form of publishing research.⁴ With regard to both uses of 'open access', disagreements have emerged about the requirements publications need to meet to be designated 'open access' and on the future of open access. Competing definitions and understandings of what open access is, or ought to be, have highlighted different conceptions of the role of academic publishing, the current state of higher education

²Frosio, "Open Access Publishing."

³Greco, "A Bibliography of Books and Journal Articles on Scholarly Publishing."; Grandbois and Beheshti, "A Bibliometric Study of Scholarly Articles Published by Library and Information Science Authors About Open Access."; Aaron Swartz, *Guerilla Open Access Manifesto*; Taylor, "A Commentary on 'Developing an Effective Market for Open Access Article Processing Charges'"; Young, "A Response to Jeffrey Beall's Critique of Open Access"; Rocks-Macqueen, "Open Access Does NOT Equal You, the Author, Paying"; McCormick, "Review of Open Access Humanities by Martin Eve"; Harnad, "Harnad Comments on HEFCE/REF Open Access Mandate Proposal."

⁴Eve, *Open Access and the Humanities*, 8.

in the UK (and beyond) and the role of research in society.⁵ Debates about the relative value of green vs gold (defined below) open access indicate much more than just a preference for certain publishing mechanisms as outlined by Gorman,⁶ Abadal⁷ and Fredrick.⁸ This important issue will be considered in depth when analysing the role that research funders can, and should, play in trying to influence the development of open access.

Open access will be broadly defined simply as:

‘unrestricted access to the published output of research’.⁹

This definition is useful for a number of reasons. It focuses on the issue of access without specifying what this access should entail. A major area of debate within the open access movement is whether open access should imply particular licenses.¹⁰ It is important to consider the approach of research funders to open access when assessing different approaches to funding open access, and in particular APCs. A benefit of using this open definition as a starting point is that it is one adopted by the Wellcome Trust. Funding organisations, notably the Wellcome Trust, have fundamentally impacted the direction of open access and this justifies taking the Wellcome Trust as a major case study in this dissertation.

History of Open Access

Discussions of the history of open access serve to contextualise its current state, but this history has not yet been covered systematically. This history is particularly important in understanding the shifts that have taken place from open access being a ‘bottom up’ movement to a ‘top down’ policy following the introduction of various mandates. There are currently no major histories of open access, though a partial history has been deployed within literature on current issues surrounding open access. Björk and Solomon have briefly described the development of open access quantitatively across time;¹¹ others focus on the history

⁵Harnad, “United Kingdom’s Open Access Policy Urgently Needs a Tweak”; Harnad, “Why the UK Should Not Heed the Finch Report.”

⁶Gorman, “Going for Gold, or Is It Green? The Open Access Debate Continues.”

⁷Abadal, “Gold or Green.”

⁸Fredericks, “Questioning the Efficacy of ‘Gold’ Open Access to Published Articles.”

⁹Wellcome Trust, “Open Access Policy,” n.d.

¹⁰Poynder, “Open and Shut?”; Harnad and Poynder, “Open and Shut?”

¹¹Laakso and Björk, “Anatomy of Open Access Publishing.”

or development of open access in particular disciplines.¹² Often history is utilised either to support or criticise open access.¹³ It is important when assessing any literature which deals with the history of open access to keep in mind that it is still a relatively new phenomenon (though not without precedent). This relatively short and sometimes controversial history is largely informed by pre-existing scholarly publishing practices.

It is necessary, once again, to make a disclaimer about the limited history that can be covered in the available space. A full history of open access would need to include the development of the technology which is usually understood as creating the possibility for open access to exist, primarily the World Wide Web, and a discussion of the development of academic publishing from its early forms to its commercialisation from the 1960s onwards. It will be only possible to briefly touch on these issues in this literature review.

The Beginnings of Open Access: Technological Possibilities

The history of open access can be roughly conceived as having two different aspects: 'positive' or 'proactive' possibilities and 'negative' or 'reactive' responses. The development of technology can be seen as serving a 'positive' role in the development of open access.¹⁴ Technology has fostered the development of academic publishing in the past. It is the printing press and resulting disruptions that created the possibilities for a wider form of dissemination by drastically lowering costs. This history has been covered in depth by Elizabeth Eisenstein, Lucien Febvre and Henri-Jean Martin.¹⁵ The Berlin Declaration outlined the possibilities created by the technology of the internet.¹⁶ One of the questions to be addressed in this dissertation is why journal publishing has not been disrupted

¹²Graziotin, "Green Open Access in Computer Science – an Exploratory Study on Author-Based Self-Archiving Awareness, Practice, and Inhibitors"; Eve, *Open Access and the Humanities*; Guo, Xue, and Li, "Open Access in China"; Björk, "Open Access Subject Repositories"; Forde and Roberts, "Plant Methods Moves to Fund Open-Access Publishing"; McCormick, "Review of Open Access Humanities by Martin Eve."

¹³Beall, "What the Open-Access Movement Doesn't Want You to Know | AAUP"; Forgues and Liarte, "Academic Publishing"; Willinsky, *The Access Principle*.

¹⁴Hargrave, "Disruptive Technological History"; Fitzpatrick, "Giving It Away"; Seaman and Graham, "Sustainability and the Scholarly Enterprise."

¹⁵Eisenstein, *The Printing Press as an Agent of Change*, Febvre and Martin, *The Coming of the Book*.

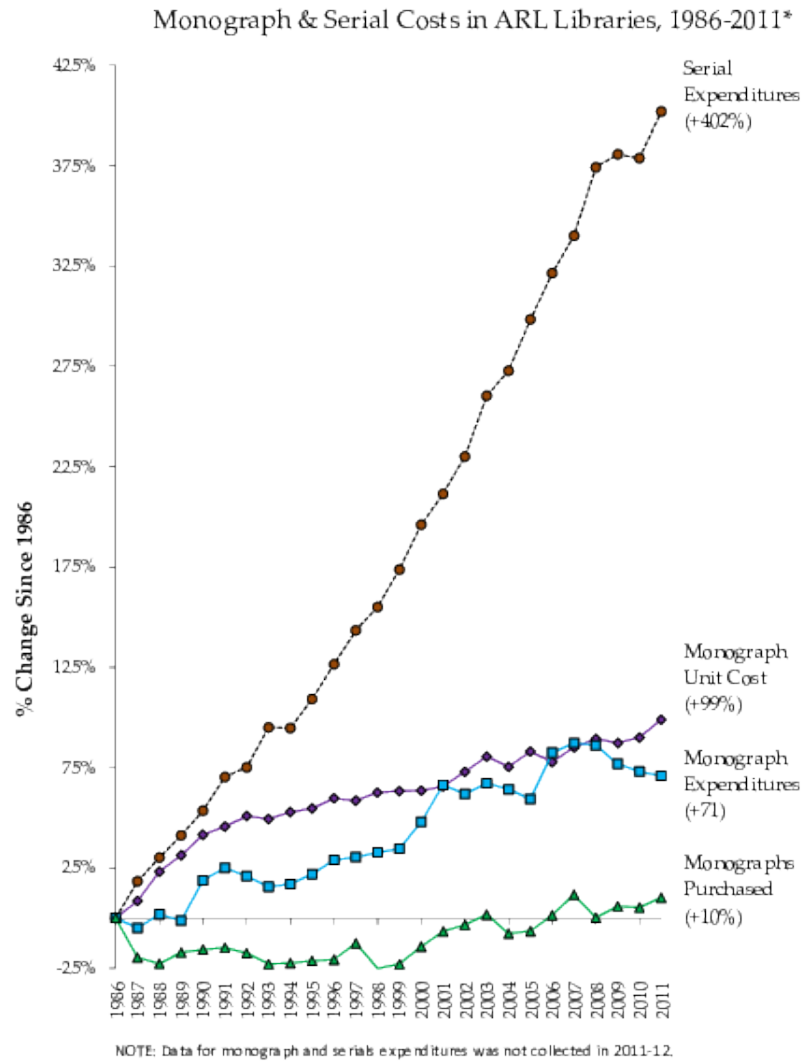
¹⁶The Berlin Conference, "Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities."

by technology, in particular the internet, in the same way as other publishing industries.¹⁷ Discussion of the 'serials crisis' offers some potential explanations to why this is the case.

The Growth of Journals and the Serials Crisis

The history of journal publishing provides an important context to the development of open access. The growth and development of academic journals over the twentieth century can be conceived of as providing the 'negative' or 'reactive' component for open access in the development of what is commonly termed the 'serials crisis'. With the development of perceived problems within academic publishing and research practices - in particular rising journal prices - open access has been presented as a potential solution. It is not accurate to attribute the growth of open access as merely a reactive response to journal markets but it is an important factor in its development.

¹⁷Cunningham et al., "Rates of Change"; Easley, Michel, and Devaraj, "The MP3 Open Standard and the Music Industry's Response to Internet Piracy"; Moreau, "The Disruptive Nature of Digitization."



Source: Association of Research Libraries, "Statistical Trends." ¹⁸

¹⁸Association of Research Libraries, "Statistical Trends."

A steady growth¹⁹ in the number of journals published since the early (1665) publishing efforts of the Royal Society and *Journal des Sçavans*,²⁰ alongside increasing subscription costs, led to the 'serials crisis' - the problem libraries faced in coping with rising costs, which in some cases resulted in reduced access to journals and the cancellation of subscriptions. The literature on the serials crisis is extensive; it focuses on the crisis itself, whilst Philip Young and others have assessed the perceived arguments for open access emerging from this crisis.²¹ A great deal of this literature focuses on the issues faced by libraries.²² The serials crisis presents an important point of departure for research funders and government. Whilst some claim that access to academic literature is not a problem, a more general recognition of this issue was partly responsible for the adoption of mandates.²³

Government Policy

Government policy, as this dissertation demonstrates, is vital in shaping research practice and the market for scholarly publishing. There is a large body of literature on the role government plays in science funding.²⁴ The position of government as the 'benefactor' of academic research is used as a starting point in the arguments in favour of open access by Suber and Eve.²⁵ The literature surrounding government support of open access provides further insight into the reasons why government may choose to support it, an issue also investigated in this dissertation.

¹⁹Greco et al., "The State of Scholarly Journal Publishing."

²⁰Kronick, "Notes on the Printing History of the Early "Philosophical Transactions""; Society, "Philosophical Transactions - the World's First Science Journal."

²¹Young, "The Serials Crisis and Open Access"; Roth, "The Serials Crisis Revisited"; Dougherty, "Turning the Serials Crisis to Our Advantage"; McGuigan, "Publishing Perils in Academe"; Mason, "Academic Research, Scholarly Publishing, and the Serials Crisis"; Van Orsdel and Born, "Choosing Sides"; Greco et al., "The State of Scholarly Journal Publishing."

²²Jones and Courant, "Monographic Purchasing Trends in Academic Libraries"; McGuigan, "Publishing Perils in Academe"; Young, "The Serials Crisis and Open Access"; Dougherty, "Turning the Serials Crisis to Our Advantage."

²³Beall, "The Open-Access Movement Is Not Really About Open Access."

²⁴Herbst, *Financing Public Universities*; Goldfarb, "The Effect of Government Contracting on Academic Research"; Leyden and Link, "Why Are Governmental R & D and Private R & D Complements?" Lasthiotakis, Kretz, and Sá, "Open Science Strategies in Research Policies.."

²⁵Suber, *Open Access*, 14; Eve, *Open Access and the Humanities*, p.ix.

The Finch Report (2012) and the response by government marks an important stage in the development of open access as an aspect of government policy. The report is important for a number of reasons. Firstly, it influences the context within which open access funding takes place. Secondly, as a major funder of research, the acceptance and implementation of the recommendations of the Finch Report potentially have a large impact on the market for academic publishing and open access more specifically. The Finch Report will be discussed in depth in chapter four. The Finch Report generated a wide range of responses from open access advocates, with Stevan Harnad being particularly critical of its suggested approach.²⁶ Other responses to the Finch Report will be analysed and built upon in this dissertation.²⁷

Alongside the Finch Report, the Research Excellence Framework (REF)²⁸ defines the future open access landscape. Literature on the REF has focused on the role it plays in shaping research practice in the UK.²⁹ There is also a growing body of

²⁶Harnad, "Critique of RCUK's Response to BIS Recommendations on UK Open Access Policy"; Harnad, "Fast-Forward on the Green Road to Open Access"; Harnad, "Gold Open Access Publishing Must Not Be Allowed to Retard the Progress of Green Open Access Self-Archiving"; Harnad, "Harnad Comments on HEFCE/REF Open Access Mandate Proposal"; Harnad, "HEFCE/REF Adopts Optimal Complement to RCUK OA Mandate"; Harnad, "How and Why RCUK Open Access Policy Needs Revision"; Harnad, "Hybrid Gold Open Access and the Cheshire Cat's Grin"; Jump, "RCUK Takes Open-Access Green Targets Off Fast Track"; Harnad, "United Kingdom's Open Access Policy Urgently Needs a Tweak"; Harnad, "Why the UK Should Not Heed the Finch Report"; Harnad, "Worldwide Open Access."

²⁷Finch, "Accessibility, Sustainability, Excellence," 2013; Mac Sithigh and Sheekey, "All That Glitters Is Not Gold, but Is It Diamond?"; Jubb, "Finch 18 Months on"; Jump, "Finch Access Plan Unlikely to Fly Across the Atlantic"; Ptolomey, "Finch and Open Access"; Jump, "Finch's Open-Access Cure May Be 'Worse Than the Disease'"; Abadal, "Gold or Green"; Russell, "How Are Universities Putting Policy into Practice, from Both Library and Research Perspectives?"; Verhaegen, "Hybrid OA - a Way to Go?"; Pinfield, "Is Scholarly Publishing Going from Crisis to Crisis?"; Prior, "Key Issue - the 'Finch Report'"; Willetts, "Letter to Dame Janet Finch on the Government Response to the Finch Group Report"; Jubb, "The Finch Report and the Transition to Open Access"; Hall, "What Does Finch Mean for Researchers, Librarians and Publishers?"

²⁸The current process of assessing research carried out in UK universities

²⁹Hicks, "Performance-Based University Research Funding Systems"; Nolan, Ingleton, and Hayter, "The Research Excellence Framework (REF)"; *ibid.*; Russel Group, "Russell Group Warns That REF Impact Weighting Is Still Too High"; Martin, "The Research Excellence Framework and the 'Impact Agenda'"; Watermeyer, "Impact in the REF"; Watermeyer, "Issues in the Articulation of 'Impact'"; Murphy and Sage, "Perceptions of the UK's Research Excellence Framework 2014"; Mryglod et al., "Predicting Results of the Research Excellence Framework Using Departmental H-Index"; Townsend, "The Publication Game."

literature dealing with the REF's relationship to open access which will be important in understanding the market for scholarly publishing.³⁰ This dissertation explores the role of government in the research process, including the REF before turning to look at the market for scholarly publishing in chapter three.

The Business and Economics of Journal Publishing

To understand the way APCs currently operate and the extent to which policy makers try to influence the market it is important to understand the business and economics of journal publishing more broadly. Literature on this topic by King, Rolnik and others focuses on different areas of the publishing business.³¹ This dissertation will build on this literature, in particular in its consideration of the market for scholarly journals and their monopolistic tendencies.

Literature on the business of journal publishing often aims to identify the size of the market. Angus Phillips calculates some headline figures in support of this claim:

'Journal publishing is big business. The total value of the journals market in 2006 was estimated as \$7 billion. Globally there are around 23,700 peer-reviewed journals available, 1.92 million researchers producing articles, and 1.59 million new articles are published each year.'³²

These sorts of figures and claims about the size of the journal publishing market are often repeated in the literature,³³ It is important, however, to temper these

³⁰Aacock, "Managing Open Access (OA) Workflows at the University of St Andrews"; Sweeney and Johnson, "Seeking a Fresh Perspective"; Hall, "Green or Gold? Open Access After Finch."; Higher Education Funding Council for England, "Policy for Open Access in the Post-2014 Research Excellence Framework (Updated July 2015)"; Harnad, "Harnad Comments on HEFCE/REF Open Access Mandate Proposal"; Harnad, "HEFCE/REF Adopts Optimal Complement to RCUK OA Mandate"; Sykes, "Open Access Gets Tough."; Hall, "Green or Gold? Open Access After Finch."; Harnad, "HEFCE/REF Adopts Optimal Complement to RCUK OA Mandate."

³¹Forgues and Liarte, "Academic Publishing"; Chang, "Business Models for Open Access Journals Publishing"; Phillips, "Business Models in Journals Publishing."; Pinfield, "Is Scholarly Publishing Going from Crisis to Crisis?"; Open Access Directory, "OA Journal Business Models"; Rolnik, Binfield, and Graves, "Publishing 101"; Holmes, "Publishing Trends and Practices in the Scientific Community"; Drake, "Scholarly Communication in Turmoil"; Withey et al., "Sustaining Scholarly Publishing"; Vaughn, "The Future of Scholarly Communication"; Beverungen, Böhm, and Land, "The Poverty of Journal Publishing"; Teute, "To Publish and Perish."

³²Phillips, "Business Models in Journals Publishing."

³³Rolnik, Binfield, and Graves, "Publishing 101," 38; Forgues and Liarte, "Academic Publishing," 740–2.

claims. Whilst \$7 billion is a vast sum, it must be contextualised alongside other publishing markets. Book publishing in the UK alone was estimated as worth £3.3 billion in 2014.³⁴ A wide definition of publishing markets valued the UK at £10 billion in the same year.³⁵

Whilst the size of the market is an important component, what is more significant about journal publishing is the unique way in which academic publishing works. In particular, the issue of substitutability will be considered by drawing on economic literature on monopolistic and online markets.³⁶ It is the specificity of academic journal publishing as a business model which needs to be properly outlined in order to explain the current market for scholarly publishing and the influence of research funders on this market. This dissertation will assess this issue.

Although not all scholarly publishing is for profit, it is a useful starting point for outlining how scholarly publishing works. The growth of 'for profit' publishing is still a relatively recent innovation.³⁷ Early journals published by scholarly societies were not primarily published as 'for profit' enterprises. The first journals, such as those published by the Royal Society and *Journal des sçavans*, were published by scholarly societies with the primary goal of transmitting scientific knowledge.³⁸ Scholars have always found a variety of means to communicate to each other besides journal publication.³⁹ This has included letters,⁴⁰ emails, skype and increasingly social media.⁴¹ Alongside this, scholars have communicated

³⁴The Publishers Association, "The UK Book Publishing Industry in Statistics 2014."

³⁵The Bookseller, "Wider Publishing Industry 'Worth £10bn to UK in 2012'."

³⁶Davies and Cline, "A Consumer Behavior Approach to Modeling Monopolistic Competition"; Zheng and Kaiser, "A Two-Sided, Empirical Model of the Submission and Subscription Markets for Economics Journals"; Welfens and Weske, *Digital Economic Dynamics*; Clay et al., "Retail Strategies on the Web."

³⁷Willinsky, *The Access Principle*, 189.

³⁸Society, "Philosophical Transactions - the World's First Science Journal"; Kronick, "Notes on the Printing History of the Early 'Philosophical Transactions'."

³⁹Morrison, "Economics of Scholarly Communication in Transition"; Marks and Hannay, "Evolving Scholarly Communication."

⁴⁰Blair, *Too Much to Know*.

⁴¹Haustein, Sugimoto, and Larivière, "Guest Editorial"; Ali Al-Aufi and Crystal Fulton, "Impact of Social Networking Tools on Scholarly Communication"; Gu and Widén-Wulff, "Scholarly Communication and Possible Changes in the Context of Social Media"; Tenopir, Volentine, and

ideas in person, whether at conferences or more informal meetings. These other forms of communication continue to play an important role in the communication of new and improved ideas in scholarly research. The topic of ‘scholarly communication’ has an extensive literature associated with it.⁴² An important argument put forward in this dissertation is that academic journals have taken an increasingly important role in scholarly communication for reasons that will be discussed at length in chapter four. This has important consequences for the development of open access publishing. The development of new practices in scholarly publishing will be considered in the conclusion as one potential way of realising the aims of open access more fully.

Models of Open Access Publishing

A variety of models for providing open access exist. There is extensive discussion of these in the ‘introductions’ to open access by Suber and Willinsky,^{43,44} as well as in institutional guides to open access.⁴⁵ Two main models are important to understand for this dissertation: green and gold.

Green open access is:

‘Green OA is where a paper is stored in an online open repository other than the publisher’s system. This can be an institutional repository, or one designated by the funder of the research eg. Europe PubMed Central... The version of the paper released as green OA is normally the accept-

King, “Social Media and Scholarly Reading”; Haustein, Sugimoto, and Larivière, “Social Media in Scholarly Communication.”

⁴²Solomon, “Digital Distribution of Academic Journals and Its Impact on Scholarly Communication”; Waters, “Digital Humanities and the Changing Ecology of Scholarly Communications”; Morrison, “Economics of Scholarly Communication in Transition”; Marks and Hannay, “Evolving Scholarly Communication”; Fitzpatrick, “Giving It Away”; Ali Al-Aufi and Crystal Fulton, “Impact of Social Networking Tools on Scholarly Communication”; Barquinero, “Next-Generation Scholarly Communication”; Leslie, “Peer Review Practices of Mass Communication Scholarly Journals”; Cronin, “Scholarly Communication and Epistemic Cultures”; Morrison, “Scholarly Communication for Librarians”; Meadows, “Scholarly Communication in Transition”; Drake, “Scholarly Communication in Turmoil”; Estelle, “The British National Approach to Scholarly Communication”; De Roure, “The Future of Scholarly Communications.”

⁴³Suber, *Open Access*, 49–75.

⁴⁴Willinsky, *The Access Principle*, 111–16.

⁴⁵City University London, “Open Access to Research.”

ed manuscript: i.e. the paper as accepted for publication, including all changes resulting from peer review, but not necessarily incorporating the publisher's formatting or layout.'⁴⁶

Whilst gold can be defined as:

'Gold OA is where a paper is published immediately as OA in an online journal and is therefore stored in the publisher's system.

Key points to note:

- To cover the costs of gold OA, publishers normally charge a fee to the author or their institution, known as the Article Processing Charge (APC).
- The version of the paper released as gold OA is the version of record: i.e. the publisher's final (formatted) version. Gold does not mean "gold standard" or that it is "better" than Green.'⁴⁷

There are many potential definitions available for green and gold open access.⁴⁸ The above have been provided here because they offer concise definitions which do not reveal an obvious preference for one model. There is an extensive literature discussing the benefits of each model.⁴⁹ Though these debates will inform the dissertation, it is particular issues that have emerged around APCs that will be focused upon. This dissertation will develop the existing literature on gold open access by focusing on the practical implications of implementing this approach.

⁴⁶University of Oxford, "Open Access at Oxford » Glossary."

⁴⁷Ibid.

⁴⁸Suber, *Open Access*, 49–75.

⁴⁹Mac Sithigh and Sheekey, "All That Glitters Is Not Gold, but Is It Diamond?"; Jiří, "Case Study"; Harnad, "Gold Open Access Publishing Must Not Be Allowed to Retard the Progress of Green Open Access Self-Archiving"; Abadal, "Gold or Green"; Hall, "Green or Gold? Open Access After Finch."; Harnad, "How and Why RCUK Open Access Policy Needs Revision"; Peterson, Emmett, and Greenberg, "Open Access and the Author-Pays Problem"; Houghton and Swan, "Planting the Green Seeds for a Golden Harvest"; Fredericks, "Questioning the Efficacy of 'Gold' Open Access to Published Articles"; Jump, "RCUK Takes Open-Access Green Targets Off Fast Track"; Guédon, "The 'Green' and 'Gold' Roads to Open Access."

Article Processing Charges (APCs)

There is a relatively limited, but growing, body of literature on APCs. Björk and Solomon have made a particularly extensive contribution.⁵⁰ Lawson has carried out research into the average spend on APCs across UK institutions,⁵¹ while Martin Eve has outlined the ways in which institutions can achieve open access without the payment of APCs.⁵² Other literature addresses other issues surrounding APCs,⁵³ including how APCs may exclude those in developing countries or those without funding.⁵⁴

The growing literature exploring APCs as a business model is important in forming an understanding of open access publishing as a developing market.⁵⁵ Whilst

⁵⁰Solomon and Björk, "A Study of Open Access Journals Using Article Processing Charges"; Solomon, "APC Funding Survey"; Björk and Solomon, "Article Processing Charges in OA Journals"; Björk and Solomon, "Pricing Principles Used by Scholarly Open Access Publishers."

