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Short and long-term impacts of an increase in graduate funding☆

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ABSTRACT

This paper studies the short- and long-term impacts of an increase in merit-based scholarships with a novel data set containing 1114 recipients from the 2004 and 2005 doctoral competitions of the Social Science and Humanities Research Council (SSHRC). Using the scores received by recipients and the funding thresholds, I take advantage of a regression discontinuity design to estimate the causal impact of an increase in scholarship amount on locational choice and career outcomes of recipients. First, I find no evidence that recipients are induced to remain in Canada when they are promised a larger scholarship if they study in Canada. Second, there is no evidence that receiving a larger scholarship affects the probability of PhD completion within either five or nine years. Third, there is some evidence that a larger scholarship does increase the probability of having a tenure-track academic position nine years after receiving the award by approximately 15 percentage points. This result only holds for students who were initially awarded the scholarship in their second year.

1. Introduction

It is common for universities and countries to offer doctoral scholarships to their students. Canada, for example, offers almost $70 million yearly in doctoral scholarships to students in the humanities and social sciences. In spite of the millions spent on these scholarships, very little is known about their impact on students. Understanding their impact is important to justify their existence and possibly improve their efficiency. Unfortunately, it is difficult to determine the causal impact of graduate scholarships, because they are granted to the most talented candidates. It is therefore impossible to disentangle differences in funding from initial differences in talent. Regression discontinuity addresses this issue by comparing similar candidates - those with similar scores - but with different funding packages.

In this paper, I take advantage of the fact that the Social Science and Humanities Research Council of Canada (SSHRC) grants students entering their first or second year of doctoral studies a small ($20,000 per year) or a large scholarships ($35,000 per year) depending on the scores given by outside evaluators. This funding difference combined with the allocation rule makes it possible to study the impact of an increase in funding on short- and long-term student outcomes.

I first study the role of financial incentives on the locational choice of students. Only students enrolled at Canadian universities are eligible for the large scholarship. Students above the funding threshold therefore have the choice between studying abroad and receiving $20,000 or studying in Canada and increasing their earnings to $35,000. If this financial incentive is effective, students with a score above the threshold should be more likely to stay in Canada than similar students below the threshold. I find no such evidence. In other words, the larger scholarship does not induce recipients to remain in Canada. This paper contributes to a literature studying the impact of financial incentives on university choice. It is the first to study this question with a sample of doctoral students. Previous evidence shows that undergraduate merit-based scholarships which are only redeemable in the home state - like those offered by the HOPE program in Georgia - increase slightly the probability of undergraduate students to stay in their home state (Cornwell, Mustard, & Sridhar, 2006; Fitzpatrick & Jones, 2012; Zhang & Ness, 2010).

More generous graduate scholarships could also have a long-term impact by providing their recipients more resources and therefore more opportunities. Recipients of larger scholarships could focus their time on research, thus completing their thesis faster or potentially increasing the quality of their dissertation. To study this issue, I collected data on completion time and labour market outcomes of eligible recipients. Using this novel data in combination with a regression discontinuity design, I find no evidence that receiving a larger scholarship increases the speed of completion, but I do find some suggestive evidence that it improves the quality of recipients' research as measured by their

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Table 1
Disciplines by committee.

First committee	Fine arts, literature (all types)
Second committee	Classical archaeology, classics, classical and dead languages, history, mediaeval studies, philosophy, religious studies
Third committee	Anthropology, archaeology (except classical archaeology), archival science, communications and media studies, criminology, demography, folklore, geography, library and information science, sociology, urban and regional studies, environmental studies
Fourth committee	Education, linguistics, psychology, social work
Fifth committee	Economics, industrial relations, law, management, business, administrative studies, political science

subsequent labour market outcomes. Indeed, students who received a larger scholarship in their second year of doctoral studies are found to have a 15 percentage point higher probability of being a professor nine years after receiving the award in comparison to students who received the smaller award in their second year.

These results contribute to the literature studying the academic impact of scholarships. While there is some evidence that need-based scholarships help recipients improve their probability of graduation (Castleman & Long, 2016), results for merit-based scholarships at the undergraduate level are mixed.[1] This paper contributes to this literature by finding a positive impact of an increase in funding on job market outcomes for a subpopulation that plays an important role for innovation but that has not been studied so far: doctoral candidates.

The rest of the paper is organized as follows. I first present the institutional background and the data. I then describe the econometrics methodology and show the results for the short- and long-term impacts of scholarships. The third section shows robustness checks. Finally, I summarize the findings and present some policy implications in the concluding section.

