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Abstract

Although many students suffer from anxiety and depression, and students often identify school pressure and concerns about their futures as the main reasons for their worries, little is known about the consequences of a selective school environment on students' physical and mental health. In this paper, we draw on rich administrative data and the features of the high school assignment system in the largest Norwegian cities to consider the long-term consequences of enrollment in a more selective high school. Using a regression discontinuity analysis, we show that eligibility to enroll in a more selective high school increases the probability of enrollment in higher education and decreases the probability of diagnosis or treatment by a general medical practitioner for psychological symptoms and diseases. We further document that enrolling in a more selective high school has a greater positive impact when there are larger changes in the student–teacher ratio, teachers' age, and the proportion of female teachers. These findings suggest that changes in teacher characteristics are important for better understanding the effects of a more selective school environment.

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1 Introduction

Depression and anxiety are among the leading causes of illness and disability among adolescents (WHO, 2019). For instance, roughly one in three high school students in the US report suffering from depression or anxiety symptoms in a given year (HHS, 2017). Adolescent mental illness is also widespread in countries that conventionally rank among the happiest countries according to the World Happiness Report. In Norway, for example, 22% of high school students report depression or anxiety issues (Ungdata, 2018). This is important because mental health problems among adolescents are associated with various costly long-term outcomes such as lower labor market productivity, less marriage stability, and other adult health problems (Currie et al., 2010; Goodman et al., 2011; Lundborg et al., 2014).

Survey evidence indicates that school pressure is one of the main causes of adolescent worries (see e.g., Eriksen et al., 2017). However, we know little about the relationship between the school environment, and in particular school selectivity, and adolescent mental health. As it stands, the potential effects of school selectivity on mental health are ambiguous. On the one hand, a selective school, with more high-ability peers, might be a more stressful experience negatively affecting student mental health. On the other hand, peers at more selective schools may have different health care usage and display better health behaviors such as lower smoking rates or greater physical activity. Moreover, enrolling in a more selective school could result in different teacher characteristics and may be an inspiring experience that opens up new perspectives. This could positively influence student aspirations and mental health in both the short and long term. Because common determinants likely influence student choice of enrolling in a more selective high school and student health and health behaviors, and because data linking detailed school and health outcomes are not easily available, evidence on the causal effects of the school environment on student mental health remains very scarce.

This paper overcomes these identification and data challenges, providing new insights into how high school selectivity affects mental health. First, to overcome the identification problem, we build on the features of the high school assignment system in the two largest Norwegian cities, which assign students to high schools through a centralized process giving priority to students with the best average grades in middle school. This assignment system enables a regression discontinuity analysis, where we compare the long-term outcomes of students that are very similar at the end of middle school but are eligible to enroll in less or more selective high schools. Second, we link several administrative data sources, including information about educational institutions and school grades, as well as health care take-up, and create a long panel allowing us to document the effects on outcomes during and beyond high school.

The available data also enable us to characterize the features of a more selective school environment with respect to peer and teacher characteristics, school size, and the number of students per teacher. These features may differ across countries and contexts and are therefore important to consider. Abdulkadiroğlu et al. (2014), for example, demonstrate that going to an exam school in Boston implies going to a school with higher-achieving peers, fewer Black and Hispanic students, more experienced teachers, and larger class sizes. In the context of Romania, Pop-Eleches and Urquiola (2013) also find variations in teacher characteristics across selective schools. In France, where the central administration attempts to equalize resources across schools, Landaud et al. (2018) reveal little variation in teacher characteristics or class sizes across selective Parisian high schools, despite large variation in student ability. Beyond documenting the implications of enrolling in a more selective high school in terms of peers, teachers, and other school features, we make use of the fact that we have variation in which of these school inputs changes more when enrolling in a more selective high school and implement a heterogeneity analysis. In essence, we estimate our regression discontinuity model for each of the 84 admission thresholds and each school feature separately and estimate whether changes in longer-term outcomes are greater when students gain eligibility to schools where peer and teacher characteristics or school resources change by a larger margin at the admission thresholds.

