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Field of Study and Financial Problems: How Economics Reduces the Risk of Default

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Abstract

This paper documents how extensive economic education can reduce the risk of getting into financial trouble by comparing people who enter business and economics programs with people who enter other higher education programs. To identify the causal effect, I exploit GPA admission thresholds that quasi-randomize applicants near the thresholds into different higher education programs. I find that admission to an economics program reduces the probability of loan default and delinquency by one half. This large reduction is associated with changes in financial behavior, but it is not associated with differences in the level or stability of people's income.

Keywords: Financial Problems, Education, Regression Discontinuity, Financial Literacy
JEL codes: G51, G53, I23

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1 Introduction

Financial decision-making in households has received growing interest in recent years (Gomes et al., 2021). For instance, the OECD argues that ill-informed financial decision-making has "tremendous adverse effects on both personal, and ultimately, global finance" (OECD, 2016, p. 80). The interest is often focused on the debt behavior of households and how well people manage and service their debts. Loan defaults and delinquencies have great consequences for debtors, who can lose credit access, and for creditors, who can lose their money (Kreiner et al., 2020). More generally, defaults have important adverse effects on the credit market and can lead to credit rationing (Stiglitz and Weiss, 1981).

How can we avert the consequences of ill-informed financial decision-making? A growing strand of literature studies whether increasing financial literacy through educational interventions can improve financial decision-making. Still, evidence on the extent to which educational interventions can alleviate financial problems is scarce.

In this paper, I investigate how studying economics causally reduces the risk of developing financial problems. The main challenge in identifying the causal effect of studying economics is that correlations between field of study and financial outcomes[1] can be driven entirely by prospective students self-selecting into study programs. For instance, unobserved factors, such as students' skills and preferences, can potentially drive both their financial behavior and their choice of study program (Wiswall and Zafar, 2015).

To address this self-selection problem, I leverage a combination of high-quality, third-party reported administrative data on applications and admissions to institutions of higher education and on the universe of personal loans in Denmark. The Danish system of admission to higher education generates locally unpredictable grade point average (GPA) admission thresholds that effectively quasi-randomize applicants with GPAs close to the thresholds into different fields of study. I exploit this source of exogeneous variation to identify the causal effect of admission to the *Business and economics* field of study.

[1]See, for instance, Andersen et al. (2020) and Chetty et al. (2014) for correlations between majoring in finance or economics and financial behavior.

Intuitively, I compare similar applicants who are admitted to different fields of study due to slightly different upper secondary school GPAs. As an example, think of two applicants who would both prefer to study political science (a branch of the field of study, *Social science*) if their GPA is above the admission threshold for this program. Both applicants have economics (a branch of *Business and economics*) as their alternative choice, i.e., their "second choice", if they do not meet the admission threshold for political science. Suppose economics has a lower GPA admission threshold than political science. The applicants' GPAs are both very close to the admission threshold for political science, but one is just above the threshold and one is just below. Due to this small difference between their GPAs, one applicant is admitted to *Social science* (the preferred field of study) and the other is admitted to *Business and economics* (the alternative field of study), and thereby they are quasi-randomized into different fields of study.

I focus on applicants who have *Business and economics* as their alternative field of study but would prefer another field as in the example above.[2] For these applicants, I find that admission to *Business and economics* reduces the risk of default and delinquency 10 to 23 years after program admission by 5 percentage points. This corresponds to a 50% reduction in the probability of defaulting. Previous studies have found that studying economics increases income (e.g., Bleemer and Mehta, 2022). Can this explain the reduced default probability? I show that this is not the case. The reason is that, for the applicants I study, the most common preferred fields are *Social science* and *Law*. If they are not admitted to *Business and economics*, they are most likely admitted to one of these fields, both of which lead to high incomes for the graduates. I also present evidence that admission to *Business and economics* does not reduce the probability of becoming unemployed or self-employed nor does it lead to a more stable income than admission to the preferred fields. Instead, I find that admission to *Business and economics* affects financial behavior. In particular, I find that applicants admitted to *Business and economics* are less likely to be liquidity constrained, i.e., they are less likely to have low levels of bank deposits and a

[2] An attractive feature of these applicants is that they do not prefer to study economics but the exogenous variation I exploit "pushes" them into studying economics.

high marginal interest rate, they are less likely to have non-mortgage debt, and they also have a lower debt-to-income ratio.

The findings in this paper complement previous empirical findings on the effect of economic and financial education on financial behavior. Financial education has often been suggested as a way of improving financial decision-making (e.g., Lusardi and Mitchell, 2014) but others remain skeptical about the effectiveness of this approach (Willis, 2011, 2021). In a recent meta-analysis, Kaiser et al. (2022) find that financial education programs, on average, positively affect financial knowledge and financial behavior. This paper contributes to the existing knowledge by providing evidence on the effects of education on financial behavior based on high-quality, third-party reported administrative data. Furthermore, I provide evidence for the effects of an educational treatment, namely studying economics, that has not been studied before.

First, the administrative data enable me to study the effect of education on actual behavior, where many previous studies, in particular those studying randomized controlled trials, rely on financial literacy assessments, self-reported behaviors, or elicited preferences (e.g., Bover et al., 2020; Bruhn et al., 2016; Lührmann et al., 2018). There are a few exceptions but the evidence is mixed. For example, Frisancho (2022) studies high school students in Peru and finds that a school-based financial education program reduces arrears for a small share of the sample that holds outstanding debt, while Bruhn and Zia (2013) find no effect of an intervention among young entrepreneurs in Bosnia and Herzegovina on the likelihood of loan default.

Second, the data allow me to study a wide range of relevant outcomes. Most previous studies with access to administrative data mainly rely on credit bureau data, e.g., Brown et al. (2016), Cole et al. (2016), and Urban et al. (2020) who all use quasi-experimental variation to study the effect of mandatory high school graduation requirements in the US. Therefore, most studies only have information on individuals' liabilities. In addition to information on liabilities, my data also contain third-party reported information on income as well as assets. All educational interventions have the potential to affect income, which

in turn can affect financial behavior. Due to the richness of my data, I can actually explore this. I find that "counterfactual" study programs are as high-paying as economics, and therefore I can estimate the effect of studying economics in the absence of differences in incomes. Information on individuals' assets further allows me to assess the prevalence of liquidity constraints, which are arguably a precursor to loan defaults.

Third, the data allow me to study the long-term effect of education. For the earliest application cohorts, I observe defaults and delinquencies more than 20 years after they applied for a higher education program. Previous studies typically measure outcomes shortly after the interventions they evaluate, and in a few cases 2 to 3 years after (e.g., Frisancho, 2022; Skimmyhorn, 2016). This enables me to demonstrate that educational interventions can have long-lasting effects on financial behavior.

This paper also contributes to the existing knowledge by evaluating the effect of extensive economics education. Previous studies vary in the design of the interventions. For instance, Drexler et al. (2014) and Skimmyhorn et al. (2016) evaluate whether rule-of-thumb training works better than more standard interventions, while Lusardi et al. (2017) assess the effect of an informal brochure, a visual interactive tool, a written narrative, and a video narrative. The comprehensiveness of the intervention I study is likely important for the large and long-lasting effect on the default probability that I find. One should keep in mind that besides improving economic and financial knowledge, studying economics can potentially affect the applicants' networks, extracurricular activities, and vocational opportunities. I present evidence suggesting that these aspects of studying economics are not driving my findings. Furthermore, the comprehensiveness of the intervention hints at the potential scope for educational interventions to alleviate financial problems.[3] While the method and setting provides a powerful setup for studying the causal effect of economics education on financial behavior, it should be borne in mind that the estimates are by nature local to the admission thresholds and the sample affected by these thresholds.

[3]Applicants to higher education programs are a more selected group and a few years older than the high school students targeted in many previous studies. Consequently, interventions at this age are harder to scale to the full population. However, treating people at this stage of life, when they make their first serious financial decisions, also means that it is likely to be a more receptive group.

The implication of my findings is not that everyone should study economics at university level, but the findings suggest that economics and financial education can indeed have long-lasting effects on financial behavior and reduce the risk of financial problems significantly, thereby serving as a "proof of concept" for smaller, scalable and more cost-effective educational interventions.

2 Institutional Background and Methodology

2.1 Admission to post-secondary education

In Denmark, higher education is free of charge, and most students are eligible for public support from the State Educational Grant. Higher education programs vary in duration: Generally, it requires five years of study to obtain a university degree, three years for a Bachelor's degree and two years for a Master's degree. It is possible to graduate only with a Bachelor's degree, but the majority of students continue with a Master's degree. At university colleges, it normally takes three and a half years to obtain a professional Bachelor's degree and become a teacher or nurse for example. Finally, programs from business academies only require two years of study, but since they have a different admissions system, applicants to these programs are only included in the descriptive statistics for the universe of applicants and not in the causal analysis.

Admission to higher education programs requires an Upper Secondary School Leaving Certificate, and the Coordinated Admission under the Ministry of Higher Education and Science administers the admissions process. Admission to the programs is allocated through either the Quota 1 system or the Quota 2 system. The majority of slots are allocated through the Quota 1 system where the applicants are ranked based on their GPA from upper secondary school. The best ranked applicant receives their preferred choice, the second best ranked applicant receives their highest available choice and so on. The number slots is limited in most programs, and if the number of applicants exceeds the number of slots, admission is restricted. This implies that applicants with a GPA above

a certain threshold will be admitted to a particular program, and applicants with a GPA below the threshold will be offered another program if available. It is important to note that applicants do not know the specific thresholds at the time of application. Thereby, the Quota 1 admissions process generates locally unpredictable GPA thresholds that effectively randomize applicants near the thresholds into different programs and fields of study.

Quota 2 admissions are allocated by the educational institutions based on criteria the institutions select. These can be work experience, grades in particularly relevant subjects, etc. If students apply for a program through the Quota 2 system, but fulfill the Quota 1 requirements, they will be admitted to the program through Quota 1. For a more detailed description of the admission process see Heinesen (2018).

2.2 Fuzzy Regression Discontinuity Design

Following Kirkeboen et al. (2016), the institutional setting described in the previous section enables me to estimate the causal effect of admission to a particular field of study on the probability of loan default and delinquency using a fuzzy regression discontinuity design.

Imagine we have a group of individuals, $i = 1, ..., N$, who all have the preferred field $f_i^p = j$ and the alternative field $f_i^a = k$. Then, the effect of admission to field k, the alternative, instead of field j, the preferred, on outcome y can be estimated by 2SLS for this sample:

$$D_i = \tilde{\beta}_0 + \tilde{\beta}_1 x_i + \tilde{\beta}_2 x_i T_i + \tilde{\beta}_3 T_i + u_i \tag{1}$$

$$y_i = \beta_0 + \beta_1 x_i + \beta_2 x_i T_i + \beta_3 D_i + \varepsilon_i \tag{2}$$

where (1) is the first stage and (2) is the second stage. In the equations above, x_i is the running variable, the distance to the GPA threshold. D_i is a dummy that equals 1 if individual i is admitted to field k, and T_i is a dummy indicating whether individual i's GPA is below the threshold of their preferred field, j.

3 Data

First, this section provides an overview of the different sources of data I combine and how I select the sample used in the estimations. Second, it defines field of study and financial problems and gives a graphical illustration of the research design.

3.1 Data Sources

I combine third-party reported Danish administrative data from three different sources: *i)* Coordinated Admission under the Danish Ministry of Higher Education and Science,[4] *ii)* Statistics Denmark, and *iii)* Danish Tax Authorities. I link the data to individuals using a unique personal identifier.

From *i)*, Coordinated Admission, I have information on all applications to higher education programs in Denmark from 1993 to 2006. This means that for all applicants, I observe which programs they apply for and how they rank their choices. From Coordinated Admission, I also have information on the study programs' GPA thresholds.

In order to determine how far the applicants' GPAs are from the relevant GPA admission thresholds, I need information on GPAs from upper secondary school. I obtain this information from *ii)* Statistics Denmark. The registers of Statistics Denmark, anlso contain information on income, assets, education, employment and demographic variables.

Finally, I use data from *iii)* Danish Tax Authorities on the universe of personal loans. The data contain information on loan defaults and delinquencies from 2003 to 2016 and I use this to determine whether individuals are in financial problems.

[4]The Danish admission data have previously been used to study how admission to the first choice or preferred field affects educational outcomes, earnings, timing of family formation, gender gap in earnings, and portfolio choice (Heinesen, 2018; Humlum et al., 2017; Daly et al., 2022; Andersen et al., 2020; D'Astous and Shore, 2021). Other studies use Swedish (Öckert, 2010; Dahl et al., 2021, 2022), Finnish (Silliman and Virtanen, 2022), Norwegian (Kirkeboen et al., 2016; Kirkebøen et al., 2021) and non-Scandinavian data (Altmejd et al., 2021; Hastings et al., 2014; Smith et al., 2020) to study labor market returns, family spillovers and assortative mating.

3.2 Sample selection and summary statistics

I study individuals who applied for a higher education program between 1993 and 2006. For the oldest cohort, I have loan information from 10 years after the year of application, and for the youngest cohort, I have loan information until 10 years after the year of application. I focus on first time applicants from age 18 to 30, leaving me with 427,885 applicants.

In order to implement the research design described in section 2.2, I can only use applicants with a binding GPA threshold that effectively determines which program they are admitted to. This means I drop an application if *i)* a higher ranked program has a lower threshold, *ii)* an applicant's GPA is below the threshold of a lower ranked program, *iii)* the applicant's GPA is above the thresholds of at least two higher ranked programs, *iv)* or if there is a binding threshold for a higher ranked program (see examples in Appendix Table A1). I refer to the highest ranked program as the *Preferred* program (and later field of study) and the lowest ranked program as the *Alternative*. As in Kirkeboen et al. (2016), the preferred program is not necessarily the first priority program but rather the highest ranked program where the GPA threshold is binding. This leaves me a sample of 53,882 applicants (see an overview of the selection process in Appendix Table A2).

Finally, the sample used in the analysis consists of the applicants whose preferred program and alternative program are within different fields of study (18,236) and who completes at least one higher education program within 10 years from the year of application and not two programs from different fields of study. I make this restriction in order to increase the probability that admission actually leads to studying, but I show that the results are robust to the inclusion of non-completing applicants and applicants that complete several fields. This gives me a sample of 14,181 applicants.

Table 1 shows summary statistics for all first time applicants, applicants with a binding GPA threshold and the analysis sample. The table shows that the analysis sample is slightly younger than all first time applicants and the share of male applicants is 36.3%

Table 1: Summary statistics

	1st time applicants		Binding threshold		Sample	
	Mean	SD	Mean	SD	Mean	SD
Age	21.8	2.4	21.4	1.8	21.1	1.8
Male (%)	40.5	49.1	32.2	46.7	36.3	48.1
GPA	8.3	1.0	8.6	0.9	8.8	0.8
1st priority threshold	5.8	4.1	8.8	0.7	9.1	0.6
Offered rank	1.2	0.6	1.6	1.0	1.8	1.1
Number of applications	1.9	1.2	3.1	1.3	3.2	1.4
Income rank	58.2	28.0	58.6	28.0	63.2	28.5
Father's income rank	67.0	28.4	69.2	28.2	70.7	28.2
Mother's income rank	47.3	26.0	51.0	26.5	52.7	27.1
Father has Master's (%)	13.3	33.9	18.9	39.2	22.8	41.9
Mother has Master's (%)	6.4	24.5	9.6	29.4	11.9	32.3
Default (%)	11.1	31.4	9.2	28.8	8.0	27.1
Observations	427885		53882		14181	

Notes: The *1st time applicants* are all applicants observed in the data. This includes applicants to business academies that use another admission system than universities and university colleges. The *Binding threshold* group are applicants whose preferred program has a binding GPA threshold. The *Sample* are the applicants whose preferred program has a binding GPA threshold and whose preferred program and alternative program are within different fields of study. *Income rank* is within cohort rank based on total income measured 10 years after application. Father's and mother's income rank are measured when they are 45 yeas old. *Default* is measured 10 to 23 years after application. Appendix Table A3 shows the exact number of observations for each variable.

compared to 40.5% for all first time applicants. The table also shows that the analysis sample have a higher average GPA from upper secondary school, almost 0.6 standard deviations higher. This is because the majority of the analysis sample applicants apply for university programs whereas the group of all first time applicants also include applicants that apply for the shorter, less selective academy profession programs. Looking at the parents' incomes and educational levels, the applicants' backgrounds also reflects this selection. Additionally, the table shows that 10 years after the year of application, the analysis sample have a within cohort income rank that is 5 ranks higher than the average rank for all first time applicants.

Turning to the application pattern, the sample applicants apply for more programs, 3.2 on average compared to 1.9 for all first time applicants. Despite that the sample applicants have a higher GPA, they are admitted to programs that they rank lower because

they apply for more competitive programs. Their first priority program has an average threshold of 9.1 whereas it is only 5.8 for all applicants.

In the final row, the table shows the default and delinquency rate, the indicator financial problems, and we see that sample applicants have a lower probability of experiencing default and delinquency. This could be because they have higher incomes, or because their parents on average have higher incomes. The important takeaway is that the analysis sample is an advantaged group of applicants. Therefore, we might a priori not even expect field of study to affect the probability of getting into financial problems since it is already low for this group and because they come from relatively affluent backgrounds.

3.3 Fields of study

I define 8 fields of study. I use the broad fields (level 4) of the Danish International Standard Classification of Education (DISCED) classification provided by Statistics Denmark[5] as a starting point, but make some adjustments since there is no broad DISCED field with a focus on business, finance, and economics.

Here it is worth emphasizing the difference between *fields* and *programs*. If we take economics as an example, a specific program would be Economics at the University of Copenhagen. If this program has more applicants than slots, this generates a GPA admission threshold for the program. In the DISCED classification, this program is a branch of the detailed field (level 2) *Economics*, the narrow field (level 3) *Social and behavioural sciences* and the broad field (level 4) *Social sciences, journalism and information*. This means that a *field* does not have a GPA threshold, but rather applicants to the same field have different thresholds depending on what specific *program* they prefer.

Appendix Table A4 illustrates how I construct the 8 fields of study based on the DISCED classifications. The main field in this paper is the *Business and economics* field. To construct this, I pool the narrow field *Business and administration* with the detailed fields *Economics*, *Agricultural economics* and *Mathematical economics*. The exact

[5] https://www.dst.dk/en/Statistik/dokumentation/nomenklaturer/disced15-udd (accessed March 3, 2023).

educational content differs across programs, but all programs provide education within economics and finance.[6] The programs in the *Business and economics* field are very similar to the programs selected by Chetty et al. (2014, p. 1214) to cover terminal degrees within economics, accounting, and finance.

The programs in the application data from Coordinated Admission and the DISCED fields in the educational data from Statistics Denmark are not directly linked. To establish this link, I do the following: First, I take all applicants admitted to each program in the Coordinated Admission data. Second, I examine which DISCED field they are enrolled in later in the same year according to the educational data from Statistics Denmark. Finally, I create a link by determining which DISCED field is the most common among applicants admitted to each Coordinated Admission program. As an example, we can look at the accepted applicants to the Economics program at the University of Copenhagen in 2006 according to the Coordinated Admission data. Of those applicants who were still enrolled in higher education later in the year, 97% were enrolled in the detailed DISCED field *Economics*. Therefore, I classify the Economics program at the University of Copenhagen as belonging to the DISCED field *Economics*.

It is important to notice that the program composition of the fields can be different based on whether the field is the preferred or the alternative. Appendix Table A5 shows the most common programs for each field of study depending on whether the field of study is the preferred or alternative. For instance, if *Business and economics* is the preferred field of study, the most common programs are *Business economics and language* (29%), *Business economics* (15%) and *Language and international marketing* (9%). On the other hand, if *Business and economics* is the alternative field then the most common programs are *Economics* (38%), *Business economics and law* (22%) and *Business economics* (20%).