⁵¹Lawson, "APC pricing."

⁵²Eve, "Co-Operating for Gold Open Access Without APCs."

⁵³Shin, "A Study on APC Subsidy Policies to Encourage OA Publishing"; Hyams, "Are Academic Journals Fit for Purpose?"; Björk and Solomon, "Article Processing Charges in OA Journals"; Eve, "Co-Operating for Gold Open Access Without APCs."; Pinfield, "Is Scholarly Publishing Going from Crisis to Crisis?"; Burchardt, "Researchers Outside APC-Financed Open Access Implications for Scholars Without a Paying Institution"; Cockerill, "The Economics of Open Access Publishing."; Jones, "The First Six Months and the Introduction of Article Processing Charges."; Research Information Network CIC, "The Potential Role for Intermediaries in Managing the Payment of Open Access Article Processing Charges (APCs)"; Brook, "The Sheer Scale of Hybrid Journal Publishing."

⁵⁴Burchardt, "Researchers Outside APC-Financed Open Access Implications for Scholars Without a Paying Institution"; Shah and Gul, "Philosophy of Escapism in the Open Access World."

⁵⁵Solomon and Björk, "A Study of Open Access Journals Using Article Processing Charges"; Shin, "A Study on APC Subsidy Policies to Encourage OA Publishing"; Pinfield, "Is Scholarly Publishing Going from Crisis to Crisis?"; Cockerill, "The Economics of Open Access Publishing."; Jones, "The First Six Months and the Introduction of Article Processing Charges."; Björk and Öörni, "A Method for Comparing Scholarly Journals as Service Providers to Authors"; Björk, "A Study of Innovative Features in Scholarly Open Access Journals"; Solomon and Björk, "A Study of Open Access Journals Using Article Processing Charges"; Björk, Sylwestrzak, and Szprot, "Analysis of Economic Issues Related to Open Access to Scientific Publications"; Björk et al., "Anatomy of Green Open Access"; Laakso and Björk, "Anatomy of Open Access Publishing"; Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges"; Björk, "Have the 'Mega-Journals' Reached the Limits to Growth?"; Björk and Solomon, "How Research

this literature is important in understanding the issues that arise from APCs as a model for funding open access, the literature dealing with APCs in relation to research funders is more limited. It is in this area that the dissertation aims to make a contribution.

Research Funder Policies on the Payment of APCs

Björk and Solomon provide the most extensive assessment of current, and potential, policy options for research funders in the payment of APCs. ‘Developing an Effective Market for Open Access Article Processing Charges’, a report by Bo-Christer Björk and David Solomon⁵⁶ and commissioned by the Wellcome Trust and other research funders, outlined some of the problems relating to the current market for APCs. The problem of high APC charges for hybrid journals was identified in this report. Alongside this, the report sought to:

‘identify and appraise policy options for funders and other stakeholders, through which they can help ensure a competitive and transparent market for scholarly journal APCs that supports the continued development of innovative new approaches.’⁵⁷

This dissertation will cover similar questions, focusing, however, on the role of government and how this relates to the market. There is a limited literature on APC policies for research funders, and the research carried out for this dissertation will begin to address this gap.⁵⁸

In order to address this gap, an eclectic range of literature has been drawn upon. To understand the market for APCs, author surveys have been particularly important.⁵⁹ Alongside the published literature, policy documents and other grey

Funders Can Finance APCs in Full OA and Hybrid Journals.”; Björk, “Open Access to Scientific Publications - an Analysis of the Barriers to Change?”; Björk and Solomon, “Open Access Versus Subscription Journals”; Shen and Björk, “‘Predatory’ Open Access”; Björk and Solomon, “Pricing Principles Used by Scholarly Open Access Publishers”; Björk, “The Hybrid Model for Open Access Publication of Scholarly Articles.”

⁵⁶Solomon and Björk, “Developing an Effective Market for Open Access Article Processing Charges.”

⁵⁷Ibid., 7.

⁵⁸Ibid.; Glover, Webb, and Gleghorn, “Open Access Publishing in the Biomedical Sciences”; Pontika and Rozenberga, “Developing Strategies to Ensure Compliance with Funders’ Open Access Policies.”; Kent and Russell, “Paved with Gold.”

⁵⁹Björk and Öörni, “A Method for Comparing Scholarly Journals as Service Providers to Authors”; Rowlands, Nicholas, and Huntington, “Scholarly Communication in the Digital Environment,” 2004; Schroter and Tite, “Open Access Publishing and Author-Pays Business Models”;

literature, supported by interview responses, give a deeper insight into the current policies of research funders and how these relate to the current market for scholarly publishing.

Gaps in the Literature

Though brief, this literature review has outlined some core themes that inform this dissertation and are important in understanding the implementation of open access. It has also identified gaps in the literature. Whilst there is a growing body of literature on the implementation of open access,⁶⁰ there is a limited amount published on the topic of research funder policies and the payment of APCs. Much of the literature on research funder policy has been carried out by Björk and Solomon,⁶¹ but there is scope for more research in this area. This dissertation will take a different approach to that of Björk and Solomon. Rather than focusing primarily on the practicalities of different potential APC payment policies, this dissertation provides a broader consideration of the place of these policies in broader scholarly publishing practices. Though this dissertation will not seek to offer policy suggestions, it will enhance the understanding of the important considerations that need to be made when forming policies and outline potential directions funders could take.

Nicholas, Jamali, and Rowlands, "On the Tips of Their Tongues"; White, "The Journal Publication Process"; Cozzarelli, Fulton, and Sullenberger, "Results of a PNAS Author Survey on an Open Access Option for Publication"; Dallmeier-Tiessen et al., "Open Access Journals - What Publishers Offer, What Researchers Want."

⁶⁰Tickell, "Implementing Open Access in the United Kingdom."; Meadows, "Scholarly Communication in Transition"; Marks and Janke, "The Future of Academic Publishing"; Morrison, "Economics of Scholarly Communication in Transition."

⁶¹Björk, Sylwestrzak, and Szprot, "Analysis of Economic Issues Related to Open Access to Scientific Publications"; Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges"; Björk and Solomon, "How Research Funders Can Finance APCs in Full OA and Hybrid Journals."; Solomon and Björk, "Publication Fees in Open Access Publishing"; Björk, "The Hybrid Model for Open Access Publication of Scholarly Articles."

Chapter two: The Role of Research Funding Policies in Shaping Open Access

Before discussing the potential interventions of research funders on the market for APCs, it is important to outline the broader context of open access in the UK. This chapter will analyse the emergence and impact of open access as a means for government to more effectively derive the benefits it anticipates from funding scientific research. This will be achieved by outlining and assessing some of the recommendations made in the Finch Report. The Finch Report (2012) was commissioned by the government and many of its recommendations were accepted.⁶² The recommendations of this report contributed to the shaping of government policy and played an important role in shaping the current market for APCs. The approach and recommendations of the Finch Report will then be contrasted with the requirements set out for the next Research Excellence Framework (REF) (2020).⁶³

Though the Finch Report and HEFCE's requirements for submission to the next REF, to be discussed below, both have an impact on the role APCs play in providing open access, APCs are not the main focus of the Finch Report or REF requirements. To understand more fully the relationship between research funding and academic publishing, this chapter will outline the approaches adopted by the Wellcome Trust, a pioneer in the introduction of open access mandates. This will be compared with the approach of the Austrian Science Fund (FWF). The FWF is chosen as a comparison as another major research funder which has taken steps to support the payment of APCs, though its approach differs from that of the Wellcome Trust. Austria has no equivalent of the REF at the present time.⁶⁴ The discussion of research policy in this chapter will be directed at explaining its influence on the market for scholarly publishing.

The Role of Government and Research Funders

Although APCs as a funding model were introduced in 2000, before the introduction of open access mandates, governments have increasingly promoted

⁶²Hawkes, "UK Government Comes down in Favour of Making All Publicly Funded Research 'Open Access'."

⁶³Higher Education Funding Council for England, "Policy for Open Access in the Post-2014 Research Excellence Framework (Updated July 2015)."

⁶⁴Tiefenthaler and others, "ERAWATCH Country Report 2008-an Assessment of Research System and Policies."

APCs as a means of funding open access.⁶⁵ The Finch Report was of particular significance in shaping policy, and, subsequently, the adoption of an open access requirement for the 2020 REF. Alongside government, research funders have actively shaped the context in which open access has developed.

The full title of the Finch Report, *Accessibility, Sustainability, Excellence: How to Expand Access to Research Publications*, highlights the concerns it aimed to address. Whilst many of the aims of Finch reflect concerns expressed by early open access activists, there are also important differences in approach. The Finch Report aimed to tackle:

‘the important question of how to achieve better, faster access to research publications for anyone who wants to read or use them’.⁶⁶

The Report was produced by a group representing a range of viewpoints and interests, including ‘representatives of universities, research funders, learned societies, publishers, and libraries.’⁶⁷ The Report intended to address the issue of ensuring broader access to peer-reviewed outputs.

Government and Open Access

Though not all governments promote open access to research publications, an increasing number of governments have implemented some form of support for open access. Locating overviews of national or government mandates for open access is far from straightforward for a number of reasons. In many cases a number of different agencies are involved in dispersing government supported research funding. These agencies may have different approaches to open access and the requirements to meet mandates may not be the same for different types of research funding (i.e. humanities funding compared to life sciences). One way to get a rough estimation of the growth in government open access policies is through ROARMAP (The Registry of Open Access Repository Mandates and Policies). ROARMAP is a ‘searchable international registry charting the growth of open access mandates and policies adopted by universities, research institutions and research funders that require or request their researchers to provide

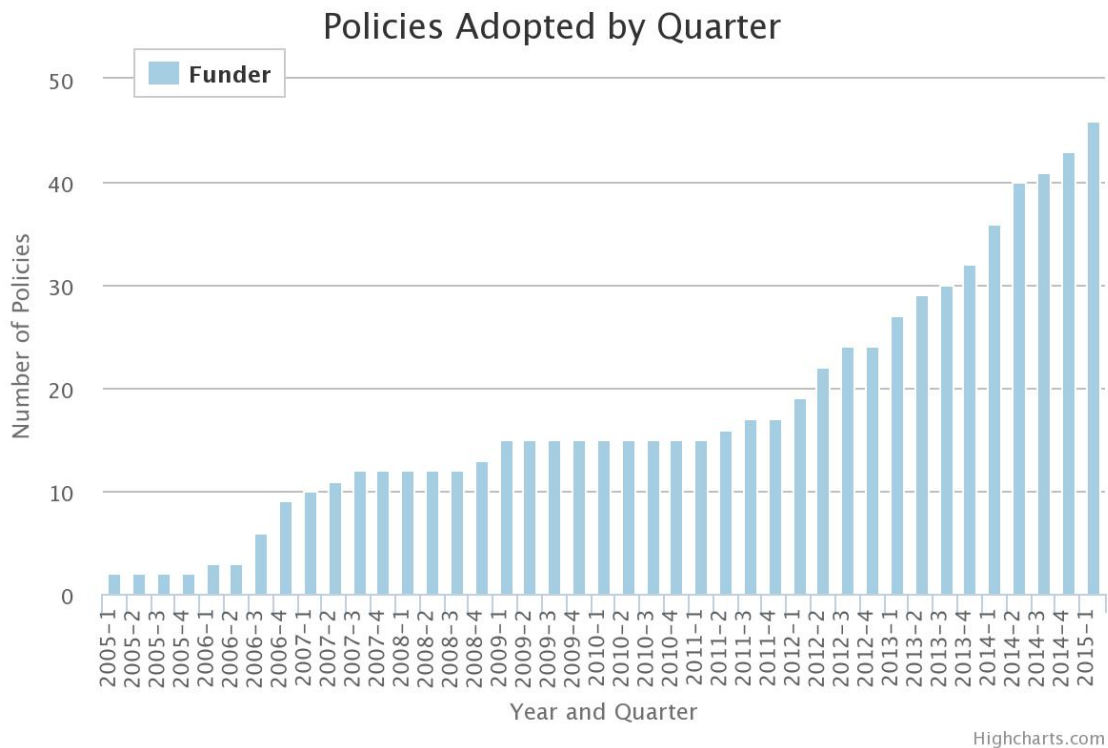
⁶⁵Solomon and Bjork, “A Study of Open Access Journals Using Article Processing Charges.”

⁶⁶Finch, “Accessibility, Sustainability, Excellence,” 2012, 4.

⁶⁷Ibid., 4.

open access to their peer-reviewed research article output by depositing it in an open access repository'.⁶⁸

The graph below illustrates the growth of mandates recorded by ROARMAP as 'funder mandates'. The search used to produce this output has been kept deliberately broad to encompass different types of license requirements, etc. Though this graph includes non-government funding, it is reasonable to assume that because a large amount of research is supported either directly or indirectly by government that some of this drive for policy change must come from government funders. Indeed, assessing the exported results from this ROARMAP search confirms that many of these funders are either directly or indirectly funded by government.



Source: ROARMAP ⁶⁹

The question remains, why are some of these governments pursuing open access mandates? The Finch Report provides a good source to start answering this question.

⁶⁸University of Southampton, "The Registry of Open Access Repository Mandates and Policies (ROARMAP)."

⁶⁹Ibid.

'The internet has brought profound change across all sectors of society and the economy, transforming interactions and relationships, reducing costs, sparking innovation, and overturning established modes of business. Researchers and journal publishers were quick to embrace the digital and online revolutions. But there is a widespread perception, in the UK and across the world, that the full benefits of the advances in technologies and services in the online environment have yet to be realised.'⁷⁰

This statement echoes similar sentiments made by open access advocates in public declarations in favour of open access. Though not all advocates of open access have lobbied from the standpoint of government, with some taking a more philosophical standpoint (i.e. information wants to be free) many have targeted government as one of the main actors that needs to be persuaded of the benefits of open access. As a result of this, open access advocates have made similar arguments to those expressed in the Finch Report about the benefits of open access.

Government Support for Academic Research

In many countries governments are major funders of academic research, and in order to understand why governments support open access, it is useful to evaluate the wider support they give to scientific research. Many of the benefits anticipated from increased open access are primarily associated with extending access to funded research.

Almost all western democratic states support academic research in some way, though levels of funding vary greatly.⁷¹ This includes a broad range of different spending: contributions towards the funding of universities and research institutions as well as direct funding of particular research projects. Though the size of this funding is relatively low as a component of total GDP, governments anticipate a range of public, economic and scientific benefits from this support.⁷²

Literature on government spending on academic research outlines a number of different envisaged benefits.⁷³ One of the main arguments in favour of government spending on academic research relates to the nature of the research being funded. Though private sector businesses at times devote large amounts of fund-

⁷⁰Finch, "Accessibility, Sustainability, Excellence," 2012, 4.

⁷¹Rohn, Curry, and Steele, "UK Research Funding Slumps Below 0.5."

⁷²Grant, "Science Is Vital."

⁷³Leyden and Link, "Why Are Governmental R & D and Private R & D Complements?" Goldfarb, "The Effect of Government Contracting on Academic Research.,David, Hall, and Toole, "Is Public R&D a Complement or Substitute for Private R&D?."

ing to research & development, this spending is primarily directed towards research intended to directly benefit the business. Research funded by the state is not always directly applicable to a particular business use, so is unlikely to be funded by the private sector. Governments, by supporting broader research, anticipate that discoveries and improvements to existing knowledge might be made over a longer time frame, and later utilised in direct applications. This is then anticipated to contribute to economic output.⁷⁴ Economic models have been developed to assess the contribution of government spending on research on business revenue.⁷⁵

Though funding for academic research and further education is usually not determined directly by these criteria, it partly steers funding decisions. Different governments take different approaches to funding criteria.⁷⁶ Some countries, such as France, take a more distanced approach and direct their criteria for funding primarily towards the academic impact of this research. Meanwhile, the UK government has become increasingly directive in the criteria it values in research, and demands demonstration of intended impact.

The desire for research to produce ‘impact’ has been increasingly outlined in the criteria for research funding by UK research councils. Richard Watermeyer argues that:

‘Universities in the United Kingdom (UK) and across Europe are increasingly mobilised to facilitate the prosperity of national and global knowledge economies and as gate-keepers of an information society... This is reflected in a more pronounced strategic and organisational focus on the transfer, translation and commercialisation of academic knowledge.’⁷⁷

This link between research and prosperity has increasingly been assessed as a criteria for research funding in the UK.⁷⁸ The role of impact, especially when understood narrowly (i.e predominately in terms of citation counts etc.), will be returned to in subsequent chapters.

The Finch Report provides a concise summary of the role governments are envisaged to play in funding research:

⁷⁴Walwyn, “Finland and the Mobile Phone Industry.”

⁷⁵Hartmann, “Linking R&D Spending to Revenue Growth.”

⁷⁶Rebora and Turri, “The UK and Italian Research Assessment Exercises Face to Face.”

⁷⁷Watermeyer, “Issues in the Articulation of ‘Impact’.”

⁷⁸Russel Group, “Russell Group Warns That REF Impact Weighting Is Still Too High”; Commission, “Horizon 2020”; Baker.

‘Governments tend to be the major funders of the basic and applied research that results in such findings; and they have increased – or at least sought to protect – their budgets for investment in research because they see such investment as an essential underpinning for a successful modern economy and society.’⁷⁹

Why Do Governments Support Open Access?

There is much overlap between government support of open access and the wider benefits of public funding for science, as open access extends the value of research support and provides ‘better value for money’. This notion of ‘value for money’ is one that is frequently raised around the best models for transitioning to open access, and in particular in relation to APCs.

The Finch Report highlights the following benefits accruing from open access:

‘Improving the flows of the information and knowledge that research produce will promote:

- enhanced transparency, openness and accountability, and public engagement with research;
- closer linkages between research and innovation, with benefits for public policy and services, and for economic growth;
- improved efficiency in the research process itself, through increases in the amount of information that is readily accessible, reductions in the time spent in finding it, and greater use of the latest tools and services to organise, manipulate and analyse it; and
- increased returns on the investments made in research, especially the investments from public funds.’⁸⁰

‘Enhanced transparency’ can be related to a general shift towards ‘open government’. Some argue that ‘openness and transparency are now considered to be an essential part of any modern government.’⁸¹ A general shift in government rhetoric has taken place in the US, the UK, and many other countries.⁸² Barack Obama issued a memorandum on January 21, 2009 in which he stated:

‘My Administration is committed to creating an unprecedented level of openness in Government. We will work together to ensure the public trust and establish a system of transparency, public

⁷⁹Finch, “Accessibility, Sustainability, Excellence,” 2012, 22.

⁸⁰Ibid.

⁸¹Pedley, *Essential Law for Information Professionals*, 106.

⁸²Van Strien, “What Are the Main Barriers to People Being Able to Re-Use Public Sector Information and How Does the UK and EU Legislation Try to Address This? Will the UK Implementation of Directive 2013/37/EU Improve the Situation, and If so How?”

participation, and collaboration. Openness will strengthen our democracy and promote efficiency and effectiveness in Government.⁸³

In the UK David Cameron has made similar commitments to creating a more open government:

‘Greater transparency across Government is at the heart of our shared commitment to enable the public to hold politicians and public bodies to account; to reduce the deficit and deliver better value for money in public spending; and to realise significant economic benefits by enabling businesses and non-profit organisations to build innovative applications and websites using public data.’⁸⁴

A closer link between research and innovation is facilitated by removing barriers to access research findings. Though this is not applicable to all research, as with open data, there are hopes that open access publishing will provide a useful resource to business, both in directly supplying useful knowledge and also in applying that knowledge which had not been anticipated. In the US, arguments from government on the benefits of open access have tied it more closely to the right of taxpayers to access research they have helped fund.⁸⁵

The UK government’s proposed implementation of open access represents an influential factor both in shaping debates, and also, and arguably more importantly, in defining the approaches to open access required for future REF.

Finch Report: Recommendations for a Transition to Open Access

This brief overview of some of the reasons why government has increasingly supported open access, and how this relates to more general aims behind research funding, contextualises and explains some of the decisions governments have made on the implementation and transition to open access. Though this dissertation is not focused solely on government research funders they are important in creating the landscape in which all research funders will operate.

⁸³Obama, “Transparency and Open Government.”

⁸⁴Cameron, “Letter to Government Departments on Opening up Data.”

⁸⁵Noorden, “White House Announces New US Open-Access Policy.”

The Principles of the Finch Report

‘There is now a broad consensus, that includes for-profit publishers, that open access is the way of the future. The debate – and disagreement – is about the policies that are best suited to steering this transition.’⁸⁶

Many have echoed the sentiments of Martin Hall that there is a broad consensus around open access that will direct future scholarly publishing, but much debate has focused on the best way for this to be implemented, in particular whether green or gold is the preferred model for open access.⁸⁷ The Finch Report made a number of key recommendations in relation to gold open access.

The first recommendation of the Finch Report clearly sets out a preference for gold or hybrid open access funded by APCs:

‘a clear policy direction should be set towards support for publication in open access or hybrid journals, funded by APCs, as the main vehicle for the publication of research, especially when it is publicly funded’.⁸⁸

The Finch Report provides a number of main arguments about why this model of open access is preferred.⁸⁹ Commencing with an overview of the current state of scholarly publishing, the Finch Report then outlines the criteria it aims to address in making proposals for implementing open access in the UK. One key consideration is that:

‘communicating research costs money, and that judgements about the most appropriate channels and mechanisms for increasing access are in part judgements about costs and benefits; and about who meets the costs and how.’⁹⁰

Before turning to address the question of how costs will be met, the Report goes on to outline four principles that have prompted its recommendations. These principles are worth quoting extensively:

‘i. Access: our aim is to increase access to the published findings of research produced in the UK and the rest of the world for the benefit not only of researchers but also for the many people and organisations – in the public, commercial and voluntary sectors, as well as in society at large –

⁸⁶Hall, “Green or Gold? Open Access After Finch.”

⁸⁷Ibid.; Abadal, “Gold or Green”; Björk et al., “Anatomy of Green Open Access”; Laakso, “Green Open Access Policies of Scholarly Journal Publishers”; Oppenheim, “Electronic Scholarly Publishing and Open Access”; Peek, “Comparing U.S. and U.K. Gold.”

⁸⁸Finch, “Accessibility, Sustainability, Excellence,” 2012, 7.

⁸⁹Ibid.

⁹⁰Ibid., 17.

who have an interest in those findings. ii. Usability: there are now nearly two million peer-reviewed articles published in journals each year, along with huge volumes of monographs, reports working papers and other relevant information. In order to be able to use them effectively, researchers and others need help to navigate their way around and to interpret the inexorably-increasing volumes of research literature; and to be able to the full range of the latest tools to enable them to organise, analyse and manipulate the content relevant to their work. iii. Quality: UK researchers are world-leading in the quality as well as the quantity of the work they produce. Their standing is underpinned by systems to ensure that they have effective and high-quality channels through which they can publish and disseminate their findings, and that they perform to the best standards by subjecting their published findings to rigorous peer review. Neither the quality and standing of the UK research community nor the underpinning of high-quality publishing channels must be put at risk. iv. Costs and sustainability: the costs of research communications constitute a relatively small but nevertheless significant component in the overall costs of research. Those costs must be kept in check; but at the same time it is important that in seeking change, we do not put at risk the fundamental functions and purposes of a research communications and publishing system that operates in the interests of researchers.⁹¹

These principles must be kept in mind when assessing the recommendations made in the Finch Report. A number of criticisms have been levelled at the Finch Report.⁹² The criticisms need to be set in the context of why certain policy suggestions were made in the Report. The next section will look at one of the key recommendations made in the Finch Report: the preference for gold open access.⁹³

A Recommendation for Gold (and Hybrid) Open Access

The Finch Report produced a fairly extensive list of recommendations, some of which were subsequently adopted by UK government. The recommendation of most interest when considering the current market for APCs and policies regarding their payment, is the preference made in the Finch Report for gold and hybrid open access. This recommendation appears in a number of different places within the Report. The executive summary of the Report outlines as the first recommendation:

⁹¹Ibid., 17–8.

⁹²Harnad, “Why the UK Should Not Heed the Finch Report”; Prior, “Key Issue - the ‘Finch Report’”; Pinfield, “Is Scholarly Publishing Going from Crisis to Crisis?”; Verhagen, “Hybrid OA - a Way to Go?.”; Hall, “Green or Gold? Open Access After Finch.”; Abadal, “Gold or Green”; Jump, “Finch’s Open-Access Cure May Be ‘Worse Than the Disease’”; Jump, “Finch Access Plan Unlikely to Fly Across the Atlantic.”

