



Stability and longevity in the publication careers of U.S. doctorate recipients¹

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ABSTRACT

Since the 1950s, the number of doctorate recipients has risen dramatically in the United States. In this paper, we investigate whether the longevity of doctorate recipients' publication careers has changed. This is achieved by matching 1951-2010 doctorate recipients in astrophysics, chemistry, economics, genetics and psychology with rare names in the dissertation database ProQuest to their publications in the publication database Web of Science. Our study shows that post-PhD publication career spans have not changed much in most fields, with the share of doctorate recipients who have published for over twenty years having remained stable over time.

INTRODUCTION

The career system in modern day academia is typically pyramidal in structure with relatively few professors at the top and many PhD students at the bottom. Supply typically exceeds demand: more PhD students and postdoctoral researchers indicate they would like to have a university research career than there are positions available (Cyranoski et al. 2011; 'Make the most out of PhDs', 2015; Stephan, 2012). Indeed, studies have shown that opportunities to occupy tenured or tenure track faculty positions in academia have decreased (Schuster & Finkelstein, 2006; Stephan, 2012; Waaijer, 2015).

However, this does not necessarily mean that there are fewer opportunities to do scientific work after the PhD, as "investigative careers" can be found in a number of positions within the scientific workforce. In this paper, we assess the length of the investigative careers of

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doctorate recipients with rare names from U.S. universities in five fields: astrophysics, chemistry, economics, genetics and psychology, for the period 1951 – 2010.

DATA AND METHODS

The ProQuest Dissertations and Theses database was used as a source of data on U.S. doctorate recipients (ProQuest, 2015). From this database, the names of all 1951-2010 doctorate recipients of U.S. universities in astrophysics, chemistry, economics, genetics and psychology were retrieved. In our study, our goal was to estimate the post-PhD publication careers of these doctorate recipients by measuring when they published scientific papers. However, the attribution of papers can be difficult due to the problem of homonymic names, names shared by one or more individuals (Smalheiser & Torvik, 2009). Therefore, we restricted our sample of doctorate recipients to those with a unique name, an approach also followed by Boyack and Klavans (2008), for example. This was achieved by selecting names of doctorate recipients occurring only once in ProQuest with two or three initials. Furthermore, surnames occurring commonly in the Web of Science were removed (i.e., for each surname the number of distinct combinations of surname and initials was counted, and surnames occurring in 100 or more combinations were removed). Finally, we removed names of researchers with publications in fields outside the PhDs' broader research field, as such publications suggests these names are homonyms.

Unique names in the ProQuest database are not necessarily unique in the much larger WoS database. Therefore, further criteria were imposed on the retrieval of papers from this database. The type of paper was limited to “articles” or “reviews” as we are interested in measuring the research output of doctorate recipients. Papers published between five years before PhD and thirty years thereafter were retrieved. This period was chosen because publications published long before the PhD (e.g., ten years before PhD), or many years after (e.g., sixty years after) are unlikely to be authored by the doctorate recipient. As a further selection criterion a doctorate recipient's first publication must be between five years before and three or five years after PhD graduation; three years for astrophysics, chemistry, and genetics; five years for economics and psychology as PhD graduates in these fields publish their first paper later than in the other three fields. In addition, at least one publication must be in the (narrow) field of their PhD.

