

# DOES IT ALL START AT HOME? THE EDUCATIONAL IMPACT ON ECONOMICS CHOICES

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## Motivation and Purpose

Danish news outlets regularly list and rank different educational programs based on their expected income after graduation.<sup>1</sup> This is usually seen by parents and prospective students as an important source of information when choosing a field of study. In particular, some prospective students might face the difficult choice of applying to a major that they are highly interested in but that yields a low anticipated income, versus applying to a less desirable major that yields a higher anticipated income. Using such program rankings to choose a field of study assumes that income after graduation is a direct effect of studying a given major. In this study, we seek to test whether this assumption is valid.

There are two potential reasons why an educational program could lead to higher future income. One reason is because students that enroll in the program have the innate ability to generate a high income; this is a *selection* effect that could be the result of attracting students with high IQ, good inter-personal skills, etc. Another reason is because students who graduate the program have acquired skills that are valuable in the job market; this is a *causal* effect that is the result of the field of study itself and the education acquired.

If higher income after graduation mostly reflects a selection effect, students should be careful in choosing a field of study solely on the average income of its graduates; they should instead choose a field of study that closely matches their interest and skills, and public policy should aim at matching students to fields of study that fit their profile. If higher income reflects a causal effect from the program of study, students seeking to maximize future earnings should pay close attention to such rankings and public policy should aim at nudging such students towards high earning majors.

Because the Danish government plays an important role in allocating slots to different fields of study, majors and university, it is an important public policy question to understand where the value added of a fields of study comes from and what would be the costs/benefits of cutting down or increasing spots available in different university programs.

However, in reality, the average outcomes of graduates of different fields of study is most likely a mix between selection and causal effects. In this project, we have identified a way to quantify how much of the attributes of a cohort of graduates from a field of study are causal, and how much are selection based on discontinuity built into the admission system at Danish Universities and particular to Denmark. Such methodology can help identify the role of these two mechanisms in driving the dispersion in income after graduation for different majors.

Moreover, we realize that education does not only affect future income but potentially also affects how people make important economic choices such as saving in the form of pensions, bonds, and stock as well as owning a house, taking on debt, and financial delinquency. In this project, we seek to identify the impact of studying different majors on financial performance and efficiency of household economic choices later in life. For example, studying finance or economics could cause people to make better financial choices (e.g. lower debt delinquency), or the type of individuals likely to make better financial choices may apply anyway to study in these types of program. To the best of our knowledge, our study will be the first to separate the selection and the causal effect of university education in financial and economic outcomes later in life.

## Methodology

We exploit a discontinuity built into the admissions system at Danish universities to answer our research question. When people apply to university, they can enter to their desired education depending on the grade cut-off or lack of it in a given program. We focus on prospective students that barely made the

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<sup>1</sup> For example look at: <https://www.dr.dk/nyheder/penge/se-hvad-du-kan-tjene-med-din-uddannelse>

cut-off to enter an educational program and compare them against prospective students that were really close to the cut-off but missed it by a very small margin.

This feature of our design allow us to identify the causal effect of education on economic outcomes, since both groups of students we focus on are very similar except that a group was “lucky” and made the cut-off by a tiny margin, while the other group wasn’t so “lucky” and missed the cut-off by a tiny margin. This implies that if there is a difference in outcomes between the two groups is because of differences in education. People can apply in Denmark to what are called Quota 1 and Quota 2, and we focus on the former since it is the one where grades is virtually all that matters for entering into a program.<sup>2</sup>

We use Danish registry data to compare financial outcomes (income; stock, bond, and bank assets; home ownership, home value, and mortgage debt; other debts and assets; pension savings) 10 years after enrollment in cases where the assignment scheme moves students from programs with worse outcomes to those with better outcomes, or vice versa.

The educational discontinuity we consider inherits the appealing econometric features of a regression discontinuity design (RDD). These RDD techniques were originally used by Thistlethwaite and Campbell (1960) to study the impact of merit awards on future academic outcomes. These methodologies rely on the assumption that individuals are unable to precisely manipulate their position around the discontinuity and effectively replicate a randomized experiment in which individuals would be randomly assigned to the treatment. In our case, grades are decided the preceding two to three years before applying early July, where grades are locked, and before the cutoffs are made in early August. Therefore, it is virtually impossible for prospective students to position themselves around the cut-offs.

### **Data**

Our dataset includes demographic, educational and financial information on the universe of adult Danes between 1986 and 2016. We derive data from three different administrative sources made available through Statistics Denmark: demographic information from the Danish Civil Registration System (CPR Registeret), from the Ministry of Education we obtain student upper secondary school grades, application for higher education programs, the official cut-off information on each program, and the obtained highest educational degree from diplomas. From the Danish Tax Authority (SKAT) we obtain income and financial information.