Appendix Table A6 shows the sample applicants' preferred and alternative fields of study. I drop applicants who have *STEM* as their preferred field or *Medicine* as their

[6] According to the ISCED manual, "the main subject of a programme or qualification is determined by the detailed field in which the majority (i.e. more than 50%) or clearly predominant part of learning credits or of students' intended learning time is spent." (UNESCO, 2014)

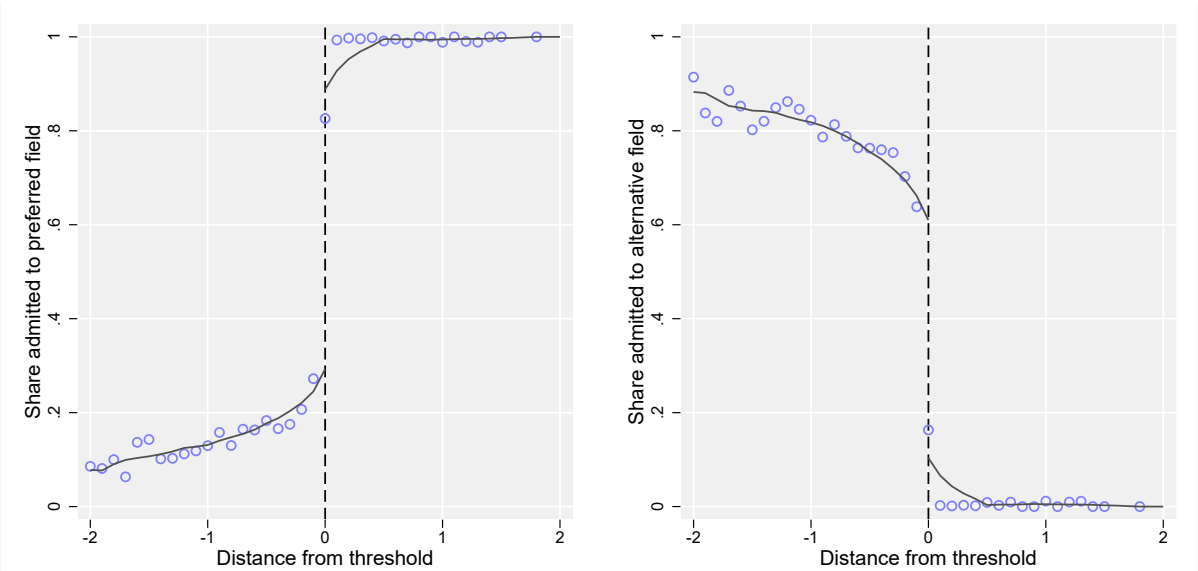
alternative, since there are only 265 and 98 applicants in these groups. For the *Business and economics* field, the table shows that 2063 applicants have this field as their alternative field. Almost 75% of these applicants have *Law* or *Social science* as their preferred field of study. This is important to keep in mind when we interpret the effects of admission to *Business and economics* when this is the alternative field in section 4.1. In section 4.3, I will also analyze the effect by preferred field of study for these applicants. If *Business and economics* is the preferred field, then 73% have *Humanities, art and architecture* or *Social science* as their alternative field.

3.4 Graphical illustration of research design

Figure 1 shows the change in the applicants' probability of admission to their preferred or alternative field of study based on the distance to the GPA admission threshold of their preferred field. Panel A shows that the probability of admission to the preferred field is not zero if an applicant's GPA falls below the threshold. As discussed in section 2.1, this is due to the Quota 2 system, where GPA is not the sole determinant of admission. The probability of admission increases with the GPA below the threshold because the GPA is also taken into consideration in the Quota 2 system.

The panel also shows that almost all applicants with a GPA strictly above the threshold are admitted to the preferred field while it is around 80% for the applicants who are exactly at the threshold. There are two explanations for this. First, the GPA is measured with one decimal's precision in the data, but the educational institutions may have more precise information than this. Second, if all applicants at the threshold cannot be admitted, it is decided either by lottery or age who will be admitted. Few programs use the age criterion, where they admit the oldest applicants. In the graphical illustrations, I will not consider this, but in the regressions, I will use the age criterion to characterize whether an applicant is above or below the threshold. Furthermore, I show that the main result is robust to using a donut regression discontinuity design where I drop all applicants exactly at the threshold from the estimation.

Figure 1: Share of applicants admitted to preferred or alternative field of study



Notes: The figures are based on all applicants whose preferred field of study has a binding threshold and whose preferred and alternative field of study differ. The y-axes show the probability of admission to either the preferred (Panel A) or alternative (Panel B) field of study. The x-axes show the distance to the GPA admission threshold (0) of the preferred field of study. The bins are the discrete values observed in the data with at least 30 applicants. The local linear polynomials have a bandwidth of 0.5.

Panel B of Figure 1 shows the probability of admission to the alternative field. It clearly mirrors Panel A and shows a sharp discontinuity in the probability of being admitted to the alternative field at the GPA threshold.

Both of these clear discontinuities enable me to estimate the causal effect of admission to a particular field on different outcomes. I exploit whether an individual is above or below the GPA threshold as an instrument for admission to the preferred or alternative field in a fuzzy regression discontinuity design as described in section 2.2.[7]

3.5 Financial problems

3.5.1 Defaults and delinquencies As described in section 3.1, I use data from Danish Tax Authorities to measure whether people are in financial problems. For each personal loan, the data indicates if the debtor is at least 60 days late with payments on the loan

[7]Appendix Figure A1 also shows sharp discontinuities in enrolment after one year and completion within 10 years of application.

at the end of the year. Banks and other financial intermediaries report this to the tax authorities in order to verify that tax deductions for interest payments are correct. The data only include limited information about the type of loan or credit. It does not include mortgage debt since this information comes from a separate data set, but it includes loans secured on real estate, normal debt to financial institutions (for instance car or consumption loans), student loans, and interest expenses on public debt. The loans are recorded at the individual level. It is possible for a couple to have a shared loan (if this is in default, I record both to be in default), but they can also have separate loans. For separate loans, if one member of a couple has a defaulted loan, I record only this individual as being in default. I provide a robustness check where I include defaults and delinquencies of spouses. Since the data are collected for tax purposes, they do not include credit scores.

In Denmark, debt discharge is rare, and therefore people may stay in financial problems for a long time if they do not service their debt (Kreiner et al., 2020). The consequences of default and delinquencies depend on the type of loan or credit and the nature of the creditor. Having a loan in default or delinquency can result in being recorded as a bad payer by a credit bureau company, which effectively removes the possibility of obtaining new loans or credit (Kreiner et al., 2020), lead to wage garnishment, or in severe cases, even have a bailiff seizing goods to recover owed money.

I generate an indicator that equals one if an applicant has a loan default or delinquency at some point 10 years or later after the year of application. This means that I observe all application cohorts from 1993 to 2006 in the default data at least one year, but I observe the oldest cohort up to 23 years after the year of application. It also means that I have one observation for each individual. In a robustness check, I use yearly observations for each individual (such that I have between 1 and 14 observations per individual) and cluster on the individual level.

This quantification of financial problems is similar to the method used by Kreiner et al. (2020) based on the same source of data from 2004 to 2011. Additionally, they also

use information on financial problems from two credit bureau companies and conclude that their findings using the data from Danish Tax Authorities are not confined to this specific measure of financial problems.

Panel A of Appendix Figure A2 shows how the share of applicants in default or delinquency varies across completed fields of study from 7.0% for *Medicine* to 10.3% for *Humanities, art and architecture*. For *Business and economics* the share is 9.5%. It is important to note that there are large differences between detailed and narrow fields within the broad fields of study. For instance, for graduates in *Economics*, the average probability of default is 5.9% while it is 9.8% for graduates in *Business and administration*.

Panel B of Appendix Figure A2 shows that the outstanding amounts on accounts in default or delinquency are non-trivial. 40,623 first time applicants had debt in default in 2016. The median outstanding amount in default for these applicants is almost 13,000 DKK (approximately 1,700 Euro), and the distribution is highly right skewed with a mean outstanding amount in default of 147,890 DKK (almost 20,000 Euro).

Panel C of Appendix Figure A2 shows the evolution of default and delinquency after application. It shows that the default and delinquency probability is low right after application, increases during studies and early work life and somewhat stabilizes after 10 to 12 years. Furthermore, the pattern is similar for all applicants with a binding threshold and applicants with *Business and economics* as their alternative field.

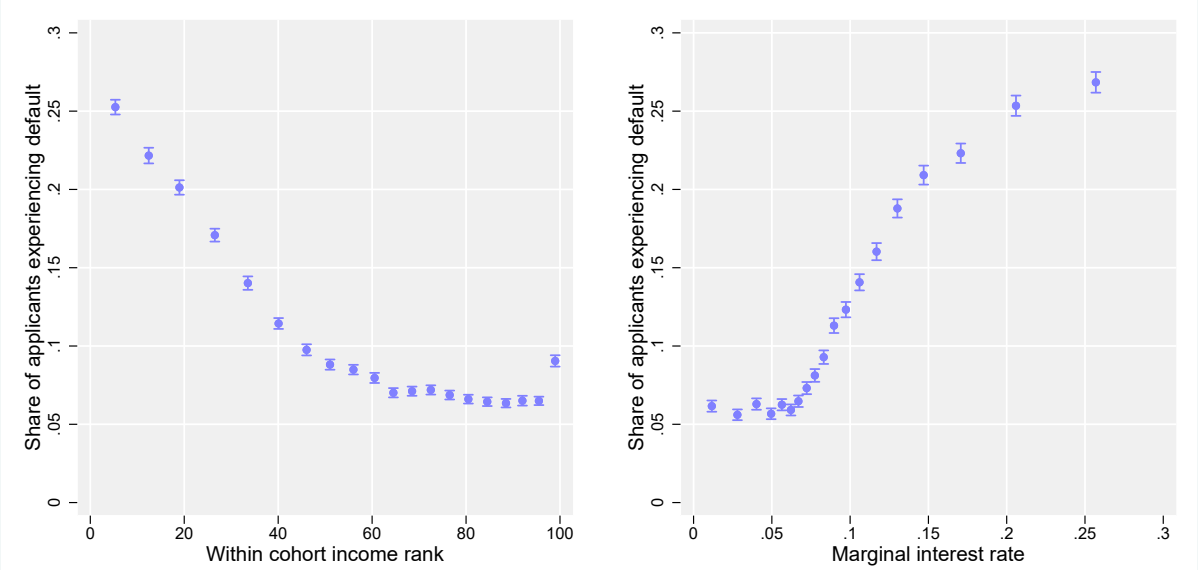
3.5.2 Covariates of financial problems Figure 2 shows how the probability of experiencing default or delinquency co-varies with income and the marginal interest rate. These are two potential channels that could be affected by field of study and explain why field of study affects the probability of default and delinquency. A third channel is unemployment which Kreiner et al. (2020, p. 250) show affects the default probability.

Panel A shows that applicants who are below the median income within their cohort 10 years after applying are more likely to experience default and delinquency, and the probability increases the lower they are ranked in the income distribution.

Figure 2: Correlation between default and income rank and marginal interest rate

(A) Income rank

(B) Marginal interest rate



Notes: The figures are based on all first time applicants. Default and delinquency status is observed from 10 years after application until 23 years after application for the oldest application cohorts. Within cohort income rank and the marginal interest rate are measured 10 years after application. There are the same number of applicants in the 20 bins in each panel. In the right panel, I have left out the outlier top bin. The capped spikes shows the 90% confidence intervals.

In Panel B, I follow Kreiner et al. (2019) and use the marginal interest rate as a continuous measure of how liquidity constrained the applicants are. I define the marginal interest rate as the highest interest rate an individual pays on a single loan in a year and the interest rate is calculated as the interest paid during the year divided by the mean of the outstanding amount in the beginning of the year and at the end of the year. The marginal interest rate is based on the data from Danish Tax Authorities.

The panel shows that applicants who are more liquidity constrained 10 years after applying, are also more likely to experience default or delinquency 10 years or later after the year of application.

These correlations show that the default and delinquency indicator is a valid measure of non-trivial financial problems that vary across fields of study. In section 4.1, I will present results on the causal effect of field of study on the probability of getting into financial problems, and in section 4.5, I explore the three potential channels of income, financial behavior, and labor market outcomes, as well as discuss the role of peers.

4 Results

4.1 Economics and financial problems

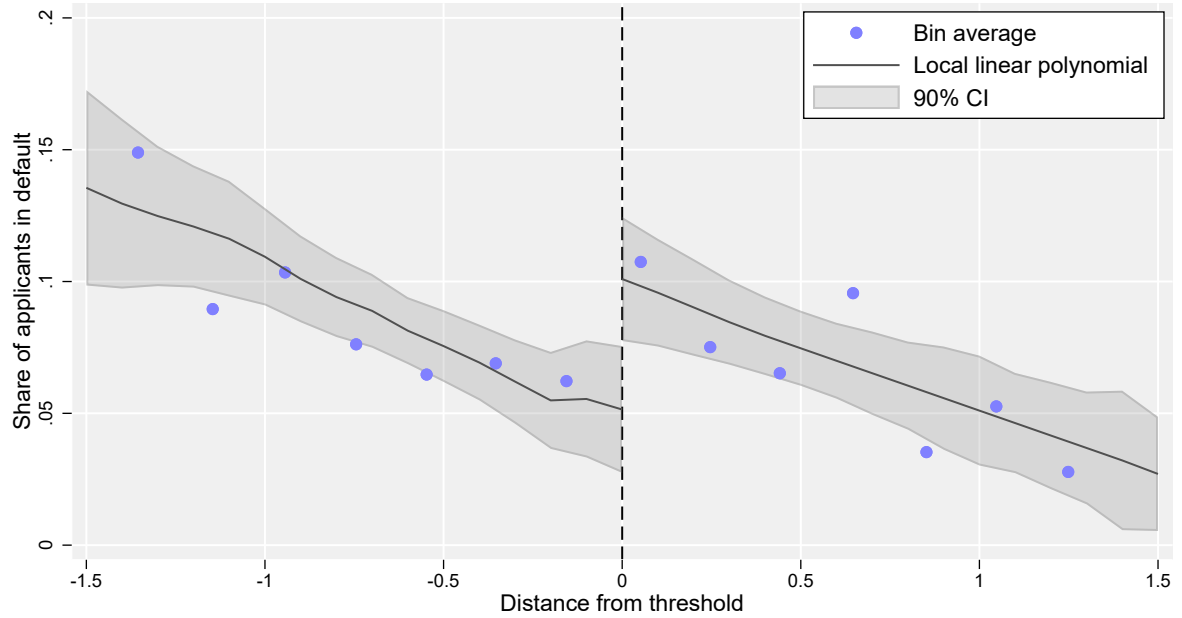
In this section, I present evidence on the effect of admission to *Business and economics* for applicants who have this as their alternative field. The models estimated are very similar to equation 1 and 2, but instead of only using applicants who have preferred field $f_i^p = j$ and alternative field $f_i^a = k$, I first pool all preferred fields and compare them to *Business and economics*. This group of applicants is particularly interesting from a policy perspective, since the applicants would actually prefer to study something other than *Business and economics*, but they are "pushed" into this field if their GPAs are below the admission thresholds to their preferred fields. In section 4.3, I explore the effect by preferred field as in equation 1 and 2 for applicants who prefer *Social science* or *Law*.

Figure 3 illustrates the reduced form effect of admission to *Business and economics* on the probability of default and delinquency. The figure shows that a higher GPA is associated with a lower probability of default and delinquency, and the effect is similar above and below the threshold. Exactly at the threshold, there is a clear jump in the probability, such that the applicants who are just above the threshold of their preferred field of study are approximately 5 percentage points more likely to experience default or delinquency than the applicants who are just below the threshold. The 90% confidence bands also indicate that this jump in the probability is statistically significant.[8]

Panel A of Appendix Figure A3 shows the first stage, namely the probability of admission to the *Business and economics* field based on the distance to the GPA threshold of the preferred field. The figure shows a pattern very similar to Panel B of Figure 1: The applicants above the threshold are very unlikely to be admitted to *Business and economics*, whereas the applicants just below the threshold are much more likely to be admitted to *Business and economics*.

[8] Appendix Figure A3 shows different versions of Figure 3. Panel D shows the figure with four bins of roughly the same size on each side of the threshold and Panel F shows the figure with bins for the discrete values of the running variable and a local linear polynomial with a bandwidth of 1.

Figure 3: Admission to *Business and economics* and the probability of default



Notes: The figure is based on applicants with *Business and economics* as their alternative field of study and another field as their preferred. On the x-axis, 0 is the admission threshold of the preferred field of study. Therefore, applicants with GPAs below the threshold are more likely to be admitted to *Business and economics*. The y-axis shows the probability of default and delinquency 10 years or more after application. The local linear polynomials have a bandwidth of 1.5, and I use a rectangular kernel. The bin width is 0.2, but I only plot bins with at least 30 observations.

Table 2 confirms the graphical evidence and column (1) shows that being below the threshold increases the probability of admission to *Business and economics* by 69 percentage points. Column (2) shows the estimated reduced form effect of being below the threshold on the default probability as Figure 3. The effect is a 5.2 percentage point reduction in the probability of default or delinquency if an applicant is admitted to *Business and economics* instead of their preferred field of study. This is a reduction of one half of the baseline default probability of 10.3%, i.e., the estimated probability for the applicants who are just above the threshold and therefore admitted to their preferred field.

Following Lee and Lemieux (2010), I explore the sensitivity of the results to the inclusion of baseline covariates in column (3). I include flexible controls for preferred field, gender, year of application, and age. This has a negligible effect on the estimated discontinuity, suggesting that the no-manipulation assumption holds, which is confirmed by formal tests in section 4.2.

Table 2: Admission to *Business and economics* and the probability of default

	B&E (%)	Probability of default (%)				
	(1) First stage	(2) Reduced form	(3) Reduced form	(4) Reduced form	(5) Local ATE	(6) Simple OLS
𝟙(Economics)	69.0***	-5.2**	-5.1**	-5.5***	-7.6**	-2.3***
	(2.4)	(2.1)	(2.1)	(2.1)	(3.0)	(0.2)
N	1910	1910	1910	1910	1910	422353
Baseline	1.9	10.3				
Pref. field FE			✓	✓		
Male (=1)			✓	✓		✓
Year & age FE			✓	✓		
Income				✓		

Notes: In the estimations in column (1)-(5), I use applicants with *Business and economics* as their alternative field of study and another field as their preferred for whom I observe all the control variables. *𝟙 (Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. Column (1) shows the first stage effect, i.e., the change in the probability of admission to *Business and economics*, in percentage points estimated with OLS. Column (2)-(4) show the reduced form effects, i.e., the change in the probability of default, in percentage points estimated with OLS. In column (5), I instrument admission to *Business and economics* with the indicator for being below the threshold of the preferred field using 2SLS. Column (6) uses all first time applicants and simply regress the default indicator on an indicator for admission to *Economics*, *Business economics* or *Business economics and law*, i.e., the 3 programs that around 80% of the sample used in column (1)-(5), has as the alternative, as well as a male dummy since males are more likely to default and being admitted to *Business and economics*. *Baseline* indicates the estimated outcome for applicants just above the threshold. *Pref. field FE* are fixed effects for the preferred field of study. *Male, year & age* are a male indicator, year of application fixed effects, and indicators for age in the year of application. *Income* are income quintile indicators based on total income 10 years after application. Bandwidth in the estimations is 1.5 with a rectangular kernel. Robust standard errors in parentheses. $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

In column (4), I additionally control for income. As discussed in section 3.5.2, income itself is potentially affected by field of study and is therefore a "bad control." As in Panel A of Figure 2, I use within cohort rank based on total income 10 years after applying, and include dummies for income quintiles in the regression. The inclusion of income controls also does not change the estimated effect substantially, which indicates that changes in income are not driving the results. I will explore this issue further in section 4.5.1 and show that there are no income changes for these applicants around the threshold.