⁹³Finch, “Accessibility, Sustainability, Excellence,” 2012, 125.

‘a clear policy direction should be set towards support for publication in open access or hybrid journals, funded by APCs, as the main vehicle for the publication of research, especially when it is publicly funded’.⁹⁴

This suggestion is followed by a further recommendation in relation to APCs:

‘ii. the Research Councils and other public sector bodies funding research in the UK should – following the Wellcome Trust’s initiative in this area but recognizing the specific natures of different funding streams - establish more effective and flexible arrangements to meet the costs of publishing in open access and hybrid journals.’⁹⁵

These recommendations have a variety of implications regarding choice in research funder policy. Firstly, the recommendations of the Finch Report were (to a large extent) implemented in a variety of ways by the UK government. As a major funder of research, the government’s approach to open access and the funding of APCs significantly shapes the open access landscape in the UK. The preference for gold publishing, however, has further implications for the market for APCs. A full shift towards gold open access, funded by APCs, would represent a fundamental shift away from the business models currently utilised by the majority of publishers. Potential implications of such an approach are outlined in this dissertation. Though it would be interesting to explore in detail the way in which the Finch Report has shaped Research Council UK (RCUK) policy on open access this issue will only be discussed briefly.

HEFCE: A Green Mandate

Following on from the Finch Report, one of the most significant developments in the UK’s open access landscape was the introduction of a mandate for green open access post the 2014 REF. The REF:

‘is the new system for assessing the quality of research in UK higher education institutions.’⁹⁶

The REF process involves a number of different steps to determine the quality of the research output of UK universities⁹⁷ (the exact process taken in the REF is beyond the scope of this dissertation). The processes and purpose of the REF are

⁹⁴Ibid., 10.

⁹⁵Ibid., 10.

⁹⁶Higher Education Funding Council for England, “Open Access Research.”

⁹⁷Ibid.

frequently criticised.⁹⁸ This has led to disagreement between open access advocates whether they should commend the mandate introduced for the next REF. The influence of the REF in academic publishing will be discussed in more depth in the following chapter. What is already important to note at this point is that the outcome of the REF determines, in a large part, the level of research funding received by universities.⁹⁹ This outcome already makes clear the importance for researchers, and their institutions, of complying with the requirements of the REF.

The reasons given by HEFCE in favour of open access are similar to the reasons given by other government organisations:

'We believe that all research arising from HEFCE funding should be as widely and freely accessible as the available channels for dissemination will allow.

We believe this will:

- enable the prompt and widespread dissemination of research findings
- benefit both the efficiency of the research process and economic growth driven by publicly funded research
- increase public understanding of research.'¹⁰⁰

However, unlike the approach taken by Finch and partially adopted by RCUK, HEFCE does not favour, or require, gold open access. Though some have interpreted this as a decision based on a preference by HEFCE for the gold model based on *total* costs,¹⁰¹ HEFCE's policy statements suggest that it is rather the cost at an *institutional* level that is of concern:

'Institutions can achieve full compliance without incurring any additional publication costs through article processing charges.'¹⁰²

Though this statement discusses APCs, it does so in the context of compliance, not 'total spend' on open access. Because of the importance of the REF for funding, and the large amount of work and money that already goes into REF sub-

⁹⁸Nolan, Ingleton, and Hayter, "The Research Excellence Framework (REF)"; Russel Group, "Russell Group Warns That REF Impact Weighting Is Still Too High."

⁹⁹Higher Education Funding Council for England, "Research Excellence Framework."

¹⁰⁰Higher Education Funding Council for England, "Open Access Research."

¹⁰¹Harnad, "HEFCE/REF Adopts Optimal Complement to RCUK OA Mandate."

¹⁰²Higher Education Funding Council for England, "Policy for Open Access in the Post-2014 Research Excellence Framework (Updated July 2015)."

mission,¹⁰³ HEFCE's mandate presumably tries to minimise any additional institutional costs.

The requirements of the next REF are likely to ensure that more research outputs will be made available in green open access. Poynder has disputed the faith open access advocates have placed in the REF to increase open access outputs. Not all academics and not all work will be submitted to REF, meaning coverage will certainly not be total.¹⁰⁴ Poynder has also criticised open access advocates' uncritical praise of the REF policy:

'Is compulsion really essential? There is, after all, an alternative green OA model — the so-called Harvard model. This is a voluntary approach... Is not the ultimate test of a successful repository the number of downloads, not the number of uploads?'¹⁰⁵

The issue of 'stick versus carrot' is one that is frequently raised in relation to discussion of open access policy. The implementation of a green requirement for the next REF will likely increase the number of publications found in an open access form. However, it does not automatically make a positive case for open access to researchers. When many already have a poor perception of the REF, it possible that linking open access to the REF will not enhance authors' perceptions and understanding of open access.¹⁰⁶

The implementation of the REF requirement diverges from the recommendations made in the Finch Report, particularly in not mandating gold open access. It instead requires researchers to submit their work to a repository. This approach may also, as a result, do less to disrupt the market for scholarly publishing in its current form. However, the REF, through influencing author behaviour, already impacts on scholarly publishing to a significant extent. These issues will be returned to in the next chapter.

Though having an influence on other funding policies, REF does not set the policy for other research funders directly. Other funders may choose different approaches and have a different impact on the market for scholarly publishing. It is

¹⁰³Sayer; Scott.

¹⁰⁴Poynder, "Open Access and the Research Excellence Framework," February 2015, Poynder, "Open Access and the Research Excellence Framework," February 2015.

¹⁰⁵Poynder, "Open Access and the Research Excellence Framework," February 2015.

¹⁰⁶Watermeyer, "Impact in the REF"; Murphy and Sage, "Perceptions of the UK's Research Excellence Framework 2014"; Russel Group, "Russell Group Warns That REF Impact Weighting Is Still Too High."

therefore important that this is also assessed when looking at the market for APCs and the role policy has in shaping this market. It is also important that the influence of REF on the market for scholarly publishing is considered more broadly. The approach taken by HEFCE has been praised by critics of the Finch Report.¹⁰⁷ Steve Harnard suggests that following the REF approach will avoid large amounts of money being spent on implementing gold open access, whilst still meeting its basic aims of making research available.¹⁰⁸ The next section will turn to look at the approach taken by the Wellcome Trust and the Austrian Science Fund (FWF), which place much greater emphasis on APCs as a means of achieving open access. The third chapter will go on to look at the possible impact of these different approaches on the market for APCs.

Research Funder Approaches to Open Access

Research funders play an important role in academic publishing and in facilitating research more broadly. This support comes in a range of forms, varying between disciplines, and including funded leave, lab equipment, conference attendance, teaching buyout, research expenses, and, increasingly, contributing towards the costs associated with research publication. Research funders can thus influence the market for open access publishing in a number of ways. In order to assess how this influence works, and whether it can be made to function more effectively, it is important to outline the policies and approaches of research funders in relation to open access publishing.

The Wellcome Trust has played a leading role in the development and implementation of open access in the UK and provides an important case study. The Wellcome Trust was the first research funder in the UK to introduce a mandatory open access policy.¹⁰⁹ As an early pioneer in mandating and funding open access, the Wellcome Trust is an important point of reference for the development of other policies,¹¹⁰ and the next section will outline the differences in aims and objectives between the Wellcome Trust and the FWF.

¹⁰⁷Harnad, "HEFCE/REF Adopts Optimal Complement to RCUK OA Mandate."

¹⁰⁸Harnard is dismissive of the need for open licenses suggesting text mining is only being used by a small number of researchers. However, a large reason why this approach to research is still limited is because of the lack of easily and legally usable collections to carry out text mining on.

¹⁰⁹Gray, "10 Years of Open Access at the Wellcome Trust in 10 Numbers."

¹¹⁰Finch, "Accessibility, Sustainability, Excellence," 2012, 7.

The Aims of the Wellcome Trust and Austrian Science Fund's Open Access Policies

The Wellcome Trust, in a similar way to government support of open access, positions its open access policy as an extension of its broader mission to 'improve health by supporting bright minds in science, the humanities and social sciences, and public engagement.'¹¹¹ The outputs of this work produce new ideas and knowledge, which the 'Trust expects its researchers to publish as high-quality, peer-reviewed articles, monographs and book chapters.'¹¹² Open access is suggested to provide the most effective means of disseminating these research outputs:

'The Wellcome Trust believes that maximising the distribution of these publications - by providing free, online access - is the most effective way of ensuring that the research we fund can be accessed, read and built upon.'¹¹³

These aims were confirmed during my interviews with Robert Kiley (head of Digital Services at the Wellcome Library). He emphasised that ten years after introducing their open access policy, its central aim remained ensuring that the articles they funded were freely available.¹¹⁴

The aims outlined by the FWF in support of open access are more concise than those of the Wellcome Trust and are linked to their support for the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities.¹¹⁵ The Berlin Declaration states the belief that:

'[the] mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society. New possibilities of knowledge dissemination not only through the classical form but also and increasingly through the open access paradigm via the Internet have to be supported. We define open access as a comprehensive source of human knowledge and cultural heritage that has been approved by the scientific community.'¹¹⁶

¹¹¹Wellcome Trust, "Open Access Policy," n.d.

¹¹²Ibid.

¹¹³Ibid.

¹¹⁴Robert Kiley (Wellcome Trust) interview with author 21 October 2015

¹¹⁵Austrian Science Fund, "Open Access Policy for FWF-Funded Projects."

¹¹⁶The Berlin Conference, "Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities."

Though not signatories of the Berlin Declaration, the Wellcome Trust Position Statement on Open Access was published in the same year,¹¹⁷ and outlines a broadly similar approach: that open access can make use of the new technologies of electronic publishing and the web to increase dissemination of research much further than that allowed by existing publishing models. From this increased dissemination, a variety of other benefits are expected to follow: improvements in research practice, new scientific discoveries and greater equality in access to information. The policies of these research funders, and indeed, most policies and statements on open access (where it is supported) outline broadly similar envisaged benefits. Where differences lie is in the approach different research funders have taken to the practical questions of implementing, and, in particular, paying for open access.

Research Funder Support for Open Access

There are a number of different ways in which research funders can support open access, exemplified in the cases of the Wellcome Trust and FWF.

Open Access Mandates

‘Almost all the authors in both groups said that if publishing their work in an open access outlet were a condition of a grant-awarding body they would comply; fewer than ten percent said this condition would make them look elsewhere for funding.’¹¹⁸

There are a variety of different types of open access mandate.¹¹⁹ Some policies merely express a preference for research to be published in an open access format. Most ‘stronger’ mandates make a ‘requirement’ for the rights of an article to be retained, so that an article can be deposited in a repository and green open access requirements can be met. Suber has pointed out that, though the term ‘mandate’ can imply a requirement to publish in open access form, there are often loopholes.¹²⁰ Though there are varying levels of ‘stick’ and ‘carrot’ when mandating open access, even the strongest mandates still rely on a voluntary contract between the researcher and the research funder.

The open access mandates of research funders are an important component of their support for open access for a number of reasons. The introduction of open

¹¹⁷Sparc Europe, “OA Statements and Declarations – Links and Resources.”

¹¹⁸Swan and Brown, “JISC/OSI Journal Authors Survey Report,” 2.

¹¹⁹Suber, *Open Access*, p77-86.

¹²⁰*Ibid.*, p77-86.

access mandates provided, and continues to provide, a very clear indication of the research funders' support for open access to researchers, other funders, government and the public. This indication of support is further enhanced when the institution has an existing reputation or prestige associated with it. Through this public support for open access, the arguments of open access advocates are further legitimised.

A further, though potentially variable, outcome is that more research will be published in open access form as a result of a mandate. Whether this is primarily green or gold will depend on the particular mandate and the way in which mandates are implemented. The number of articles published in an open access form can depend on the type and size of grants and the nature of the research being carried out, as these will produce different levels of scholarly output in the form of published work. Apart from these criteria, other factors can influence how successful this component of a mandate is. The availability of appropriate venues for publishing, the level of education amongst researchers about the mandate, and the monitoring of compliance, can all influence the success of mandates. These issues will be discussed in greater depth below.

A final, and closely related, benefit of open access mandates is that they potentially give research funders the ability to influence the 'landscape' or 'market' of open access more broadly. This influence will be discussed in much greater depth in this chapter, and is often tied to other components of the support for open access. However, a mandate is the starting point for much of this influence. A mandate itself can already lead to the development or expansion of repositories, changing policies for existing journal publishers, providing an incentive for new publishers to consider these mandates. For large research funders this influence can be quite significant.¹²¹

The Wellcome Trust announced their open access policy in 2005:

'The Wellcome Trust has announced that from 1st October 2005, all papers from new research projects must be deposited in PubMed Central or UK PubMed Central - once it has been formed - within 6 months of publication. The move comes as part of a drive from the UK's biggest medical research charity to push forward open access publication of scientific literature, making findings freely available to those who want to see them.'¹²²

¹²¹"Publishers' Policies on the NIH Public Access Policy."

¹²²"Wellcome Trust Announces Open Access Plans."

Since the introduction of this mandate, the Wellcome Trust has continued to develop its policy in relation to open access but the introduction of a mandate undoubtedly provided an important starting point.

Education

In addition to mandates, research funders are also able to support open access by providing education in a number of forms about the envisaged benefits of open access, the means of facilitating open access and the benefits for researchers in publishing in this way. This role is not one exclusively carried out by research funders with academic librarians,¹²³ universities, colleagues and publishers all contributing. Both the Wellcome Trust and the FWF provide a variety of support to educate the researchers they fund about the benefits of open access, including information on their websites.¹²⁴ Educating researchers often involves particular issues around the research funders requirements for compliance with their policies. This will therefore be an important question to consider when thinking about how research funders can influence the market for APCs. If researchers are confused about the funders policy or it frequently changes, then it will become more difficult for researchers to comply and for research funders to have a positive impact on the market.

Monitoring Compliance

Related to the above point, the monitoring of compliance with mandates is a potentially important aspect of providing support for open access and ensuring the aims of a research funder's organisation are met. Compliance refers to the adherence of a researcher to open access policy, such as the requirement for a certain type of license, or it can refer to the broader criteria and whether the outputs of research funding have been published in an open access form.¹²⁵ The question of compliance is becoming an increasingly prominent one with the HEFCE requirement for articles submitted to the next REF to be open access. This has led universities to try to develop processes to ensure that their researchers will meet

¹²³Mullen, "Index"; Mullen, "Collection Development Librarians and Open Access"; Rodriguez, "Scholarly Communications Competencies"; Linlin, "Riding the Wave of Open Access."

¹²⁴Austrian Science Fund, "Open Access Policy for FWF-Funded Projects"; Wellcome Trust, "Open Access Policy," n.d.

¹²⁵Corbyn, "Low Compliance with Open-Access Rule Criticised."

these requirements.¹²⁶ Both the Wellcome Trust and the FWF are attempting to monitor compliance with their policies in a number of different ways. However, a question for research funders remains: how to best ensure compliance with their policies? A variety of approaches have been attempted. The FWF from 2016 will only accept final reports on grants when all publications have been made open access.¹²⁷ The FWF require that compliance:

‘with FWF’s Open Access Policy [is] demonstrated by providing a persistent address where the full text of the publication can be accessed, read and downloaded. This address may either be an ID associated with a recognised service (DOI, identifier of PubMedCentral, ArXiv, RePEc, SSRN or Datacite DOI) or other persistent addresses that can be guaranteed to be resolvable for at least ten years.’¹²⁸

The Wellcome Trust outlines in more depth the outcomes for non-compliance:

- ‘Where non-compliant papers are identified in an End of Grant Report, the Trust will withhold the final 10 per cent of the “total transferable funds” budget on the grant until all papers comply. [See 10 per cent retention policy](#).
- Applicants will be required to ensure that Trust-funded papers resulting from current or previous grants are compliant before formal notification of any funding renewals or new grants can be issued.
- Researchers will not be permitted to include any non-compliant Wellcome-funded publications in any application submitted to the Trust; such papers will be removed from the application and therefore discounted from consideration of a researcher’s track record.’¹²⁹

This policy outlines a clear consequence for not complying with mandates. The Wellcome outline their 10 per cent retention policy in more detail:

‘The end-of-grant report has been identified as a key tool in assessing the grants we have funded, enabling us to review the outputs and outcomes of recently completed research, assess the quality of the research undertaken and identify important questions raised.’¹³⁰

Compliance is an important issue for research funders. If they have low compliance then they will not have succeeded in achieving the hoped-for benefits of open access. Robert Kiley made it clear throughout the interview that the Wellcome Trust were keen to ‘bring authors along’ with their approach rather than

¹²⁶Pontika, “Why Principal Investigators Funded by the US National Institutes of Health Publish in the Public Library of Science Journals.”

¹²⁷Austrian Science Fund, “Open Access Policy for FWF-Funded Projects.”

¹²⁸Ibid.

¹²⁹Wellcome Trust, “Authors’ FAQs.”

¹³⁰Wellcome Trust, “10 Per Cent Retention Policy.”

‘punishing’ them for not complying.¹³¹ The Wellcome Trust wanted to convey the benefits of open access to authors as a motivator rather than using the threat of withholding funding or other penalties, the commonly highlighted benefit of increased citations¹³² being just one of the potential benefits for authors. However, alongside outlining the benefits, both the Wellcome Trust and FWF support researchers financially in making their work open access through the provision of support for APCs. i

Paying for APCs

The payment of APCs for researchers offers a clear, direct means for research funders to support the development of open access, and an increasing number of research funders have started offering some level of support for the payment of APCs. A growing number of universities are also adding their support to the management of block grants for the payment of APCs, supplementing these payments with their own contributions.

Both the Wellcome Trust and the FWF currently provide support for the payment of APCs. This support is often interpreted as support for gold over green open access.¹³³ However, neither the Wellcome Trust or the FWF require the use of gold open access.¹³⁴ Both funders require articles to be deposited in repositories regardless of the original publishing venue with an embargo of no more than 6 months for the Wellcome Trust and no more than 12 months for FWF.¹³⁵ This policy allows increased access to research whilst also helping to ensure preservation of research findings.¹³⁶ Research funders have tried to be increasingly open about their spending on APCs, aiming to make discussions about the cost of open access more evidence based.¹³⁷

¹³¹Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

¹³²Gaulé and Maystre, “Getting Cited.”

¹³³Jump, “Fools’ Gold?”

¹³⁴Wellcome Trust, “Open Access Policy,” n.d.; Austrian Science Fund, “Open Access Policy for FWF-Funded Projects.”

¹³⁵Wellcome Trust, “Open Access Policy,” n.d.; Austrian Science Fund, “Open Access Policy for FWF-Funded Projects.”

¹³⁶Guédon, “The ‘Green’ and ‘Gold’ Roads to Open Access.”

¹³⁷Kiley, “Wellcome Trust Open Access (OA) Spend and Compliance Monitoring”; Lawson, “Jisc Collections Aggregated APC Data 2014”; Bielefeld University, “Datasets on Fee-Based Open Ac-

Alongside the issue of compliance, the monitoring of costs, which will be discussed in much more depth below, is a growing concern. The publication of APC spend data has often attempted to assess compliance. It is clear from the current level of compliance that paying for APCs alone is not enough to ensure compliance. The availability of venues for publication, the prestige attached to particular journals and potential non-compliance from publisher all contribute to a lower compliance rate.

Alongside the issue of compliance, research funders also need to tackle the major issue of monitoring and publishing the costs of APCs, both on average and in total. Questions have been posed about the costs of the transition to open access,¹³⁸ notably the issue of how much research funders want to spend out of their own budgets, both as part of the total spent on publishing and as a percentage of total spend on research.¹³⁹ It is worth pointing out that for some disciplines where the costs of carrying out the research itself are very high the percentage of a total grant spent on publishing results will be relatively low. However, this is not always the case, and research funders may still want to lower these costs if possible.

Research funders may also have a broader aim of influencing the market for APCs. Though some research funders may be able to cover the cost of high APCs, smaller research funders, or institutions or disciplines which tend to have lower levels of funding, may struggle. Some research funders are beginning to explore options to make the market for APCs less dysfunctional.¹⁴⁰ The way in which this support currently works and the way in which research funders are currently influencing the market for APCs and may try to influence this market in the future, will be the focus of the remainder of this chapter.

cess Publishing Across German Institutions"; Reckling and Rieck, "Austrian Science Fund (FWF) Publication Cost Data 2014."

¹³⁸Shieber, "The Occasional Pamphlet"; Pinfield, "Can Open Access Repositories and Peer-Reviewed Journals Coexist?"; Houghton and Oppenheim, "The Economic Implications of Alternative Publishing Models."

¹³⁹Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

¹⁴⁰Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges."

The Different Approaches of Open Access: HEFCE and the Wellcome Trust

There are a number of differences between HEFCE policy for open access and those of research funders such as the Wellcome Trust and FWF. These differences are summarised in the table below:

Wellcome Trust	HEFCE
Green	Gold
APCs	Repositories
Publishers providing service	Institutions

Source: Wellcome Trust and HEFCE open access policies

This table outlines the key differences in approach between the Wellcome Trust and HEFCE. It does not, however, explain why these differences exist. It could be suggested that the key difference is a preference for gold open access, achieved through APCs by the Wellcome Trust and a preference for green, achieved via repositories by HEFCE. Whilst it is possible to make this distinction both in terms of policy and in the likely channels used to achieve open access, the main difference between the approaches is not green vs gold.

Though the Wellcome Trust and HEFCE's policies both make use of a particular type of open access, their reasoning has more to do with the aims and scope of the organisations.

	HEFCE	Wellcome Trust
Fund Research	Not directly through the REF	Yes
Pay for publishing	Not directly	Yes
Government organisation	Yes	No
Number of articles impacted by policy	191,232	2556

Source: Wellcome Trust and FWF open access policy¹⁴¹

¹⁴¹Wellcome Trust, "Open Access Policy," n.d.; Austrian Science Fund, "Open Access Policy for FWF-Funded Projects"; Higher Education Funding Council for England.

The above table again is a crude summary of the differences between the two organisations. The Wellcome Trust *directly* funds research. It does this by allowing researchers and institutions to submit applications either for core or capital funding or for particular funding schemes or projects. HEFCE in contrast funds research indirectly. These different funding channels lead to differences in the demands and expectations that these organisations can place on those they fund. This becomes especially true in cases where the Wellcome Trust directly funds the costs of publishing. HEFCE instead states that additional costs should not be incurred to meet their mandate for institutions.¹⁴² Some have interpreted this as a decision to pursue a lower ‘total cost’ for publishing open access, i.e. to avoid costs associated with APCs for gold and hybrid publishing. However, this is not a declared aim of HEFCE and largely relates to the fact that HEFCE would place a strong burden on researchers to find funding for the payment of APCs when they themselves do not cover this cost.

HEFCE envisages the REF as a means to assess research outputs. This assessment is about judging the ‘excellence’ of research. HEFCE, like the government and RCUK, increasingly regard making research results available as a component of achieving this excellence. HEFCE outline similar aims to the government in supporting open access. For HEFCE these aims are more readily achieved through the green rather than the gold route. The Wellcome Trust places a greater emphasis on gold because they favour immediate access to the version of record, with an open license that will allow for data and text mining.¹⁴³ The Wellcome Trust also make clear that in paying for APCs they believe they can demand certain services from publishers, something that will be returned to in subsequent chapters. Though HEFCE and the Wellcome Trust have taken different approaches, these institutions have both had an impact on the market for scholarly publishing. The extent to which this influence can be ‘actively’ used will be explored below.

Conclusion: The Influence of Government and Research Funders on Scholarly Publishing

This chapter has demonstrated that the research policies of both government and research funders increasingly express support for open access. This pursuit of open access has often been presented as offering a way of enhancing existing re-

¹⁴²Higher Education Funding Council for England, “Open Access Research.”

¹⁴³Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

search objectives. HEFCE and the Wellcome Trust have taken different approaches in their policies towards open access, with the Wellcome Trust policy placing a much greater emphasis on APCs as a means of achieving open access, whilst HEFCE has mandated for green. As discussed, the differences in policies are not primarily ideological but are rather based on the different aims of their policies, their different roles in research funding, and the different resources available to these organisations to pursue open access. What remains an important question in relation to these policies, is the impact they will have on the market for scholarly publishing, a market which is partially created by research funders, but is not necessarily easily controlled by them.