We present four key findings. First, we find that students that are eligible to enroll in a more selective high school are 8.3 percentage points more likely to enroll in the more selective school. Further, we show that eligibility to enroll in a more selective high school increases the likelihood of high school completion by 2.3 percentage points (4.2%) and the likelihood of enrollment in higher education by 1.6 percentage points (4.0%). Students gaining access to the most selective schools in our sample mostly drive these improvements in educational outcomes. Second, we document that eligibility to enroll in a more selective school does not affect the use of primary care services up to six years after high school completion but does decrease the likelihood of diagnosis or treatment for mental health issues. In particular, we estimate that eligibility for enrollment in a more selective school reduces the likelihood of mental health diagnosis or treatment (driven by a reduction in anxiety and depression) by 1.7 percentage points (5.2%). In particular, we conclude that female students and students gaining access to the most selective schools drive these estimated effects, whereas the mental health of male students is largely unaffected. Hence, our findings indicate that eligibility for enrollment in a more selective school is protective of the mental health of girls. Third, we investigate what features of the school environment change at the threshold. We document that eligibility for enrollment in a more selective high school significantly changes the ability level of peers, peers' parental education and income, the number of students per teacher, and the share of female teachers. Lastly, our heterogeneity analysis suggests that changes in teacher characteristics—and not necessarily peer characteristics—could be important for explaining our main findings. Taken together, our findings provide key implications for ongoing policy debate over the consequences of school selectivity and the role of school inputs for student educational and health outcomes.

This paper particularly contributes to the literature on the relationships between education and health and school selectivity. Most empirical research identifying the causal effects of education on physical or mental health exploits exogenous variations from compulsory schooling reforms, regulations on school starting age, or school tracking (see, e.g., Böckerman et al., 2019; Clark and Royer, 2013; Crespo et al., 2014; Dursun and Cesur, 2016; Lager et al., 2016; Lleras-Muney, 2005; Meghir et al., 2018). We expand this literature by moving beyond changes in compulsory education, which mostly target individuals at the lower end of the educational distribution, and analyze the extent to which the high school environment links to health. Because the selectivity of higher education institutions correlates with student mental health and wellbeing (Fletcher and Frisvold, 2011, 2014; Frisvold and Golberstein, 2011), it is important to understand better the effect of high school selectivity, as well as the influence of high school peers, teachers, and financial resources on student health. Establishing this link is crucial for education policies aiming at improving the learning environment for students to increase their long-term welfare.

In addition, this paper complements the growing literature on the consequences of school selectivity (see e.g., Abdulkadiroğlu et al., 2017, 2014; Clark and Del Bono, 2016; Cullen et al., 2006; Dobbie and Fryer Jr, 2014; Jackson, 2013; Landaud et al., 2018; Pop-Eleches and Urquiola, 2013).[1] First, we expand the set of outcomes by studying the effects on health and educational outcomes after high school to provide a more complete longer-term picture of the effects of a more selective school environment. Our second contribution concerns the mechanisms behind the estimates. We combine a unique setting of 84 different school admission thresholds with detailed information on several school inputs (characteristics of peers, teachers, school size, and the number of students per teacher) to investigate which features of a more selective school environment may help explain our findings. Understanding the role of school inputs for educational outcomes or mental

[1]Note that our paper mostly relates to studies on selectivity in the context of nonelite schools. In our setting, school admission cutoffs are located between the 4th and the 97th percentile of the test score distribution after middle school in the areas of interest and on average located around the 40th percentile.

health is important for explaining in what context selectivity matters. This could help reconcile why selective schools have negative or no effects in some contexts and positive effects in others.

2 Institutional Context

2.1 The Norwegian School System

The Norwegian education system consists of four levels: primary school (grades 1–7), middle school (grades 8–10), high school with academic (grades 11–13) and vocational (grades 11–14) tracks, and college and university education. Norwegian compulsory education starts at age six years, lasts for 10 years, and consists of primary and middle school. Compulsory schooling is organized by Norwegian municipalities and the vast majority (98%) of pupils attend local public schools. The curriculum is identical in all primary and middle schools, there is no streaming by ability, and all pupils are allocated to schools based on fixed school catchment areas within municipalities.