2. Background and data

2.1. SSHRC and the selection procedure

The Social Science and Humanities Research Council (SSHRC) is a Canadian federal agency that promotes and supports postsecondary-based research and training in the humanities and social sciences. SSHRC achieves this goal by awarding yearly almost $70 million[2] to doctoral students[3] through two scholarships. First, the Joseph-Armand Bombardier Canada Graduate Scholarship (CGS) provides recipients with three annual payments of $35,000. Recipients entering first or second year are informed that they could receive CGS should they decide to study in Canada. If they decide to study abroad, they are awarded the smaller scholarship: the SSHRC Doctoral Fellowship (SDF). This second scholarship represents a yearly payment of $20,000 per year up to the fourth year of doctoral studies.[4] All doctoral candidates entering fourth year or below are eligible for SDF.

It is unlikely for domestic recipients of SSHRC scholarships to receive other major scholarships. Even though SSHRC does not place any restrictions on other sources of funding, the major provincial scholarship-granting agencies (Ontario Graduate Scholarship and the Fonds Quebecois de Recherche et Societe et Culture) do not allow their recipients to receive funding from SSHRC. Students studying abroad could stack scholarships. Unfortunately, I have no information on other scholarships received by students. Finally, scholarship recipients are allowed to work a maximum of 450 h per 12-month period.

Both scholarships have been exempt from income tax in Canada since 2006. To give some context for these amounts, the Ontario Student Assistance Program (OSAP) estimates the cost of living at $22,500 for single graduate students in Toronto and would provide a loan of $8,000 to someone receiving $20,000 (assuming no work income), but would offer no loan to a student in receipt of CGS.[5] Financially CGS recipients would therefore be in a much more comfortable situation than the SDF recipients.

To receive these scholarships, candidates apply in the fall with the following documentation: a project proposal, a CV, two reference letters from faculty, and all their university transcripts. Students enrolled at a Canadian university submit their applications to their home university pre-selection committee. Each university is provided with a quota restricting the number of students that can be forwarded to the national competition. This quota is adjusted regularly to take into account the previous success of the university. Students enrolled at foreign universities submit their application directly to the preliminary competition at SSHRC.[6] The top-ranked candidates from the university pre-selection and those from the preliminary competition at SSHRC are forwarded to the national competition. The data used in this study stems from the 2004–2005 and 2005-2006 national competitions.

Applications forwarded to the national competition are then sorted into one of the five committees based on the discipline of the project proposal. Table 1 shows the distribution of disciplines by committee. Within each committee, applications are then allocated to one of the 3 or 4 subcommittees based on the alphabetical ordering of the candidate's last name.[7] Each subcommittee assesses approximately 100 candidates and is composed of 3 associate or full professors who assign each candidate in the sub-committee a score from 0 to 10. The evaluation is done individually and the identity of the other evaluators is generally not known. The scores of the three evaluators are added to form the final score according to which the candidates are ranked.

The eligible[8] applicants in the top tier of a subcommittee are awarded a CGS, the second-tier obtains a SDF,[9] and the last tier does not receive any scholarship.[10] The thresholds are implicitly defined by civil servants who give awards to the top candidates.[11] The thresholds vary

[1] Scott-Clayton (2011) finds some evidence that the PROMISE scholarships induce students to reach renewal targets, but the effects disappear in fourth year when renewal is no longer possible. Results from Dynarksi (2008) showing the positive impact of merit scholarships on degree completion in Georgia and Arkansas has been cast in doubt by Sjoquist and Winters (2012); 2015) suggesting at best a modest impact on the performance of undergraduate students. Results are similar when considering the impact of National Health Institute grants on established and postdoctoral researchers (Jacob & Lefgren, 2011a; 2011b). More recently, Bettinger (2016) show that California's Cal Grant increases completion rates and salaries of recipients.

[2] SSHRC awarded $65,928,665 CAD for the 2004–2005 competition and $65,775,00 CAD for the 2005–2006 competition.

[3] Only Canadian permanent residents and Canadian citizens are eligible.

[4] If students receive the scholarship in their first year of doctoral studies, they will be awarded overall $80,000. Similarly, students winning a scholarship in 4th year will only receive one payment of $20,000.

[5] OSAP calculator available here: https://osap.gov.on.ca/AidEstimatorWeb/enterapp/enter.xhtml.

[6] These were the policies for the 2004–2005 and 2005–2006 competitions. Some of these policies have changed.

[7] Table 1 in the appendix shows the subcommittees of committee 5 for both competition years. Candidates with last names starting with letters A to F went to the first subcommittee; those with names starting with letters from G to M, to the second subcommittee; and the remaining candidates to the 3rd subcommittee. Exceptions can be explained by the fact that evaluators cannot assess candidates from their university and that French applications all went to a subcommittee in which all evaluators were fluent in French.

[8] Those starting first or second year of a doctoral studies at a Canadian university.

[9] Top-ranked candidates who are not eligible for CGS receive a SDF.

[10] This last group of students can still receive scholarships from other agencies or from their own university.

[11] For example, in committee 5 in the 2004–2005 competition, the first 41, 41 and 42 candidates received a scholarship in the first, second and third subcommittees respectively. See the bottom row of Table 1 in the appendix. Other committees are similar. Committee 5 was chosen, because it contains doctoral students in economics.