Government policy plays a major role in shaping scholarly practices and priorities through its funding decisions, its policy approaches and its assessment of research outputs. It would be reasonable, as a result of this to assume that the market for scholarly publishing, including the market for APCs, would be influenced by government decisions. Similarly, with the support research funders provide to researchers in publishing, either directly through payment of APC, or indirectly through supporting research, it could be speculated that research funders also influence the market for scholarly publishing. The types and requirements of mandates and the financial support associated with them all potentially have an influence on the functioning of scholarly markets.

The decision by HEFCE to mandate green open access has had a number of potential impacts on the market for scholarly publishing and APCs. Some have suggested that the recommendations made in the Finch Report would merely increase the amount of money spent on hybrid publishing without significantly moving open access forward.¹⁴⁴ This argument has merit but the approach suggested by Harnad et al does not offer obvious explanations of how the market will be influenced to provide more open access. Though the debate between green and gold is not the focus of this dissertation, it is important to recognise the potentially limited impact of green open access, especially when embargoes may be maintained, on the broader market for scholarly publishing. It is in this area where research funders have arguably played a leading role.

‘Gold open access is being appropriated by publishers, with the apparent blessing of the UK government. As a result, publishers are migrating their journals to an open access environment on their own terms, and in a way that locks their current profit levels into the OA environment, even though those profits are universally held to be unacceptably high.’¹⁴⁵

¹⁴⁴Harnad, “Why the UK Should Not Heed the Finch Report.”

¹⁴⁵Poynder, “Open Access and the Research Excellence Framework,” February 2015.

The existing market for scholarly publishing and how this has changed with the rise of open access will be the focus of chapter three. Chapter three will address the extent to which statements, like Poynder's, are accurate portrayals of open access publishing. Chapter four will go on to discuss the extent to which research funders are responsible for this situation.

Chapter three: The Market for Scholarly Publishing

Introduction

This chapter will look at the market for scholarly publishing, and in particular for APCs. It will consider how the policies created by research funders (as discussed in the previous chapter) impact on the market for scholarly publishing. A number of commentators have identified high costs and other dysfunctions in the current market for APCs, in particular for hybrid publishing.¹⁴⁶ This chapter will explore these issues, by discussing the history of APCs and looking at how APCs differ from 'traditional' publishing practices. It will then explore the current market for APCs. Problems in the market for APCs have sometimes been 'blamed' on the willingness of research funders to pay publishers high APCs. This chapter will begin to explore how far this is true. It will conclude by assessing the economic characteristics of the market for APCs and the extent to which the market for scholarly publishing was, and potentially remains, monopolistic. This will provide a foundation for the following chapter, which will look at the policies introduced by research funders to try and navigate, and potentially influence, the market for APCs.

APCs

This chapter will outline in more depth issues surrounding APCs. Although open access advocates are keen to stress that APCs are not the only model for funding open access,¹⁴⁷ they are becoming increasingly common.¹⁴⁸ With the removal of subscriptions as a source of revenue for publishers, other models of funding publishing have emerged. As a model for providing open access, APCs are sometimes termed 'the author pays', often in relation to discussions of 'predatory'¹⁴⁹ open access.¹⁵⁰ Whilst this way of describing APCs captures the major

¹⁴⁶Priego, "Wellcome Trust's Open Access Spend 2012-13"; Björk, "The Hybrid Model for Open Access Publication of Scholarly Articles"; Shah and Gul, "Philosophy of Escapism in the Open Access World"; Waaijers, "'Open Access' or 'Open Excess'?"; Harnad, "Hybrid Gold Open Access and the Cheshire Cat's Grin"; Solomon and Björk, "A Study of Open Access Journals Using Article Processing Charges."

¹⁴⁷Open Access Directory, "OA Journal Business Models," Eve, "Co-Operating for Gold Open Access Without APCs.."

¹⁴⁸Solomon, Laakso, and Björk, "A Longitudinal Comparison of Citation Rates and Growth Among Open Access Journals."

¹⁴⁹Beall, "What the Open-Access Movement Doesn't Want You to Know | AAUP."

change from the traditional publishing model: a shift from readers paying to authors paying, it is not entirely accurate. In both subscription and APC models, payment is often made by an institution. APCs are covered by a variety of different sources, including authors, university departments, block grants within universities, and also, as is the focus in this dissertation, by research funders.

A Brief History of APCs

APCs were first introduced in 2000 by the Public Library of Science (PLOS) and BioMed Central (BMC) as a means of funding open access.¹⁵¹ Since then a steady stream of publishers have introduced APCs. These have been used to cover the costs of new journals, to 'flip' existing journals into open access publications, and to cover the cost of individual articles being made open access.¹⁵² Some of these APCs have emerged from existing publishers,¹⁵³ whilst other new publishers have started with a business model developed around open access.¹⁵⁴ These publishers vary in size from single title publishers to 'mega publishers' publishing tens or even hundreds of journals. PLoS one currently has over '140,000' articles published.¹⁵⁵

Whilst emerging only recently as a means of funding journal publishing, APCs have become increasingly important in the market for open access publishing and scholarly publishing more generally. Government implementation of many of the recommendations of the Finch Report, alongside RCUK's payment of APCs, have expanded the development of this business model for open access. Whilst the introduction of APCs did not directly coincide with the introduction of mandates by research funders, they are frequently used to reinforce each other. For example, many publishers refer directly to APCs as being an easy way of complying with mandates. Conversely, research funders point to the increasing number of open access options created by APCs to assure authors that they will still have options in choosing where to publish their research.

¹⁵⁰Rocks-Macqueen, "Open Access Does NOT Equal You, the Author, Paying," Stratford, "'Predatory' Online Journals Lure Scholars Who Are Eager to Publish..

¹⁵¹Solomon and Björk, "A Study of Open Access Journals Using Article Processing Charges," 1485.

¹⁵²Open Access Scholarly Information Sourcebook, "Converting to Open Access."

¹⁵³Elsevier, "Pricing."

¹⁵⁴Peters, "Going All the Way."

¹⁵⁵Plos One, "Journal Information."

How Do APCs Replace the Subscription Model of Journal Publishing?

In contrast to ‘traditional’ journal publishing where the costs associated with publication are recovered through subscription charges, with APC funded open access the costs are fully, or partially, recovered by levying a payment for publishing an article.¹⁵⁶ For gold open access journals funded by APCs, a charge is levied at some point prior to publication to ‘cover the cost’ of publishing that article. In hybrid open access, an APC may be levied which allows for that article to be made open access in otherwise subscription journals.¹⁵⁷ There are a variety of different costs associated with publishing, including the costs of facilitating peer-review, typesetting, promotion, server costs and other overheads.¹⁵⁸

Given this wide variety of associated costs, there is much debate about the ‘true’ costs of publishing peer-reviewed research.¹⁵⁹ It is difficult to calculate the exact costs associated with the publication of an individual article or even a whole journal. For a publisher with many titles, one journal may charge considerably more to publish, with the higher costs being used to subsidise other titles. In the subscription market, some prestigious journals are able to charge a great deal more in subscription fees than for other titles. It is sometimes suggested that this higher price reflects the costs associated with a higher rejection rate in these journals, as the rejected articles still need to be peer-reviewed and processed.¹⁶⁰ Following this logic, subscription fees for these higher priced journals reflect the costs associated with processing a greater number of potential articles even if these are not published.

¹⁵⁶Open Access Directory, “OA Journal Business Models”; Oppenheim, “Electronic Scholarly Publishing and Open Access”; Pinfield, “Can Open Access Repositories and Peer-Reviewed Journals Coexist?”; Phillips, “Business Models in Journals Publishing”; Phillips, “Business Models in Journals Publishing.”; Forgues and Liarte, “Academic Publishing.”

¹⁵⁷Solomon and Björk, “A Study of Open Access Journals Using Article Processing Charges.”

¹⁵⁸King, “The Cost of Journal Publishing.”

¹⁵⁹Ibid.; Esposito, “The Devil You Don’t Know”; Sauropod Vertebra Picture of the Week, “The Obscene Profits of Commercial Scholarly Publishers”; Hide, “How Much Does It Cost, and Who Pays? The Global Costs of Scholarly Communication and the UK Contribution.”

¹⁶⁰Esposito, “Return of the Big Brands.”

There is skepticism concerning this explanation for higher prices,¹⁶¹ with many pointing out that most peer review is done without payment.¹⁶² Robert Kiley (of the Wellcome Trust) suggested that the costs associated with publishing are high at the moment, due to a lack of competition between prestigious journals.¹⁶³ In effect, it is suggested that the publishers of these journals hold a monopoly and can thus charge above ‘market prices’ for their product.¹⁶⁴ This point will be further discussed below. However, regardless of whether costs are accurately reflected in the prices of journals, it is generally accepted that there are costs associated with publishing, whether in open access or subscription models. Even models of open access which favour ‘voluntary labour’ still accept that there will be costs, including server hosting. Even if supported by an institution, these costs ultimately have to be paid. The question then, is not whether costs are incurred in publishing articles, but rather how the price of APCs relates to these.

A micro focus on individual publishers or journals is difficult to take far. There is limited research assessing the business of journal publishing at this level, though other research explores these issues.¹⁶⁵ Some attempts have been made to calculate the marginal cost of publishing an article for various journals. These studies try to assess what the cost of publishing an additional article is for journal publishing.¹⁶⁶ These studies draw on mainstream economic explanations of how companies determine output. Whilst these studies offer some help in assessing how publishers make decisions, it is important from the perspective of research funders that research publishing is understood at a total market level. Though this general overview of the wider market may appear to be a more straightforward task, as we will see, difficulties arise here too.

¹⁶¹Van Noorden, “Open Access.”

¹⁶²Beverungen, Böhm, and Land, “The Poverty of Journal Publishing,” 932.

¹⁶³Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

¹⁶⁴Navin and Vandever, “The Market for Scholarly Communication.”

¹⁶⁵Dirkmaat and Kohn, “Pricing and Cost of Electronics Journals”; King and Tenopir, “Economic Cost Models of Scientific Scholarly Journals”; Garson, “Can E-Journals Save Us? A Publisher’s View”; Fisher, “Comparing Electronic Journals to Print Journals”; Bot, Burgemeester, and Roes, “The Cost of Publishing an Electronic Journal.”

¹⁶⁶King, “The Cost of Journal Publishing.”

What Kind of Market is there for APCs?

The emerging market for APCs is developing and changing. There are a number of re-emerging issues that have been raised about the functioning of the market. This section will briefly describe the market at a more 'general' level, before turning to dysfunctions identified both in the literature and by research funders.

The Size of the APC Market

It is difficult to accurately assess the current number of open access journals funded by APCs. Solomon and Björk estimated that as of:

'August 2011, 1,825 journals were listed in the Directory of Open Access Journals (DOAJ) that, at least by self-report, charge APCs. [This represented] just over 26% of all DOAJ journals.'¹⁶⁷

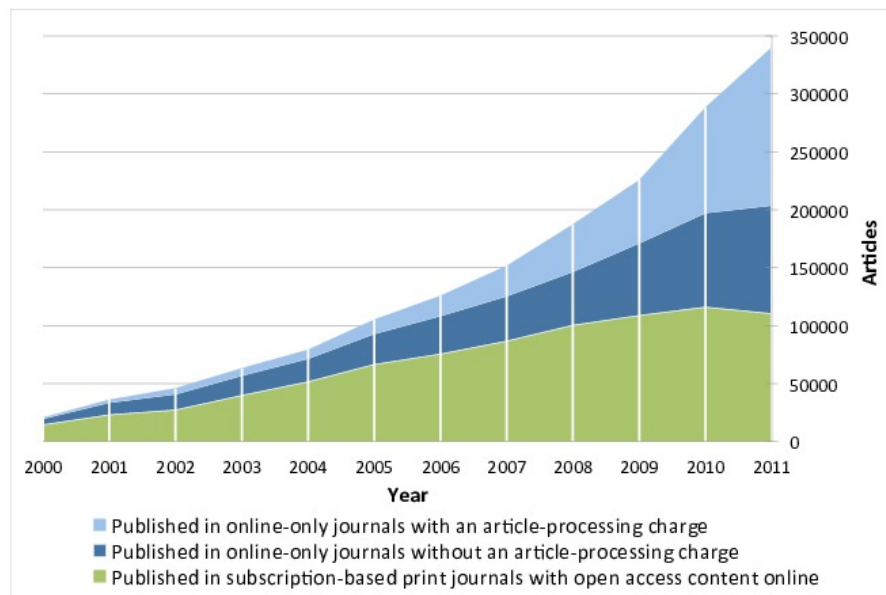
However, an analysis of the DOAJ in September 2015 revealed different figures. Out of 10,568 listed journals, only 688 are self reported as having APCs. However, this figure is likely to be inaccurate. An examination of a small number of journals not reported as having APCs on the DOAJ revealed that almost all of these did in fact levy an APC. The lower percentage therefore probably represents a lack of reporting of charges rather than charges not being levied.

A recent survey of APCs in the DOAJ found similar problems with the accuracy of information recorded.¹⁶⁸ Though this survey admitted to methodological challenges and attempted to overcome them, the accuracy of the listing on the DOAJ currently makes it difficult to recommend using the DOAJ as reliable tool for understanding the current market for APCs. Despite this, analysis of DOAJ listings appears to be the approach taken by most research on APCs. It is likely this is because the lack of viable alternatives.

¹⁶⁷Solomon and Björk, "A Study of Open Access Journals Using Article Processing Charges."

¹⁶⁸Morrison et al., "Open Access Article Processing Charges."

Growth of APCs



Source: 'Developing an effective market for article processing charges'¹⁶⁹

Though there are major issues in using the DOAJ as a source of information on the market, it is currently the best proxy for obtaining an overview. In time, the accuracy of information on the DOAJ may improve and provide a clearer picture of the size, and functioning, of the market for APCs. Though it is difficult to accurately judge the size of the market, it is reasonable to say it is growing. A number of studies have addressed this question from a quantitative perspective.¹⁷⁰

The Price of APCs

Similar issues emerge when calculating the average price of APCs. Currently a broad range of prices are charged for APCs, essentially starting at zero for articles where the fee has been waived. The higher end of the scale reaches upwards

¹⁶⁹Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges."

¹⁷⁰Solomon, Laakso, and Björk, "A Longitudinal Comparison of Citation Rates and Growth Among Open Access Journals"; Mukherjee, "Green and Gold Open Access in India."; Gargouri et al., "Green and Gold Open Access Percentages and Growth, by Discipline."

of \$2500. These high level APCs often make ‘headlines’ in the discussion around open access.¹⁷¹ Though these high prices attract attention, what is more relevant for authors and research publishers, is the *average* price for APCs and the reasons *why* certain journals may be able to command a higher price for their APCs.

A study by Morrison examined APC prices drawn from the DOAJ.¹⁷² The DOAJ shows listed prices for APCs. As listed prices, these are currently only an advertisement for a service and do not represent a ‘sale’. It is possible that the prices actually paid vary greatly from the listed prices, or, indeed, that these APCs have never been paid, because of the limited number of articles published in some of the smaller journals listed on the DOAJ. This view is supported by paid APC data. The prices paid for both individual APCs and on average for a publisher differ from those advertised. The FWF for example have negotiated different prices with some publishers. Regardless of the actual APC prices, because journals advertise their services at various prices it could be argued that they influence the market. However, there are several problems with this argument that will be explored in more depth below.

Calculating the average price of APCs seems to be a simple task. However, in reality reaching an accurate figure can be difficult.¹⁷³ It is possible to estimate the price of APCs on the market by taking a representative sample of journals currently offering APCs as a means of making their content open access. There are a number of problems with this method. Firstly, choosing a representative sample would be difficult. Would the sample only choose existing journals or include new journals, would it focus on a particular discipline or would it include all disciplines? Alongside this concern, is the more important issue related to the methodological challenges of estimating the size of the market for APCs using the DOAJ. All of the prices used in a sample would represent an advertised price, rather than the price which is actually being paid in the market. The higher end of the scale for APCs is accounted for by prestigious and hybrid journals.¹⁷⁴ This is a major issue currently facing research funders.

¹⁷¹Brook, “The Sheer Scale of Hybrid Journal Publishing,” Harris, “Wellcome Releases Details of APC Spend., Lawson, “APC pricing..

¹⁷²Morrison et al., “Open Access Article Processing Charges.”

¹⁷³Björk and Solomon, “Article Processing Charges in OA Journals”; Solomon and Björk, “Developing an Effective Market for Open Access Article Processing Charges.”

¹⁷⁴Björk and Solomon, “Article Processing Charges in OA Journals.”

Cost of APCs: Average Spend by Research Institutions

Assessing the cost of APCs appears to address the same question as the section above on the price of APCs. However, there are important differences. As discussed earlier, the price of APCs usually refers to ‘advertised’ price, which varies drastically. What is important to recognise is that these prices may not result in actual purchases by anyone. Looking at the price of APCs alone may lead one to dismiss some of the problems identified in relation to high APCs as insignificant because of the varied prices on offer to authors. Authors or research funders may negotiate or be entitled to reduced APCs, or may have fees waived entirely.¹⁷⁵ Researchers from developing countries in particular receive discounts or fee waivers for journals based on APCs.¹⁷⁶

An increasing number of research institutions supporting the payments of APCs are publishing their APC spend.¹⁷⁷ The publication of APC data already represents a more transparent approach to scholarly publishing when compared to the lack of disclosure around subscription spending.¹⁷⁸ The Wellcome Trust state that the decision to publish APC data was based on a desire for transparency and to:

‘attempt to make the debate around the costs of open access publishing more evidence-based.’¹⁷⁹

The availability of this data provides opportunities for researchers to look at the current functioning of the market. This data makes it possible to identify which publishers are most expensive and to calculate average APCs and the total spend of institutions, as well as to establish other characteristics of the market. This chapter will not carry out a comprehensive discussion of the APC data or a detailed statistical analysis. However, some of the key conclusions will be identified, in particular criticisms made in response to findings drawn from the data.

¹⁷⁵Peterson, Emmett, and Greenberg, “Open Access and the Author-Pays Problem”; Shieber, “Equity for Open.”

¹⁷⁶Christian, “Open Access Initiative and the Developing World.”

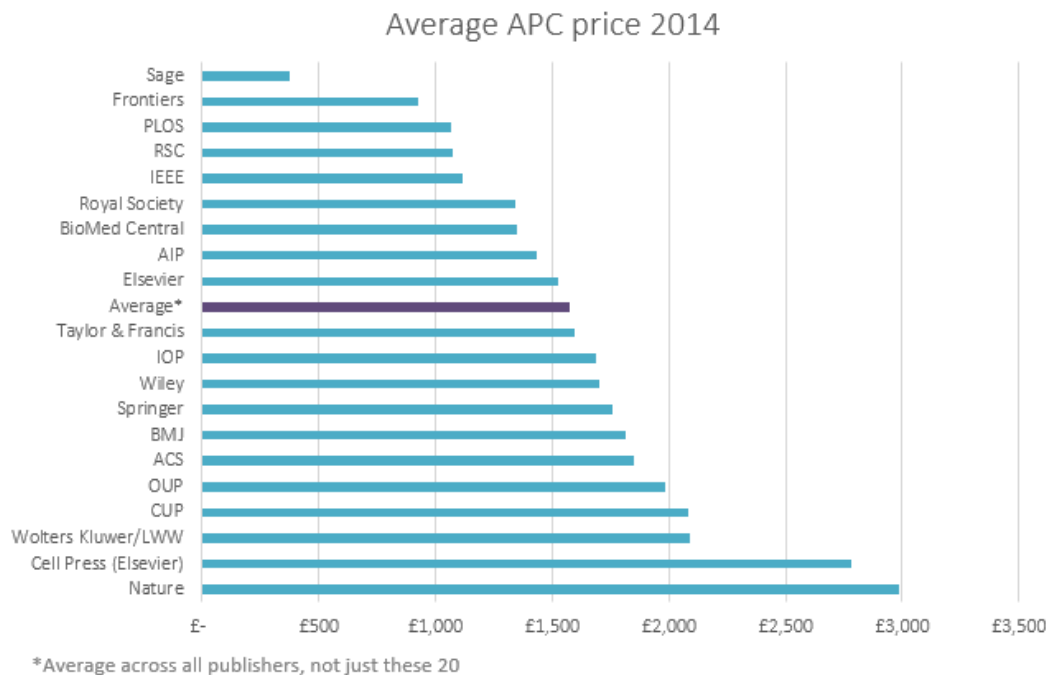
¹⁷⁷Bielefeld University, “Datasets on Fee-Based Open Access Publishing Across German Institutions”; Reckling and Rieck, “Austrian Science Fund (FWF) Publication Cost Data 2014”; Kiley, “Wellcome Trust Open Access (OA) Spend and Compliance Monitoring”; Lawson, “Jisc Collections Aggregated APC Data 2014.”

¹⁷⁸Bergstrom, Courant, and McAfee, “Big Deal Contract Project.”

¹⁷⁹Wellcome Trust, “The Cost of Open Access Publishing.”

Average APC Data

The data sets can be used to find average APCs at a number of different levels.



Source: 'Average APC price 2014'¹⁸⁰

The above table illustrates the distribution of average APCs paid to the 20 largest publishers weighted by the number of APCs paid.¹⁸¹ This data is drawn from the aggregation of spending by various institutions across the UK, in total representing 6,741 APCs. The average APC is found to be £1,575. This is based on a calculation of average APC for each publisher. Publishers may vary the price of APCs extensively for different journals they publish.¹⁸²

The Wellcome Trust have made their APC data available with extensive commentary.¹⁸³ A number of findings emerge from this data:

'In headline terms, some 2556 articles were published under an APC model, and the total spend for the year 2013-14 was just under £4.7 million. The average APC was around £1837, whilst the median cost was £1800.'¹⁸⁴

¹⁸⁰Lawson, "Average APC price 2014."

¹⁸¹Ibid.

¹⁸²Ibid.

¹⁸³Kiley, "The Reckoning."

It can be seen that the average APC for the Wellcome Trust is slightly higher than the one calculated by Lawson (£1,837 compared to £1,575).¹⁸⁵ This can largely be explained by the Wellcome Trust's focus on life sciences, whose journals on average charge higher APCs and which have traditionally also charged higher subscriptions. Further information can be drawn from a comparison with previous APC data published by the Wellcome Trust.

	2012-13	2013-14
Number of articles for which an APC was paid	2126	2556
Total spend on APCs	£3,884,788	£4,694,428
Total Wellcome Trust spend on APCs (some APCs' costs were split between Wellcome and another funder)	£3,884,788	£4,383,939
Average APC	£1821	£1837
Median APC	£1837	£1800

Table 1: APC spend 2012-13 v 2013-14

Source: 'The Reckoning: An analysis of Wellcome Trust Open Access Spend 2012-14'¹⁸⁶

The above table shows the difference between costs for 2012-13 and 2013-14. There was a small increase in the average cost, but on the whole costs remained stable. It is other aspects of the data that have caused particular concern for the Wellcome Trust and other institutions.

Hybrid Journal Data

The Finch Report was positive about the possibilities offered by hybrid journals:

'In addition to the fully open access journals, nearly all the large scholarly publishers now offer the hybrid option for at least some of their journals: that is, in return for the payment of an APC, they will make an article in an otherwise subscription-based journal accessible immediately on publication, without any reader having to pay a subscription or PPV charge.'¹⁸⁷

¹⁸⁴Ibid.

¹⁸⁵Ibid.; Lawson, "Average APC price 2014."

¹⁸⁶Kiley, "The Reckoning."

¹⁸⁷Finch, "Accessibility, Sustainability, Excellence," 2012, 22–3.

However a number of problems have been identified with hybrid journals. One of the main issues that has emerged out of the publication of APC spend data by research funders is the discrepancy between the cost of gold and hybrid APCs.