We already have access and have processed, as well as matched, all the datasets mentioned above. The correct identification of the cut-off information was the most challenging dataset to clean up and match up to the rest of the datasets – as the admission clearinghouse at the ministry of education (Den Koordinerede Tilmelding) does not use the same standardized unique codes as Statistics Denmark. We started from old scanned files dating back to 1992 and converted them into online format. We then had to manually identify the KOT identification number for each university program<sup>3</sup> such that we could follow them over time and match that to different types of educational program categories. Additionally, we had to build algorithms to decompose grades from high school diplomas as well as aggregate these into the grade used by the clearinghouse to be able to correctly identify students’ acceptance at each program.

### **Policy Implications**

One of the cornerstones of the Danish welfare system is equal access to education. This means that Danes can focus on the decision to find the education that matches their preferences, skills and income ambitions, without having to worry about saving or borrowing massive amounts of money to pay for education like the in U.S. One of the big unknowns for prospective students is how much education can actually determine their future prospects in life.

Our project will help answering key related questions such as: Will certain education help a person achieve his/her financial goals? Or is it all that matters are people’s background and skills? Our project will provide useful information that prospective students can use to make the complicated trade-offs in

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<sup>2</sup> In Quota 2 there are factors that can affect the probability of entering into a program such as previous work experience.

<sup>3</sup> The KOT number is available for the last few years of our sample but this is not the case for most of the years we had access to.

educational attainment choices. Moreover, this will help young people set themselves up for future financial/economic success, which in turn will contribute to the improvement of the Danish welfare system.

Additionally, there are ongoing policy debates about cutting slots available in particular fields of study. For example, there have been discussions recently about reducing the intake of foreign students in programs in Denmark. If this were to also affect the intake of Danish students, such policy should also have an effect on future income and financial outcomes of prospective students that are left out in the margin. Our study can help quantify the economic impact of such policy proposals.

Finally, our results will also inform a current debate on the effectiveness of the Danish education system to promote intergenerational mobility. Landersø and Heckman (2017) found that intergenerational educational mobility is remarkably similar in Denmark and the United States, which came to a surprise to some policy-makers in Denmark. Our results will inform this debate also by identifying the causal effect of education on financial health of individuals. If these effects are positive, it will constitute additional strong arguments in favor of equal access to education. Does it all start at home?

### **Contribution to the Literature**

Our study will contribute to a small but growing body of literature on payoffs to postsecondary field of study, reviewed by Altonji, Blom and Meguir (2012), where many of the studies reviewed cannot separate the causal and the selection effect of education. One exception is Kirkeboen et al. (2016) who study choice of field of study on labor outcomes while controlling for selection effects. We extend this literature by studying virtually a full range of financial choices and outcomes of observable in the individual's balance sheet. For example, pension saving (compulsory and private), financial asset holdings (stocks, bonds and deposits), housing (mortgage debt and value), debt (loans and interest paid) as well as other outcomes (car value, price of square meter of housing in neighborhood, and average wealth in neighborhood). We also contribute to a body of literature in finance that have studied stock market participation, saving, and credit management (e.g., bankruptcy and delinquency). This literature has focused on the effect of additional years of education in high school using survey or census data, which have in many case incomplete or indirect measures of the outcomes of interest. We will contribute to this literature by studying the effect of education in the full balance sheet of individuals, which will give us an overall view of the effect of education on the economy and finances of households.

### **Timeline of Project and Budget**

We seek financial support for one and a half years, from October, 2018, to March, 2020. We have already spent close to a year preparing, cleaning and matching the datasets. We are at the stage where we will start analyzing the data. We expect to take 6 months to have a full draft of the paper such that we can apply to conferences and workshops around April, 2019. We expect to go to several conferences for the rest of 2019 and submit the paper to journals towards the end of 2019. Our expectation is that this paper should be of interest to top economics journals or top finance journals. We seek support for research time, research visits, travel expenses to present the paper in conferences and journal submission expenses (See the attached Budget.xls file). This financial support will facilitate tremendously the writing and completion of the paper.

### **Project Participants**

Our research team is already established and have been working together for about two years and we even have a working paper that is currently submitted to a journal. The members of the team are:

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Philippe d'Astous, HEC Montreal, Canada  
Steffen Andersen, Copenhagen Business School  
Stephen Shore, Georgia State University, USA

## References

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