

Gender, Ethnicity and Funding of Early Career Researchers: Evidence from the UK

Charitini Stavropoulou¹ and Ian Viney²

¹City, University of London, UK

²Medical Research Council, UK

April 21, 2023 - NBER

Overview

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- Securing funding in early stages of one's research career is crucial.
- Funding bodies have established early career schemes to support post-doctoral researchers:
 - USA: Pathway to Independence Awards (NIH);
 - UK: Career development awards and fellowships from Medical Research Council, the Wellcome Trust or the NIHR;
 - EU: Starting Grants (European Research Council).
- Yet, empirical evidence of the effect that early career schemes have on individual researchers is scarce.

Two studies on the topic provide conflicting results:

- Bol et al (2018) support the Matthew effect hypothesis: previous successes positively affect future successes in terms of research income, but not other academic outcomes.
- Wang et al (2019) show that near misses are more likely to win grants in the future, due to a perseverance mechanism; near misses are more likely to apply for more grants.

- The more recent debate is shifting towards *who* is more likely to benefit from research funding.
- Prior literature on socio-demographic characteristics and research grant success has focus on disparities in grant submission and success rates (Cruz-Castro, Ginther, and Sanz-Menendez 2022).
- What happens to these groups *after* they receive a grant, remains unexplored.

- To explore the impact of funding of early career researchers, defined as those applying to secure their first grant as Principal Investigators (PI), on researchers' subsequent academic performance.
- Subgroup analyses of specific groups for whom the impact may be different, including female applicants and those of Black, Asian and Minority Ethnic (BAME) background.

- The Medical Research Council (MRC) is the largest public funding body of medical research in the UK and one of the largest in the world (Viergever and Hendriks, 2016).
- The MRCs early career schemes include:
 - two fellowship programmes: the Career Development Award and Clinician Scientist Fellowships and
 - one grant scheme that is aimed for early career researchers only: the New Investigator Research Grant.

- Our sample consists of every individual researcher who applied for an MRC early career fellowship or award between 2006 and 2016.
- For the purposes of the main analysis, we focus only on those applicants who were assessed at the board level.
- We exclude applicants:
 - who are no longer in academia as these are not applying for grants and are less likely to publish in peer review journals;
 - who appear as unsuccessful in our dataset, but secured an early career award from another funding body.

We match three databases:

- 1 The MRC's own records for key baseline characteristics (SIEBEL);
- 2 Dimensions, a database compiling research information of individual researchers, on research outcomes for research income and publication outcomes;
- 3 Manually identified information from LinkedIn and Google for career progression.

Variables and sources

Variable	Description	Source
Gender	Female (0) or male (1)	SIEBEL
BAME	White (0) or Black, Asian and Minority Ethnic (1) background	SIEBEL
Age	Applicant's age at submission in years	SIEBEL
Elite institution	No (0) Yes (1)	SIEBEL
Year	Year of applying for an early career scheme	SIEBEL
Success	Applicant was successful (1) or not (0)	SIEBEL
Publications	Total and last authorship publications, standardised	SIEBEL
Citation variables	Total citations, standardised; Relative Citation Ratio (RCR); Field Citation Ratio (FCR); Altmetrics	Dimensions
Research income	Total and PI income secured in £, standardised	Dimensions
Field of Research	Field of research	Dimensions
Destinations	Applicant still in academia (1) or not (0)	LinkedIn
	Applicant still in the UK (1) or not (0)	Google

Table 1: Description of variables and data sources

Empirical investigation

We use propensity score weighting (Rosenbaum and Rubin 1983). By conditioning on the probability of receiving an award on observed covariates, we estimate the average treatment effect (ATE) that the award has on academic outcomes.

$$ATE = E[Y^T - Y^C | T] \times P(T) + E[Y^T - Y^C | C] \times P(C)$$

where:

- Y^T is the outcome for the treated group T (successful applicants)
- Y^C is the outcome for the control group C (unsuccessful applicants)
- $P(T)$ is the individual's probability of receiving the award
- $P(C)$ is the probability of being unsuccessful

Descriptive characteristics

		Unsuccessful	Successful	Total
Sex	Female	749	159	908
	Male	988	263	1251
BAME	White	1,378	355	1,733
	BAME	296	54	350
Elite Institution	No	914	209	1,123
	Yes	853	215	1,068
Average Age		36.71	36.21	36.62
Still in the UK in 2021	No	605	30	635
	Yes	1,043	394	1,437
Still in academia in 2021	No	670	12	682
	Yes	976	412	1,388