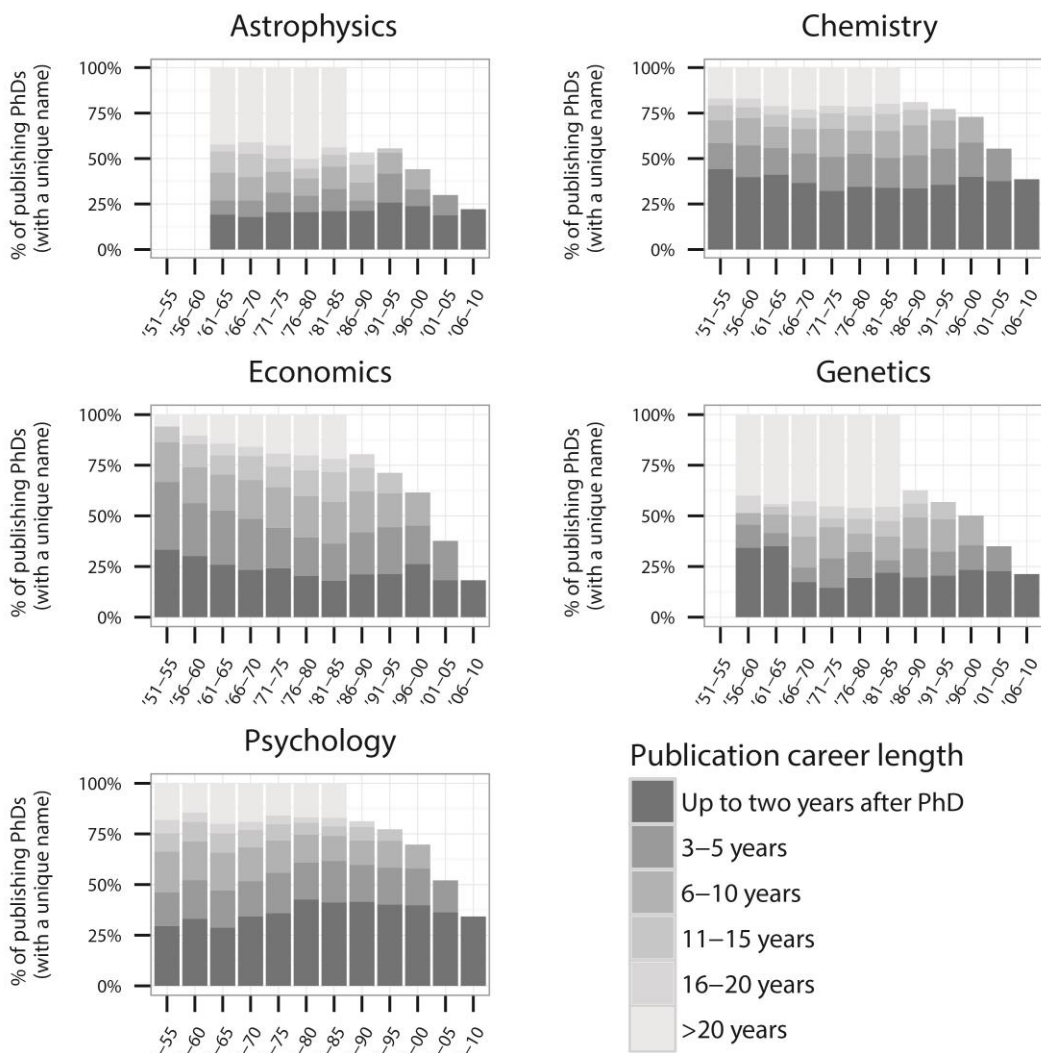
RESULTS

Post-PhD career spans of U.S. doctorate recipients were examined by computing the share of recipients publishing at various career lengths: up to two, three to five, six to ten, eleven to fifteen, sixteen to twenty, and twenty to thirty years since the doctorate. We consider the publication career spans of the 1951-2010 doctorate recipients, with papers published after a long interruption in publication (five years or longer) removed (Fig. 1). In such an investigation, no distinction can yet be made between post-1985 doctorate recipients with a short publication career and those whose publication careers have been interrupted but who will later resume publishing. For example, a scholar receiving a PhD in 1990 could have published their last paper in 1995, which means a career span of five years. However, they could publish a next paper in 2017, which would mean their career span would actually be 27 years. Clearly, it is impossible to predict if this will happen. However, when papers published after an interruption are disregarded, the determination of post-1985 doctorate recipients'

publication career length is possible. Results are only shown when all doctorate recipients in a five-year period have had the opportunity to publish in a given period. An example: for 2001-2005 doctorate recipients, we do not plot the shares of doctorate recipients publishing for 6-10 years after PhD, because this figure also includes people that will continue to publish for a longer period. Hence, the shares do not add up to 100%. Finally, shares were only plotted when number of doctorate recipients with one or more published papers in a five-year period was > 25.

Looking at trends in the spans of publication careers, in astrophysics, chemistry, genetics and psychology, the share of doctorate recipients with long publication careers has remained quite stable, but increased in economics. With respect to the share of brief publication careers, in chemistry, recent decades have seen a slight upward trend after an initial decline. In economics, there was a downward trend. The share of intermediate length careers (6-20 years) decreased in psychology in the late 1980s and the 1990s.

Figure 1. Career length by five-year period and field.



DISCUSSION AND CONCLUSIONS

The large growth in the number of doctoral students compared to a smaller growth in tenure track positions has raised concerns in the scholarly community ('Indentured labour', 2007; 'Make the most out of PhDs', 2015). We investigated whether the changes in academic employment have replaced long investigative careers with more volatile ones for doctorate recipients.

We do not find evidence for changes in academic employment to have led to shorter investigative careers. The span of the publication career has remained stable (in astrophysics, chemistry, genetics, and psychology) or even increased (in economics). Furthermore, in the basic research fields of astrophysics and genetics, long publication careers (of over twenty years) have been the most common career for doctorate recipients from the early 1950s to the early 1980s.

In conclusion, not only are long publication careers common, the shares of more recent doctorate recipients publishing for a short period after the PhD are also stable. Therefore, while employment structures may have changed, the span of research activity by doctorate recipients has not. So in what types of positions do these academics work? Data on academic positions show a large increase in the number of postdoctoral positions (Cantwell & Taylor 2015; Stephan & Ma, 2005). This rise is due to both an increase in the number of recent doctorate recipients taking a first postdoctoral position and to an increase in the time spent in postdoctoral positions (Stephan & Ma, 2005). In addition, the number of non-tenure track staff positions has increased through time (Schuster & Finkelstein, 2006). Our results show researchers have publication careers that are as long as they were before. However, they may be in "holding positions" or on "soft money" (i.e., postdoctoral and non-tenure track positions) for a much longer time. In addition, they may have continued publishing in non-academic employment.

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