Column (5) shows the fuzzy regression discontinuity estimate, i.e., the local average treatment effect of admission to *Business and economics* on the probability of default or delinquency. I instrument admission with the dummy for being below the threshold for

the preferred field, and I find a 7.6 percentage point reduction in the default probability. With a baseline probability of 10.3% at the threshold and 8.0% in the sample (cf. Table 1), the estimate of the local average treatment effect is rather large. Note, importantly, that this should be interpreted as the effect on the *compliers* and not the true population average treatment effect as emphasized by e.g., Jiang (2017).[9]

To explore this further, I estimate the local average treatment effect using only applicants admitted through Quota 1 in Appendix Table A7 (column 2). This increases the first stage to a 93.4 percentage points jump in the probability of admission, which means that the reduced form estimate is not "inflated" to the same extent. In this case, I find a local average treatment effect of 4.9 percentage points which is close to the estimated reduced form effect in Table 2. For comparison, column (6) of Table 2 shows the effect of admission to *Business and economics* estimated with a simple regression using all first time applicants.[10] The point estimate is -2.3 percentage points, which of course is smaller than the local average treatment effect, but "only" by a factor of three. This should be compared to the finding that IV estimates on average are 9.2 times larger than OLS estimates in a sample of 255 publications in the "Big Three" finance journals (Jiang, 2017). Based on the discussion above, I will focus on the reduced form effects going forward.[11]

Appendix Table A8 is similar to Table 2 but is based on applicants who have *Business and economics* as their preferred field of study. Here I find a reduced form effect of being above the threshold (since *Business and economics* is now the preferred field) of -2.4

[9]The strong first stage, with an F-statistic of 1853, means that the standard errors in column (5) are only 1.4 times larger than the standard errors in column (2) which reduces the risk of the instrumentation "blowing up" the local average treatment effect as discussed by Jiang (2017). Following Angrist and Pischke (2009), I characterize the compliers by comparing the first stage for different subgroups to the overall first stage. This indicates that compliers are more likely to have a below median income father (1.22), less likely to prefer *Law* (0.80), more likely to prefer *Social science* (1.14), and less likely to be more than 20 years old (0.80) while the first stages are similar for males and females and for early and late application cohorts.

[10]Here the explanatory variable indicates admission to *Economics*, *Business economics* or *Business economics and law*, i.e., the 3 programs that around 80% of the sample used in the regression discontinuity estimations, has as the alternative. I include a male indicator since males are both more likely to apply for these programs and more likely to default in general.

[11]More generally, Appendix Figure A4 shows that admission to detailed fields of study with lower default rates among the accepted applicants is associated with a lower probability of default and delinquency using applicants with a binding threshold whose preferred and alternative detailed field of study differ and who are within a 0.5 band of the admission threshold to the preferred program.

percentage points, meaning that for these applicants, admission to *Business and economics* also reduces the probability of default or delinquency. This is based on only 720 applicants, so the estimated effect lacks precision.[12] At the threshold, the baseline probability of default for these applicants is only 6.6% such that admission to *Business and economics* reduces the default probability by 36%, similar to the reduction of one half found in Table 2. Due to the small sample size in Appendix Table A8, I mainly focus on applicants with *Business and economics* as the alternative field. The effect should therefore be interpreted as the effect of "pushing" people to acquire more economic knowledge (as in Brown et al. (2016); Cole et al. (2016); Urban et al. (2020) who study mandated high school graduation requirements) rather than the effect of "voluntary participation" in an intervention (as in e.g., Bruhn et al. (2014)). In section 4.2.4, I will exploit the applicants who prefer *Business and economics* in an estimation where I pool applicants who prefer the field and who has it as their alternative, but first, I will examine the robustness and validity of the research design.

4.2 Robustness of result and validity of design

4.2.1 Robustness of the main result Appendix Table A7 shows that the result from Table 2 is robust to different restrictions of the estimation sample. The results are similar if I include applicants who never complete a higher education program as well as applicants who complete programs within different fields. The results also hold if I only use applicants who are admitted through Quota 1, complete a Master's degree, or complete at least a Bachelor's degree. The result is also robust to using the definition of economics from Chetty et al. (2014), which covers all degrees in economics, accounting, and finance.

[12] There are two explanations for the small number of observations. First, in order for a program to be preferred in the local course ranking it needs to have a binding admission threshold. Looking at the programs each year from Coordinated Admission, this is only the case for 27% of the *Business and economics* programs. For comparison, 77% of the *Social science* programs have binding thresholds while all the *Law* programs have binding thresholds in all the years. Second, among the applicants who prefer a *Business and economics* program with a binding threshold, 73% have another *Business and economics* program as their alternative, which means that the admission threshold does not randomize them into different fields. For comparison, the corresponding shares for *Law* and *Social science* are 16% and 32%.

Appendix Table A9 shows that the result is also robust to the measurement of financial problems. The table shows the reduced form effect of admission to *Business and economics* on the default probability when I include partners' defaults and delinquencies (column 1), when I exclude defaults during the financial crises in 2008-10 (column 2), and when I measure defaults and delinquencies from 8 or 12 years after application instead of 10 (column 3 and 4). Finally, the table also shows that the estimated effect is significant if I only look at defaults and delinquencies in 2016 (the only year where I observe the financial problems indicator for all applicants) instead of pooling all observed years (column 5). The effect is still significant on the 10%-level if I restrict to accounts with an outstanding amount of more than 2,500 DKK, approximately 350 Euro (column 6).

Appendix Table A10 investigates the robustness of the results with respect to including different fixed effects and levels of clustering of the standard errors. In column (1)-(5), I look at yearly observations in the data on defaults and delinquencies, instead of pooling all the observed years of an individual in one indicator, while clustering the standard errors at the applicant level. For the earliest application cohort, I have 14 observations for each applicant (2003-2016), and for the latest application cohort, I only observe them in 2016. This enables me to include fixed effects for both year of application and year of default data observation. The estimated effect is a 1.6 percentage points reduction in the yearly probability of default or delinquency. With a predicted probability of default and delinquency for applicants just above the threshold of 3.0%, this again roughly corresponds to a reduction in the probability of getting into financial problems of one half. Including the different fixed effects has little impact the estimated effect.

In column (6)-(8), I investigate the effect of clustering the standard errors. Column (6) clusters by detailed preferred field, similar to Daly et al. (2022); Heinesen (2018); Humlum et al. (2017) who cluster by narrow field or program. This does not affect the level of significance. Column (7) clusters by year of application. Since I only observe 14 application cohorts, this can cause problems due to too few clusters, in particular since I also have a limited number of observations (Cameron and Miller, 2015). Therefore, I use

wild bootstrap (Cameron et al., 2008), which gives a P-value of 0.082. Finally, I cluster by values of the discrete running variable in column (8) as suggested by Lee and Card (2008) even though Kolesár and Rothe (2018) argue that clustering by the running variable is generally unable to resolve bias problems in discrete regression discontinuity design settings. This increases the level of significance to the 1% level. In total, Appendix Table A10 shows that the results are robust to including different fixed effects and to clustering the standard errors at different levels.

4.2.2 Manipulation of the running variable and covariate balance Following the suggestions in Lee and Lemieux (2010), Appendix Figure A5 shows the distribution of the applicants' distances to the threshold of the preferred field of study. Panel A shows this for all applicants with a binding admission threshold and differing preferred and alternative field of study. The figure shows no evidence of manipulation of the running variable, i.e., the applicants cannot sort themselves above the threshold in order to be admitted to their preferred field. The same is the case in Panel B, which only uses applicants with *Business and economics* as their alternative. These results are confirmed in Appendix Table A11 that shows that formal manipulation tests do not indicate manipulation either.

Adding baseline controls in Table 2 does not change the estimated reduced form effect, which indicates that applicants just above and just below the threshold are very similar. This is confirmed by Panel B of Appendix Figure A3 which shows no evidence on covariate imbalance around the threshold using the predicted default probability based on predetermined characteristics. Appendix Table A12 explores this further by estimating the effect of crossing the threshold on predetermined characteristics as also suggested by Lee and Lemieux (2010). There should not be any jumps in the predetermined characteristics, but out of 33 estimated effects, two are significant on the 10%-level: applying in 1995 and having *Medicine* as the preferred field. To investigate whether this is a potential concern, I re-estimate the main specification in column (2) of Table 2 in Appendix Figure A6, where I leave out applicants from different years of application in Panel A and leave out

applicants based on their preferred field in Panel B. The figure shows that the estimated effects are close to the effect of -5.2 percentage points found in Table 2 irrespective of which year of application cohort or applicants based on preferred field I drop, indicating that the imbalances are not driving the results.

4.2.3 Choice of bandwidth The choice of bandwidth and how to control for the running variable is key in regression discontinuity designs, as noted by Lee and Lemieux (2010). I explore the sensitivity of the estimates to the choice of bandwidth in Appendix Figure A7. The figure shows the reduced form effect of admission to *Business and economics* as in column (2) of Table 2 with varying bandwidth and demonstrates that the estimated effect is relatively stable across bandwidth choices. The effect size decreases slightly at smaller bandwidths but is always within the 90% confidence interval of the estimate using a bandwidth of 1.5 as in Table 2. It is possible to use different procedures to choose the bandwidth. The second generation MSE-Optimal (Calonico et al., 2014) and CE-Optimal (Calonico et al., 2020) bandwidth procedures, both implemented in the Stata command `rdbwselect` (Calonico et al., 2017), gives optimal bandwidths of 0.47 and 0.32 using rectangular kernels. At these bandwidths, I lose precision but the point estimates of -3.4 and -5.1 percentage points are close to the estimate of -5.2 percentage points in Table 2.

In Appendix Table A13, I assess the robustness of the results regarding choice of bandwidth and control for the running variable further. Column (1) shows the main result from Table 2 to ease comparison. In columns (2)-(4), I use a triangular kernel, a second order polynomial and all observations, and drop applicants exactly at the threshold in a donut regression discontinuity. In all cases, the estimated reduced form effects are similar to the effect in column (1).

The admission data produces a discrete running variable, which poses a challenge for the bandwidth selection procedures described above, since the methods assume a continuous running variable as Heinesen (2018) also points out (p. 4). Still, column (5) and

(6) of Appendix Table A13 show the estimated effect using, in the terminology of Cattaneo and Vazquez-Bare (2017), the first and second generation MSE-optimal bandwidths (Calonico et al., 2014; Imbens and Kalyanaraman, 2012). In both cases, I use the donut design and triangular kernels. The first generation MSE-optimal bandwidth, calculated using the `ikbw` Stata command (Bertanha and Imbens, 2020), is 1.6 and the estimated effect is -4.9 percentage points, which is significant on the 5%-level. Using the second generation MSE-optimal bandwidth, as implemented by the `rdrobust` Stata command (Calonico et al., 2017), yields a bandwidth of 0.6 and an estimated effect of -3.5 percentage points with a standard error of 3.9.

Cattaneo and Vazquez-Bare (2017) provide an overview of different methods for choice of bandwidth in regression discontinuity designs and suggest using "local randomization" estimation as a way to handle discrete running variables. This is implemented in the final column (7) of Appendix Table A13. Here, I simply compare the outcome of applicants just below the threshold, at -0.1, and just above, at 0.1. The number of observations is only 225, so the estimate lacks precision, but the estimated effect is -4.8, which again is close to the estimate using a rectangular kernel and a bandwidth of 1.5.

In summary, Appendix Figure A7 and Appendix Table A13 show that the finding that admission to economics reduces the default probability with around 5 percentage points from a baseline of around 10%, is robust to the choice of bandwidth, but the estimate loses precision at small bandwidths.

4.2.4 Placebo thresholds and fields As a final validity check, I investigate whether I detect significant jumps in the default probability at placebo thresholds and for placebo fields. In Appendix Figure A8, I use the same specification as in column (2) of Table 2 and vary the threshold from -0.5 to 0.5 in steps of 0.1. The six panels show the estimated effects using different bandwidths ranging from 0.5 to 3. In Panel D, I use a bandwidth of 1.5, as in Table 2, and the panel shows that there are no significant jumps in the probability of default for placebo thresholds far from the true threshold. Right below the

true threshold, the jumps at the placebo thresholds are significant at the 10%-level. The same pattern emerges for larger bandwidths. In Panel B, I shrink the bandwidth window to 0.9, which is the smallest bandwidth for which I detect a significant jump at the true threshold with a P-value of 0.055. The point estimate at the true threshold is almost unchanged but the point estimates at the placebo thresholds decrease and all become insignificant at the 10%-level. At lower bandwidths, I lose precision and do not detect any significant jumps.

Next, I investigate if I find similar effects of being admitted to other fields of study than *Business and economics*, the "placebo fields". I do this by estimating the effect of admission to each field of study. I pool applicants who prefer a particular field and have it as the alternative. I generate an indicator variable, Z_i, that equals 1 if an applicant prefers the field and is above the threshold ($T_i = 0$), or if an applicant has the field as the alternative and is below the threshold, ($T_i = 1$). I then estimate the following equation:

$$y_i = \beta_1 x_i + \beta_2(x_i \times p_i) + \beta_3(x_i \times T_i) + \beta_4(x_i \times p_i \times T_i) + \beta_5 T_i + \beta_6 Z_i + \phi f_i^p + \psi f_i^a + \varepsilon_i \quad (3)$$

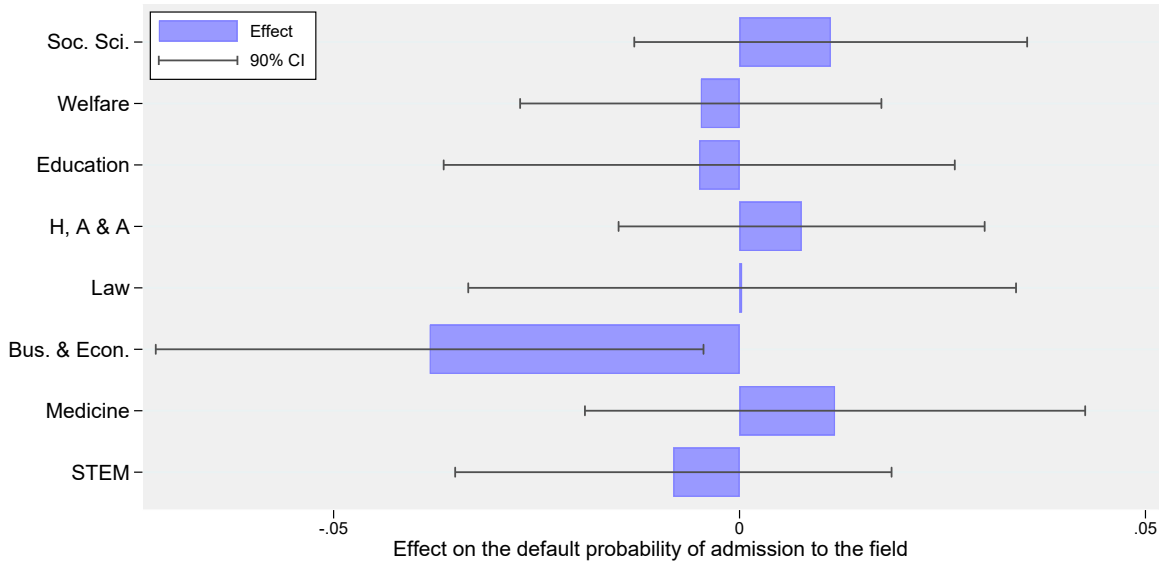
where I allow for different effects of the running variable above and below the threshold and depending whether field j is preferred ($p_i = 1$) or the alternative ($p_i = 0$). I also include fixed effects for preferred and alternative field, f_i^p and f_i^a.

Figure 4 shows the estimated β_6 from separate estimations of equation 3 field-by-field. I interpret these estimates as the reduced form effect of admission to the given field of study, no matter if it is the preferred or alternative. The figure shows that the only field where admission has a significant effect on the default probability is *Business and economics*. Admission to the other fields of study has no significant effect and the point estimates are all close to 0.

4.3 Effect by preferred field of study

As previously noted, of the applicants, who have *Business and economics* as their alternative field, a large share has *Law* or *Social science* as their preferred field. Figure 5

Figure 4: Admission to different fields of study and the probability of default



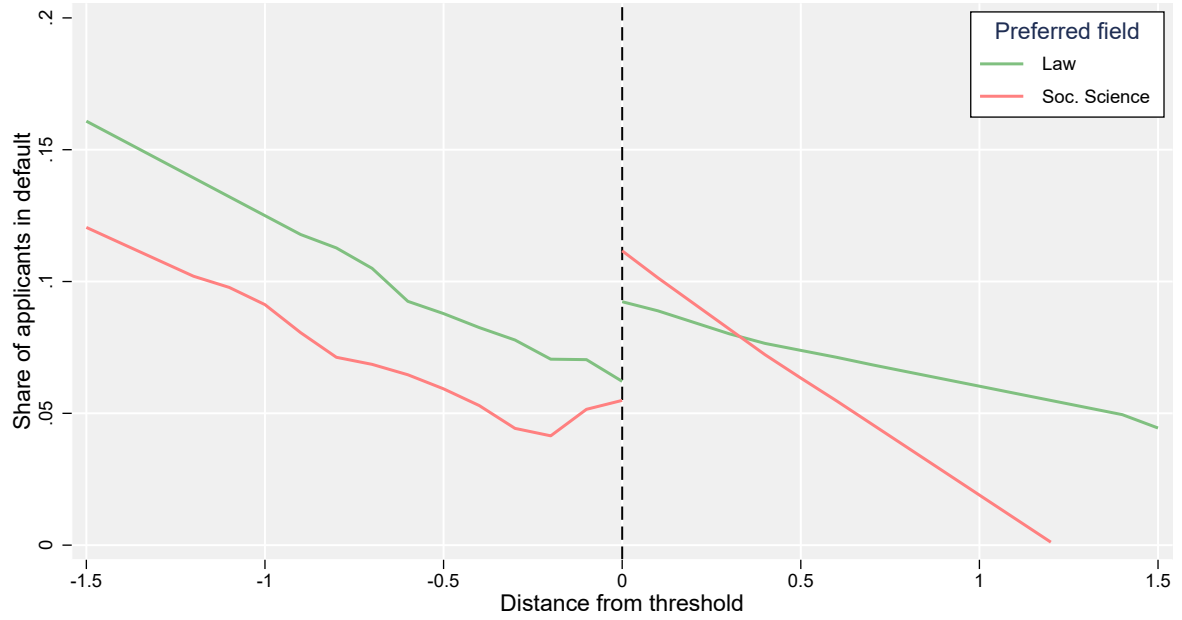
Notes: The bars plot the estimated reduced form effects of crossing the threshold to the admission side of each field of study. Each field's effect is estimated separately as in equation (3) where I pool applicants who have the field j as the preferred field of study, and another as their alternative, with applicants who have the field j as the alternative field of study, and another field as their preferred. The bandwidth is 1.5 in the estimations and the capped spikes indicate the 90% confidence intervals.

shows the effect of being above or below the GPA admission threshold on the probability of default and delinquency focusing specifically on applicants who have *Law* or *Social science* as their preferred field of study. For both groups of applicants, the figure shows a jump in the default probability right around the threshold, but the jump is larger for the applicants who have *Social science* as their preferred field. Appendix Table A14 estimates the sizes of the jumps at the threshold and shows that only the jump for the applicants with *Social science* as their preferred field is statistically significant.[13]

Figure 5 also shows negative slopes for all the local linear polynomials as in Figure 3. Below the threshold, the slopes are similar since the majority of applicants are admitted to the same field, but there is still a level difference. This suggests that applicants with the same alternative field are very likely different "types" if they have different preferred

[13]Column (1) and (4) of Appendix Table A14 show that the first stage increase in the probability of being admitted to *Business and economics* is almost 25 percentage points larger for the *Social science* group. This is because more applicants are admitted to *Law* through Quota 2 (10.8%) than to *Social science* (6.1%). Appendix Table A15 shows the estimated effects for applicants with the detailed field *Economics* as the alternative. The estimates are imprecise due to the small sample sizes, but the point estimates suggest that the effect is larger when the preferred field has less economics and finance content.