	Fully OA journals	Hybrid journals	Unknown
Number of articles published in:	607	1894	55
Average APC:	£1,241	£2,030	£1,763

Table 2: Fully OA v hybrid OA - 2013-14

¹⁸⁸ Source: 'The Reckoning: An analysis of Wellcome Trust Open Access Spend 2012-14'¹⁸⁹

The above table illustrates one of the major concerns for the Wellcome Trust and other research funders who pay for APCs - a much higher average price for hybrid journal APCs. This higher price is found across hybrid journals in the Wellcome Trust data.¹⁹⁰ The market for hybrid open access journals has been characterised as dysfunctional:

'The hybrid market... is highly dysfunctional with very low uptake for most hybrid journals and a relatively uniform price in most cases without regard to factors such as discipline or impact.'¹⁹¹

It is important to note that higher charges amongst hybrid journals are found not just in individual titles but also on average.¹⁹² A study by Solomon and Björk carried out on behalf of a consortium of research funders 'comprising JISC, Research Libraries UK, Research Councils UK, the Wellcome Trust, the Austrian Science Fund, the Luxembourg National Research Fund and the Max Planck Institute for Gravitational Physics'¹⁹³ is of particular relevance to the topic covered in this dis-

¹⁸⁸Kiley, "The Reckoning."

¹⁸⁹Ibid.

¹⁹⁰Ibid.

¹⁹¹Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges," 16.

¹⁹²Björk, "The Hybrid Model for Open Access Publication of Scholarly Articles," Solomon and Björk, "A Study of Open Access Journals Using Article Processing Charges," Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges," Pinfield, Salter, and Bath, "The 'Total Cost of Publication' in a Hybrid Open-Access Environment," Pinfield, "Is Scholarly Publishing Going from Crisis to Crisis?," Brook, "The Sheer Scale of Hybrid Journal Publishing," Verhagen, "Hybrid OA - a Way to Go?..

¹⁹³Solomon and Björk, "Developing an Effective Market for Open Access Article Processing Charges," 1.

sertation. The study identifies a number of issues with regard to the current situation for APCs and hybrid journals in particular, and outlines potential policy responses. Solomon and Björk identify difficulties in calculating the average price of hybrid open access:

‘due to the lack of systematic uptake statistics on the journal or even publisher level.’¹⁹⁴

They do, however, suggest that:

‘a very crude estimate can be made of the average APC list prices for the six biggest publishers. For three, a uniform price level can be used. These are Springer (3,000 USD), Taylor & Francis (2,950 USD) and Wiley & Blackwell (3,000 USD). For Elsevier, the average over journals calculated using the data is 2,366 USD. Sage has a price of 3,000 USD for STM and 1,500 for Social Sciences. Assuming that two thirds of Sage’s journals are in the social sciences, the average APC is 2,000 USD. An average across all these publishers, weighted by the number of hybrid journals, results in a global average of 2,727 USD.’¹⁹⁵

This higher average APC charge can be identified in other research on APCs.¹⁹⁶ There is currently limited research that might explain differences in price. Further research could focus on establishing more deeply what factors, if any, might explain these variations. Without a rational justification for higher APCs in hybrid journals, the extra costs become an issue for research funders paying for APCs:

‘The second key finding is that the average APC levied by hybrid journals is 64% higher than the average APC charged by a fully OA title. This higher average fee is despite the fact that hybrid journals also enjoy a revenue stream from subscriptions.’¹⁹⁷

The higher average APC is a problem, especially when considered in the context of how hybrid journals work. It is common for hybrid journals to have only one or two articles per issue made available open access. For doing this, the publisher receives an APC. However, alongside this, they retain their subscription fees. This is a potential issue for a number of reasons. The first one is that the higher APCs do not seem to be justified alongside the subscription revenue stream. Though some additional costs may be faced in making articles available open access, it is unlikely these would account for the price of hybrid APCs. Another issue is the potential for ‘double dipping’. Double dipping refers to the situation

¹⁹⁴Ibid., 25.

¹⁹⁵Ibid., 25.

¹⁹⁶Björk, “The Hybrid Model for Open Access Publication of Scholarly Articles,” West, Bergstrom, and Bergstrom, “Cost Effectiveness of Open Access Publications..

¹⁹⁷Kiley, “The Reckoning.”

where an institution or author has paid for an article to be made open access in a hybrid journal to which the institution also subscribes. In effect the institution might be paying the publisher twice - once for a subscription and once for an APC - hence the 'double dipping'.

Publishers have been very keen to reject claims of double dipping.¹⁹⁸ There are a number of mechanisms which publishers have proposed for dealing with double dipping, typically focusing on discounts or reimbursing affected institutions. Though publishers by and large reject the claim of double dipping they are often less clear about the precise mechanisms used to avoid this. There has been much skepticism about the approaches used to deal with double dipping.¹⁹⁹ Double dipping can pose a particular challenge for university libraries who are often not able to cancel subscriptions to hybrid journals because the majority of articles in these journals remain behind a paywall. A number of studies have examined the issue of 'total cost' for institutions paying both subscriptions and APCs.²⁰⁰²⁰¹

A major problem for research funders is that hybrid journals were often anticipated to be a transitional model. This period of transition was hoped would allow publishers to establish new business models and as publishers recognise APCs as a viable model for replacing subscription costs. However, with institutions often paying both APCs and subscription fees for hybrid journals, the question facing research funders now is whether this (after ten years of open access mandates) is a transitional period or a new norm for scholarly publishing?

The Problem for Research Funders: Transitional Cost or the New Norm?

The introduction of open access mandates and the funding of APCs has allowed research funders to increase the number of articles available open access. The support research funders have provided for open access, whilst allowing them to pursue the objectives they have in funding research (as discussed in chapter two), may also have contributed to what has been termed the 'dysfunctional'

¹⁹⁸Wiley, "Subscription Pricing for Hybrid Journals"; Estelle, "SAGE Open Access Statement on 'Double Dipping'"; Research Libraries UK, "Fair Prices for Article Processing Charges (APCs) in Hybrid Journals," Elsevier, "Pricing..

¹⁹⁹Research Libraries UK, "Fair Prices for Article Processing Charges (APCs) in Hybrid Journals."

²⁰⁰Prosser, "The Costs of Double Dipping."

²⁰¹Schimmer, Geschuhn, and Vogler, "Disrupting the Subscription Journals' Business Model for the Necessary Large-Scale Transformation to Open Access."

market for APCs. This problem is not isolated to research funders, but also impacts upon universities and researchers.²⁰² Pinfield and others have looked at the total cost currently facing research institutions.²⁰³ It is increasingly complicated to calculate the total cost in an environment where institutions, particularly those with a large research output, could potentially be paying publishers for both subscriptions and APCs.

Whilst the pursuit of green open access by HEFCE has advantages, it also means that research funders supporting the payment of APCs are still in a relative minority in the overall research publishing and open access landscape. This has led people to question whether open access publication fees will grow out of control.²⁰⁴ One of the assumptions of the Finch Report was that:

‘The measures we recommend will bring greater competition on price as well as the status of the journals in which researchers wish to publish. We therefore expect market competition to intensify, and that universities and funders should be able to use their power as purchasers to bear down on the costs to them both of APCs and of subscriptions.’²⁰⁵

This has not happened. The question remains whether it is possible for research funders who are currently funding APCs to influence this market and bring down the costs of APCs.

The market for APCs: A Continuation of Dysfunctions in Scholarly Publishing?

To assess how research funder APC policies may influence the market for APCs, it is important to discuss the areas policies target as a *means* of influencing the market. Research funders may have an impact on the market whether they intend to or not. It is therefore very important that research funders are aware of their potential influence on the market. In order to develop an analysis of this issue, there will be some discussion of the problems concerning markets for subscription journals. This focuses on highlighting some of the characteristics of academic

²⁰²Waijers, “‘Open Access’ or ‘Open Excess’?”

²⁰³Pinfield, Salter, and Bath, “The ‘Total Cost of Publication’ in a Hybrid Open-Access Environment.”

²⁰⁴Shieber, “Will Open-Access Publication Fees Grow Out of Control?”

²⁰⁵Finch, “Accessibility, Sustainability, Excellence,” 2012, 11.

publishing practices that might explain why the ‘market’ for APCs and open access publishing more generally remains dysfunctional.

Influencing the Market for APCs

In order to influence a market, it is first necessary to understand what kind of market you are trying to influence. Whilst other markets have clearly been heavily disrupted by the introduction of the web, for example, markets for music and film, the market for journals seems in comparison not to have seen the same level of disruption.²⁰⁶ Economists have tried to assess how markets on the internet operate.²⁰⁷ Of particular relevance is the question of whether the internet has tended to create more competition, or prompt the emergence of monopolies.²⁰⁸ The internet has arguably increased innovation in many areas. With new technologies and lowered barriers to entry it could be reasonably assumed that prices for journal publishing, whether for subscriptions or APCs, would have fallen. The lack of disruption of the market for scholarly publishing suggests it must have some unique characteristics. Exploring these in some depth will give a much better understanding of research funder policies and the potential impact these might have.

Is the Market for Journals and APCs Monopolistic?

Competition exists in a monopolistic market, but it is limited by the substitutability of goods within that market. The *Penguin Dictionary of Economics* defines a monopolistic market as:

‘competition in an industry in which there are many firms each producing products that are close, but not perfect, substitutes’.²⁰⁹

²⁰⁶Fund, “Will Open Access Change the Game?”; Gaigher, Roux, and Bothma, “The Predictive Value of Disruptive Technology Theory for Digital Publishing in the Traditional Publishing Environment.”

²⁰⁷Welfens and Weske, *Digital Economic Dynamics*; Noe and Parker, “Winner Take All”; Dewan, Jing, and Seidmann, “Product Customization and Price Competition on the Internet”; Chevalier and Goolsbee, “Measuring Prices and Price Competition Online”; Nagurney and Wolf, “A Cournot-Nash-Bertrand Game Theory Model of a Service-Oriented Internet with Price and Quality Competition Among Network Transport Providers”; Clay et al., “Retail Strategies on the Web”; Haucap and Heimeshoff, “Google, Facebook, Amazon, EBay.”

²⁰⁸Haucap and Heimeshoff, “Google, Facebook, Amazon, EBay.”

²⁰⁹Bannock, Baxter, and Davis, “Monopolistic (Imperfect) Competition.”

A number of commentators have made the claim that the market for journal publishing exhibits many of the characteristics of a monopolistic market.²¹⁰ This claim relates not only to current subscription models but also to the market for APCs. To assess the extent to which this claim is true, we can look at three features identified in the *Penguin Dictionary of Economics*' definition of monopolistic competition:

'Firms make products between which consumers slightly differentiate (they may have different-coloured packets, for example) and consequently, the demand for any individual firm's product is not perfectly elastic (elasticity). Some consumers will prefer one product to those of its competitors sufficiently to exhibit a limited amount of loyalty to that brand when its price rises. This means that each firm has a small amount of market power (monopoly) and is thus not a price-taker in the market for its own product. In this regard it is similar to a monopoly, but not a perfect competitor (perfect competition).'²¹¹

This feature is present in journal publishing in a number of ways. We can consider journals as goods from the perspective of the reader of a journal article. Though sometimes a reader may just be interested in learning more about a particular topic, and a range of articles may be suitable for finding out about that topic, often a particular article in a particular journal will be required. This makes journal articles non-substitutable goods. For a reader of an article it is therefore important to gain access to this particular article. In monopolistic markets a lack of substitutability between different goods (in this case journals/journal articles) leads to the prices of these goods not being elastic.

Price elasticity refers to how much a change in the price of a good will effect the demand for that good.²¹² When a good is perfectly substitutable, its price will be

²¹⁰Navin and Vandever, "The Market for Scholarly Communication."

²¹¹Bannock, Baxter, and Davis, "Monopolistic (Imperfect) Competition."

²¹²

This can be expressed as

$$E_d = \frac{dQ/Q}{dP/P}$$

The higher the price sensitivity of demand the higher the influence on demand. The above formula assumes a linear relationship between price and demand. In reality it is likely that for most journal articles the relationship will be closer to an arc elasticity in which the higher or lower the price the larger the impact on demand. This can be presented as:

very elastic. If the price of this good goes up, demand will go down proportionately, as there is little to prevent consumers purchasing an alternative, cheaper good. It has been calculated that many online retailers face relatively higher price sensitivity compared to their offline competitors.²¹³ Online retailers attempt to escape some of this price sensitivity by attempting to make other aspects of their services less substitutable. Amazon, for example, has attempted to patent its '1-click' online service in an attempt to prevent other companies from competing with similar services.²¹⁴ For journals, however, the introduction of online publishing has not had the same impact. Because journals, and journal articles largely remain un-substitutable, they remain relatively price insensitive (i.e. their price has to increase substantially before demand falls). This is particularly pronounced in the case of subscriptions to journals, because the end reader often does not see or know the price being paid for the subscription to a journal as it is covered by their library. It has been suggested that there is a 'moral hazard' with regard to journal subscriptions.

A moral hazard refers to:

'the presence of incentives for individuals to act in ways that incur costs that they do not have to bear.'²¹⁵

This potential issue is highlighted as one of the major problems with the inflation of journal prices, because readers are often not aware of the costs of the subscriptions which they demand. This does not account for the issue of bundling (requiring libraries to subscribe to whole collections of journals rather than individual titles) which may mitigate any potential substitutability between different journal titles. However, this strengthens the argument that the market for journals is monopolistic.

Monopolistic Market? Are APCs Substitutable Goods?

We have seen how the 'traditional' subscription model of journal publishing could be monopolistic. How does this shift with the emergence of APCs as a means of funding publishing?

$$E_d = \frac{\frac{P_1 + P_2}{2}}{\frac{Q_{d1} + Q_{d2}}{2}} \times \frac{\Delta Q_d}{\Delta P} = \frac{P_1 + P_2}{Q_{d1} + Q_{d2}} \times \frac{\Delta Q_d}{\Delta P}$$

²¹³Chevalier and Goolsbee, "Measuring Prices and Price Competition Online."

²¹⁴Wikipedia, "1-Click"; Worstall, "Amazon Loses 1-Click Patent."

²¹⁵Bannock, Baxter, and Davis, "Moral Hazard."

As discussed earlier in this chapter, the development of APC funded journals re-locates the source of revenue from subscribers to APCs. With this, the potential for differentiation between journals is no longer an issue for the reader on the basis of price. Readers may prefer, or simply find it easier to access open access articles, which might be reflected in the higher citation scores for such articles.²¹⁶ The question remains whether APCs are substitutable for the authors who are deciding where to submit their articles. In order to address this question, it is important to consider the different criteria upon which authors base their decisions.

'Any academic in the twenty-first century knows that publication is important. It is important to communicate findings to other interested parties but it is also crucial for career progression.'²¹⁷

Most researchers in the UK are reliant on a university salary. Career considerations play an important function in shaping their behaviour. Publishing has become a major component in career progression for academics at all levels.²¹⁸

Some of the considerations authors have to make were briefly discussed in Chapter two, namely to adhere to the demands placed on the research community by government and funders. These requirements can vary by discipline and be implemented differently by different institutions, but there are some general points that authors are required to consider. Of particular importance in the UK, is the Research Excellence Framework (REF), which fundamentally shapes academics decision making.

The next REF will require authors to provide an open access version of their submitted articles.²¹⁹ Though this requirement will shape the open access landscape, it may not impact on authors' decisions of where to publish, compared with other factors, many of which are associated with the REF. 'Impact' and 'quality' emerge as the major criteria being assessed in the REF. It has been pointed out that 'capturing' what is meant by this is difficult.²²⁰ Similarly, quality is hard to define and has led to different local interpretations:

²¹⁶Gaulé and Maystre, "Getting Cited"; Eysenbach, "Can Tweets Predict Citations? Metrics of Social Impact Based on Twitter and Correlation with Traditional Metrics of Scientific Impact."

²¹⁷Eve, *Open Access and the Humanities*, 44.

²¹⁸*Ibid.*, 44.

²¹⁹Higher Education Funding Council for England, "Open Access Research."

²²⁰Martin, "The Research Excellence Framework and the 'Impact Agenda'"; Murphy and Sage, "Perceptions of the UK's Research Excellence Framework 2014"; Watermeyer, "Impact in the

'The major impact of exercises such as the REF is not national, but local, and is associated with the term "quality" and how universities interpret this along the way. For some, the number of citations associated with a published piece of research represents a quality perspective. For others, the reputation of the publication outlet, usually journals, is a key indicator'.²²¹

It is already clear why authors might consider the 'quality' and citation score of journals alongside other factors. Alongside this influence on *where* to publish, it has also been suggested that the REF may also influence *when* and how often to publish.²²² The REF arguably creates incentives to publish particular types of work with:

'heightened pressures to publish and a developing culture of disregard for certain types of research in favour of short-term "REF-able" work.'²²³

This all has the potential to create considerations for authors about where to publish which make different journals not immediately substitutable for one another. A new journal with no track record may seem very different to an established journal with a strong reputation and a high citation score.

Government policy does not immediately define what authors have to consider, but it may significantly shape the policies and culture of their universities, departments and colleagues, especially when the outcomes of these exercises greatly influence future funding for institutions. The factors authors consider when choosing where to publish have been evaluated in a number of different ways. Many articles and books are dedicated to the issue of publishing targeted at academic authors.²²⁴ This work recommends that authors consider: speed of publication, open access, reputation and scope, and peer review,²²⁵ as well as other con-

REF"; Watermeyer, "From Engagement to Impact? Articulating the Public Value of Academic Research"; Watermeyer, "Issues in the Articulation of 'Impact'."

²²¹Townsend, "The Publication Game."

²²²Watermeyer, "Impact in the REF."

²²³Murphy and Sage, "Perceptions of the UK's Research Excellence Framework 2014."

²²⁴Sharman, "Where to Publish"; Van Cott, "A Graduate Student's Guide to Publishing Scholarly Journal Articles"; Shewan et al., "A Statement on Ethical Standards in Publishing Scientific Articles in the International Journal of Cardiology Family of Journals"; Koushan et al., "Ethical Considerations in Publishing Medical Articles in Iranian Journals"; Kumashiro, "Five Tips for Publishing Journal Articles"; Zolotov, "Journals Publishing Articles in Analytical Chemistry"; Gleberzon and Killinger, "The Journal Article Cookbook"; Khattri, "Writing, Editing and Publishing an Article in a Scientific Journal"; Becker and Denicolo, *Success in Research*.

²²⁵Sharman, "Where to Publish."

siderations, such as ethical choices.²²⁶ Some of these articles offer particular advice for authors considering publishing in open access venues:

‘open access outlets are an excellent way for scholars to reach their readership speedily (no printing delays) and so to foster a community of scholarship. They can also be read by those in your field without the limitations of libraries having restricted funding for journals. Despite being free to access, they are not amateur productions: articles are still peer reviewed and can be of the highest standard. As with all publishing ventures you need to approach this option with your eyes open: make sure that you are working with an open access outlet which you can trust and which will further your career and promote your research appropriately. Always ensure before you go ahead that you are very clear about how publication in this online form will affect your intellectual property rights. Major journal publishers, such as SAGE, are involved in this movement, so there will be no need for you to compromise professional quality and integrity in order to gain a wide and immediate readership.’²²⁷

These articles and books should be approached with caution. Firstly, they do not focus predominantly on the considerations authors make in relation to APCs, and, secondly, these ‘self-help’ style guides for potential authors may not reflect how authors *actually* behave and make decisions.

A number of surveys have been carried out to question what authors value in a digital publishing environment.²²⁸ A major large study was carried out in 2004 by Ian Rowlands, Dave Nicholas and Paul Huntingdon.²²⁹ Though over ten years old, and prior to the recent growth in open access, which may have disrupted some of the findings, the report still offers important insights into author behaviour. These may not have shifted drastically following the growth of the APC model for funding journal publishing. The report also highlights issues which continue to be of relevance in relation to APCs.

One of the points raised in the executive summary of the report was that authors:

²²⁶Shewan et al., “A Statement on Ethical Standards in Publishing Scientific Articles in the International Journal of Cardiology Family of Journals”; Koushan et al., “Ethical Considerations in Publishing Medical Articles in Iranian Journals.”

²²⁷Becker and Denicolo, *Success in Research*.

²²⁸Bröchner and Björk, “Where to Submit? Journal Choice by Construction Management Authors”; Swan and Brown, “JISC/OSI Journal Authors Survey Report”; Rowlands, Nicholas, and Huntingdon, “Scholarly Communication in the Digital Environment,” 2004; Gibler and Ziobrowski, “Authors’ Perceptions and Preferences Among Real Estate Journals”; Sharman, “Where to Publish.”

²²⁹Rowlands, Nicholas, and Huntingdon, “Scholarly Communication in the Digital Environment,” 2004.

‘do not understand or appreciate the value added that publishers bring to the scholarly communication process: this is evident from many comments which reveal bemusement at the prices being charged for journals.’²³⁰

This lack of understanding on the part of authors may result in part from the domination of the subscription model. However, whilst this could be seen as a healthy approach to take to a market in which profit rates are very high, and innovations relatively slow compared to other media sectors, it may also lead to a cynicism, which could prevent authors from considering the different services offered by publishers.

One of the premises of much of the literature on author decisions about where to publish is that authors behave rationally in making their decisions.²³¹ This is assumed to lead authors to balance the likelihood of being accepted by a subscription journal with the prestige of that publication.²³² It is necessary to assess whether this assumption reflects current author behaviour. Following this, it is necessary to assess how authors practices might have changed as a result of the introduction of APCs. Returning to surveys of authors offers insight into these questions.

The survey carried out by Rowlands et al.:

‘tried to establish some benchmarks by asking authors to indicate what they want from the journals system by focusing their attention on the factors that influenced their last choice of a journal outlet’.²³³

Similar surveys used a similar methodology but instead focused on the preferences of authors in particular disciplines.²³⁴ Rowlands et al. found that:

‘the most highly rated factor determining journal choice was the fact that a particular title was perceived to offer the author access to a highly targeted, not necessarily the biggest, readership.’²³⁵

²³⁰Ibid., 1.

²³¹Bröchner and Björk, “Where to Submit? Journal Choice by Construction Management Authors,” 739–40.

²³²Ibid.; Poltronieri et al., “Where on Earth to Publish? A Sample Survey Comparing Traditional and Open Access Publishing in the Oncological Field.”

²³³Rowlands, Nicholas, and Huntington, “Scholarly Communication in the Digital Environment,” 2004, 10.

²³⁴Gibler and Ziobrowski, “Authors’ Perceptions and Preferences Among Real Estate Journals”; Bröchner and Björk, “Where to Submit? Journal Choice by Construction Management Authors.”

Gibler and Ziobrowski's study found the number one factor to be that the 'author perceives the journal is high quality,'²³⁶ while a study by Bröchner and Björk found 'high academic status' the number one factor for journal choice.²³⁷ Though there is some discrepancy between the findings of the surveys; with one finding quality, and the other readership, as the most important factor, both were highly prioritised and arguably could stand in for each other to some extent. What is more difficult to assess is how 'quality' is defined or judged. Though different metrics can be applied to demonstrate quality, it is difficult to find clear objective criteria that could be used to determine the quality of a journal. This reduces the substitutability of journals.

Quality is not an easily quantifiable or measurable attribute. It is in large part based on the perception of the authors and readers. However, once established as a belief, it has real existence. It is also a judgment that becomes self-replicating over time; if a journal is perceived to be of high quality, authors will attempt to submit their best work to this journal, and in turn this journal will tend to publish high quality articles, reinforcing the perception of its quality. Whilst 'quality' remains a major factor in author considerations, substitutability of journals will be difficult to achieve. Criticisms can be made of authors placing such a high importance on 'quality', but this judgment underlies 'rational' considerations. When quality is used as a proxy for a relevant (and potentially large) readership, this judgment is not only about perceptions related to authors' career progress and other more 'mundane' considerations, but also about the likely reach an article is going to have on peers in the author's research field. If an author perceives her article will be read by more people - and promote more responses - in a highly regarded journal, then it makes sense that she would want to publish her article in that journal. This is likely not to be majorly disrupted by the presence of an APC charge, though this criteria may have to be balanced with the cost of publishing in that journal. This issue will be touched on in more depth below.

Surveys of authors have found that following 'quality' and related considerations, authors take into account a series of other factors relating to 'operational' considerations, such as 'circulation, speed of refereeing, coverage by abstracting

²³⁵Rowlands, Nicholas, and Huntington, "Scholarly Communication in the Digital Environment," 2004, 10.

²³⁶Gibler and Ziobrowski, "Authors' Perceptions and Preferences Among Real Estate Journals," 143.