While there are no grades in primary school, the school system becomes more competitive from middle school onward, where exit exams and teacher grades are crucial for admission into the best high schools. At the end of grade 10, all students obtain a diploma with a total grade point average (hereafter, middle school GPA). This is the weighted total of all teacher-awarded grades, combined with the grades from written and oral exams in randomly drawn subjects.[2] The middle school GPAs possible range is from zero to 60, where 60 is the best possible grade. Assignment to high schools varies across counties.[3] The two largest cities in Norway—Oslo and Bergen—have varied their intake systems over recent years. In this paper, we consider those years where they followed a free school choice system with a centralized intake based on the middle school GPA. That is, we study enrollment in general study programs in high schools located in Bergen from 2006 to 2010 and in Oslo from 2009 to 2010.

In contrast to the compulsory middle schools, enrollment in high schools is voluntary. Nevertheless, all students aged 16 to 23 years in Norway have a statutory right to enrollment at this level. However, this right is at the county level and does not ensure enrollment in a specific school or program. First time enrollment in high school in Norway is high: 98% of students enroll in the first year. Students enroll either in general studies

[2]The subjects of the teacher-awarded grades are written (two courses) and oral Norwegian, written and oral English, mathematics, nature and science, social sciences, religion, home economics, physical education, music, and arts and craft.

[3]Twelve of the 19 counties in Norway had a free school choice system in 2016. In rural counties, geographic criteria still largely determine student high school choice.

(50%), in vocational programs (45%), or in alternative training plans (3%). There is, however, considerable dropout in the second and third years: only 80% of students initially enrolled in general studies programs graduate. Graduation rates for vocational programs are even lower. Graduating in general studies provides students with the required qualifications for enrollment in higher education, while students graduating in the vocational track need to spend an additional year of study before reaching similar qualifications.

Although high school ranks are not important for access to higher education, high school grades and national exams at the end of high school determine access to higher education. In Norway, the intake to public higher education follows a centralized admission system based on total grade points from high school (hereafter, high school GPA). For those graduating high school with a general studies degree, about 40% do not enroll in any general higher education program.

2.2 High Schools in Oslo and Bergen

There are 15 public high schools in Bergen offering general education programs and 20 in Oslo. For Bergen, we focus on the five cohorts of students completing middle school between 2006 and 2010. For Oslo, we consider the two cohorts of students completing middle school between 2009 and 2010.[4] During these periods, assignment to general programs in high school worked through a centralized system where students ranked schools and education programs, and were then assigned based on their ranked-ordered list and middle school GPA. Students could rank up to six different schools for enrollment in general studies. The key feature of this assignment system is that there is a minimum admission score for enrollment in general studies for each oversubscribed high school. Oversubscribed high school are high schools that receive more applications than they can accommodate. In the years we study, the majority of high schools in Bergen and Oslo were oversubscribed for enrollment in general studies, and we observe significant discontinuities in the rate of enrollment of students at specific cutoff points of the distribution of middle school GPA. This feature makes it possible to implement a regression discontinuity analysis to assess the effect of enrollment in general education programs in more or less selective high schools on subsequent health and educational outcomes.

To help with interpretation, we now briefly describe the Oslo and Bergen high schools. We focus on how they are similar and how they differ along key dimensions, such as peer and teacher quality and financial

[4]The health data we are using covers the years 2006–2016 which is why we start with the graduating cohort of 2006 in Bergen. For Oslo, we start in 2009 because high school assignment was based on geographical criteria rather than on the middle school GPA for the graduating cohorts between 2006 and 2008.

resources. High schools in Oslo and Bergen have on average about 540 students per school, and there are about 15 students per teacher. Resources for high schools are centrally allocated and based on the numbers of students, and there is variation across schools in both financial and teacher resources. For example, the top quartile of schools in terms of the students to teacher ratio has just nine students per teacher, while the lowest quartile of schools have 19.8.[5] Similarly, the top quartile of schools in terms of teacher diploma have about 65% of teachers with a master's degree, while the lowest quartile of schools have none. Another key difference across high schools is student ability. The top quartile of schools in terms of student ability have students with an average middle school GPA of 50, while the lowest quartile of schools has students with an average GPA of 37.7.[6] Because middle school GPA is correlated with gender and family background, we also observe significant differences in average student characteristics across high schools. Finally, all general programs offer compulsory core curriculum subjects like languages, natural sciences, and human sciences, but there is greater variety across schools in the availability of more specialized subjects like music, media, arts, and sports.