Figure 5: Admission to *Business and economics* vs. *Law* and *Social science* and default



Notes: The figure is based applicants who have *Business and economics* as their alternative field of study and either *Law* or *Social Science* as their preferred field. The y-axis shows the probability of default and delinquency 10 years or more after application. The x-axis shows the distance to the GPA admission threshold (0) of the preferred field of study. The local linear polynomials use rectangular kernels with a bandwidth of 1.5.

fields. The two groups also have a different composition of programs within the *Business and economics* field. For instance, the most frequent program for applicants with *Law* as the preferred field is *Business economics and commercial law* (42%) while the most frequent program for applicants who prefer *Social science* is *Economics* (52%).

In Appendix Table A16, I extend the analysis by estimating the effects for all combinations of preferred and alternative fields jointly. The first column shows the estimated effects of being below the thresholds to different preferred fields for applicants with *Business and economics* as their alternative. All point estimates are negative for this group of applicants meaning that admission to *Business and economics* reduces the probability of default no matter what the preferred field is, and most estimates are significant on the 10%-level. For the other fields, I do not find any systematic patterns related to the probability of default.

4.4 Heterogeneous effects of admission

For applicants with *Business and economics* as their alternative, Appendix Table A18 investigates whether the treatment effects differ by gender, parental background, year and age of application, and by track in upper secondary school.

Column (1) shows the effect of being below the threshold of the preferred field for men and women. I find that the estimated effect is largest for men, but the effects for men and women are not statistically different. Column (2) shows the effect split by whether the applicant's father has a higher education or not. The table shows that effects are very similar for the two groups. Column (3) investigates if the effect varies by age at application. I split by the median age among the applicants, 20, but find no difference in the effect for the younger applicants compared to the older. Column (4) splits the applicants based on which track they attended in Upper Secondary School, namely the mathematical or linguistic track. The point estimates suggest that the applicants from the mathematical track benefit the most, but the difference is not statistically significant.

Finally, column (5) splits the sample into applicants who applied before and after the year 2000. The panel shows that the effect is larger for those who applied before 2000. This may be because they have a higher baseline probability of default by construction since I observe them for a longer period in the data from Danish Tax Authorities. I investigate this issue further in Appendix Figure A10.

First, Panel A shows the estimated reduced form effect of admission to a *Business and economics* program on the default probability at different time horizons after the year of application. The panel shows no effect in the early years (1-8). This is because a large share is enrolled in education (see Panel B), and the baseline probability of default is low. The baseline probability of default is still low the following years, but as it starts increasing, I begin to detect an effect. Panel C shows the reduced form regression discontinuity plot for the effect on default and delinquency 19 to 23 years after application. The effect is larger in magnitude compared to Figure 3, but otherwise looks similar.

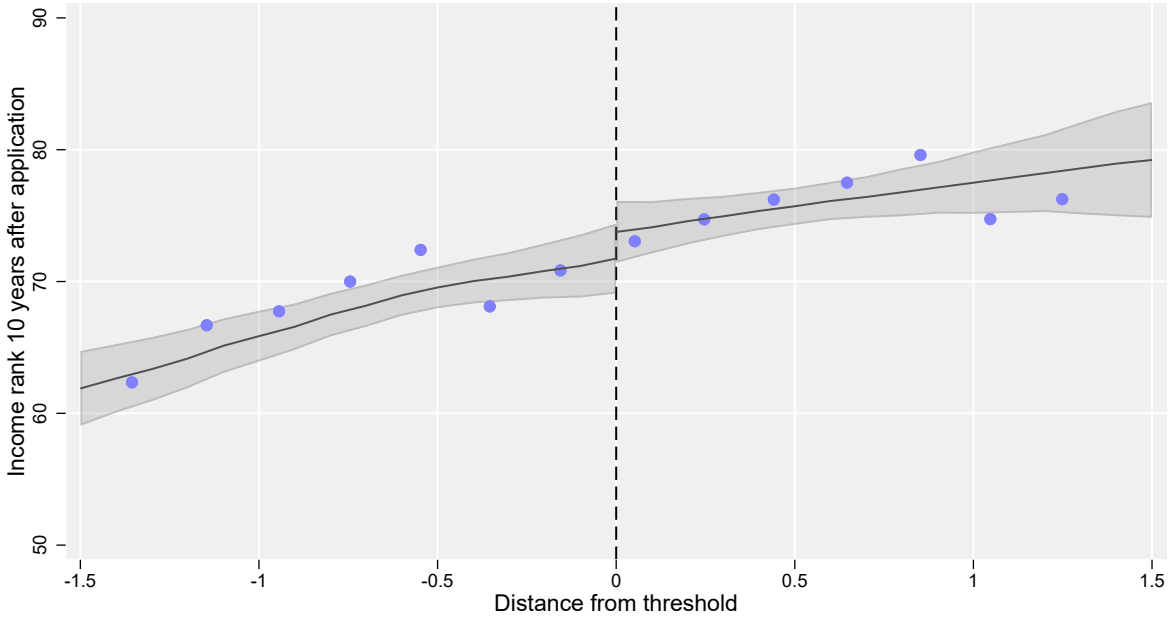
The stronger effect for the longer time horizon could also be due to differences between the youngest and oldest application cohorts. I explore this in panels D-F. Panel D shows that the shares of the applicants' preferred fields are relatively stable over the period. Therefore, changes in the "counterfactual," namely the preferred field, do not seem to explain the pattern. Panel E shows which type of upper secondary school the applicants have attended over time. The panel shows that a larger share of the applicants came from the mathematical track among the oldest cohorts compared to the youngest cohorts. A part of the explanation for this is that information on GPA, a requirement for being in the analysis sample, from Higher Commercial Examination is very limited before 2000. This indicates that the oldest cohorts have a different background than the youngest cohorts. Panel F indicates that this could translate into differences in which particular programs the applicants have as their alternative. The panel shows how the shares of the three most common alternative programs have changed over time for those with *Business and economics* as their alternative field. I find that the share who have the detailed field *Economics* as their alternative decline from almost 50% in the late 1990's to around 30% in the middle 2000's. One could interpret this as suggesting that the effect is driven by applicants admitted to *Economics* programs, but I cannot distinguish between whether this is due to the educational content or whether the applicants are more susceptible to the content because of their more math intensive backgrounds.[14]

4.5 Channels

4.5.1 Income A key concern for the interpretation of the findings on the default probability is whether studying *Business and economics* leads to a higher income and that higher income reduces the risk of default and delinquency. For instance, Lemieux (2014) documents that the return to education varies depending on field of study. Altonji et al.

[14]In line with this interpretation, column (1) of Appendix Table A19 shows that the point estimate for the effect on the default probability is stronger for applicants who have the detailed field *Economics* as their alternative. It is important to note that the estimate is not precise enough to detect a statistically significant difference compared to the estimated effect in Table 2.

Figure 6: Admission to *Business and economics* and income rank



Notes: The figure is based on applicants with *Business and economics* as their alternative field of study and another field as their preferred. The y-axis shows the income rank within birth cohort 10 years after application based on total income. The x-axis shows the distance to the GPA admission threshold (0) of the preferred field of study. The local linear polynomials use rectangular kernels with a bandwidth of 1.5. The grey area indicates the 90% confidence interval. The bin width is 0.2, but I only plot bins with at least 30 observations.

(2015) review the literature on the return to college majors and find that the returns to business and social studies are larger than the return to education majors, but they are typically below the return to engineering (p. 351). The chapter also discusses the challenges that selection poses for identifying the causal effect of field of study and highlight variation in access to field of study as an approach to identifying the returns. A recent example of this is Bleemer and Mehta (2022), who use a regression discontinuity design to estimate the return to majoring in economics when this is the preferred major at the University of California, Santa Cruz, and find a 58% increase in the students' early career wages. This is in a different educational context, and economics is the preferred field while the alternative is often sociology or psychology. I focus on applicants who have *Business and economics* as their alternative field and would often prefer to study political science or law, which are both high-paying Master's degrees in the Danish context.

In Table 2, controlling directly for income did not affect the estimated effect on the default probability. Figure 6 corroborates this finding and shows no indication of a discontinuity in income around the threshold for applicants with *Business and economics* as the alternative field. In the figure, I measure income as the rank in the distribution of total income within the applicants' birth cohorts 10 years after applying. It is important to note that total income includes all sources of taxable income, including for instance capital income and benefits and transfers.[15]

Appendix Table A20 shows that the finding is not confined to this choice of income measure. In Panel A, column (1) shows the estimated effect on income rank as in Figure 6. Column (2) and (3) focus on applicants who prefer either *Law* or *Social science*. For applicants who prefer *Law*, I even find a significant negative effect of admission to *Business and economics*, while it is close to 0 for applicants who prefer *Social science*. Column (4) and (5) find no effect on the probability of being in the top or bottom of the income distribution. The remaining columns (6-11) show the effects for total income, labor income, and household income measured in 1,000 DKK. I find no statistically significant effects for any of these measures of income measured at different subperiods (1 to 9 years after application, which includes income during studies, and 10 to 12 years after application) nor for the standard deviation of the applicants' incomes 8 to 12 years after application. Panel B and C show similar results using local randomization and MSE Optimal bandwidths.

Panel A of Appendix Figure A11 investigates whether income has changed over time. It looks at both total income and labor income 10 years after applying for each application cohort, but here there are no substantial changes over time.

Returning to the income of *Law* and *Social science* graduates, I use all first time applicants in Panel B and find that the average income rank of graduates from *Social science* is below that of *Business and economics* graduates, while *Law* graduates have

[15]Health insurance provided by the employer is in some cases exempt from taxes, but since Denmark has universal health care provided by the government such insurances often concern prevention and treatment of work-related injuries.

a higher average income rank. Panel C focuses on the detailed fields, *Economics* (most common alternative field), *Political science*, and *Law* (the two most common preferred fields) and shows that the distribution of income for graduates from these fields are fairly similar, but more graduates in *Economics* and *Law* end up in the top 10%.

The finding of no significant effects on income is not due to imprecision in the estimates. Appendix Figure A12 shows the reduced form effect on income rank of admission to each field of study, depending on whether it is the preferred or alternative field. For instance, I detect a significant positive effect of admission to *Medicine* when this is the preferred field, and a significant negative effect of admission to *Humanities, art and architecture* when this is the alternative field. The findings are in line with previous results from studies using Danish admission data.Humlum et al. (2017) and Heinesen (2018) find no effects on earnings of admission to the preferred program, but do not estimate the effect separately by fields of study. Daly et al. (2022) distinguish between applicants who have only applied for one program, applicants whose preferred and alternative program is within the same field, and applicants whose preferred and alternative program is within different fields, and pool all applicants in their estimation. They find that on average, admission to the preferred field of study increases earnings for applicants with different preferred and alternative fields of study, which is consistent with my findings, but, importantly, they do not find any effect on earnings of admission to *Business* when this is the preferred field.

In total, changes in the level or stability of income do not seem to drive the reduced probability of default and delinquency. I now turn to other channels that could potentially help explain the finding.

4.5.2 Financial behavior Another channel that could explain why admission to *Business and economics* reduces the risk of financial problems is that admission affects the applicants' financial behavior: In order to default, you need to have debt, and without sufficient liquid assets, even small shocks could make you unable to service your debt.

Table 3: Admission to *Business and economics* and financial behavior

	Low bank deposit	High interest rate	Has bank debt	High debt-to-income ratio	Owns stocks and bonds
	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}$(Economics)	-7.3**	-6.1***	-5.9**	-3.7*	7.0**
	(3.6)	(2.0)	(2.9)	(2.2)	(3.5)
N	1910	1029	1910	1910	1910
Baseline	34.2	6.7	86.8	11.7	27.5

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. *$\mathbb{1}$(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. The table shows the estimated reduced form effects in percentage points on financial behavior outcomes. All outcomes are indicators and are measured 10 years after application. *Low bank deposit* equals one if an applicant's bank deposit is smaller than one month of total income. *High interest rate* equals one if an applicant's marginal interest rate is greater than 30%. *Has bank debt* equals one if an applicant has bank debt. *High debt-to-income ratio* equals one if the applicant's bank debt is more than twice the applicant's yearly total income. *Owns stocks and bonds* equals one if an applicant holds stocks and bonds with a value in excess of 1500 DKK (200 Euro) in 2015 prices. *Baseline* indicates the estimated outcome for applicants just above the threshold. Bandwidth in the estimations is 1.5 with a rectangular kernel. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3 shows the reduced form effect of admission to *Business and economics* on the probability of being liquidity constrained and debt behavior.[16] Column (1) shows that admission reduces the probability of having bank deposits less than one month of total income by 7.3 percentage points. This indicates that those admitted to *Business and economics* are less likely to be liquidity constrained and with a baseline probability of having low bank deposits of 34.2%, this is a reduction of more than 20%. Similarly, column (2) shows that admission to *Business and economics* reduces the probability of having a high marginal interest rate (greater than 30%) with 6.1 percentage points at the threshold, which is a large effect given the baseline probability of 6.7%.

In column (3), the outcome is an indicator for having non-mortgage bank debt, and here I find a reduction of 5.9 percentage points at the threshold. Looking at the debt-to-income ratio in column (4), I similarly find that admission to *Business and economics* reduces the probability of having a high debt-to-income ratio (non-mortgage debt larger than two years of total income) by 3.7 percentage points. This is a reduction of more than 30% since the baseline probability of having a high debt-to-income ratio is 11.7%.

[16] Appendix Table A21 shows the results using local randomization and MSE optimal bandwidths.

These findings are in line with the lower probability of default and delinquency, but one could also hypothesize that studying economics *increases* the probability of holding debt, i.e., to use debt when appropriate. For instance, using information from the Survey of Consumer Finances, Lim et al. (2019) find that financial knowledge is negatively associated with aversion toward education debt. They also find that lower levels of education are associated with more aversion towards education debt, and Nguyen et al. (2021) study Vietnamese entrepreneurs and find the same aversion. These findings could reflect the association between higher cognitive skills and economic preferences documented by Burks et al. (2009). In the current setting, it is not clear whether the changes in debt behavior are due to changes in debt aversion or changes in debt management – even though the lower probability of having a high marginal interest rate could indicate this. Furthermore, looking at mortgage debt, I find no differences in the probability of having debt (see Appendix Table A22).

In the final column (5), I replicate the main result of Christiansen et al. (2008). Using a different research design, they show that graduating from an economics education affects the likelihood of participating in the stock market. Similarly, I find that admission to *Business and economics* increases stock market participation with an estimated effect of 7.0 percentage points. This suggests that studying economics affects financial behavior broadly, and not only affects debt behavior. It could also indicate that the applicants become more willing to take risks, which could have an adverse effect on the probability of getting into financial problems. The fact that they still have a lower probability of default and delinquency suggests that they become better at managing and servicing their debt.

In total, Table 3 shows that admission to *Business and economics* affects financial behavior. The applicants are less likely to be liquidity constrained and less likely to take on debt. Both of these findings can potentially contribute to the explanation of why the applicants admitted to *Business and economics* are less likely to experience financial problems (Appendix Table A22 and A23 provide additional financial outcomes).

Table 4: Admission to *Business and economics* and labor market outcomes

	Unemployment			Self-	Private	Finance &
	$>$ 3 months	November	$>$ 6 months	employed	sector	insurance
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}$(Economics)	0.7	-0.4	1.0	0.4	7.6*	4.6**
	(1.7)	(1.1)	(2.7)	(0.8)	(3.9)	(1.8)
N	1910	1910	1910	1910	1910	1910
Baseline	4.9	2.3	13.1	0.7	46.2	4.6
Period	10	10	1-9	10	10	10

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. *$\mathbb{1}$(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. The table shows the estimated reduced form effects in percentage points on labor market outcomes. All outcomes are indicators. *Period* indicates when the outcome is measured. *$>$ 3 months* indicates unemployment for more than 3 months in the year. *November* indicates unemployment in November. *$>$ 6 months* indicates unemployment for more than 6 months in the first 9 years after application. *Self-employed*, *Private sector*, and *Finance & insurance* each equal one if the applicant was either self-employed, employed in the private sector or employed in the *Finance and insurance* sector 10 years after application. Bandwidth in the estimations is 1.5 with a rectangular kernel. Robust standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

4.5.3 Labor market outcomes The level of income is not the only way income could be related to financial problems. Another possibility is that fluctuating income, for instance due to unemployment, can increase the risk of financial problems (Kreiner et al., 2020).

Table 4 explores how admission to *Business and economics* affects different labor market outcomes. Column (1)-(3) show the reduced form effects on different measures of unemployment. In column (1), the outcome is an indicator for having experienced more than 3 months of unemployment in year 10 after application. The outcome in column (2) indicates if the applicant was unemployed by the end of November 10 years after application, and in column (3), the outcome indicates whether the applicant experienced more than 6 months of unemployment in the first 10 years after application. None of these measures of unemployment seem to change around the threshold. Taken together with the estimated insignificant effects on labor income in Appendix Table A20, these results suggest that for the applicants with *Business and economics* as their alternative, there are no changes in the unemployment risk around the threshold.

Column (4) shows the effect of admission to *Business and economics* on the probability of being self-employed 10 years after application. If applicants admitted to *Business and*

economics are less likely to be self-employed, this could indicate that they have a more stable source of income, but the estimated effect shows this is not the case.

In column (5) and (6), I investigate which sectors the applicants are employed in 10 years after applying. Column (5) shows the effect of admission to *Business and economics* on the probability of being employed in the private sector. Job security is often considered to be higher in the public sector (e.g., Luechinger et al., 2010) so if studying economics makes applicants more likely to work in the public sector, this could reduce the risk of financial problems. The estimated effect is a 7.6 percentage point *increase* in the probability of being employed in the *private* sector. Therefore, the job security explanation does not seem to explain the reduced risk of getting into financial problems.

Column (6) shows the effect on the probability of being employed in the *Finance and insurance* sector. The table shows that admission to *Business and economics* increases the probability of working in this sector by 4.6 percentage points. This result and the result on the probability of working in the private sector in column (5) show that field of study does affect the applicants' future work lives. The effect of studies and subsequent work experience cannot be disentangled in this setup, since they are co-determined.[17] However, if we believe that it requires more financial knowledge and understanding to get a job in the *Finance and insurance* sector, this result suggests that admission to the *Business and economics* fields of study actually increases financial knowledge and understanding.

The results from Table 4 show that employment or income stability does not seem to change for applicants around the threshold in a way that can explain the reduced risk of financial problems. Therefore, it is unlikely that these channels explain the change in the probability of default and delinquency.[18]

In section 4.5.1, I found no changes in labor income 1-9 years after applying around the threshold (Appendix Table A20) Still, there could be differences in the *types* of student jobs that different fields of study give access to (Joensen and Mattana, 2022). Column 1-4

[17] Dropping applicants who end up working in this sector in column (6) of Appendix Table A7 reduces the estimated effect of studying economics to a 4.1 percentage point reduction with a P-value of 0.062.