²³⁷Bröchner and Björk, "Where to Submit? Journal Choice by Construction Management Authors," 744.

and indexing services and the availability of electronic copy.’²³⁸ Similarly, Bröchner and Björk also highlighted:

‘two more pragmatic variables affecting the fate of a submission, namely likelihood of acceptance (3.3) and short lead time from submission to final publication (3.4)’.²³⁹

Factors other than quality, which can be used to distinguish journals, may become more important in the future, something that will be touched on in the conclusion.

Under the ‘traditional’ subscription model, price was found to come relatively low on the list of considerations authors made when choosing where to publish their work.²⁴⁰ Other surveys do not ask about price considerations for authors in great detail, probably because in a non-open access model of publishing this consideration was less important for authors.²⁴¹ The question of how this attitude changes with the introduction of APCs is important when addressing how research funders view authors, decisions on where to publish and the nature of the market for APCs.

Rowlands et al. summarised their findings as reflecting a view:

‘of what authors want from the publishing system that has probably not changed much over the past three and a half centuries: the ability to effectively target and communicate with their key readers, the imprimatur of authority and quality, together with reasonable levels of publisher service’²⁴²

It is important for this assessment to be reviewed following the growth of APC funded open access publishing to see if this judgment is still accurate, and, if so, what impacts this has on the market for APCs and author perceptions and interactions with this market.

²³⁸Rowlands, Nicholas, and Huntington, “Scholarly Communication in the Digital Environment,” 2004, 10.

²³⁹Bröchner and Björk, “Where to Submit? Journal Choice by Construction Management Authors,” p744.

²⁴⁰Rowlands, Nicholas, and Huntington, “Scholarly Communication in the Digital Environment,” 2004, p11.

²⁴¹Bröchner and Björk, “Where to Submit? Journal Choice by Construction Management Authors.”

²⁴²Rowlands, Nicholas, and Huntington, “Scholarly Communication in the Digital Environment,” 2004, 11.

How Has Open Access Shifted Authors' Considerations?

A number of studies have assessed author attitudes to open access publishing.²⁴³ This section will briefly assess some of the reasons authors select open access options, and outline how open access might have shifted author priorities. This section will turn to research focused on the issue of authors' interaction with journals in an APC funded open access environment.

A particularly useful resource for assessing the views of authors is a report by Swan:

'this report [was] the result of a project funded by the Joint Information Systems Committee (JISC) and the Open Society Institute (OSI). These bodies wished to undertake a survey of authors of academic journal articles, comparing the experience of around 100 of those who publish on an "open access" basis with the same number of those who do not.'²⁴⁴

A similar survey took place in 2011 which sought to:

'uncover the attitudes and experiences of scholars with open access publishing.'²⁴⁵

This was done by carrying out an extensive survey of authors' opinions on open access that received 53,890 responses.²⁴⁶ Though authors were not asked directly about their decision-making process around APCs, some insight can nonetheless be gleaned from this literature.

The motivation for authors to publish open access was found to primarily relate to a:

²⁴³Dallmeier-Tiessen et al., "Highlights from the SOAP Project Survey. What Scientists Think About Open Access Publishing"; Swan and Brown, "JISC/OSI Journal Authors Survey Report"; Pelizzari, "Academic Staff Use, Perception and Expectations About Open-Access Archives"; Schroter, "Importance of Free Access to Research Articles on Decision to Submit to the BMJ"; Schroter and Tite, "Open Access Publishing and Author-Pays Business Models"; Cozzarelli, Fulton, and Sullenberger, "Results of a PNAS Author Survey on an Open Access Option for Publication"; Wiley, "Wiley's 2013 Open Access Author Survey"; Graziotin, "Green Open Access in Computer Science – an Exploratory Study on Author-Based Self-Archiving Awareness, Practice, and Inhibitors."

²⁴⁴Swan and Brown, "JISC/OSI Journal Authors Survey Report," 3.

²⁴⁵Dallmeier-Tiessen et al., "Highlights from the SOAP Project Survey. What Scientists Think About Open Access Publishing," 2.

²⁴⁶Dallmeier-Tiessen et al., "Open Access Journals - What Publishers Offer, What Researchers Want." 87.

'belief in the principle of free access to research information. Over 90% of open access authors said this is important.'²⁴⁷

Though this is not entirely surprising, other factors appeared to contribute to the decision to publish in an open access venue.

'authors also perceive open access journals as being faster than traditional journals, having a larger readership and thus resulting in higher numbers of citations to their work'.²⁴⁸

This suggests that the possibility of faster publishing could contribute to authors choosing a particular venue for publication, suggesting some potential for differentiation on this criteria. However, for authors who responded to the survey who had not published in open access journals the perception was of:

'open access journals as having slower publication times, a smaller readership and receiving fewer citations.'²⁴⁹

A higher citation rate is a frequently touted benefit of open access for authors. There are a range of studies that support this view, but it appears that authors do not necessarily share an understanding of this supposed benefit, particularly if they are not experienced in publishing via open access journals:

'42% of respondents said that the feedback they had received from readers had been about the same as expected from a traditional journal, 15% agreed it had been more than expected from a traditional journal. Only 7% said it was less.'²⁵⁰

This perception could have a number of implications. It might suggest that perceived readership is not a major concern for authors when deciding where to publish. However, this does not fit with the other concerns for authors highlighted in both the study by Swan, and in other author surveys.²⁵¹ There are a number

²⁴⁷Swan, Willmers, and King, "Opening Access to Southern African Research," 1.

²⁴⁸*Ibid.*, 1.

²⁴⁹*Ibid.*

²⁵⁰Swan and Brown, "JISC/OSI Journal Authors Survey Report."

²⁵¹Dallmeier-Tiessen et al., "Highlights from the SOAP Project Survey. What Scientists Think About Open Access Publishing"; Swan and Brown, "JISC/OSI Journal Authors Survey Report"; Pelizzari, "Academic Staff Use, Perception and Expectations About Open-Access Archives"; Schroter, "Importance of Free Access to Research Articles on Decision to Submit to the BMJ"; Schroter and Tite, "Open Access Publishing and Author-Pays Business Models"; Cozzarelli, Fulton, and Sullenberger, "Results of a PNAS Author Survey on an Open Access Option for Publication"; Wiley, "Wiley's 2013 Open Access Author Survey"; Graziotin, "Green Open Access in Computer Science – an Exploratory Study on Author-Based Self-Archiving Awareness, Practice, and Inhibitors."

of potential explanations for why authors do not believe that they will receive more citations when publishing open access. At the macro level, it is possible to demonstrate a higher citation rate, but at the micro level this might not be as easily identified.²⁵² Another possibility is that authors' opinions do not accurately reflect the true citation and rankings of journals.

The survey highlighted that authors were not familiar with open access journals in their own field.²⁵³ This perception of lower reputation and prestige for open access journals could have a number of implications for authors' choices between different APC funded journal venues. It could partially explain why authors may be willing to pay (or have someone else pay) a much higher price for publication in a hybrid journal. A large number of hybrid journals are established journals with strong reputations.²⁵⁴ It might be that authors perceive these journals to be a 'safer' place to publish open access than a newer fully open access venue with a less established reputation. This, in turn, would allow hybrid journals to command a higher price for their APCs as authors are not willing to substitute publishing in these venues for less well known journals. This view may be confirmed by the finding that:

'the issue of publication fees is only of middling importance to these authors as a reason not to publish in open access journals'.²⁵⁵

However, this view was only found to be true for authors who had published in open access. Authors who had not published open access expressed a much lower willingness to pay, with \$1500 per article being the upper limit found in the survey.²⁵⁶ A potential issue with this finding is that these authors might have viewed this sum solely as the price they would personally have to pay. Whether this concern about price translates to a concern about someone else paying remains an open question. One potential indication that authors might be willing

²⁵²Gibney, "Low Citation Gains via Gold Open Access"; Craig et al., "Do Open Access Articles Have Greater Citation Impact? A Critical Review of the Literature."

²⁵³Swan, Willmers, and King, "Opening Access to Southern African Research," 1.

²⁵⁴As an example: The third highest APC (£3,839.51) paid by Cambridge University in 2014 was for an article in the *American Journal of Clinical Nutrition*. The journal has an impact factor of 6.8 (<http://ajcn.nutrition.org/>) and was 'selected by the Special Libraries Association (SLA) as one of the top 100 most influential journals in Biology and Medicine over the last 100 years.'

²⁵⁵*Ibid.*, 1.

²⁵⁶Swan and Brown, "JISC/OSI Journal Authors Survey Report," 44.

to consider the cost imposed on research funders is found in the fifth ranking concern of authors:

'the cost to my [the authors] institution of non-OA journals, in other words, scholars who have accepted their library's predicament regarding journals budgets'.²⁵⁷

This acknowledgment of the predicament of their library suggests that authors are potentially sensitive to price, even if the institution is bearing the cost. This issue of the potential 'principle-agent' problem will be discussed in greater depth in the following chapter.

Authors in the survey perceived:

'[open access journals] to be of lower reputation and prestige'²⁵⁸

This concern with lower reputation or prestige was echoed in a number of comments made by authors and reproduced in the survey. These comments include:

'* Need to build impact factor so that academic programs are convinced * Talking with colleagues and professors, they still look at the rating of a journal (e. g. impact factors). Thus open access publishing will not affect career/grants etc per se, but how they are cited.

* OA journals need higher impact factors to attract authors, but this is a distortion caused by the RAE in the UK. The effect on promotion/grants/career is completely dependent on the perceived impact of the journal, regardless of open/closed access. * The biggest drawback just now is the chance that the work may not be permanent and that graduate students and post-docs cannot afford to have there papers published in non-prestige factor journals.' * Prestige of journal is very important to career, the one I published in happens to have a strong reputation by now – I probably would not have considered publishing in it if it wasn't well known'²⁵⁹

The comments confirm that authors are still concerned about the impact factor and other proxies for quality in an open access environment. There is some evidence that open access journals have a higher average acceptance rate.²⁶⁰ If authors continue to value the impact factor of journals (for very rational self-interested reasons) then it also suggests that authors can differentiate between different journals in terms of the 'service' they provide. The next section will consider more specifically how authors' decisions concerning where to publish may be impacted by APCs.

²⁵⁷Swan, Willmers, and King, "Opening Access to Southern African Research," 25.

²⁵⁸Ibid., 1.

²⁵⁹Swan and Brown, "JISC/OSI Journal Authors Survey Report," 34–35.

²⁶⁰Sugimoto et al., "Journal Acceptance Rates."

Have Author Decisions Concerning Where to Publish Been Impacted by APCs?

There is much more limited research on the factors influencing choice of journal for authors paying APCs. Some authors surveys include discussion of their views on open access. However, there is limited research on the considerations authors make when publishing in APC funded publications. The main study of sources of funding and factors influencing choice of journal for authors is provided by Solomon and Björk.²⁶¹ The study carried out a survey of 429 authors located in 65 countries who had published articles in 69 journals from 23 publishers.²⁶² The full list of questions focused on a limited number of criteria for authors to choose from and asked a limited number of questions to try and increase author response rates.²⁶³

The findings of this study, whilst representing a limited sample, are still of use in clarifying the extent to which it should be expected that author choices have changed with the introduction of open access. In response to requests for written comments, a number of points were identified in relation to choice of journal:

- ‘ten comments pointed to difficulty getting manuscripts published elsewhere
 - 5 of these authors suggested their eventual place of publication was more receptive to different approaches to research
- twelve indicated a relatively low APC was important
- four made comments that in general APCs were too high
- three authors said they found high APCs unfair
- eleven identified quality, impact and audience reach as important factors
- ten indicated quality of service they received from publisher as an important factor
- four indicated that being allowed to publish colour figures, multimedia or not being restricted by page length as an important factor.’²⁶⁴

These comments highlight some concern about the price level of APCs, suggesting potential price sensitivity for authors. However, most concerns reflect those

²⁶¹Solomon and Björk, “Publication Fees in Open Access Publishing.”

²⁶²Ibid., 101.

²⁶³Solomon and Björk, “Publication Fees in Open Access Publishing,” 2015/05/20/14:10:22 2012.

²⁶⁴Solomon and Björk, “Publication Fees in Open Access Publishing,” 101–2.

found in other author surveys: 'fit with the scope' (4.39 mean rating out of 5) and 'quality/impact' (4.18 mean rating out of 5) leading as the first and second most important criteria respectively.²⁶⁵ Following this, 'speed of review/publication', 'type of readership' and 'likelihood of acceptance' were listed as the most important factors.²⁶⁶ These findings were summarised as 'confirm[ing] the results of previous studies concerning what factors authors take into consideration when choosing where to submit a manuscript.'²⁶⁷

Are Journals Substitutable for Authors?

Authors consider different factors when considering where to publish. Though there is some evidence of limited changes in the factors considered by authors because of the increase in open access - and more specifically APC funded open access - considerations are largely the same as in a subscription journal context. For a good or service to be a substitute for another good or service:

'A product [or service] at least partly satisfies the same needs of consumers. Products are defined as substitutes in terms of cross-price effects between them. If, when the price of cassettes goes up, sales of CDs rise, CDs are said to be a substitute for cassettes, because consumers can to some extent satisfy the need served by cassettes with CDs.'²⁶⁸

In the case of journals or APCs the services offered are in many ways similar. Most journals carry out some form of peer-review, copy editing and advertising. These services are at least in part comparable. It is the other factors discussed above that make journals, and now APCs, non-substitutable for authors. As a result of this, APCs prices can be set without fear of authors directly substituting the service offered for a cheaper APC offered by another venue.

Monopolistic Market? The Ability to Enter the Industry

A strong argument can be made that journals are not directly substitutable for authors (and other actors in academia that make decisions that influence authors). Whether impact factors are a useful criteria for differentiating between journals is another topic in itself. However, the result of this lack of substitutability suggests the market for journals and APCs can be assumed to conform to one of the major features of a monopolistic market.

²⁶⁵Ibid., 104 figure 1.

²⁶⁶Ibid., 104 Figure 1.

²⁶⁷Ibid., 103.

²⁶⁸Bannock, Baxter, and Davis, "Substitute."

Another component of monopolistic markets is that:

'firms are able to enter the industry if the level of profits is attractive. This is a feature shared with the perfectly competitive industry, but not the monopoly.'²⁶⁹

This feature is one found in the journals market to a certain extent. New journals are regularly established. An issue emerges when turning to consider publishers more broadly. It is more difficult, though not impossible, for new publishers to enter the journal publishing market. Though the costs of entry are relatively low in electronic publishing, the importance of establishing impact and reputation make it difficult for new publishers to enter the market. This is not to say it is impossible. There have been a number of examples of new journals/publishers becoming established and successful in relatively short spaces of time.²⁷⁰ There is a potential for research funders to have some influence on this aspect of the market, although their interventions may not always relate directly to APCs.

Monopolistic market? Do Producers Maximise Profits?

'Like both perfectly competitive and monopolistic firms, producers in monopolistic competition are assumed to maximize profits.'²⁷¹

Another characteristic of monopolistic markets is that producers maximise profits. Whilst this is true of commercial publishers, there are other publishers who may balance profits with other priorities or be explicitly not-for-profit. Though publishers may not have profit maximisation aims, they operate within markets in which this is the aim for other publishers. It is important that the profit maximisation aim of journal publishers is kept in mind when considering how to influence the market for APCs.

Conclusion: the Market for APCs

The market for APCs is unique. Economic descriptions of markets are never completely accurate, but they can be useful in helping to identify prominent and important features. This dissertation has helped address the lack of analysis on the functioning of the market for APCs. Though there is currently limited research on this topic, by translating findings from existing author studies into an APC context an assessment has been made about the market for APCs. An argument has been presented that monopolistic tendencies operate within the

²⁶⁹Bannock, Baxter, and Davis, "Monopolistic (Imperfect) Competition."

²⁷⁰Peters, "Going All the Way."

²⁷¹Bannock, Baxter, and Davis, "Monopolistic (Imperfect) Competition."

market for APCs. This is largely the result of the services (APCs) being offered not being easily substitutable for buyers. The fact that authors often make purchasing decisions about services in the market without bearing the cost, adds another potential source of disruption to the market. The findings have important consequences for policy.

It has been argued that behaviour of authors within the market is shaped at least partially by policies set out at local, national and international levels. In particular the following play a strong role: the importance of publishing for career progress and the emphasis on 'impact' and citations rates as measures of academic value. The fact that, in many disciplines at least, journal articles remain the primary academic output (alongside monographs) used to evaluate academic success and credibility, plays a large part in making the market for APCs function in the way that it does. Funders can potentially contribute to some of these behaviours and their potential role will be discussed in the next chapter.

Chapter four: Research Funder Policy and the Payment of Article Processing Charges

Introduction

Chapter two sought to outline the policy aims of research funders, and the ways in which open access enables them to pursue these aims more effectively. Chapter three assessed the functioning of the market for APCs in the context of scholarly practices that might create monopolistic tendencies. These tendencies have been argued to continue in journals funded by APCs. The high price of APCs, in particular for hybrid journals, can be at least partly explained by the lack of true competition in the market. Authors are not able to substitute journals for one another even when the journals offer very similar services. This can be a problem with both subscription and APC funded journal models. This author behaviour is to a large extent the result of structural features of higher education in the UK. The careers of researchers can be heavily influenced by decisions they make as to where to publish so authors are - to some extent at least - behaving rationally when they make a decision to publish in a top journal with an APC of £3,839.512²⁷² rather than a journal which charges \$800.²⁷³ This is even if the lower priced journal is able to offer additional services, such as the publication and preservation of research data. These incentives are in a large part ones created by academic policy set by the government. Research funders like the Wellcome Trust, though not having created these incentives, may enable them when they support authors in paying APCs with no upper limit. This chapter will look at the extent to which research funders may be able to influence the market for APCs to make it function more effectively.

Can Research Funders Influence the Market for APCs?

Though responsibility for the current dysfunctions in the market for open access journal publishing cannot be attributed to research funders directly, the question remains: to what extent do they reinforce negative tendencies in the market? Alongside this question, research funders have taken different approaches to try

²⁷²Highest Cambridge APC 2014

²⁷³The APC charged for publishing in the Journal of Nutrition and Metabolism by Hindawi <http://www.hindawi.com/journals/jnme/apc/>

and influence the market for APCs to make it function more effectively. Two recent reports resulted in proposals relating to the current situation for research funders and potential approaches for the future. A report by Björk and Solomon intended to address some of the questions being raised for research funders.²⁷⁴ Its title, ‘Developing an effective market for open access article processing charges’, hints at the potentially interventionist role research funders could take. The report outlined two primary aims:

‘1. To review the current market for Article Processing Charges (APC) funded open access, analyse emerging trends in the UK and internationally, and identify the key current and future drivers that will serve to determine costs. 2. To identify and appraise policy options for funders and other stakeholders, through which they can help ensure a competitive and transparent market for scholarly journal APCs that supports the continued development of innovative new approaches.’²⁷⁵

It is the second aim that is of particular interest for this dissertation. Whilst having covered similar ground to Björk and Solomon in the previous chapters, this dissertation has also attempted to outline the broader context in which research funders develop APC funding policies, as well as the role government plays. In addressing the second aim of the report, Björk and Solomon outline and evaluate a range of potential policy scenarios. The next section will attempt to build on this work by offering a comparison between the policies of two research funders, the Wellcome Trust and FWF.

Do the Wellcome Trust and the Austrian Science Fund Aim to Influence the Market for APCs?

The question of whether research funders aim to influence the market for APCs can be approached in a number of ways. It is of course possible to summarise this as a ‘yes’ or ‘no’ response. However, this will miss subtle differences in approach. An earlier section discussed the aims of research funders in pursuing open access. Though there were differences in approach, the aims were similar - that of making the research they fund available on an open access basis. Research funders may *also* have an additional aim: to influence the market for APCs.

Where differences between the Wellcome Trust and the FWF become more apparent is in response to an interview question of whether their APC policy is ‘in-

²⁷⁴Solomon and Björk, “Developing an Effective Market for Open Access Article Processing Charges.”

²⁷⁵*Ibid.*, 7.

tended to influence the market for APCs?'. Falk Reckling, one of the designers of the FWF's APC policy responded in the following way to this question:

'Yes, in sense that a proper and transparent price-service relation is implemented. That is why the FWF has pushed the adapted OA recommendation of Science Europe.'²⁷⁶

Robert Kiley of the Wellcome Trust, in response to being questioned about whether the aim of their APC policy was to make the research they fund available open access, or whether they had broader aims, stated that the:

'Ambition is to make the research [the Wellcome Trust] have funded available open access.'²⁷⁷

These responses seem to suggest that the FWF aims to influence the market, whilst the Wellcome Trust does not make this an aim of their APC policy. This view could be supported by the response Falk Reckling gave to the question of what role research funders have in the transition to open access:

'Research funders have an important role as OA vanguards...'²⁷⁸

However, despite the FWF being more explicit about their aim of influencing the market for APCs, there are also similarities in approach. These similarities suggest that whilst the Wellcome Trust does not view its role as influencing the market, they do want a market that functions effectively.

What Do Research Funders Want From the APC Market?

Although the Wellcome Trust and the FWF place different emphasis on their desire to influence markets, both organisations outline the services they want publishers to deliver when they charge APCs. Before looking at the policies currently implemented by both organisations, it is important to consider what they desire from the market. Some of these aims will overlap with the broader aims of the organisations' open access policies but many are more specifically related to the practical functioning of the market for APCs. Once these aims are better understood, it will be easier to assess the success of the current policies of research funders. There are a number of things that both funders appear to want from the market.

²⁷⁶Falk Reckling email message to author, 25 August 2015.

²⁷⁷Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

²⁷⁸Falk Reckling email message to author, 25 August 2015.

Open Access

Though a fairly obvious aim, it is nevertheless important for research funders that when they pay an APC an article is made available open access. Compliance involves monitoring authors' compliance with the policy, but can also involve ensuring that publishers comply. The Wellcome Trust requires that for articles where an APC has been paid, publishers should submit the full-text of the article to PubMed Central. A compliance tool was commissioned by the Wellcome Trust to check whether this requirement was being met by publishers. 13% of articles where an APC had been paid did not appear in PubMed Central.²⁷⁹ As well as papers not appearing on PubMed Central, a small number (17 articles (5%)) were not available as open access on the publishers' websites.²⁸⁰ Though this number, is small, it is understandable that there is concern on the part of research funders when these papers are identified for which APCs have been paid. The FWF also requires that authors or their publishers deposit articles in a relevant repository. Embargo periods are not allowed to be longer than 12 months.²⁸¹ The FWF also requires that for gold and hybrid articles the publisher must comply with the highest standards of 'HowOpenIsIt?' These standards relate to a number of different areas including: Reader Rights, Reuse Rights, Copyrights, Author Posting Rights, Automatic Posting, and Machine Readability.²⁸²

Open Licenses

Both the Wellcome Trust and FWF want articles to be made available with open licenses. These licenses are required by the Wellcome Trust when an APC has been paid.²⁸³ Similarly, the FWF's demand for the highest standards of 'HowOpenIsIt' to be met requires that open licenses are used.²⁸⁴

Related to the use of open licenses is the preference both funders have for the machine readability of articles, a requirement for the highest level of 'HowOpenIsIt?':

²⁷⁹Kiley, "The Reckoning."

²⁸⁰Ibid.

²⁸¹Austrian Science Fund, "Open Access Policy for FWF-Funded Projects."

²⁸²"How Open Is It?"

²⁸³Wellcome Trust, "Open Access Policy," n.d.

²⁸⁴"How Open Is It?"

‘Article full text, metadata, citations, & data, including supplementary data, provided in community machine readable standard formats through a community standard API or protocol.’²⁸⁵

Although the Wellcome Trust does not mention machine readability as explicitly, the requirements for open licenses and the publication in XML do allow for this in practice. Publication in PubMed Central also allows for data and text mining to take place more easily utilising Wellcome Trust funded research.²⁸⁶

Transparency

One of the major complaints about the subscription model of scholarly publishing is that costs were often not made publicly available. The APC funded open access model already has more transparency because publishers (usually) make their APC costs public. However, pricing models are not always entirely clear. Some publishers charge extra for illustrations, data, etc. Both the Wellcome Trust and FWF will not pay for these charges.²⁸⁷ Presumably this is to try to dissuade publishers from pricing in these unclear ways. The other difficulty that emerges in claiming that the market is more transparent is that sometimes the price paid for an APC differs from the advertised price. The publication of APC spend data by the Wellcome Trust and FWF has made the *actual* charges paid easier to monitor.