In section 5, we document how school characteristics vary on average at the admission thresholds and leverage this information on differences in school inputs at the thresholds to provide insights into what school characteristics may explain the average effects on health and education.

2.3 Health Services in Norway

In Norway, health services are publicly financed and universally accessible for all Norwegian citizens. The services are organized in two levels: primary care and specialist care. Primary health care is the responsibility of the municipalities and includes general practitioners, emergency rooms, infant and child health care centers, school health services, and elderly care. Specialist care is the responsibility of the four health regions in Norway and it includes somatic specialist care, psychiatric health services, and private referral specialists.

Primary and Specialist Health Services. General practitioners (hereafter GPs) and local emergency rooms (hereafter ERs) are the basis of the primary care services. The vast majority of Norwegian citizens

[5]Note that the students to teacher ratio does not necessarily reflect classroom size, rather the variety of teachers employed by the school given we measure the number of teachers employed at each school rather than the number of full-time positions.

[6]A middle school GPA of 50 or 37.7 corresponds to the 83rd percentile or the 35th percentile of the distribution of middle school GPA, respectively.

belong to a specific GP's list, and GPs are responsible for providing primary health care services to the patients on their list. GPs diagnose their patients, certify sick leave, prescribe treatments, and refer their patients to specialist care when needed. They also follow up on their patient after they have received care in the specialist system. In general, the GPs serve as gatekeepers to the specialist care system and health-related welfare benefits.

Most specialist care is provided through public hospitals and outpatient care clinics, but contracted private specialists can also provide specialist care. In general, the first contact with specialist care takes place via the referral of the patient by the GP or the ER because it is not possible for a patient to proceed directly to specialist care within the public health system.

School Health Services. All Norwegian school children and youth are entitled to vaccinations, health education, and guidance, as well as medical examinations and access to health care professionals when needed (Helse- og omsorgsdepartementet, 2003). For school-age children, these are responsibilities of the school health services.[7] School health care services are easily accessible to students and are free of charge. These services are available at school premises during school hours and primarily provided by school nurses. School nurses are employed by municipalities and not by schools and may provide services to more than one school simultaneously. Importantly, the school health services are preventive. For curative purposes, the children are referred to primary or specialist care services (Helsetilsyn, 1998). One exception is that school nurses are entitled to prescribe birth control pills (free of charge) to young women aged 16–19 years.

There is no systematic registry of the actual use of school health services by students (Abrahamsen et al., 2019). Survey information from 2013 shows that about 25% of the students in high school use school health services at least once a year (Bakken, 2018). However, there are substantial gender differences in use: only about 13% of high school boys consult school nurses at least once a year, but 35% of high school girls. The most common reason for using school health services during high school are matters regarding sexuality and contraception.

[7] Younger children receive these services in child health care centers that also provide pre- and postnatal services for mothers and newborns.

3 Data and Empirical Strategy

3.1 Data

The data for this paper is compiled from several Norwegian administrative records, including the national educational registers, tax records, family registers, and health registers. We consider the sample of students that completed 10$^{\text{th}}$ grade between 2006 and 2010 in Bergen and in 2009 or 2010 in Oslo. In total, our sample comprises 19,932 individuals attending 87 different middle schools.

3.1.1 Demographic and Socioeconomic Information

The demographic and socioeconomic information is from registers covering the entire resident population in Norway up to 2014, which includes information such as the year and month of birth, gender, immigration status, municipality of residence in each year, and highest educational attainment. Information on earnings is from the tax registers. All registers include unique identifiers, and the population register specifies unique identifiers for the parents of each individual. This enables us to recover for each individual and his/her parents all relevant socioeconomic information.[8]

3.1.2 Schools and Educational Data

Information on enrollment in middle school, high school, and university is from the national educational registers and is available up to 2014. For each individual in our sample, we observe the middle and high schools attended, as well as the track in which the student enrolled, and the degrees, if any, completed. Educational choices and attainments are reported by the schools directly to Statistics Norway, thereby minimizing any measurement error from misreporting. For each student, we also observe the 10$^{\text{th}}$ grade GPA and the GPA upon completion of high school. Finally, these registers contain information about whether individuals enrolled in college up to four years after completion of middle school, including those who enroll in college immediately after graduating from high school or following a gap year.