[18] Appendix Table A24 shows the results using local randomization and MSE optimal bandwidths.

of Appendix Table A25 show the effect of admission to the broad *Business and economics* field as well as the detailed *Economics* field on the skill-level required in student jobs and the sector of work. Similar to the result on sector of work 10 years after application, admission to a *Business and economics* program increases the likelihood of working in the *Finance and insurance* sector while studying. Again, this could be a part of the explanation for the reduction in the default probability, but it might as well be a result itself of increased financial and economic knowledge.

4.5.4 Peers An applicant's field of study also affects who their peers are, and this could potentially influence financial behavior (Haliassos et al., 2020). For instance, column 5-8 of Appendix Table A25, Panel A, show that admission to *Business and economics* is associated with admission to different institutions. Since many of these programs are offered by business schools, an applicant who has *Business and economics* as the alternative is more likely to be admitted to a business school if below the admission threshold for the preferred field.[19] In this section, I explore whether admission to *Business and economics* affects the choice of partner 10 years after applying, and whether it affects the background of the applicant's peers in the study program they are admitted to.

College can be considered a marriage market, and the field of study an applicant is admitted to could affect what their later partner's field of study is (Eika et al., 2019; Kirkebøen et al., 2021). Appendix Table A26 investigates to what extent admission to a particular field affects the probability of having a partner 10 years later who has completed a program within the same field. In column (1), I look at all applicants with a binding threshold for the preferred field. The reduced form effect of admission to the preferred field (no matter what this field is) is a 3.1 percentage point increase in the probability that an applicant has a partner 10 years later who has completed a program within the applicant's preferred field. This is in line with the findings by Kirkebøen et al. (2021). In column (2), I investigate whether the same effect is present when it comes

[19]Panel B of the table shows that I do not detect any differences when focusing on the detailed field of *Economics*, and therefore it is unlikely that the differences drive the effect on default and delinquency.

to admission to the alternative field, again using all applicants with a binding threshold. Admission to an applicant's alternative field does not significantly increase the probability that the applicant has a partner 10 years later who has completed a program within the applicant's alternative field, though the point estimate is a 1.5 percentage point increase in the probability. An interpretation of these findings could be that potential peer effects are strongest for those admitted to their preferred field of study and perhaps less important for those admitted to the alternative field.

In column (3), I focus on the applicants who have *Business and economics* as their alternative field of study. As in column (2), admission to *Business and economics* does not increase the probability of having a partner who has a *Business and economics* degree 10 years later. This suggests that the reduced probability of default and delinquency when you are admitted to the *Business and economics* field of study is not driven by an increase in the probability that you get an "economist" as partner later in life.

Finally, column (4) of Appendix Table A26 uses the educational background of an applicant's peers in their study program as the outcome and focuses on the applicants who have *Business and economics* as their alternative field of study. In particular, I look at the share of peers who come from the mathematical track (instead of the linguistic track) in upper secondary school. I find that admission to *Business and economics* increases the share of peers from the mathematical track by 8.3 percentage points. The baseline share is 39.5% so this is a substantial increase that is significant on the 1%-level.[20] I cannot rule out that this change in the peer composition is a part of the explanation for the finding on financial problems, but another way to interpret this result is that admission to *Business and economics* exposes an applicant to a more math intensive program that potentially increases the applicant's numeracy, which is also important for financial understanding.

[20]Dropping applicants with a high share of math peers does not affect the estimated effect much in column (7) of Appendix Table A7.

5 Conclusion

In this paper, I investigate how field of study affects the probability of developing financial problems. I do so by linking data on admissions to higher education programs with data on personal loans and estimating the causal effect of admission to the *Business and economics* field of study on the probability of default and delinquency. The Danish system of admission quasi-randomizes applicants into different fields of study around unpredictable GPA admission thresholds. I exploit this to identify the causal effect, and I find that admission to *Business and economics* reduces the probability of experiencing financial problems 10 to 23 years after program admission by one half.

Previous studies evaluating the effect of educational interventions on financial behavior vary tremendously in terms of the types of interventions studied. This paper evaluates the effect of extensive economics education, which is likely to profoundly influence not only economic and financial knowledge but also other aspects related to higher education, e.g., choice of occupation. The comprehensiveness of this multi-year "intervention" likely explains the large reduction in the probability of defaulting by one half. The large reduction provides a notion of the degree to which educational interventions can reduce the propensity to get into financial trouble – keeping in mind that programs targeted at people with fewer prerequisites for making well-informed financial decisions or programs delivered exactly at the time of making important decisions could have even larger impacts.

Studying economics does not completely eliminate the possibility of getting into financial trouble. Reducing the probability of defaulting to zero is probably too much to ask of any intervention, and most likely not socially optimal. The take away from this study is not that everybody should study economics at the university level, but rather that economics education can have long lasting, causal effects on financial behavior and reduce the risk of financial problems.

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Appendix

Table A1: Examples of program rankings at University of Copenhagen in 2006

	GPA	Priority	Program	Threshold	Field
Ex. 1	8.6				
		1	Law	8.5	Preferred
		2	Economics	0	Alternative
		3	Pol. science	9.7	Drop: Law has higher rank and lower threshold
Ex. 2	8.3				
		1	Pol. science	9.7	Drop: GPA below threshold of Law
		2	Law	8.5	Preferred
		3	Economics	0	Alternative
Ex. 3	10.0				
		1	Pol. science	9.7	Preferred
		2	Law	8.5	Alternative
		3	Economics	0	Drop: GPA above threshold for all programs
Ex. 4	9.5				
		1	Pol. science	9.7	Preferred
		2	Law	8.5	Alternative
		3	Economics	0	Drop: Lowest of two thresholds

Notes: The table shows made up examples of four applicants to programs at the University of Copenhagen in 2006. The first applicant has a grade point average of 8.6 from upper secondary school and has *Law* as her first priority, *Economics* as her second priority, and *Political science* as her third priority. The column labelled *Threshold* shows the (real) GPA thresholds for the three programs. The final column shows how the applications are used in the research design. For this applicant, *Law* is the preferred program, *Economics* is the alternative program and the *Political science* application is discarded because the other programs have a higher rank and lower thresholds and therefore the applicant will never be admitted to *Political science*. The three remaining examples illustrate other cases where applications are discarded for different reasons.

Table A2: Selection of sample

Restriction	Observations
First time applicants	427,885
Only one program has first priority	426,666
At least two applications in ordinary system	170,098
GPA threshold for first priority program	133,009
Not admitted to program with another admission system	129,320
Admitted to one program	98,688
GPA is not missing	81,350
GPA is above the GPA threshold of at least one program	67,522
Applicants with binding threshold	53,882

Notes: The large reduction from the restriction *At least two applications in ordinary system* is caused by the fact that many applicants only apply for one program and many only apply for programs that use another admission system. The *GPA is not missing* restriction reduces the sample size because GPA was not recorded for Upper secondary higher commercial examination before 2000.

Table A3: Summary statistics

	1st time applicants			Sample		
	Obs.	Mean	SD	Obs.	Mean	SD
Age	427885	21.8	2.4	14181	21.1	1.8
Male (%)	427885	40.5	49.1	14181	36.3	48.1
GPA	323751	8.3	1.0	14181	8.8	0.8
1st priority threshold	320740	5.8	4.1	13666	9.1	0.6
Offered rank	358047	1.2	0.6	14181	1.8	1.1
Number of applications	427885	1.9	1.2	14181	3.2	1.4
Income rank	412865	58.2	28.0	14022	63.2	28.5
Father's income rank	325715	67.0	28.4	11638	70.7	28.2
Mother's income rank	367522	47.3	26.0	13014	52.7	27.1
Father has Master's (%)	389010	13.3	33.9	13530	22.8	41.9
Mother has Master's (%)	400293	6.4	24.5	13829	11.9	32.3
Default (%)	422353	11.1	31.4	14170	8.0	27.1

Notes: The *1st time applicants* are all applicants observed in the data. This includes applicants to business academies that use another admission system than universities and university colleges. The *Sample* are the applicants whose preferred program has a binding GPA threshold and whose preferred program and alternative program are within different fields of study. *Income rank* is within cohort rank based on total income measured 10 years after application. Father's and mother's income rank are measured when they are 45 years old. *Default* is measured 10 to 23 years after application.

Table A4: Construction of fields of study from DISCED classifications

Fields of Study	DISCED
Humanities, arts and architecture	Arts and humanities (L4) Architecture and town planning (L2)
STEM	Engeneering, manufacturing and construction (L4) Natural sciences, mathematics and statistics (L4) Information and communication technologies (L4)
Law	Law (L3)
Business and economics	Business and administration (L3) Economics (L2) Mathematical economics (L2) Agricultural economics (L2)
Social science	Social sciences, journalism and information (L4)
Education	Education (L4)
Welfare	Health and welfare (L4)
Medicine	Medicine (L2) Veterinary (L3)

Notes: The parentheses indicate the DISCED level. Level 4 is ISCED Broad fields, level 3 is ISCED Narrow fields and level 2 is ISCED Detailed fields. Two level 4 (L4) DISCED groups are left out. These are *Agriculture, forestry, fisheries and veterinary* and *Services*. For the first group there are very few observations that do not belong to the narrow field *Veterinary* (included in *Medicine*) and for the latter group there are also very few observations, since the *Service*-educations are not at university or university college level. The DISCED name for *Mathematical economics* is *Inter-disciplinary programs involving mathematics and statistics*. The DISCED name for *Agricultural economics* is *Inter-disciplinary programs involving agriculture*.

Table A5: Most common programs within the fields of study

Field of study	Preferred	Alternative
Hum., art & arch.	Humanistic basic education (22%) Architect (16%) History (8%)	History (12%) Business language (10%) Danish (7%)
STEM		Engineer (25%) Biology (15%) Natural science (15%)
Law	Law (100%)	Law (100%)
Bus. & econ.	Business econ. and language (29%) Business economics (16%) Language and int. marketing (9%)	Economics (38%) Bus. econ. and law (22%) Business economics (20%)
Social science	Political science (25%) Psychology (22%) Anthropology* (12%)	Soc. sci. basic edu. (39%) Librarian (13%) Admin./Soc. studies (10%)
Education	Teacher (84%) Audiologopedics (7%) Pedagogy (4%)	Teacher (91%) Pedagogy (6%) Audiologopedics (2%)
Welfare	Sports (22%) Dentist (17%) Social worker (14%)	Pedagogue (31%) Nurse (24%) Social worker (12%)
Medicine	Medical science (83%) Veterinary (16%)	

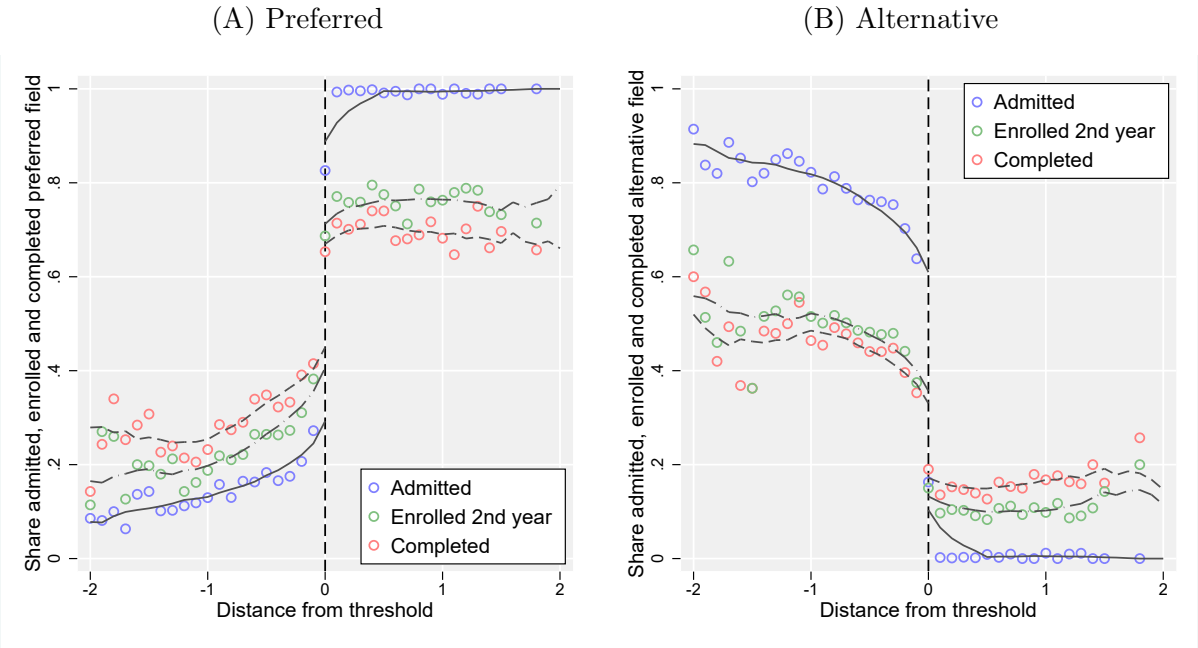
Notes: The *Preferred* column shows the most common programs when the field is the preferred field of study. The *Alternative* column shows the most common programs when the field is the alternative field of study. **Anthropology* consists of two programs: *Anthropology* and *Humanities 2*. The latter was a program at Aarhus University from 1993 to 1998 where the enrolled applicants were divided into different programs. The mode of applicants accepted to the program studied *Anthropology* later in the year of application, but others studied philosophy or literature for instance.

Table A6: Combinations of preferred and alternative field of study

	Alternative field of study							
	B&E	Law	HAA	Educ.	Welf.	SocSci	STEM	Tot.
Preferred field								
Bus. & Econ.		47	344	< 25	< 25	214	162	767
Law	806		490	28	71	150	127	1672
Hum., Art & Arch.	196	79		227	238	591	444	1775
Education	41	< 25	338		416	92	89	976
Welfare	163	55	410	425		162	489	1704
Social Science	730	477	2593	260	429		327	4816
Medicine	127	121	161	< 25	518	73	1061	2061
Total	2063	779	4336	940	1672	1282	2699	13771

Notes: The table is based on all applicants whose preferred field of study has a binding threshold and whose preferred and alternative field of study differ. The rows show the number of applicants in the sample that prefer each field and the columns show the number of applicants that have each field as their alternative. The "< 25" cells are excluded from the totals.

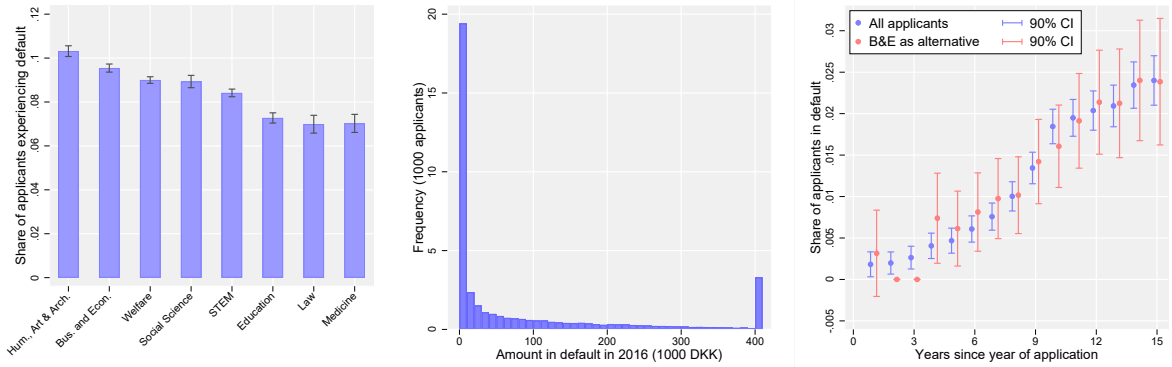
Figure A1: Admission, enrolment and completion for preferred or alternative field of study



Notes: The figures are based on all applicants whose preferred field of study has a binding threshold and whose preferred and alternative field of study differ. The bins are the discrete values observed in the data with at least 30 applicants. The local linear polynomials have bandwidth of 0.5.

Figure A2: Completed field of study, time since application and default

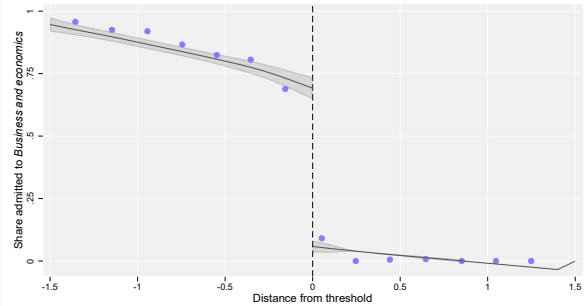
(A) Default by field of study (B) Distribution of amount (C) Years since application



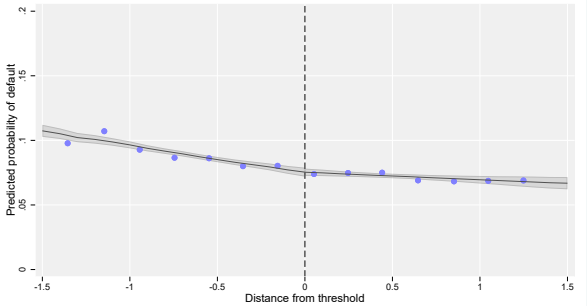
Notes: In the left panel, default and delinquency status is observed from 10 years after application until 23 years after application for the oldest application cohorts. The figure is based on first time applicants who complete a higher education degree. For these applicants, the average probability of default is 8.9%. In the middle panel, the bin width is 10,000 DKK (1300 Euro). The amount in default is censored above 400,000 DKK. The right panel shows the share off applicants with binding GPA thresholds that experience default or delinquency in each year since their first year of application. *All applicants* includes all applicants with a binding threshold and different preferred and alternative fields of study and *B&E as alternative* only includes applicants with *Business and Economics* as their alternative field of study.