APC Prices to Reflect Quality

A theme that emerged in interviews with both the Wellcome Trust and the FWF was the desire for APC prices to reflect quality. The FWF said that they wanted to influence the market for APCs:

‘in [the] sense that a proper and transparent price-service relation is implemented’.²⁸⁸

The Wellcome Trust, though not stating as directly that they wanted to influence the market through their APC policy, expressed a desire for the APC market to

²⁸⁵Ibid.

²⁸⁶Rebholz-Schuhmann, Oellrich, and Hoehndorf, “Text-Mining Solutions for Biomedical Research.”

²⁸⁷Austrian Science Fund, “Open Access Policy for FWF-Funded Projects”; Wellcome Trust, “Open Access Policy,” n.d.

²⁸⁸Falk Reckling email message to author, 25 August 2015.

‘operate like a market’, and for the price of APCs to be set by the quality of the service offered by publishers.²⁸⁹

Both the Wellcome Trust and the FWF suggested that the current metrics being used to assess the quality of journals was problematic and should be extended to focus on the price-service relation.²⁹⁰ The issue of relating price to quality is a major theme in the aims of both policies. The main issue for the research funders in the current market does not necessarily relate to the price of APCs, but rather to the lack of a clear relationship between price and quality in the APC market. This issue will be discussed in greater depth below. Before turning to look at differences in approach, it is useful to see a summary of the current approaches, highlighting similarities and differences.

A Brief Summary of Policy Approaches

Funding requirements	Wellcome Trust	FWF
Open access mandate	Yes	Yes
Pay for APCs	Yes	Yes
Pay for Hybrid APCs	Yes	Yes
Cap APCs	No	Yes
Cap Hybrid APCs	No	Yes
Different hybrid and Gold APC cap	N/A	Yes
Open license required	Yes when APC paid	Yes when APC paid
Repository deposit required	Yes	Yes
Publish APC spend data	Yes	Yes

Source: Wellcome Trust and FWF open access policies.²⁹¹

The above table outlines the main differences between the Wellcome Trust and FWF APC funding approaches. It is clear from the table that there are many similarities in approach. Both funders pay for APCs, both require open licences when APCs are paid. Both want authors to deposit in a repository and both publish

²⁸⁹Kiley, “The Reckoning.”

²⁹⁰Ibid.; Falk Reckling email message to author, 25 August 2015.

²⁹¹Wellcome Trust, “Open Access Policy,” n.d.; Austrian Science Fund, “Open Access Policy for FWF-Funded Projects.”

their APC spend data. However, when discussing policy the devil is often in the detail. The capping of APCs by the FWF is the main difference in approach but one that is potentially important. The FWF's differentiated cap for gold and hybrid APCs represents a middle ground between refusing to pay for hybrid APCs, as some other research funders have done and not capping APCs at all, as implemented by the Wellcome Trust.²⁹²

Influencing the Market for APCs: Policies Dealing with a Monopolistic Market?

If the depiction of the market for journal publishing and APCs in the previous chapter is correct, then influencing the market for APCs in turn involves influencing a market which, at the very least, exhibits *some* monopolistic characteristics. If this is the case, then any policies which aim to influence this market need to consider these characteristics. Even if there is no intention by research funders to influence the market, it is important for the market to be understood. Without this, achieving the aim of making articles available open access will be more difficult.

Influencing the market needs to be distinguished from the regulation of markets. In response to perceived market failure, governments may introduce regulation.²⁹³ Sometimes they will seek to create more competition by removing regulation.²⁹⁴ When governments regulate a market they can take a number of different approaches. What is common about all these approaches is that they place a legal requirement on the market. In comparison, research funders have much less power within the market. Though they can set their own policies, these policies can only be enforced in less direct ways. It is, therefore, important to emphasise that, though research funders may have and may try to use their *influence* over a market, this influence is less than that of government. If the role of research funders, whether actively or inactively, is to *influence* markets, it is important to consider how this influence works.

²⁹²The Research Council of Norway, "Stimulation Scheme for Open Access Publication."

²⁹³Bannock, Baxter, and Davis, "Monopolistic (Imperfect) Competition"; Crew and Spiegel, "Obtaining the Best from Regulation and Competition."

²⁹⁴Crew and Spiegel, "Obtaining the Best from Regulation and Competition."

How the Wellcome Trust is Implementing its Policies - Hands Off Approach or a Demanding Customer?

The Wellcome Trust's policy on APCs is for the most part straightforward. This section outlines this policy and also discusses the motivations behind it and potential problems emerging from this approach. The next sections will then contrast the approach taken by the Wellcome Trust with that of the FWF.

The Wellcome Trust pays APCs in a number of different ways. Some of the payment for APCs is undertaken directly by the Wellcome Trust as part of a grant, whilst other payments are made through block grants to institutions supported by the Wellcome Trust. The key distinction from the FWF's policy is that the Wellcome Trust does not limit the level of APCs.

The Wellcome Trust does not demand that authors publish in a gold or hybrid journal. Authors have the option of meeting the mandate for open access by depositing articles in PubMed Central. The Wellcome Trust has expressed a preference that the version of record is available on publication with an open license. In discussion with Robert Kiley, he suggested that by paying an APC, the Trust could demand a service from publishers.²⁹⁵ When an APC is paid, the Wellcome Trust demands more from publishers than when authors deposit a manuscript themselves. This includes publishing articles with an open licence, making the version of record available open access immediately upon publication and depositing the article in PubMed Central. The Wellcome Trust believe that when they pay APCs, they are able to demand these services from publishers.²⁹⁶ The Wellcome Trust's policy below summarises their expectations:

- 'authors to make published work freely available
- requires the depositing of work in PubMed Central and Europe PMC as soon as possible
- expects work to be published in venues that allow immediate open access of the final published form when publishers provide this option
- the Wellcome will provide additional funding to support the payment of APCs.
- encourages, and when APCs have been paid for requires a CC-BY license.
- affirms that it is the merit of the work rather than the venue of publication that is of importance.'²⁹⁷

²⁹⁵Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

²⁹⁶Ibid.

²⁹⁷Wellcome Trust, "Open Access Policy," n.d.

FWF: A Price Cap With a Lower Limit for Hybrid

The FWF takes a similar approach to the Wellcome Trust in many ways. The main distinction between the approaches of the two funders to APCs is the application of two caps by the FWF to be discussed fully below.

The FWF, as discussed earlier, do not expand on their open access policy to the same extent as the Wellcome Trust; rather they link this to the Berlin Declaration.²⁹⁸ The FWF give authors the option of complying with their mandate through gold, hybrid or green, and also suggest that:

‘Whenever legally and ethically possible, all research data and similar materials which are collected and/or analysed using FWF funds have to be made openly accessible. Data underlying the published research results should either be openly accessible immediately or – if not used in publications – two years after the project is finished.’²⁹⁹

The Wellcome Trust also asks researchers to make research data available where possible. Neither organisation currently mandate this requirement to the same extent as open access. A recent study of the FWF’s open access policy suggested that:

‘Our analysis clearly shows that the Austrian Science Fund (FWF) has developed one of the most effective OA policies as a public research funder and is progressing towards its goal of reaching 100% Open Access publishing by 2020.’³⁰⁰

It is likely that even with a mandate, some authors will not, either deliberately or inadvertently, be able to comply with open access. The next section will look at the policies of the two organisations from the perspective of ‘influencing’ the market, rather than considering open access compliance alone.

Influencing the Market: Authors or Publishers?

How does research funder influence on the market work? This issue has been partly discussed in the previous chapter. A more specific question is to ask how research funders influence the market *through* their APC payment policies. The market for APCs, though in some ways different from other markets, still has buyers and sellers: authors and publishers. However, with the support research funders offer to authors in paying APCs, research funders interject in this rela-

²⁹⁸Austrian Science Fund, “Open Access Policy for FWF-Funded Projects.”

²⁹⁹*Ibid.*

³⁰⁰Tonta et al., “Open Access Policies of Research Funders.”

tionship. There are a number of potential ways research funders can try to utilise this influence.

Influencing Authors

One of the issues identified as problematic in the subscription journal market is that readers are often insulated from the price of subscriptions. In the APC market a similar problem may emerge: that authors may not behave in the way that funders want them to. A definition of the ‘principal-agent problem’ may clarify this issue:

‘The problem that arises in many spheres of economic activity, when one person (the principal) hires an agent to perform tasks on his/her behalf but cannot ensure that the agent performs them in exactly the way the principal would like. The efforts of the agent are impossible or expensive to monitor and the incentives of the agent differ from those of the principal.’³⁰¹

Though funding an author may not appear to meet the above definition, there are similarities. Though research funders do not usually pay the salary of those they fund, they do help them carry out a research project. When funders cover the cost of APCs they allow authors to make decisions on where to publish. It is here that authors may make this decision based on factors that the research funder may not value (see chapter three). One potential way of influencing the market is for research funders to try and make authors more price sensitive.

As discussed in the previous chapter, currently authors do not place much emphasis on price when deciding where to publish. The use of price caps has been suggested as one possible way to make authors more sensitive to price.³⁰²

The Wellcome Trust are skeptical about this approach. One of their primary concerns is that authors do not currently consider price and it is unlikely that behaviour would change readily. Robert Kiley emphasised that the Trust had tried to stress to researchers that when they made funding decisions they were keen to evaluate the research itself, rather than the venue of publication.³⁰³ In this regard, the Wellcome Trust appeared to want to influence or ‘nudge’ authors. They were also eager to make authors think about the broader services offered by publishers rather than considering traditional metrics. This could make the market for APCs more competitive as newer or lesser known, publishers would be less readily

³⁰¹Bannock, Baxter, and Davis, “Principal-Agent Problem.”

³⁰²West, Bergstrom, and Bergstrom, “Cost Effectiveness of Open Access Publications.”

³⁰³Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

excluded because of their lack of reputation (measured in the more traditional metrics). Though the Wellcome Trust want to influence author behaviour, they are skeptical about using price caps to do this. The discussion of price caps below will return to some of these issues.

The FWF when asked about price sensitivity argued that:

'The best way to improve price sensitivity is to improve competition among publishing venues.'³⁰⁴

This suggests that the FWF are slightly more optimistic about the possibility of making authors price sensitive. However, the emphasis is placed on competition rather than author behaviour. The FWF may therefore feel that the market in general will become more sensitive to price changes rather than authors in particular.

Influencing Publishers

Research funder APC policies may also attempt to influence the behaviour of publishers. Both funders' policies aim to influence publishers but in different ways. The Wellcome Trust has had some influence on publisher behaviour, predominately through their mandate and the payment of APCs. Many publishers advertise their compliance with the Wellcome Trust mandate in setting out their open access options. However, these are more a response to the needs of authors funded by the Wellcome Trust rather than a response to research funders themselves. Robert Kiley emphasised the need for policies to be clear and stable so that publishers had time to adapt their approach.³⁰⁵ The FWF in contrast take a more direct approach. In particular, the FWF negotiate directly with publishers, something which will be returned to below. One of the reasons for introducing a price cap on the part of the FWF, was that it provided a means of negotiating with publishers.³⁰⁶

The Use of Price Caps in APC Policy

Price caps fundamentally distinguish the policy of the Wellcome Trust and the FWF. Whilst the FWF implements two price cap levels, the Wellcome Trust does not have any price caps. One aim of introducing caps is to limit the spending on

³⁰⁴Falk Reckling email message to author, 25 August 2015.

³⁰⁵Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

³⁰⁶Falk Reckling email message to author, 25 August 2015.

APC payments by a research funder. In response to a question about APCs as a component of overall research spend, the FWF said:

‘For the time being, we prefer price caps but in long run we support more competition.’³⁰⁷

This suggests that the FWF views price caps as the best means of limiting spend on APCs in the current market, with competition being seen as a potential way of reducing prices in the long run. Why does the Wellcome Trust take a different approach? A number of factors emerged in the interview. On the issue of limiting budget spending, the Wellcome Trust emphasised that spending on APCs should be considered in the context of wider research spend. In discussing the market for APCs, Robert Kiley pointed out that whilst there were many issues and that they *do* want the market for APCs to become less dysfunctional, the Trust valued the benefits of open access (in particular gold) and viewed additional spending on this as acceptable considered as a percentage of total research costs.³⁰⁸ The Wellcome Trust spent just over £4.5 million on APCs between 2013-14.³⁰⁹ Whilst this is a substantial amount of money, when considered in comparison to the Wellcome Trust’s total grant expenditure in that year, £501 million, the spend on APC appears less significant. The Wellcome Trust is therefore in a position where they want the market to improve, and for prices to reflect quality, but also accept the cost of APCs to a certain extent when they are considered as part of their total research funding expenditure. The issue of APC spend should not be limited to budget spend alone. It is also important to consider the role price caps play in the aim of influencing the market for APCs.

Beyond controlling budgets, price caps may be intended to influence the market for APCs. There are two main ways in which this might be anticipated to work. Firstly, by limiting the amount authors are able to spend, they may become more price sensitive. The second way in which this would work is to target publishers pricing policies. These two are not mutually exclusive, but will initially be discussed separately. West et al suggest that full subsidies of APCs will lead to a replication of problems found in subscription journals:

‘Our view is that full subsidies of article processing charges will create the same problems that arise under subscription-based publishing. We believe that it would be wiser for funders to support open access in ways that encourage price competition among open access publishers. A way to ensure that authors remain sensitive to price differences would be for funders to bear only a

³⁰⁷Ibid.

³⁰⁸Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

³⁰⁹Kiley, “The Reckoning.”

fraction of the cost beyond some low threshold (e.g., \$500). In economic terms, we want the price elasticity of demand to remain high.³¹⁰

The above suggests one potential approach for research funders to adopt to make authors more price sensitive. This is a potential aim of the FWF's price cap, though their focus rests more on influencing publishers. The Wellcome Trust, whilst recognising the simplicity of a price cap, worried that as a policy instrument it might have unintended consequences.³¹¹ Relating to authors there appear to be two main concerns: that authors do not consider price and that the policy may unfairly close certain publication channels.

The first concern is supported by much of the current literature on author considerations in choosing a publishing venue (discussed in chapter three). Whilst author priorities could change, this may only emerge slowly. Robert Kiley stated in the interview that research funders can make a contribution to changing the behaviour of authors.³¹² By assuring researchers that the funding they allocate will be based on the quality of their publications rather than the venue, and trying to ensure that panels making funding decisions do not use publication venue as a proxy for quality, authors may become more willing to publish in less (traditionally) prestigious journals. Although exposing authors to price could address the potential 'principal agent' problem, there are potential issues with this approach. Without addressing some of the underlying reasons (REF, career progress, future funding, etc.) that cause authors not to consider price when making publishing decisions, a price cap may only be a nuisance for authors. This will not in itself urge authors to consider price as a 'natural' consideration. If green is an acceptable publication choice, then authors do not need to consider price because they may just resort to traditional preferences, and simply comply with an open access mandate by depositing a manuscript. This ensures open access is made available but does less to address the market for APCs directly. The second potential issue discussed by Robert Kiley is that authors may sometimes have good (though not always) reasons for publishing in a particular journal venue which has a high APC.³¹³ An APC cap in this situation would prevent authors from publishing in their preferred venue.

³¹⁰West, Bergstrom, and Bergstrom, "Cost Effectiveness of Open Access Publications."

³¹¹Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

³¹²Ibid.

³¹³Ibid.

There are a number of ways a price cap is intended to influence publishers. A price cap may influence the market by directly allowing the negotiation of lower prices for APCs. This is something that has emerged out of the FWF's price cap policy.³¹⁴ These negotiations with publishers for discounts may use the price cap as a negotiating tool to lower prices for the authors research funders fund. There are a number of potential issues with this approach. One issue is that, although prices may be lowered for authors funded by that research funder, it may leave the prices unchanged for other authors/research funders. A related issue may be that markets become increasingly fragmented, with publishers offering multiple options for authors depending on their funder. This has emerged to some extent already, and publishers explicitly mention compliance with different funders. Robert Kiley suggested that in some cases it seemed that publishers had made things more complicated for themselves with the introduction of non standard licenses and a broad variety of different options for publishing depending on funder.³¹⁵ Another potential problem is that publishers may in some cases be able to justify a higher price than set by the cap for their APC. If a publisher offers extra services, such as dealing with very long articles or making available data sets or software, then an APC cap may limit their ability to offer these services. In this situation, a price cap does not lead to APCs starting to more accurately reflect the quality of the service offered, which is the aim of both funder policies. A potential outcome of a price cap could be for publishers to raise APCs to the level of the cap, which would not guarantee a relationship between price of APC and quality. The use of a price cap by the FWF distinguishes hybrid from gold journals, so it is worth considering hybrid journals more closely.

Hybrid Publishing

Though both the Wellcome Trust and the FWF fund hybrid APCs, the FWF place a lower cap on hybrid journals than gold. Both research funders believe that the current market for hybrid journals is dysfunctional.³¹⁶ The FWF's policy of a lower price cap for hybrid journals is one potential way of addressing this issue. The FWF's aim in setting different caps for hybrid and gold journals is intended:

³¹⁴Falk Reckling email message to author, 25 August 2015.

³¹⁵Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

³¹⁶Falk Reckling email message to author, 25 August 2015; Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

‘to convince publishers to introduce offsetting models or to flip journals to OA.’³¹⁷

The aim of ‘flipping,’ i.e. making hybrid journals fully open access, is one the Wellcome Trust had originally intended to follow from their APC policy. Robert Kiley suggested that the original hope had been that by supporting APCs for hybrid journals, publishers could establish that a business model based on APCs was viable, enabling them to switch hybrid journals to full open access.³¹⁸ This is something which has not happened for the most part and the Wellcome Trust and others are concerned that the current hybrid model has now become ‘business as usual.’³¹⁹ The approach of trying to demonstrate the viability of full open access journals to publishers also relied on research funders more generally supporting the payment of APCs. Though more are doing this, many are not. This has made it more difficult to convince publishers that APCs offer a reliable replacement to subscriptions. Kiley said that one of the potential ‘mistakes’ made in the Wellcome Trust’s policy was in not defining at what point hybrids would have ‘run their course’.³²⁰

The use of price caps for hybrid journals may help negotiate deals with publishers. When asked whether hybrid was understood as a transitional model, the FWF responded:

‘Yes. FWF understands Hybrid OA as a transition mode towards full Gold Open Access. We used it to negotiate one of the first offsetting models worldwide, with [IoP](#) and [Taylor & Francis](#) (partly also with RSC and ACS); deals with Springer (like [VSNU](#)) and Sage will follow soon.’³²¹

The negotiation of offsetting models is an important step in dealing with some of the main issues around the hybrid market. If publishers are required to offset subscription costs, then the incentive to move towards full open access might increase. Again this approach might lead to a fragmented market for hybrid APCs, but this could be minimised by a consistent stance on the part of funders and libraries for offsetting.³²²

³¹⁷Falk Reckling email message to author, 25 August 2015.

³¹⁸Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

³¹⁹*Ibid.*

³²⁰*Ibid.*

³²¹Falk Reckling email message to author, 25 August 2015.

³²²Schimmer, Geschuhn, and Vogler, “Disrupting the Subscription Journals’ Business Model for the Necessary Large-Scale Transformation to Open Access.”

The other approach, not taken by either the Wellcome Trust or the FWF, is not to cover the cost of hybrid publishing at all. Science Europe, a consortium of research funders, stress:

‘that the hybrid model, as currently defined and implemented by publishers, is not a working and viable pathway to Open Access. Any model for transition to Open Access supported by Science Europe Member Organisations must prevent “double dipping” and increase cost transparency.’³²³

Some research funders have responded to the problems associated with hybrid, including the issue of double dipping, by not funding such publications at all. The Research Council of Norway has taken an approach to funding open access which will not allow for spending on hybrid publications. The ‘stimulation scheme for open access publications’ provides institutions with funding:

‘covering up to 50 per cent of the institutions’ costs for open access publication from the previous fiscal year’.³²⁴

The scheme:

‘covers the cost of publishing articles in “gold” open access journals. The scheme does not cover the cost of publishing fees in subscription-based “hybrid” open access journals.’³²⁵

This approach is interesting for a number of reasons. The absence of hybrid payments differentiate the scheme from either the caps used by the FWF or the full payment of the Wellcome Trust. Because the scheme focuses on institutions recovering *some* of the costs, rather than covering the costs of individual author APCs, the aim might be to make institutions, rather than authors, responsible for considering the cost of APCs. The lack of payment for hybrid journals also removes a great deal of potential administration for institutions in monitoring potential double dipping.

Conclusion: Comparing the Success of Approaches

This chapter has built on the previous chapter looking at the market for APCs to consider the ways in which research funders are responding to this market. A broad variety of approaches are currently being taken by research funders in the payment of APCs and in dealing with hybrid publications. Though previous research on APCs has made policy suggestions, this dissertation uniquely com-

³²³Science Europe, “Science Europe Principles on Open Access to Research Publications,” 5.

³²⁴The Research Council of Norway, “Stimulation Scheme for Open Access Publication.”

³²⁵*Ibid.*

pared the current approaches taken by research funders. Importantly, a link has been made between research policy and the market for APCs. The approaches taken by research funders to the payment of APCs respond to a market with particular features, partly created or encouraged by policy approaches taken by government and research funders towards open access and research funding. How can the success of these funders approaches best be judged?

One potential approach is to compare the APC data of the two organisations. A comparison of mean, highest and lowest APCs could give insight into their different levels of spending. A similar approach would compare the cost of payments to hybrid journals by both organisations, or to look at the percentage spent on hybrid APCs as a component of total cost. Though these approaches offer insight into spending levels, they do little to assess the impact on the broader market. Both organisations aim to make the price of an APC and the level of service offered more closely linked, but there does not appear to be an easy way of assessing how successfully this aim is being addressed. It is also important that APC policies are considered as part of a research funders' open access policy. Though research funders may want the market for APCs to function more effectively this is not the *main* aim of these policies. In the conclusion these issues will be assessed in more depth and potential policy directions will be outlined.

Conclusion

This dissertation posed as its central question: can research funders use their APC funding policies to influence the market for APCs? This addresses the lack of research on the influence of research funders on the market for APCs. The answer to this question, as this dissertation has demonstrated, is not straightforward. There is no 'right' approach for research funders in setting APC funding policies, regardless of whether or not they aim to influence the market for APCs. There are a number of explanations for this.

This dissertation has strongly emphasised the role of government in creating policy and shaping the landscape of scholarly publishing. Chapter two of this dissertation suggested that governments argue in favour of open access as a means of realising their goals in supporting research. The Finch Report, a landmark document on the development of open access in the UK, argued for an emphasis on value for money, opening up research findings to business and transparency. However, as chapter two demonstrated it is not only the support for open access by UK government that is important, but the approach taken in implementing it.

Chapter two also examined the Finch Report and its recommendations in favour of gold and hybrid open access. These recommendations were partly adopted by government and RCUK. HEFCE, however, implemented its open access requirement for the next REF (2020) in a different way. The REF mandate allows for the use of institutional and disciplinary repositories to satisfy green open access. This has led to a situation whereby disparate approaches are taken in the implementation of open access. This in itself is not necessarily a problem. Practically, it would not be possible for HEFCE to mandate gold and hybrid for all publications submitted to the REF without providing the financial support to make this possible. It is also not necessarily desirable for only one channel of open access to be used. Those who advocate for gold open access will usually recognise the importance of repositories for the benefits for preservation and retrieval of research and also as an alternative way of achieving open access when gold or hybrid is not viable.

Finally this chapter demonstrated how the Wellcome Trust, and subsequently an increasing number of other research funders, have adopted open access mandates and are supporting the payment of APCs as part of their research funding activity, enabling them to expand the impact of the research they fund. However, problems have emerged in the implementation of APC payments. These relate to the perceived high cost of APCs and also to issues around the potential for 'double dipping' in hybrid journals. Research funders in particular are concerned that

these issues are not part of a transitional period but are the ‘new normal’. Though some of these issues have been discussed in the literature, this dissertation underlined the scope for contextualising the problems faced by research funders in setting their APC policies.