Table 2: Descriptive characteristics of full sample

Results - Effect of award on academic outcomes

- Our findings support the Matthew effect hypothesis for the overall sample

	Publications			Citations			Research Income	
	Total per year b/se	Last Authorship per year b/se	Citations per year b/se	Average RCR b/se	Average FCR b/se	Average Altmetrics b/se	Total per year b/se	PI income per year b/se
ATE								
Success	-0.033 0.07	-0.01 0.07	0.043 0.06	0.063 0.07	0.057 0.07	0.075 0.07	2.995*** 0.47	6.783*** 0.439
POM								
No	0.031 0.06	-0.083 0.05	-0.037 0.04	-0.06 0.06	-0.06 0.05	-0.06 0.05	7.695*** 0.41	5.621*** 0.39

*p<0.05, **p<0.01, ***p<0.001

ATE: Average treatment effects

POM: Potential-outcome means

Table 3: Effect of award on publications, citations and research income

Subgroup analysis by gender

- The Matthew effect does not hold for female applicants

	Publications		Citations per year b/se	Citations			Research Income	
	Total per year b/se	Last Authorship per year b/se		Average RCR b/se	Average FCR b/se	Average Altmetrics b/se	Total per year b/se	PI income per year b/se
FEMALE ONLY								
ATE								
Success	-0.001 0.13	0.193** 0.07	0.155* 0.06	0.185 0.11	0.219* 0.09	0.209 0.13	3.754*** 0.75	7.445*** 0.58
POM								
No	-0.115 0.13	-0.276*** 0.04	-0.257*** 0.04	-0.200* 0.09	-0.24*** 0.07	-0.171 0.09	6.829*** 0.66	4.907*** 0.58
MALE ONLY								
ATE								
Success	-0.092 0.1	-0.15 0.1	-0.028 0.1	0.019 0.1	-0.007 0.1	0.037 0.08	2.890*** 0.65	6.655*** 0.55
POM								
No	0.141 0.08	0.039 0.08	0.09 0.07	0.013 0.06	0.035 0.07	-0.011 0.05	2.444* 1.04	5.574*** 0.87

*p<0.05, **p<0.01, ***p<0.001

ATE: Average treatment effects

POM: Potential-outcome means

Table 4: Subgroup analysis by gender

Subgroup analysis by ethnic background

- Weaker evidence the Matthew effect does not hold for BAME applicants

	Publications		Citations per year b/se	Citations			Research Total per year b/se	Income PI income per year b/se
	Total per year b/se	Last Authorship per year b/se		Average RCR b/se	Average FCR b/se	Average Altmetrics b/se		
BAME ONLY								
ATE								
Success	-0.015 0.16	-0.183 0.17	0.033 0.11	0.054 0.11	0.076 0.1	0.865* 0.42	2.444* 1.04	5.574*** 0.87
POM								
No	0.117 0.09	-0.04 0.14	-0.05 0.07	-0.118 0.09	-0.119 0.07	-0.183*** 0.05	8.327*** 0.84	6.792*** 0.88
WHITE ONLY								
ATE								
Success	-0.047 0.08	0.15 0.07	0.054 0.07	0.068 0.09	0.068 0.08	0.061 0.07	3.144*** 0.51	7.038*** 0.43
POM								
No	0.012 0.06	-0.09 0.06	-0.042 0.05	-0.052 0.07	-0.056 0.06	-0.04 0.06	7.576*** 0.45	5.371*** 0.42

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
 ATE: Average treatment effects
 POM: Potential-outcome means

Table 5: Subgroup analysis by ethnic background

- In the overall sample, we find evidence of a Matthew effect; early success results in further future funding, but no other differences in academic outputs.
- However, there are gender and ethnic differences.
 - Successful female researchers *improve* their citation outreach and influence in their field more than those females who did not win an award.
 - Successful applicants from an ethnic minority background *improve* their research outreach more than those who were not successful.

Conclusions and implications

- First study in the area of public funding of early career researchers that provides evidence of a positive effect on female applicants, and to a less extent on applicants from ethnic minority background.
- The effect is mostly on scientific influence and academic outreach and has significant implications for these groups that often face more challenges in academic progression.

References

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