Figure A3: Graphical evidence on the reduced form effect of admission to *Business and economics*

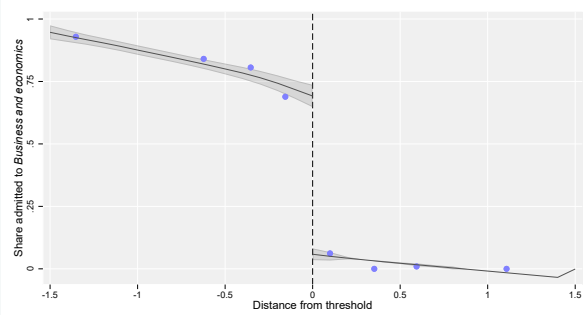
(A) First stage



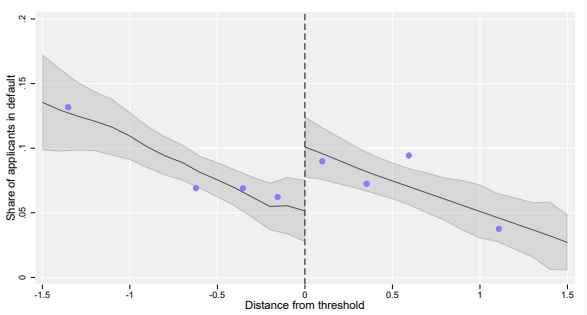
(B) Predicted default



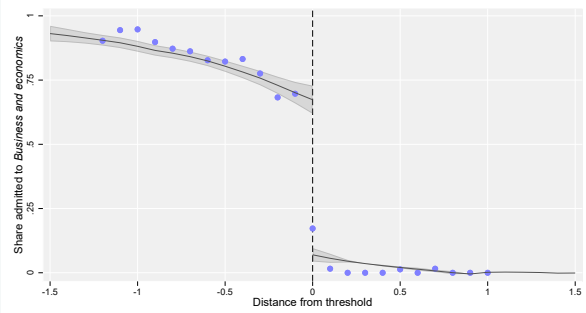
(C) First stage with 4 bins



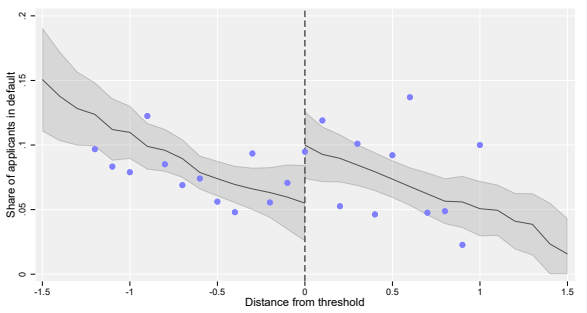
(D) Reduced form with 4 bins



(E) FS with discrete values and a BW of 1



(F) RF with discrete values and a BW of 1



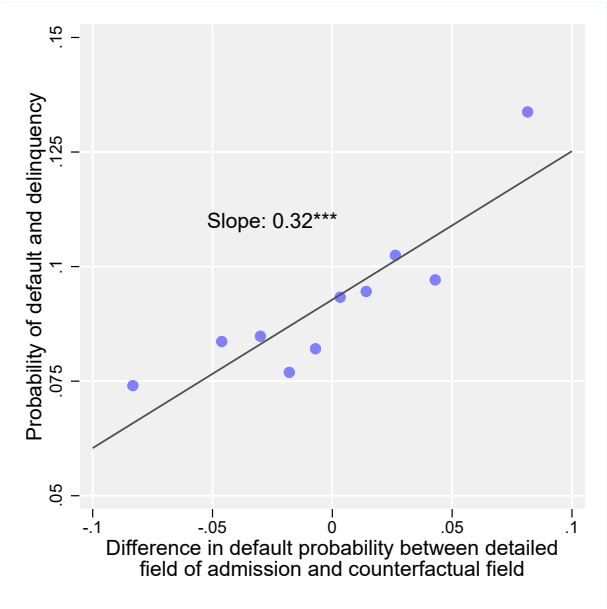
Notes: The figures are based on applicants with *Business and economics* as their alternative field of study and another field as their preferred. In the top panels, I use a bandwidth of 1.5 and a bin width of 0.2. The top left panel shows the first stage, namely how the probability of admission to *Business and economics* changes around the threshold of the preferred field of study. In the top right panel, the probability of default is predicted using a probit model with gender, year of application, age at application and grade point average as the explanatory variables. In the middle panels, I use a bandwidth of 1.5 and four bins with approximately the same number of observations. In the bottom panels, the bins are the discrete values of the running variable, but I only plot bins with at least 30 observations. The bandwidth of the local linear polynomials are 1. All panels use rectangular kernels and the shaded areas indicate the 90% confidence intervals of the local linear polynomials.

Table A7: Admission to *Business and economics* and the probability of default and delinquency with sample restrictions

	Default +10 years after						
	(1) Incl. no and multiple field completers	(2) Quota 1	(3) Master's	(4) Bachelor's	(5) Chetty et al. definition	(6) Excl. bankers	(7) Excl. high share of math peers
First stage	71.2***	93.4***	65.4***	66.8***	68.1***	66.7***	53.0***
	(2.1)	(1.4)	(3.4)	(2.6)	(2.5)	(2.8)	(3.7)
Reduced form	-6.5***	-4.6**	-4.5*	-5.1**	-5.5***	-4.1*	-5.5**
	(2.0)	(2.3)	(2.4)	(2.2)	(2.1)	(2.2)	(2.6)
LATE	-9.1***	-4.9**	-6.9*	-7.7**	-8.0***	-6.1*	-10.4**
	(2.8)	(2.4)	(3.7)	(3.2)	(3.1)	(3.3)	(5.0)
N	2451	1730	1225	1693	1831	1542	1329
Baseline	11.1	10.3	7.4	9.2	10.2	8.5	10.1

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. The estimated effects are in percentage points. The top row shows the first stage effects of being below the threshold of the preferred field on the probability of admission to *Business and economics* as in column (1) of Table 2. The middle row shows the reduced form effects of being below the threshold of the preferred field on the probability of default and delinquency as in column (2) of Table 2. The bottom row shows the effects of admission to *Business and economics* on the probability of default and delinquency using two stage least squares estimation where admission is instrumented using whether an applicant is below the threshold of the preferred field as in column (5) of Table 2. Column (1) includes applicants who never completed a higher education program as well as applicants who completed programs within several fields. Column (2) only uses applicants admitted to higher education through the Quota 1 system. Column (3) and (4) use applicants who obtained at least a Bachelor's degree or a Master's degree. Column (5) uses the classification of programs within economics, finance and accounting from Chetty et al. (2014) instead of the classification based on DISCED. Column (6) excludes applicants who end up working in the *Finance and insurance* sector, as defined by the DB07 classification provided by Statistics Denmark, 10 years after application. Column (7) excludes applicants who are admitted to a program where more than 50% of their peers come from the mathematical track in upper secondary school. Robust standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Figure A4: Difference in default rate between field of admission and counterfactual field



Notes: The figure is based on the applicants with a binding a threshold whose preferred and alternative detailed field differ and who are within a bandwidth of 0.5 of the admission threshold to the preferred program (excl. applicants exactly at the threshold). The x-axis is the difference in the default rate between the detailed field of admission (either preferred or alternative) and the "counterfactual" field, i.e., the preferred field if the applicant is admitted to the alternative. The default rates for the detailed fields are calculated separately for each year of admission cohort, are winsorized at $p1$ and $p99$, and only for fields with at least 20 accepted applicants. The slope is robust to including flexible controls for sex, age, year of application and income (0.28^{***}).

Table A8: Admission to *Business and economics* and the probability of default and delinquency for applicants with *Business and economics* as the preferred field

	B&E (%)	Probability of default (%)			
	(1)	(2)	(3)	(4)	(5)
	1st stage	Reduced form	Reduced form	Reduced form	LATE
$\mathbb{1}$(Economics)	66.0***	-2.4	-2.0	-2.7	-3.6
	(4.9)	(3.5)	(3.5)	(3.5)	(5.4)
N	720	720	720	720	720
Baseline	32.1	6.6			
Alt. field FE			✓	✓	
Male, year & age			✓	✓	
Income				✓	

Notes: In the estimations, I use applicants with *Business and economics* as their preferred field of study and another field as their alternative for whom I observe all the control variables. *$\mathbb{1}$(Economics)* is an indicator that equals 1 if an applicant's GPA is above the threshold of *Business and economics*. Column (1) shows the first stage effect, i.e., the change in the probability of admission to *Business and economics*, in percentage points estimated with OLS. Column (2)-(4) show the reduced form effects, i.e., the change in the probability of default, in percentage points estimated with OLS. In column (5), I instrument admission to *Business and economics* with the indicator for being above the threshold of *Business and economics* using 2SLS. *Alt. field FE* are fixed effects for the alternative field of study. *Male, year & age* are a male indicator, year of application fixed effects, and indicators for age in the year of application. *Income* are income quintile indicators based on total income 10 years after application. Bandwidth in the estimations is 1.5 with a rectangular kernel. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Admission to *Business and economics* and the probability of default using different measures of default and delinquency

	Default +10 years after		+8 years after	+12 years after	Default in 2016	
	(1) Incl. partners' defaults	(2) Excl. 2008-10 defaults	(3)	(4)	(5) > 0 DKK	(6) > 2500 DKK
$\mathbb{1}$(Economics)	-6.1**	-5.8***	-6.0***	-7.1***	-4.1**	-2.7*
	(2.5)	(2.1)	(2.1)	(2.4)	(2.0)	(1.4)
N	1910	1910	1910	1567	1910	1910

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. *$\mathbb{1}$(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. The estimated reduced form effects are in percentage points as in column (2) of Table 2. Column (1) shows the effect on default when partner's default and delinquency is also included in the default indicator. Column (2) excludes defaults and delinquencies during the financial crisis in 2008-10 from the indicator. Column (3) and (4) use indicators that equal 1 if an applicant experienced default or delinquency from 8 years after application or 12 after application. Column (5) and (6) only use an indicator for default and delinquency in 2016 and column (6) only uses accounts in default with an outstanding amount of more than 2500 DKK (350 Euro). Robust standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A10: Admission to *Business and economics* and the probability of default and delinquency with clustered standard errors

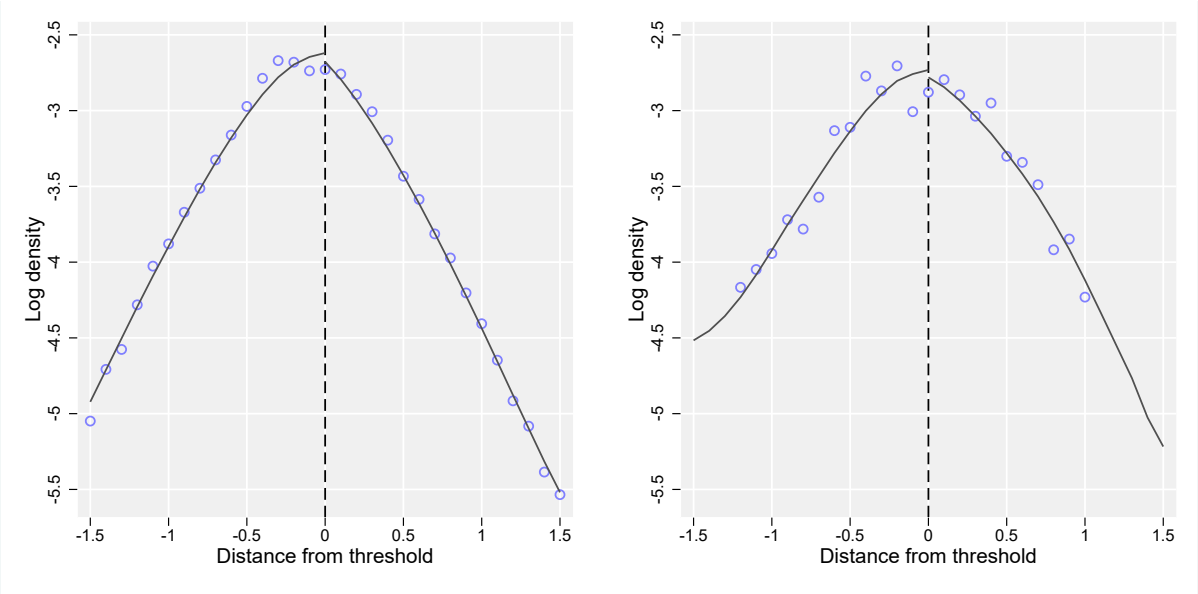
	Yearly probability of default (%)					Default +10 years after		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
𝟙(Economics)	-1.60**	-1.58**	-1.57**	-1.58**	-1.58**	-5.25**	-5.25*	-5.25***
	(0.79)	(0.79)	(0.79)	(0.79)	(0.79)	(1.90)	-	(1.76)
N	13952	13952	13952	13952	13952	1910	1910	1910
Cluster level	Applicant	Applicant	Applicant	Applicant	Applicant	Preferred field	Year of application	Discrete running variable values
Number of clusters	1910	1910	1910	1910	1910	28	14	31
Year of application FE		✓		✓				
Year of default FE			✓	✓				
Year of app. × default FE					✓			

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. *𝟙(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. The estimated reduced form effects are in percentage points as in column (2) of Table 2. In column (1)-(5), I use one observation for each applicant in each year I observe the applicant in the data on defaults. This means that for the earliest application cohorts I have 14 observations per applicant, 2003-2016, and for the latest application cohort I have 1 observation per applicant, 2016. In column (6)-(8), I use a similar specification as in column (2) of Table 2, but cluster the standards errors at different levels, indicated by *Cluster level*. *Year of application FE* indicates fixed effects by the year of application, *Year of default FE* indicates fixed effects by the year of observation in the data on defaults, and *Year of app. × default FE* indicates an interaction to get year of observation by year of application fixed effects. Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Figure A5: Distribution of the distance to the GPA threshold

(A) Preferred and alternative differ

(B) B&E as alternative



Notes: The figure is based on on applicants whose preferred field of study has a binding threshold and whose preferred and alternative field of study differ. In the left panel, I use all applicants and in the right panel, I only use applicants who have *Business & economics* as the alternative. The bins are the discrete values observed in the data with at least 30 applicants. The local linear polynomials have bandwidth of 0.68 in the left panel and of 0.85 in the right panel as suggested by the McCrary tests in Appendix Table A11.

Table A11: Test for manipulation of the running variable

Stata command	Test stat.	Std. Err. / P-val	Bandwidth
Panel A: Preferred and alternative differ			
`DCdensity`	-0.0167	0.0337	0.68
`rddensity`	0.0571	0.9544	0.22/0.25
Panel B: B&E as alternative			
`DCdensity`	-0.0055	0.0934	0.85
`rddensity`	0.5274	0.5979	0.36/0.45

Notes: The tests are based on applicants whose preferred field of study has a binding threshold and whose preferred and alternative field of study differ. In Panel A, I use all applicants and in Panel B, I only use applicants who have *Business & economics* as the alternative. The column *Stata command* indicates which Stata command was used to implement the test. The column *Std. Err. / P-val* shows the standard error for the McCrary test (McCrary, 2008) and the P-value for the bias-corrected density test (Cattaneo et al., 2018, 2020). For the latter test, the two calculated bandwidths are to the left and right of the threshold.

Table A12: Admission to *Business and economics* and background characteristics

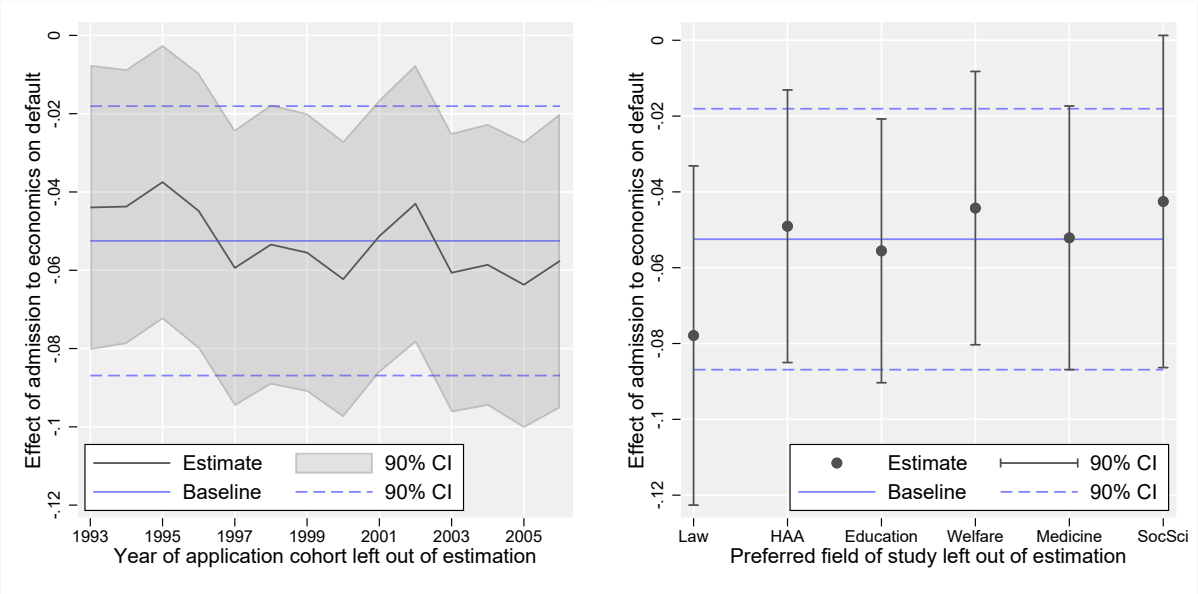
	𝟙(Economics)		N
Male (%)	-1.24	(3.86)	1910
GPA	-0.062	(0.039)	1910
Inc. rank father	-0.79	(2.50)	1602
Inc. rank mother	-1.52	(2.27)	1773
Higher edu. father (%)	-3.43	(3.36)	1846
Higher edu. mother (%)	-0.78	(2.61)	1886
Year of application	-0.14	(0.33)	1910
1993 (%)	2.68	(2.35)	1910
1994 (%)	0.048	(1.89)	1910
1995 (%)	-3.36*	(1.81)	1910
1996 (%)	0.29	(1.76)	1910
1997 (%)	0.56	(1.80)	1910
1998 (%)	-0.63	(1.78)	1910
1999 (%)	1.20	(1.94)	1910
2000 (%)	1.73	(1.98)	1910
2001 (%)	-0.27	(2.03)	1910
2002 (%)	-0.48	(2.04)	1910
2003 (%)	-2.33	(1.83)	1910
2004 (%)	2.32	(2.15)	1910
2005 (%)	-0.20	(2.06)	1910
2006 (%)	-1.56	(2.36)	1910
Age at application	-0.042	(0.11)	1910
18-19 (%)	-0.71	(2.69)	1910
20-21 (%)	5.40	(3.61)	1910
22-23 (%)	-4.16	(2.72)	1910
24-25 (%)	0.87	(1.15)	1910
25-30 (%)	-1.40	(0.88)	1910
Preferred field			
Law (%)	-3.38	(3.78)	1910
Hum., Art & Arch. (%)	0.72	(2.28)	1910
Education (%)	0.76	(1.03)	1910
Welfare (%)	1.08	(1.91)	1910
Medicine (%)	3.41*	(1.79)	1910
Social Science (%)	-2.59	(3.72)	1910

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. Note that the table is flipped such that the rows are the outcome variables and the column is the explanatory variable. *𝟙(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold of the preferred field. *(%)* indicates that the outcome is a dummy variable and the effect is in percentage points. Robust standard errors in parentheses. $^{*}\,p < 0.1$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$.

Figure A6: Admission to *Business and economics* and the probability of default leaving out applicants from particular years of application or with particular preferred fields

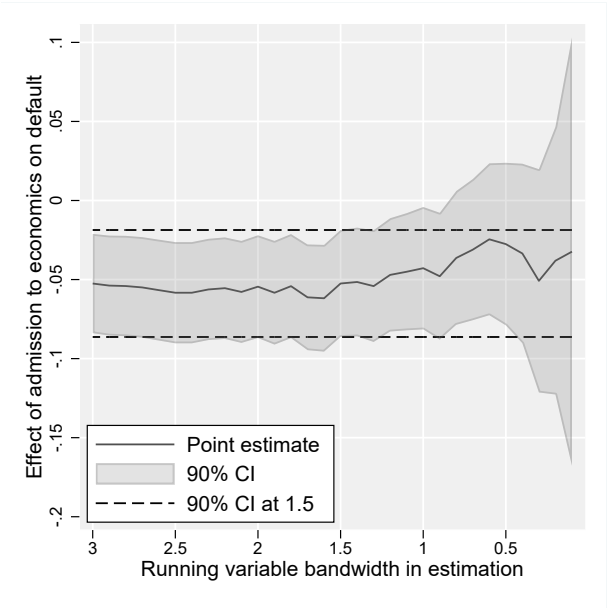
(A) Year of application

(B) Preferred field



Notes: The figures are based on applicants with *Business and economics* as their alternative field of study and another field as their preferred and the estimations are similar to the estimation in column (2) of Table 2. *Baseline* and the corresponding 90% confidence interval shows the estimated effect from this estimation for comparison. In the left panel, I drop applicants from different year of application cohorts. For instance, *1993* shows the estimated reduced form effect of admission to *Business and economics* when I leave out applicants from 1993 from the estimation. In the right panel, I similarly drop applicants based on their preferred field of study. For instance, *Law* shows the estimated reduced form effect of admission to *Business and economics* when I leave out applicants with *Law* as their preferred field of study from the estimation.