To understand these problems more fully, chapter three assessed the market for APCs, which is relatively new and subject to frequent change. Interviews carried out for this dissertation revealed that although the price of APCs could be a consideration for research funders, it is the lack of a relationship between price and quality that is the major concern of the Wellcome Trust and the FWF. To understand the source of this perceived problem it is important to comprehend the current market for APCs. Again, this is not a straightforward task. Although there is research into the economics of open access,³²⁶ there is a limited focus on APCs specifically. The size, average price and other information on the market for APCs can potentially be gleaned from the Directory of Open Access Journals (DOAJ). However, there are issues concerning the accuracy of this information. A more reliable source of information about the market is the paid APC data published by increasing numbers of universities. Although drawn on in only in a limited way in this dissertation, APC spend data offers a strong potential research tool. The data on spending can be used to assess current trends in the use of APCs and to further understand how APC policies translate into spending. The findings in chapter three demonstrate that it is important to not only describe the key features of the market, but also to understand the potential reasons why it functions in the way it currently does.

It has been argued that considering the market for scholarly publishing, and increasingly the market for APCs, as monopolistic, offers a means of understanding why some of the perceived issues exist. Many current problems relating to APCs can be understood as resulting from the difficulty authors face in substituting APCs. By drawing upon author preference surveys, an argument has been made that the lack of substitutability found in subscription journals can also be found in APCs. This lack of substitutability is in a large part down to author behaviour. This behaviour is in turn informed to a large extent by considerations imposed by government through REF, alongside the decision making process in funding applications and in academic hiring practices. As a result, the market for APCs does not have the same level of competition as other markets which have

³²⁶Dominguez, “Economics of Open Access Publishing.”; Morrison, “Economics of Scholarly Communication in Transition”; Crawford, “Open-Access Publishing”; Cockerill, “The Economics of Open Access Publishing.”; McCabe and Snyder, “The Economics of Open-Access Journals”; Doyle, Gass, and Kennison, “Who Pays for Open Access?”

seen disruption by new technologies and the web. Though a new publisher may offer very innovative research publishing technologies, without associated reputation and impact they will still not be a suitable choice for authors. This leads to a potential issue for research funders: authors are not price sensitive.

The apparent lack of price sensitivity for authors is one potential challenge for research funders in implementing APC payment policies as explored in chapter four. However before considering this issue more closely, it is important to assess what research funders want from the market for APCs. This was achieved in chapter four by assessing research funder policies alongside interviews. Though placing varied emphasis on the aim of influencing the market for APCs via their APC funding policies, both the Wellcome Trust and the FWF emphasised that they wanted the price of APCs to reflect the quality of services offered. The main distinction in approach between the Wellcome Trust and the FWF is in the use of price caps. Price caps have the benefit of simplicity and offer the potential for research funders to easily limit their budget spend. They also provide a means of negotiating with publishers about the price of APCs. There are potential problems too concerning the use of price caps. Firstly, they are a rather blunt tool. Publishers who ‘legitimately’ (i.e. their service reflects the price) charge an APC above the cap will be prohibitive for authors wishing to publish in those venues (authors may of course be able to find additional sources of funding to cover these costs). Another issue is that publishers may be tempted to raise their prices to the cap level. However, the main problem is that if policies rely on authors to be price sensitive, they will have a limited impact whilst factors that reduce author price sensitivity (discussed in chapter three) remain. Price caps distinguish the two research funder policies; they also reveal the potential for further research into the outcomes of these different policy approaches.

Problems with APCs have been identified. However, Schimmer has suggested that there is already scope for a transition to an open access publishing ecosystem. A white paper published by Max Planck Digital Library argued recently that:

‘All the indications are that the money already invested in the research publishing system is sufficient to enable a transformation that will be sustainable for the future. There needs to be a shared understanding that the money currently locked in the journal subscription system must be withdrawn and re-purposed for open access publishing services.’³²⁷

³²⁷Schimmer, Geschuhn, and Vogler, “Disrupting the Subscription Journals’ Business Model for the Necessary Large-Scale Transformation to Open Access.”

This suggestion is based on the notion that the scholarly publishing market is in transition and suggests that APCs are not a barrier to open access. This offers hope to research funders, universities and other research institutions that costs can be met. However, research funders may still be keen to speed up this transition. There are other policy approaches research funders may pursue to try achieve this.

Future Research Funder Policy Options

In relation to policies on the payment of APCs, there are a number of steps research funders could take to try and improve the functioning of the market. Suggestions include:

‘The funders cover a fixed percentage of the APCs and the universities or the authors need to cover the remaining portion of the APC through other sources.’³²⁸

Whilst this approach appears to be similar to a price cap, it uses a percentage of an APC rather than an absolute limit. It urges authors to consider costs but in a way that does not set an ‘arbitrary’ limit on the amount that can be paid for an APC. The potential to utilise libraries or universities as a processor of payments in this approach may improve the success of this policy approach, as a more price sensitive agent is involved in making decisions. There are potential difficulties related to this approach: authors may still not consider price and research institutions and authors may incur additional costs. However, the main limitation with this approach is that it does not directly address the challenge of linking price and quality. Other approaches being considered by the Wellcome Trust include:

‘APCs are funded according to multi-tier value based price caps.’³²⁹

or that

‘Journals bid for contracts based on services, quality measures and price’.³³⁰

Both of these approaches aim to directly link APC payments to the quality of journals. This ‘service improvement’ model for funders could work in a variety of different ways: a continued payment of individual APCs, the awarding of contracts, or a combination of these approaches. What all of these different ap-

³²⁸Solomon and Björk, “Developing an Effective Market for Open Access Article Processing Charges,” 29.

³²⁹*Ibid.*, 29.

³³⁰*Ibid.*, 30.

proaches would require is a means of establishing and ranking quality. Since the Wellcome Trust and FWF both indicate that they want to move beyond traditional metrics, the development of new 'service metrics' would be required to implement this model.

Some work on this issue has been carried out by Björk and Solomon who have looked at benchmarking the services journals provide to authors.³³¹ However, this dissertation has built upon this. Robert Kiley (of the Wellcome Trust) expressed interest in an approach based on ranking publishers with metrics reflecting the quality of service they offered.³³² While existing studies provide an important starting point in the development of potential metrics, they would need to be expanded upon for a number of reasons. Existing 'metrics' reflect author considerations. There is a potential danger that these new metrics would replicate the existing dominant metrics. If research funders want to encourage new considerations by authors and to stimulate the market to compete over the services they offer, then metrics need to reflect this. Research funders may choose to implement metrics which reflect what they feel are important considerations. These might include the speed and quality of peer-review, whether data is published (and in a re-usable format), and the databases in which the journal is indexed, etc. Through the use of these metrics, it would be possible to link a certain price level to a certain metric 'score' and either cap a payment at this level or pay a fixed amount of the APC. This approach very directly links the price of APC and the quality of services offered by publishers. However, the development of metrics could be an extensive project and subsequently 'ranking' publishers a difficult and costly exercise. The potential exists for limiting authors' ability to publish in the journal of their choice, though the provision of green open access reduces this problem. Whether this approach would be successful would to a large extent depend upon a more unified policy amongst research funders, which may take a long time to emerge. Whilst this 'hands on' approach to influencing the market remains an option, research funders may also seek to use their influence on research practice more broadly.

³³¹Björk and Öörni, "A Method for Comparing Scholarly Journals as Service Providers to Authors"; Björk, "A Study of Innovative Features in Scholarly Open Access Journals"; Björk and Holmström, "Benchmarking Scientific Journals from the Submitting Author's Viewpoint."

³³²Robert Kiley (Wellcome Trust) interview with author 21 October 2015.

Open Science and Alternative Open Access Publishing Models

Various alternatives to APC funded open access exist. These include:

'F1000Research... an Open Science publishing platform offering immediate publication of posters, slides and articles with no editorial bias.'³³³

and:

'The Open Library of Humanities (OLH)... a charitable organisation dedicated to publishing open access scholarship with no author-facing article processing charges (APCs). [The OLH is] funded by an international consortium of libraries who have joined us in our mission to make scholarly publishing fairer, more accessible, and rigorously preserved for the digital future.'³³⁴

These models present potential avenues for research funders to explore alongside, or as alternatives, to the payment of APCs. The issues identified with the market for APCs in this study are not restricted to the APC market alone. The reluctance of authors to substitute APCs, the (over) emphasis on publishing as the primary and most valued research output, and the issue of managing huge numbers of publications are all broader problems. The development of alternative publishing approaches, such as the ones outlined above, may go some way in addressing these underlying issues. This does not mean that APCs have no role to play in providing open access. Rather, this dissertation would suggest that the implementation of open access, on its own, does not address broader problems and potential opportunities in scholarly publishing.

Problems in the market for APCs, and scholarly publishing more generally, are not going to be fixed overnight. Indeed, the ability for research funders to influence the market is limited both by external factors and by their priority of using APC policies to secure open access for the research they fund. The Wellcome Trust recently announced the 'Open Science Prize' which aims to:

'unleash the power of open content and data to advance research and its application for health benefit[s]'.³³⁵

This competition aims to encourage researchers to develop new tools for utilising open access materials. These efforts to demonstrate the applications of open access and open data potentially shift practices in academic research. This in turn

³³³F1000 Research, "Immediate & Transparent Publishing."

³³⁴Open Library of Humanities, "About OLH."

³³⁵Gray, "The Open Science Prize."

may shift author considerations towards prioritising the services provided by publishers rather than assessing reputation or prestige. Arguably this could support research funders in achieving the aim of matching the prices and services of APCs. It is perhaps these efforts to shift culture that will in the long run allow research funders to have the most effective impact on the transition to open access.

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Appendix 1: Interview Questions

Questions asked to both research funders

1. What are the main aims of your policy for paying APCs?
2. Is your policy intended to influence the market for APCs? If so in what ways?
3. How does your policy intend to influence (or not influence) publication in hybrid journals?
4. Who do you think is the best target for price sensitivity towards APCs? Does your policy intend to influence academics towards considering the cost of APCs when choosing in which journals to publish?
5. How do you think APCs should be budgeted as a component of research funding? Is there a limit to the amount you want APCs to contribute towards the overall cost of publishing research?
6. What role do you envisage research funders playing in the transition to open access and how much of a role does policy towards APCs have in this?
7. How do you think the quality of journals, and the related price should be assessed? Are 'traditional' metrics such as h-index able to 'justify' higher APCs or should other consideration such as publishing time or quality of article presentation play a more important factor?
8. How does your policy try to address author compliance with open access mandates? Is compliance with mandates a major issue for your organisation?
9. Do you see a problem for authors wishing to publish in particular journals but being constrained by APCs and/or open access mandates?

Questions specific to FWF:

1. Why do you have different funding levels for hybrid and gold APCs? What is the aim of this policy?
2. Do you think hybrid publishing will remain viable in the long run?
3. Is green OA preferable to hybrid if the cost doesn't reduce?

Appendix 2: Dissertation Reflection

This appendix offers a short reflection on the dissertation.

The Dissertation Process

This dissertation represented an extensive research project. Carrying out the dissertation part-time allowed me a longer period in which to complete the work; however, this was conducted alongside full-time employment. This required careful time management on my part.

The research process involved extensive literature searches. Though some literature was easily accessible, other sources were less easy to locate, requiring more time and effort and the use of more sophisticated search strategies. The material covering more specialist topics required more advanced searches. I also gained experience in accessing institutional policies. Overall, this helped me to further develop my information retrieval skills.

In the process of carrying out the literature search a large amount of material was retrieved. I utilised BibDesk to manage both citations and full text articles. This was chosen as it integrated well with other selected tools. The writing was done in plain text using Markdown syntax with Pandoc being used to convert to Microsoft Word format and produce references. This allowed me to easily convert material from the dissertation to other formats as required. I used Github to version control the project.

Developments from the Original Proposal

A number of developments and changes emerged between the original proposal and final version of the dissertation. A decision was reached early on to focus on the Wellcome Trust and the Austrian Science Fund (FWF) and not to extensively outline the policies and of Science Europe. Although Science Europe comprised research funders, more detailed research findings would emerge from a direct comparison of two funders.

Although the proposal had originally intended to focus on issues related to hybrid Article Processing Charges (APCs), I developed an interest in considering the broader question of how research funders can influence the market for APCs. This allowed me to engage in more depth with the current market for APCs and

the role of government policy in shaping the scholarly publishing landscape, which in turn gave more weight to the comparison of the approaches of my two case studies. It also allowed me to make a more extensive contribution to existing gaps in the literature. A focus on the issue of funding hybrid APCs, however, remains as a possible future research project.

Learning outcomes

I learned a great deal in carrying out the research for the dissertation. Interviewing was a relatively new experience from which I gained a greater understanding of the potential insights to be gleaned from this approach as a means of understanding policy. I intend to utilise interviews in future research projects.

My initial intention had been to work on a dissertation with contemporary relevance. I believe I have been successful in doing this. I was particularly keen to focus on open access policy as I would like to work in this area. Though the dissertation did not make extensive policy recommendations, it did produce modest guidance on policy directions, as well as outlining the challenges of APCs. I believe I have developed a better understanding of the considerations that inform policy, and, in particular, the ways in which policy is constrained by existing markets.

Appendix 3: Proposal

Introduction: the transition to open access

An increasing number of open access mandates from government, funders, universities and other research institutions suggest that research will increasingly be published in some form of open access. Questions remain about how long this process will take, what publishing models will be utilised and, importantly, how much open access will cost and who will pay?

A particular concern has emerged around the cost of Article Processing Charges (APC) funded models of open access, in particular for 'hybrid' journals in which only particular articles are open access. The cost of APCs for these journals has been identified as being particularly high (Priego 2014, Brook (2014)). In response, different policies have been developed by funders as a way of dealing with these charges. This dissertation will aim to assess three different policy proposals and identify which are likely to be most successful in achieving the broad aim of funders in favour of open access: getting the best 'value for money' from the costs associated with research publication.

This project will use desk based research in combination with interviews with three funding bodies; the Wellcome Trust, Science Europe and the Austrian Science Fund (FWF). These funding bodies have taken differing approaches to funding hybrid APC charges. The Wellcome Trust will currently cover the costs of APCs, FWF will pay a capped amount whilst Science Europe will not pay for APCs in hybrid journals. The dissertation will seek to understand how these policies seek to influence the market for APCs, in particular in relation to hybrid journals. Part of this research will examine whether funding policies attempt to make authors 'price' sensitive in making decisions about where to publish research. Published figures for APC spending will be utilised to help understand the current market for APCs.

Aims and objectives

A central aim of the dissertation is to assess the ways in which open access funding policies attempt to influence the market for APCs in hybrid journals, a question which has only been partially explored in the literature. 'Developing an Effective Market for Open Access Article Processing Charges', a report by Bo-Christer Björk and David Solomon (Björk, Sylwestrzak, and Szprot 2014) commissioned by the Wellcome Trust outlines some of the problems with the current

market for APCs. The problem of high APC charges for hybrid journals was identified in this report. Alongside identifying the problem, the report sought to:

‘identify and appraise policy options for funders and other stakeholders, through which they can help ensure a competitive and transparent market for scholarly journal APCs that supports the continued development of innovative new approaches.’ (Björk, Sylwestrzak, and Szprot 2014, 7)

This dissertation will seek to build upon this report, alongside the broader literature. However, rather than looking at potential funding policies, it will research the implementation of three currently existing approaches to funding hybrid APCs costs. In this way it will address a gap in the literature. Whilst not being primarily intended to provide advice on policy for individual funders, it is hoped that the findings of the research may be of use to research funders in shaping policies surrounding APCs. The three funders were selected because of their differing approaches, because they are large funding bodies and thus have the scope for taking a variety of policy options and because these organisations have all taken strong stances on open access, making them relevant to the discussion on the transition to open access.

To address the aims, the dissertation will focus on the following objectives:

- To understand the funding policy of the Wellcome Trust, Science Europe and FWF in relation to funding hybrid APCs;
- Understand the aims behind these policies;
- Understand how ‘price sensitivity’ is utilised in these policies? Do the funding policies aim to make authors, libraries or other institutions more sensitive to the price of APCs?

Achieving these objectives should help to address the overall aim of this project.

Scope and definitions

Open access will be broadly defined simply as ‘unrestricted access to the published output of research.’³³⁶ There will be points when this definition will be, necessity have to be expanded upon, or qualified. Each of the funding bodies covered in the dissertation have particular requirements for publication in order for research outputs to be considered open access. For example, the FWF require that ‘whenever legally and ethically possible, all research data and similar materials which are collected and/or analysed using FWF funds have to be made openly

³³⁶<http://www.wellcome.ac.uk/About-us/Policy/Policy-and-position-statements/WTD002766.htm>

accessible.’³³⁷ This conception of open access will impact upon the funding policies of the FWF and it is therefore important to consider different understandings of open access within the dissertation. The impact on authors is an important outcome of funding policies, so will be an important consideration.

Hybrid open access publishing may again be defined in a number of ways, depending on the specifics of funding bodies. It will in general be understood as a form of OA in which articles in subscription journals are made available OA primarily through a payment of an APC. APCs are charges made by publisher to make articles open access. Though APCs will be the major focus of this project it is important to point out that this is not the only model for funding open access. A common misconception suggests that APCs *are the* model for providing open access. This is not the case. Other types of open access publishing have made use of a variety of alternative funding models including consortium funding or institutional repositories.

The scope of the dissertation will be constrained in a number of ways. Research on funding policies will primarily focus on the Wellcome Trust’s, FWF and Science Europe’s policies though the broader context of OA, scientific and higher education funding will be discussed. The dissertation will be international in scope as the selected funding bodies also have an international reach. The materials used, however, will primarily be in English, with potential for a small amount of German material to be drawn upon when it is deemed particularly important and no English translations exist. German speaking countries have been relatively at the forefront of open access policies. Although FWF’s material is often multilingual, it is possible that other relevant material may only exist in German.

Research context

A growing number of both government and non-government research funders have implemented support or mandates for open access. In this context questions about the development and maturation of open access publishing have arisen. A particular issue has emerged around the high price of APCs. Questions around the cost of implementing open access have often focused on the issue of APCs. Although there are different estimates of APC charges for hybrid journals, the cost of APCs in hybrid journals is almost always higher than the cost in fully open access journals (Björk, Sylwestrzak, and Szprot 2014, Priego (2014)). The reasons for this higher APC cost will be assessed. The Wellcome Trust, Science

³³⁷<https://www.fwf.ac.at/en/research-funding/open-access-policy/>

Europe and FWF's open access policies³³⁸ provide initial context for the dissertation. The motivation of research funders in supporting open access will help to understand approaches taken in policy towards funding hybrid APCs.

High costs are not the only problem that have been identified by the literature. The problem of 'double dipping' has been an area of concern (Anderson 2013). Though a term rejected by publishers (Elsevier 2015), some have suggested there are instances in which publishers are effectively paid twice by the same institution. Once for an APC charge to make an article open access and a second time for subscriptions to that journal. Though strongly rejected as an issue by publishers, the potential for double dipping could play an important part in shaping funding policies for APCs.

There is a growing body of literature on open access (Frosio 2014). This literature is made up of a variety of materials including government, funder and other institutional reports, secondary literature, blog posts and social media discussion. This literature deals with a broad range of different issues relating to open access. Some of this literature seeks to persuade of the benefits and reasoning behind open access to a variety of audiences (Suber 2012, Willinsky (2009), Eve (2014)).

Research on the functioning of the hybrid journals market will be of particular interest. The previously mentioned report by Bjork and Solomon (Björk, Sylwestrzak, and Szprot 2014) will be particularly important. Other research by Bjork on the functioning of markets in open access publishing will also help develop an understanding of the broader context in which APCs and policies towards them are determined (Björk, Sylwestrzak, and Szprot 2014). Alongside this other reports published by funders, such as Science Europe's 'Principles for the Transition to Open Access to Research Publications' will provide further information about the different approaches taken by funders.³³⁹

Methodology

A number of different approaches that will be taken in achieving the objectives of the dissertation project. The primary focus will be on desk-based research. This

³³⁸<http://www.wellcome.ac.uk/about-us/policy/spotlight-issues/Open-access/index.htm>
http://www.scienceeurope.org/uploads/PublicDocumentsAndSpeeches/SEOAPos_Statement.pdf
<https://www.fwf.ac.at/en/research-funding/open-access-policy/>

³³⁹http://www.scienceeurope.org/uploads/PublicDocumentsAndSpeeches/SEOAPos_Statement.pdf

has been driven by the availability of a large body of literature, as identified above, from which to draw; in particular reports commissioned by research funders, alongside position statements and funding policies, play an important starting point in understanding the aims of research funders. Science Europe's Position Statement 'Principles for the Transition to Open Access to Research Publications' outlines a number of important principles in relation to payment of APCs.³⁴⁰ The requirement 'that funding of Open Access publication fees is part of a transparent cost structure, incorporating a clear picture of publishers' service costs' is similar to other research funders policies. Science Europe's position on the hybrid model, however, differs from those of the Wellcome and FWF. Science Europe 'stress that the hybrid model, as currently defined and implemented by publishers, is not a working and viable pathway to Open Access. Any model for transition to Open Access supported by Science Europe Member Organisations 'must prevent 'double dipping' and increase cost transparency'.³⁴¹ This rejection of hybrid publishing as a viable approach to transitioning to open access is very different to the approach of other research funders. The Wellcome trust 'will provide grant holders with additional funding to cover open access charges, where appropriate, in order to meet the Trust's requirements.'³⁴² These different policies towards the funding of APCs will form the starting point of research for this dissertation. Analysing these policies in depth will help form a understanding of their differences and similarities, and some of the reasons behind these.

Another aspect of the desk based research will make use of the increasing number of published APC spending reports. The Wellcome Trust has published its spending on APC charges (Kiley 2015a), data which has been further refined (Priego and Neylon 2014). The publication of this data is further contextualised by the Wellcome, in particular in relation to compliance to open access mandates, an important aspect for funders in forming open access policies (Kiley 2015b). Data collected by JISC Collections will provide further scope for assessing the current level of spending on APCs. The approach to handling this data will primarily be descriptive though some basic statistical analysis might be done if it is found to be particularly useful. For example, calculating if there is any correlation between APC level and indicators of 'quality' of the journal, whether these

³⁴⁰http://www.scienceeurope.org/uploads/PublicDocumentsAndSpeeches/SEOAPos_Statement.pdf

³⁴¹http://www.scienceeurope.org/uploads/PublicDocumentsAndSpeeches/SEOAPos_Statement.pdf p.4

³⁴²<http://www.wellcome.ac.uk/About-us/Policy/Policy-and-position-statements/WTD002766.htm>

be traditional ones or new measures such as alemetrics scores, or speed of publication.

Alongside desk-based research the dissertation will also draw upon a limited number of interviews. These interviews will take place with representatives of the Wellcome Trust, Science Europe and FWF. Interviews will primarily take place by email, though some interviews with the Wellcome may take place in person. These interviews will be semi-structured in nature. A set of core questions will be devised but respondents will be left open to focus on areas of funding policies that they feel are most important. Interviews will help clarify questions about the policies of funders, and the reasoning behind them. Interviews will be limited to a small number of representatives of research funders with contact being made with the help of the Robert Kiley from the Wellcome Trust. Focusing on a limited number of interviews will help ensure that the interviews are sufficiently detailed and that the responses can be assessed in enough detail. Interviews are the methodology with the greatest potential risk involved, in particular not receiving responses. Previous correspondence and meetings with Robert Kiley from the Wellcome Trust limits the risk of not receiving responses from the Wellcome. Support from people within the Wellcome also provides additional legitimacy to representatives from other funding bodies. Alongside this contacts with librarians involved in open access in Germany will help identify additional respondents if required.

Work plan

Resources

This project will require limited additional resources. No special hardware will be required. It is envisaged that the majority of software being used will be open source. There is a growing amount of data available on APC charges so data collection will be limited to the use of existing data. It is unlikely that there will be any statistical analysis beyond very basic techniques. There are no major travel costs envisaged, with the majority of research taking place in London.

Ethics

Although there are always potential ethical issues that can arise from carrying out research, it is not envisaged that either the subject of focus, nor the methodology of the project will pose particularly great ethical risks. The greatest potential for ethical issues come from the interviews. To minimise risk, all interview participants will have the purpose and scope of the dissertation clearly explained

to them; it will also be made clear that they are free to withdraw their participation. Please see appendix for research ethics checklist.

Confidentiality

There are a number of potential issues surrounding confidentiality. In order to minimise these questions a number of steps will be taken;

- interview questions will not seek to illicit confidential responses
- it will be made clear before interviews what will be done with responses
- for the most part information gathered will be publicly available i.e. policy document, reports and published APC figures.

It is predicted that no major issues of confidentiality will arise. However, if issues do occur advice will be sought from the department.

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