For each high school, we have information about its staff from the Social Security records. This information allows us to construct proxies for teacher quality and school financial resources. In particular, we specify variables indicating the share of teachers with a master's degree, the average age of teachers,

[8]Both parental income and education are measured when students complete grade 10. For parental income, we specify the sum of the earnings of the mother and father. For parental education, we create an indicator variable taking a value of one if at least one parent completed a higher education degree.

the proportion of female teachers, students per teacher, students per non-educational staff, and the number of students per program. We also use information on student characteristics and high school enrollment to construct variables indicating for each student the average characteristics of peers in high school, such as the middle school GPA of peers, gender, parental education, and parental income.

3.1.3 Health Data

Information on visits to GPs and ERs is from the Control and Payment of Health Refunds database (acronym *KUHR* in Norwegian), which is available between 2006 and 2016. GPs and ERs are obliged to report all consultations and relevant International Classification of Primary Care (ICPC-2) codes to this national claims database to receive payment. ICPC codes convey information about the GPs' assessment of the patient's health problems and the type of care provided. Specifically, each ICPC code is made of one letter, indicating where the symptoms or diseases are located in the body, and two numbers indicating whether the GPs assessed health symptoms, diseases, prescribed a screening or preventive procedure, prescribed medication or treatments, analyzed test results, or performed an administrative task.[9]

Using this information, we constructed variables indicating whether and how many times each student visited a GP or ER between middle school completion and up to six years later, that is during the three years of high school and the first three post-high school years. In addition, as a selective school environment may have specific impacts on mental health issues, we constructed for each student a variable indicating whether during any consultation a GP assessed psychological symptoms or disease (ICPC codes beginning with the letter "P").[10] When constructing these variables, we consider academic rather than calendar years, that is, we consider for each year t visits between August t and July $t + 1$.

3.2 Cutoff Admission Scores

Our data provide detailed information on student demographic characteristics, school environment, health, and education. However, we do not have information on student applications to and rankings of high schools. As a result, it is not possible directly to identify high school admission thresholds from the data.[11]

[9]See Appendix B for the list of ICPC-2 codes.

[10]Note that we do not know whether students are diagnosed or treated for a psychological issue for the first time because we only observe GP and ER visits since 2006.

[11]Unlike admissions to universities, which follow a nationwide assignment mechanism used in Kirkeboen et al. (2016), at high school level the admission system is decentralized at the county level. Unfortunately, we do not have information on student applications in these decentralized systems.

We, therefore, build on the methodology in Hansen (2000) to overcome this issue. This method was recently used by Hoekstra (2009) to identify admission thresholds and estimate the effect of going to a flagship university in the US and by Landaud et al. (2018) to study the effect of enrollment in selective Parisian high schools.[12] In addition, Porter and Yu (2015) show that this procedure can be used in combination with a standard regression discontinuity (RD) analysis without further adjustment or assumptions. In short, we identify schools for which there exists a significant positive discontinuity in enrollment rates and the procedure selects for each school the threshold that minimizes the number of incorrectly assigned students (i.e., enrolled students below the threshold or unenrolled students above the threshold).