Figure A7: *Business and economics* and default for different choices of bandwidth



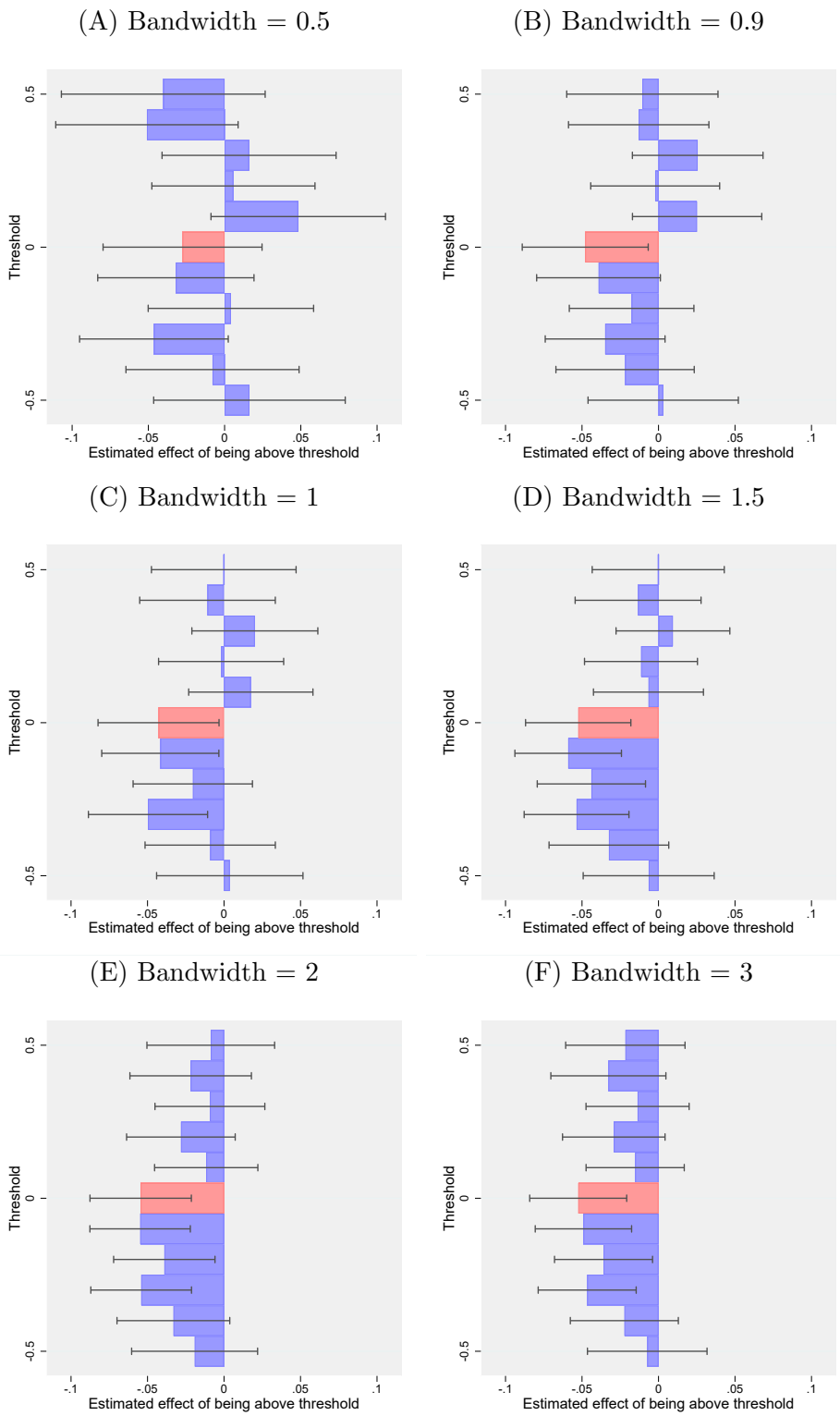
Notes: The figure shows the estimated reduced form effect as in column (2) of Table 2 with different choices of bandwidth.

Table A13: Admission to *Business and economics* and the probability of default and delinquency using different regression discontinuity approaches

	Probability of default more than 10 years after application						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
First stage	69.0***	67.8***	67.0***	68.6***	67.2***	62.7***	68.1***
	(2.4)	(2.9)	(3.0)	(2.5)	(2.8)	(4.7)	(4.8)
Reduced form	-5.2**	-4.5*	-5.7**	-5.5**	-4.9**	-3.5	-4.8
	(2.1)	(2.3)	(2.5)	(2.3)	(2.4)	(3.9)	(3.9)
LATE	-7.6**	-6.6*	-8.5**	-8.0**	-7.3**	-5.6	-7.1
	(3.0)	(3.4)	(3.8)	(3.3)	(3.7)	(6.2)	(5.8)
N	1910	1887	2006	1794	1810	1214	225
Baseline	10.3	10.1	10.3	10.4	10.3	10.6	11.9
Bandwidth	1.5	1.5		1.5	1.6	0.6	0.1
Functional form	Linear	Linear	Quadratic	Linear	Linear	Linear	-
Kernel	Rect.	Tri.	Rect.	Rect.	Tri.	Tri.	-
Donut RD				✓	✓	✓	✓

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. The estimated effects are in percentage points. The top row shows the first stage effects of being below the threshold of the preferred field on the probability of admission to *Business and economics* as in column (1) of Table 2. The middle row shows the reduced form effects of being below the threshold of the preferred field on the probability of default as in column (2) of Table 2. The bottom row shows the effects of admission to *Business and economics* on the probability of default and delinquency using two stage least squares estimation where admission is instrumented using whether an applicant is below the threshold of the preferred field as in column (5) of Table 2. *Bandwidth*, *Functional form* and *Kernel* indicate how the local linear polynomials are specified. *Donut RD* indicates that applicants exactly at the threshold are discarded in column (4)-(7). Column (5) uses the optimal bandwidth from Imbens and Kalyanaraman (2012) calculated using the `ikbw` command in Stata (Bertanha and Imbens, 2020). Column (6) is estimated using the Stata command `rdrobust` using the MSE-Optimal bandwidth (Calonico et al., 2017). Column (7) shows the results from local randomization estimations including only applicants with a distance to the threshold of -0.1 and 0.1. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A8: Admission to *Business and economics* and default at placebo thresholds



Notes: The figures show the estimated reduced form effect similar to column (2) of Table 2, but where I vary the threshold from -0.5 to 5 in steps of 0.1 which means that 0 on the y-axis is the "true" threshold. In each panel, I use different bandwidths in the estimations as indicated by the subtitles. The capped spikes indicate the 90% confidence intervals.

Table A14: Admission to *Business and economics* vs. *Law* and *Social science* and default

	Law			Social Science		
	B&E (%)	Default (%)		B&E (%)	Default (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
	1st stage	Reduced form	LATE	1st stage	Reduced form	LATE
$\mathbb{1}$(Economics)	55.6***	-1.8	-3.2	79.8***	-6.9**	-8.6**
	(4.4)	(3.4)	(6.0)	(3.5)	(3.4)	(4.2)
N	765	765	765	685	685	685

Notes: The table is based on applicants who have *Business and economics* as their alternative field of study and who prefer either *Law* or *Social science*. The estimated effects are in percentage points. *$\mathbb{1}$ (Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. Column (1) and (3) show the first stage effect of being below the threshold on the probability of admission to *Business and economics*. Column (2) and (5) show the reduced form effects of being below the thresholds on the probability of default. Column (3) and (6) show the effect of admission to *Business and economics* on the probability of default from two stage least squares estimations where admission is instrumented using whether an applicant is below the thresholds. Bandwidth is 1.5 in the estimations with a rectangular kernel. Robust standard errors in parentheses. $^{*}\, p < 0.1$, $^{**}\, p < 0.05$, $^{***}\, p < 0.01$.

Table A15: Admission to *Economics* vs. different detailed fields and default

	Probability of default (%)			
	Political science	Law	Business econ.	Inter-disciplinary business econ.
𝟙(Economics)	-10.1	-10.0*	-4.4	-9.0
	(6.1)	(5.7)	(7.0)	(8.1)
N	287	237	171	71
Baseline	17.1	11.4	12.1	11.2

Notes: The table is based on applicants who have the detailed field *Economics* as their alternative and who has either *Political science*, *Law*, *Business economics*, or inter-disciplinary programs involving *Business economics* (e.g., *Business economics* combined with law, philosophy or language). The estimated effects are in percentage points. Bandwidth is 1.5 in the estimations with a rectangular kernel. Robust standard errors in parentheses. $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Table A16: Joint estimation of the effect on default of being below the GPA threshold

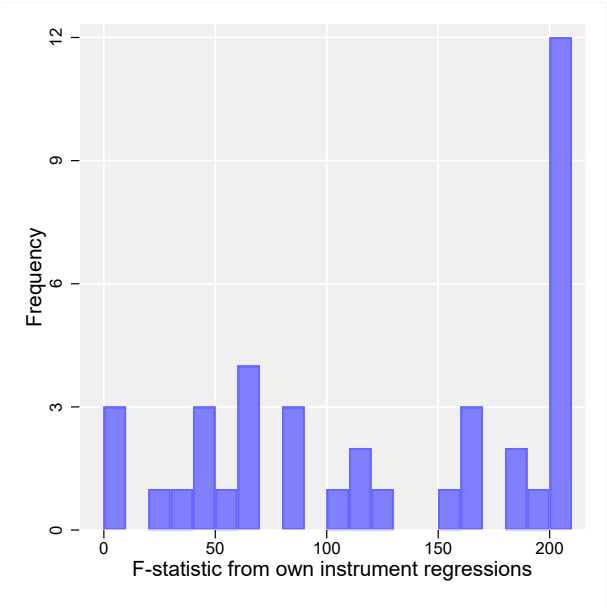
	Alternative field						
	B&E	Law	HAA	Educ.	Welf.	Soc.	STEM
Preferred field							
Bus. & Econ.		10.6	2.3			5.7	-1.3
		(8.6)	(3.7)			(4.9)	(5.4)
Law	-4.3*		6.0**	2.4	-3.0	-7.0	8.1
	(2.6)		(3.0)	(10.8)	(6.8)	(5.1)	(5.2)
Hum., A. and A.	-1.7	-3.4		0.3	-0.1	1.8	-0.9
	(4.6)	(7.1)		(4.6)	(4.5)	(3.1)	(3.3)
Education			-0.7		0.3		
			(3.8)		(3.6)		
Welfare	-4.5	-6.5	6.1*	-0.0		2.5	-2.2
	(5.4)	(7.7)	(3.3)	(3.9)		(5.1)	(3.3)
Social Science	-7.8***	0.5	2.5	-3.8	-3.2		-7.9**
	(2.8)	(3.7)	(1.6)	(4.5)	(3.6)		(3.6)
Medicine	-13.8**	-7.2	-3.6		1.0	-5.9	-0.4
	(6.1)	(5.7)	(4.6)		(3.1)	(6.9)	(2.4)
N	1878	758	4049	819	1480	1100	2381

Notes: The table shows the reduced form effects in percentage points on the default probability of being below the GPA threshold in a joint estimation of all combinations of preferred and alternative field of study. In the estimation, I use all applicants whose preferred field of study has a binding threshold and whose preferred and alternative field of study differ. I jointly estimate the reduced form effect for each combination by estimating the following equation:

$$y_i = \sum_a \beta_{1a}(x_i \times T_i \times f_i^a) + \sum_p \beta_{2p}(x_i \times f_i^p) + \sum_a \sum_{p \neq a} \left(\beta_{3ap}(T_i \times f_i^a \times f_i^p) + \pi_{ap}(f_i^a \times f_i^p)\right) + \varepsilon_i$$

I do not allow for separate effects of the running variable above and below the threshold for all combinations of fields due to the limited number of observations. Instead, I assume that the effect of the running variable below the threshold is the same for each alternative field no matter what the preferred field is. Similarly, I assume that the effect of the running variable above the threshold is the same for each preferred field no matter what the alternative field is. Still, I do allow for level differences for each combination of fields. Appendix Figure A9 shows the distribution of the F-statistics from "first stage" regressions for each combination of preferred and alternative field. For three combinations (*Education* preferred and either *STEM*, *Business and economics* or *Social science* as alternative) the F-statistic is below 10. Therefore, I leave out these three additional field combinations from the estimation. Appendix Table A17 shows the corresponding local average treatment effects from a joint two-stage least square estimation. The number of observations in the estimation is 12,465. N indicates the number of applicants in the estimation with the alternative field of study in the column. Bandwidth is 1.5 in the estimation with a rectangular kernel. Robust standard errors in parentheses. $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Figure A9: Histogram of F-statistics from own instrument regressions



Notes: The F-statistics are from estimations of the probability of admission to the preferred field, $P(admission_i) = \beta_0 + \beta_1 x_i + \beta_2 (x_i \times T_i) + \beta_3 T_i + \varepsilon_i$, using a bandwidth of 1.5 and a rectangular kernel for applicants to each combination of preferred and alternative field of study. The figure is censored above 200.

Table A17: Joint estimation of the LATE on default of admission to the alternative field

	Alternative field						
	B&E	Law	HAA	Educ.	Welf.	Soc.	STEM
Preferred field							
Bus. & Econ.		12.3	3.6			9.8	-2.0
		(10.1)	(5.4)			(8.7)	(8.2)
Law	-6.9*		8.0**	2.6	-3.7	-8.9	9.2
	(4.0)		(4.0)	(11.9)	(8.7)	(6.6)	(6.0)
Hum., A. and A.	-3.1	-3.8		0.3	-0.1	2.1	-1.2
	(5.8)	(7.8)		(6.9)	(6.1)	(3.7)	(4.3)
Education			-1.1		0.5		
			(7.5)		(11.1)		
Welfare	-6.5	-6.7	8.6*	-0.1		3.6	-2.7
	(6.8)	(8.1)	(4.5)	(7.4)		(7.3)	(4.0)
Social Science	-10.1***	0.5	3.0	-4.4	-3.5		-9.7**
	(3.5)	(4.4)	(1.9)	(5.4)	(4.0)		(4.5)
Medicine	-15.5**	-8.3	-3.8		1.1	-8.1	-0.5
	(6.5)	(6.7)	(5.1)		(3.8)	(9.3)	(2.7)
N	1878	758	4049	819	1480	1100	2381

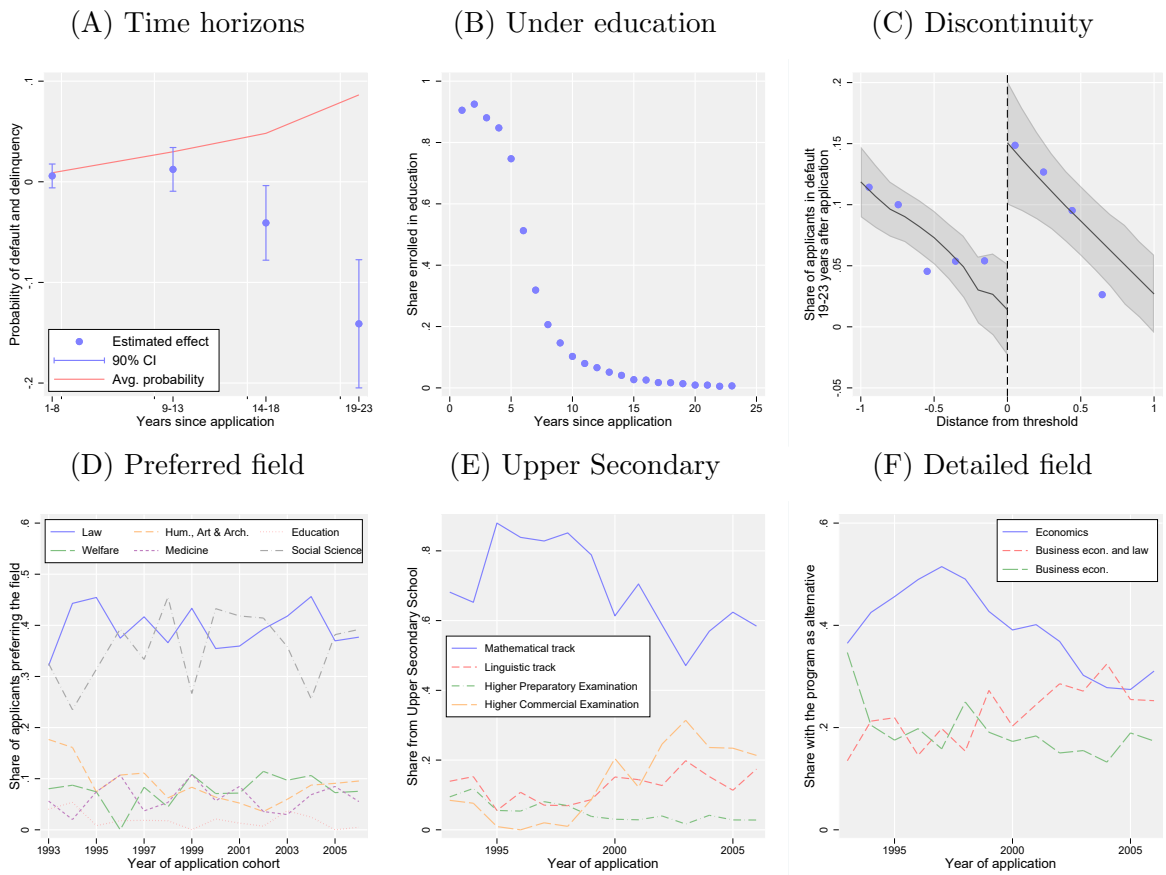
Notes: The table shows the local average treatment effects in percentage points on default of being admitted to the alternative field in a joint estimation similar to the estimation in Table A16. Bandwidth is 1.5 in the estimation with a rectangular kernel. Robust standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A18: Heterogeneous effects of being admitted to *Business and economics*

	Men	Father has high edu.	Age 18-20	Math track	Year < 2000
	(1)	(2)	(3)	(4)	(5)
𝟙(Economics)	-4.28	-4.82	-4.86*	-1.98	-0.22
	(2.62)	(2.97)	(2.81)	(3.83)	(2.74)
Group = 1	4.43	-1.00	2.21	1.57	6.33**
	(2.85)	(2.90)	(2.85)	(2.89)	(2.98)
𝟙(Economics) × Group	-1.79	-1.27	-0.20	-4.85	-10.96***
	(4.09)	(4.21)	(4.16)	(4.56)	(4.22)
N	1910	1846	1910	1910	1910
N in group	1027	949	960	1221	874
P-val of effect for group	0.054	0.042	0.099	0.006	0.001

Notes: The table shows the reduced form effects in percentage points of being below the threshold of the preferred field for applicants who have *Business and economics* as their alternative field and another field as their preferred. The columns indicate the group, e.g., in the first column I investigate whether the effect is the same for men and women where *Group = 1*, is a dummy for men. I allow for different slopes in the running variable for the groups. The bandwidth used in the estimations is 1.5 with a rectangular kernel. *Father has high edu.* indicates that the father's educational level is *Short cycle higher education* or higher. Applicants for whom their father's education is missing are left out. *Year < 2000* indicates that the applicant applied before year 2000. *Age 18-20* indicates the applicant's age in the year of application. *Math track* indicates that the applicant followed the mathematical track in Upper Secondary School. *𝟙(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. *N in group* shows the number of applicants belonging to the group in the column. *P-val of effect for group* is the P-value for a test of whether the sum of the coefficients for *𝟙(Economics)* and *𝟙(Economics)×Group* is different from 0. Robust standard errors in parentheses. $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Figure A10: Admission to *Business and economics* and default at different time horizons



Notes: All panels are based on the applicants who have *Business and economics* as their alternative field. The top left panel shows the estimated reduced form effect of admission to *Business and economics* on default at different time horizons after the year of application as indicated on the x-axis. The capped spikes indicate the 90% confidence intervals and the bandwidth used in the estimations is 1.5 with a rectangular kernel. The top middle panel shows the reduced form discontinuity plot for default and delinquency 19 to 23 years after application, similar to Figure 3. I only plot scatters with at least 30 observations and the bandwidth for the local linear polynomials is 1.5 with a rectangular kernel. The grey area indicate the 90% confidence interval. The top right panel shows the share of the applicants enrolled in education at different time horizons after the year of application. The bottom left panel shows the shares of the different preferred fields for each application cohort. The bottom middle panel shows which type of Upper Secondary Examination the applicants have at the time of application across application years. The bottom right panel shows which program, among the 3 most common programs, the applicants have as their alternative across application years.

Table A19: Admission to the detailed field *Economics*

	(1) Default	(2) Income	(3) Low deposit	(4) High rate	(5) Debt	(6) Stock
Panel A: Economics as alternative						
𝟙(Economics)	-8.4***	-2.7	-9.1*	-3.7	-4.7	8.6*
	(3.1)	(3.3)	(5.2)	(3.7)	(4.3)	(5.2)
N	971	965	971	512	971	971
Panel B: Excl. other B&E programs as preferred						
𝟙(Economics)	-9.7***	-5.3	-11.6*	-8.6**	-10.0**	12.5**
	(3.7)	(3.7)	(6.1)	(4.2)	(4.8)	(5.9)
N	719	714	719	380	719	719

Notes: The table shows the reduced form effect on different outcomes of admission to the detailed field *Economics* for applicants who prefer another detailed field. In Panel A, other *Business and economics* (broad field) programs are included among the preferred fields, while they are excluded in Panel B. *Default* is an indicator for default and delinquency 10 years or more after application. *Income* is total income rank within birth cohort 10 years after application. *Low deposit* indicates if bank deposits are smaller than one month of total income. *High rate* indicates if the marginal interest rate is larger than 30%. *Debt* indicates if the applicants has bank debt. *Stock* indicates if the applicants holds stocks and bonds with a value of more than 1500 DKK (200 Euro). Robust standard errors in parentheses. $^{*}\,p < 0.1$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$.

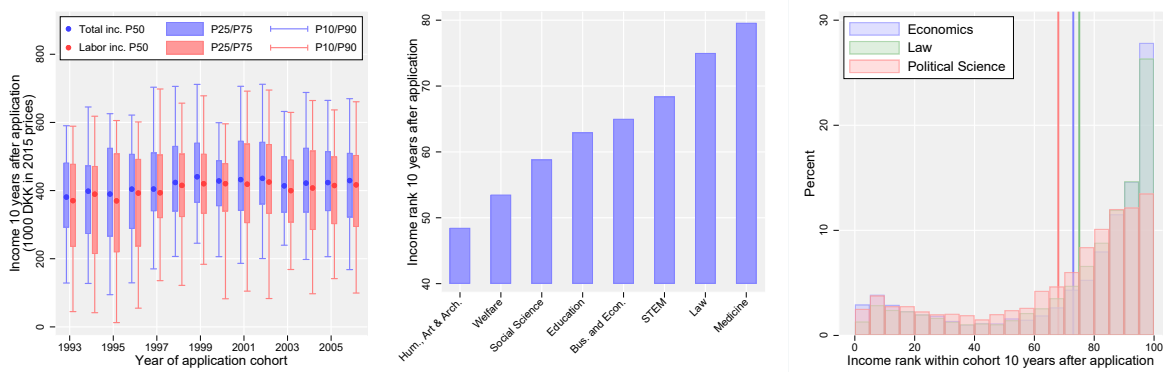
Table A20: Admission to *Business and economics* and income

	Income rank					Total income (1000)			Labor inc. (1000)		HH inc.
	All	Law	Soc. Sci.	Top 10%	Bottom 50%			Std. Dev.			(1000)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A: 1.5 bandwidth											
𝟙(Economics)	-3.0	-8.0**	0.2	-1.2	3.8	-3.6	-12.7	3.6	-3.5	-13.1	-17.3
	(2.2)	(3.4)	(3.7)	(3.6)	(3.1)	(5.5)	(12.8)	(4.9)	(6.0)	(13.6)	(23.8)
N	1910	763	679	1910	1910	1910	1910	1910	1910	1910	1910
Baseline	73.7	79.4	69.8	35.5	17.6	211.1	421.6	93.2	162.5	397.2	678.9
Panel B: Local randomization											
𝟙(Economics)	-8.4**	-8.6	-3.9	-8.4	5.8	-20.9**	-37.0	7.2	-17.7*	-40.2*	-64.3
	(3.9)	(5.6)	(7.1)	(6.2)	(5.5)	(9.5)	(22.9)	(8.9)	(10.2)	(23.5)	(42.3)
N	225	96	75	225	225	225	225	225	225	225	225
Baseline	73.4	78.2	69.7	35.7	17.5	212.3	412.5	90.2	162.0	384.1	694.4
Panel C: MSE Optimal Bandwidth											
𝟙(Economics)	-5.0	-7.4	3.3	-3.6	2.4	-14.7	-19.0	4.5	-13.0	-21.5	-24.0
	(4.0)	(6.7)	(7.7)	(6.5)	(5.5)	(10.5)	(24.9)	(9.0)	(10.9)	(27.0)	(48.6)
N	1214	450	359	1214	1214	1214	1214	1214	1214	1062	1062
Baseline	72.9	77.3	69.3	34.9	18.0	208.8	405.1	89.6	158.8	375.5	678.9
Bandwidth	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
Unit	Rank	Rank	Rank	%-point	%-point	DKK	DKK	DKK	DKK	DKK	DKK
Years after application	10	10	10	10	10	1-9	9-11	8-12	1-9	9-11	9-11

Notes: *Income rank* is within birth cohort rank based on total income. *Top 10%* and *Bottom 50%* indicates being in the top 10 or bottom 50%. *All*, *Law* and *Soc. Sci.* indicates the preferred field included. *Labor income* and *Total income* and *Household inc.* are winsorized at $p1$ and $p99$ and are in 2015-prices averaged over the years indicated in the *Years after application* row. *Std. Dev.* is the standard deviation of income across 5 years. In Panel A, I use a rectangular kernel. In Panel B, I compare applicants just below (-0.1) and just above (0.1) the threshold. In Panel C, the effects are estimated using `rdrobust` with a triangular kernel, excluding applicants exactly at the threshold (0). Robust standard errors in parentheses. $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

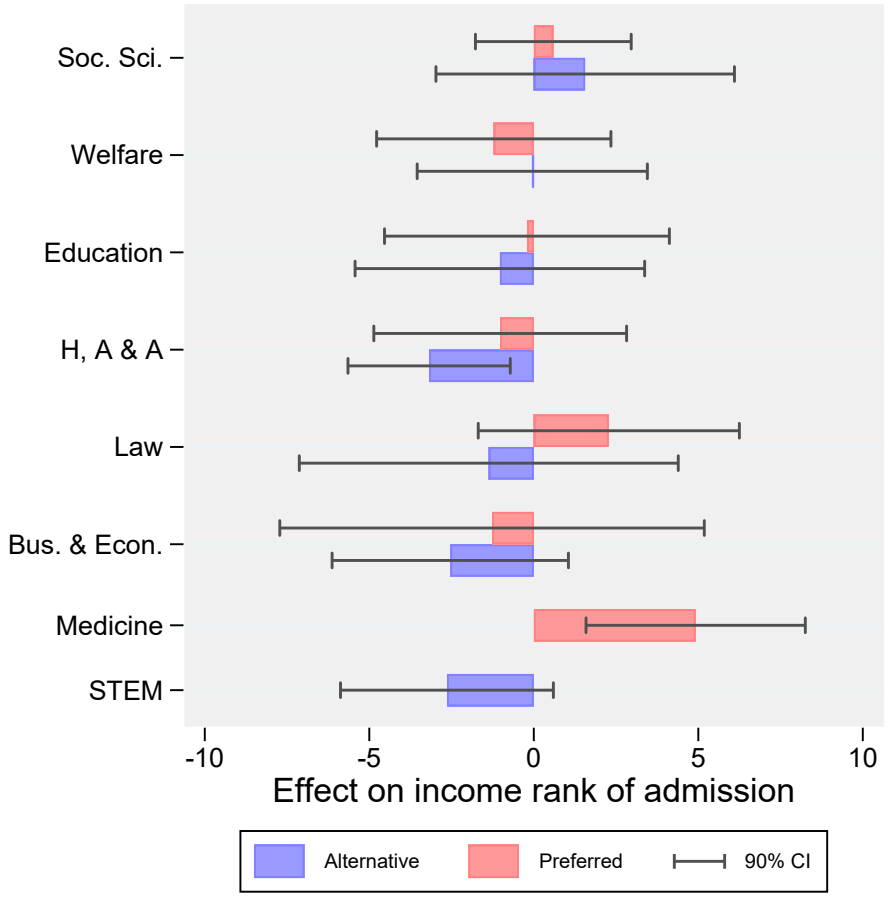
Figure A11: Income ranks by broad and detailed fields of study

(A) Across cohorts (B) Broad field (C) Detailed field



Notes: The figure uses all first time applicants who complete a higher education program. The left panel shows P10, P25, P50, P75, and P90 for both total and labor income for each application cohort using the applicants who have *Business and economics* as their alternative. The middle panel shows the average income rank within cohort 10 years after application by completed field of study using all first time applicants. The right panel shows the distribution of income ranks by detailed field of study. The vertical lines show the average income ranks for the 3 fields.

Figure A12: Admission to different fields of study and income rank



Notes: The figure uses all first time applicants with a binding threshold and different preferred and alternative field of study. The bars show the estimated reduced form effect of admission to each field on income rank within birth cohort based on total income 10 years after application. The effects are shown separately for applicants who have the field as the preferred or alternative. Bandwidth of 1.5 in the estimations with a rectangular kernel.

Table A21: Admission to *Business and economics* and financial behavior using local randomization and MSE optimal bandwidths

	Low bank deposit	High interest rate	Has bank debt	High debt-to-income ratio	Owns stocks and bonds
Panel A: Local randomization					
𝟙(Economics)	-3.0	-4.2*	-5.7	-4.6	-4.1
	(6.3)	(2.4)	(5.0)	(4.1)	(6.0)
N	225	123	225	225	225
Baseline	33.3	4.2	86.5	12.7	29.4
Panel B: MSE Optimal Bandwidth					
𝟙(Economics)	-2.5	-2.7	-9.1*	-10.3**	0.2
	(8.0)	(3.3)	(5.2)	(4.6)	(6.2)
N	897	470	1214	1062	1214
Baseline	34.9	3.5	88.8	15.7	28.4
Bandwidth	0.4	0.4	0.6	0.5	0.6

Notes: In the estimations, I use applicants with *Business and economics* as the alternative field of study and another field as their preferred. The outcomes are defined as in Table 3. The table shows the estimated reduced form effects in percentage points. Panel A only uses applicants who are just above the threshold (0.1) or just below the threshold (-0.1). In Panel B, the effects are estimated using `rdrobust` with a triangular kernel, excluding applicants exactly at the threshold (0). The optimal bandwidth is reported in the *Bandwidth* row. *Baseline* indicates the estimated outcome for applicants just above the threshold. Robust standard errors in parentheses. $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Table A22: Admission to *Business and economics* and additional financial behavior outcomes

	Mortgage debt (=1) %	Real estate (=1) %	Amount in default 1000 DKK	Number of defaults	Marginal interest rate %	Bank debt 1000 DKK	Debt-to-inc. ratio %	Public debt (=1) %	Stocks and bonds 1000 DKK	Liquid assets 1000 DKK	Bank deposits 1000 DKK
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$\mathbb{1}$(Economics)	1.8	1.2	-2.4	-1.1	-1.7*	-32.8	-13.4	-3.6	7.7	11.4	2.0
	(3.9)	(3.9)	(1.9)	(1.0)	(1.0)	(22.1)	(12.6)	(2.3)	(5.7)	(13.8)	(9.7)
N	1910	1910	1910	1910	1029	1910	1910	1910	1910	1910	1910
Baseline	44.2	46.9	3.8	2.7	10.8	253.9	91.1	12.1	20.4	109.6	86.5

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. *$\mathbb{1}$(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. *%* indicates that the outcome is a dummy and the reported effect is in percentage points. *1000 DKK* indicates that the outcome is measured in 1000 Danish kroner. *Mortgage debt (=1)* equals one if an applicant has mortgage debt 10 years after application. *Real estate (=1)* equals one if an applicant owns real estate 10 years after application. *Amount in default* is measured in 2016. *Number of defaults* is measured from 10 years after application and for all remaining years observed. *Marginal interest rate* is the highest interest rate an applicant pays on any loan 10 years after application. *Bank debt* is non-mortgage bank debt 10 years after application. *Debt-to-inc. ratio* is the ratio between non-mortgage debt and total income 10 years after application. *Public debt (=1)* equals one if an applicant had public debt has unpaid debt to the Danish Tax Authorities in 2016. *Stocks and bonds* is the market value of stocks and bonds in an applicant's portfolio 10 years after application. *Liquid assets* is the sum of the values of an applicant's stocks, bonds and bank deposits 10 years after application, and finally, *Bank deposits* is an applicant's bank deposits 10 years after application. All non-indicator variables are winsorized at $p1$ and $p99$. *Baseline* indicates the estimated outcome for applicants just above the threshold. Robust standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A23: Admission to *Business and economics* and pension savings

	Pension savings 2016	Employer contributions		Private contributions	
	1000 DKK	(=1)	1000 DKK	(=1)	1000 DKK
	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}$(Economics)	11.8	0.0	-4.2*	-0.7	-1.2
	(15.4)	(3.2)	(2.4)	(3.0)	(0.7)
N	1910	1383	1383	1383	1383
Baseline	248.4	85.9	45.5	13.4	2.7

Notes: In the estimations, I use applicants with *Business and economics* as their alternative field of study and another field as their preferred. *$\mathbb{1}$(Economics)* is an indicator that equals 1 if an applicant's GPA is below the threshold for the preferred field. *Pension savings 2016* is the value of an applicant's pension savings measured in 2016. *Employer contributions* and *Private contribution* are an applicant's contributions to their pension savings 10 years after application. *(=1)* indicates that the contribution is larger than 0 and *1000 DKK* is the amount winsorized at $p1$ and $p99$. *Baseline* indicates the estimated outcome for applicants just above the threshold. Robust standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A24: Admission to *Business and economics* and labor market outcomes using local randomization and MSE optimal bandwidths

	Unemployment			Self-	Private	Finance &
	$>$ 3 months	November	$>$ 6 months	employed	sector	insurance
Panel A: Local randomization						
$\mathbb{1}$(Economics)	4.1	-1.2	0.4	-0.8	-1.4	-0.5
	(3.3)	(2.1)	(4.5)	(0.8)	(6.7)	(3.0)
N	225	225	225	225	225	225
Baseline	4.0	3.2	12.7	0.8	42.9	5.6
Panel B: MSE Optimal Bandwidth						
$\mathbb{1}$(Economics	2.9	-0.3	-0.3	-1.7	5.0	-0.3
	(3.2)	(2.1)	(4.6)	(1.3)	(6.8)	(3.4)
N	1214	1335	1335	667	1214	1214
Baseline	4.7	2.5	15.5	1.2	39.8	5.8
Bandwidth	0.6	0.7	0.7	0.3	0.6	0.6
Period	10	10	1-9	10	10	10

Notes: In the estimations, I use applicants with *Business and economics* as the alternative field of study and another field as their preferred. The outcomes are defined as in Table 4. The table shows the estimated reduced form effects in percentage points. Panel A only uses applicants who are just above the threshold (0.1) or just below the threshold (-0.1). In Panel B, the effects are estimated using `rdrobust` with a triangular kernel, excluding applicants exactly at the threshold (0). The optimal bandwidth is reported in the *Bandwidth* row. *Baseline* indicates the estimated outcome for applicants just above the threshold. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A25: Admission to *Business and economics* and student job and educational institution

	Student job				Institution			
	High-skill	Finance	Education	R&D	AU	KU	BSS	CBS
Panel A: Broad field								
𝟙(Economics)	-6.4*	5.4***	1.3	-0.4	-9.2***	-23.2***	10.1***	26.0***
	(3.3)	(2.1)	(2.2)	(0.9)	(3.3)	(3.6)	(2.0)	(2.6)
N	1910	1910	1910	1910	1910	1910	1910	1910
Baseline	28.1	6.6	7.0	1.5	29.8	49.1	1.0	3.6
Panel B: Detailed field								
𝟙(Economics)	-3.7	10.3***	1.9	0.4	3.1	5.2	-0.6	-0.2
	(5.7)	(3.0)	(4.3)	(2.3)	(6.3)	(6.5)	(0.8)	(0.2)
N	719	719	719	719	719	719	719	719
Baseline	24.5	1.0	10.5	2.6	36.3	51.4	0.6	0.2

Notes: The table shows the reduced form effects of being below the threshold of the preferred field for applicants with *Business and economics* as the broad alternative field of study or *Economics* as the detailed alternative field and another broad field as their preferred. Column 1-4 shows the effect on different indicators related to student job. The first is whether an applicants has a job that requires high skills (based on the variable PSTILL as in Joensen and Mattana (2022) while the next 3 columns are related to the sector of work for the student job: column 2 is the Finance and insurance sector, column 3 is education at higher education institution, e.g., being a teaching assistant, and column 4 indicates work in research and development. Column 5-8 shows the effect on the probability of being admitted to different educational institutions. *AU* is Aarhus university, *KU* is University of Copenhagen, *BSS* is the business school in Aarhus, and *CBS* is Copenhagen Business School. *Baseline* indicates the estimated outcome for applicants just above the threshold. The bandwidth is 1.5 in all estimations with rectangular kernels. Robust standard errors in parentheses. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

Table A26: Admission to *Business and economics* and partner and peers

	Partner's completed field of study			Math. peers
	Preferred	Alternative	Bus. & Econ.	
	(1)	(2)	(3)	(4)
Panel A: 1.5 bandwidth				
𝟙(Admission)	3.1***	1.5	1.3	8.3***
	(0.9)	(0.9)	(2.7)	(1.1)
N	12692	12692	1910	1910
Baseline	10.1	10.2	12.8	39.5
Panel B: Local randomization				
𝟙(Admission)	-1.6	0.0	3.6	9.6***
	(1.6)	(1.5)	(4.3)	(1.9)
N	1667	1667	225	225
Baseline	12.7	11.1	9.5	39.4
Panel C: MSE Optimal bandwidth				
𝟙(Admission)	-4.6*	-1.0	5.3	7.8***
	(2.5)	(2.2)	(5.4)	(2.1)
N	6197	6197	1062	1062
Baseline	13.8	11.6	9.8	39.6
Bandwidth	0.4	0.4	0.5	0.5

Notes: The table shows the reduced form effects of being above the threshold of the preferred field in column (1) and of being below the threshold of the preferred field in column (2)-(4). In column (1) and (2), I use all applicants with a binding threshold and different preferred and alternative fields. In column (3) and (4), I only use applicants who have *Business and economics* as their alternative field. In column (1), the outcome equals 1 if the applicant has a partner 10 years after application whose completed field of study is the same as the applicant's preferred field of study. In column (2), the outcome equals 1 if the applicant has a partner 10 years after application whose completed field of study is the same as the applicant's alternative field of study. In column (3), the outcome equals 1 if the applicant has a partner 10 years after application whose completed field of study is *Business and economics*. In column (4), the outcome is the share of the applicant's peers in their program who comes from the mathematical track in upper secondary school. In Panel A, I use a rectangular kernel. In Panel B, I compare applicants just below (-0.1) and just above (0.1) the threshold. In Panel C, the effects are estimated using `rdrobust` with a triangular kernel, excluding applicants exactly at the threshold (0). Robust standard errors in parentheses. $^{*}\,p < 0.1$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$.