In practice, for each cohort and high school in Bergen, we focus on the sample of 10$^{\text{th}}$ graders in Hordaland county (the county where the city of Bergen is located). For high schools in Oslo, we consider the sample of 10$^{\text{th}}$ graders in Oslo county. For each value g of the 10$^{\text{th}}$ grade GPA score distribution, we define a dummy which takes a value of one if student's i score, f_i, is greater than or equal to the cutoff score g, $D_i^g = 1\left[f_i \geq g\right]$. For each high school z in year t, we estimate the following regression for each value g (omitting subscript t):

$$E_{iz} = \alpha + \psi_z D_i^g + \varepsilon_{iz}, \tag{1}$$

where E_{iz} takes a value of one if student i enrolls in high school z in year t, and zero otherwise. For each high school z in year t, we select as admission cutoff, f_z, the value of the 10$^{\text{th}}$ grade GPA score g that maximizes the R^2 of equation (1) with a significantly positive $\hat{\psi}_z$. Further, we exclude a few admission thresholds with very small estimated discontinuities in enrollment rates around these cutoffs.[13] For each oversubscribed high school z, we then define the subsample of 10$^{\text{th}}$ graders whose middle school is located within eight kilometers of z.[14] Then, for each student, we define his/her GPA score-distance $f_i - f_z$ to the cutoff admission score of high school z, and we use regression discontinuity analysis where we pool all subsamples of students and

[12]This approach has also been used in other settings, such as testing for discontinuities in the dynamics of neighborhood racial composition (see e.g., Card et al., 2008), or evaluation of social programs (see e.g., Carneiro et al., 2019).

[13]From the 105 estimated cutoffs, we exclude 21 with estimated discontinuities in enrollment rates below 0.015 percentage points, obtaining 84 oversubscribed high schools during the period of interest. In detail, we obtain 11 oversubscribed high schools in Bergen in 2006, 2008, and 2010, 10 in 2007, and 12 in 2009. For Oslo, we obtain 14 oversubscribed high schools in 2009 and 15 in 2010. Within each city and year, the admission cutoffs vary on average by two points between every two high schools of adjacent selectivity level.

[14]We use this criterion to maximize our first stage results because Fack et al. (2019) provide evidence that geographical proximity is a strong driver of student preferences over high schools. In addition, about 90% of students graduating from middle schools located in Bergen or Oslo during the years of interest and enrolled in general studies went to high schools located within eight kilometers of their middle school. The results are robust with respect to longer or smaller distance criteria when constructing the working sample.

use $f_i - f_z$ as a running variable.

3.3 Empirical Approach

To estimate the effects of a more selective school environment, following Lee and Lemieux (2010), we implement a standard regression discontinuity analysis where we compare students whose middle school GPA fell either just above or below the admission threshold of an oversubscribed high school. For each educational or health outcome Y_i in our data, we start by estimating the following model (omitting subscript t):

$$Y_i = \delta + \alpha \mathbb{1}\{f_i - f_z \geq 0\} + \eta(f_z - f_i) + \lambda(f_i - f_z) \times \mathbb{1}\{f_i - f_z \geq 0\} + X_i\gamma + \omega_z + u_i, \qquad (2)$$

where $f_i - f_z$ measures the distance in points between school z's admission threshold and student i's middle school GPA. X_i is a set of control variables, which includes student age, gender, family background, and average GPA in grade 10 in mathematics and Norwegian. We also include as control variables a full set of cutoff dummies, ω_z, and u_i represents the unobserved determinants of student health and education. Under the maintained assumption that there is no discontinuity in the distribution of u_i at the cutoffs, the parameter α can be interpreted as the causal effect of eligibility for admission in a more selective high school on the outcome Y_i. The standard errors are clustered at the individual level, and we exclude students whose middle school GPA fell within 0.1 points of the admission thresholds from the analysis to avoid measurement error issues due to estimated cutoffs. We follow Calonico et al. (2014) to choose an optimal bandwidth around admission thresholds, which is 5.19 points. Finally, we use a triangular kernel centered on the admission cutoffs. In the following sections, we show that our results are robust to alternative functional forms, bandwidths, and sets of control variables.

Because we study the effects on a relatively large number of potentially correlated outcomes, we test which of the estimated impacts survive adjustment for multiple hypothesis testing. We use the procedure in algorithms 4.1 and 4.2 of Romano and Wolf (2005), which account for testing several hypotheses simultaneously. Romano and Wolf (2005) propose an iterative rejection/acceptance procedure for a fixed level of significance. We use 1,000 block-bootstrap replications to obtain the adjusted critical values (the block is the individual). The result tables indicate whether the coefficients remain significant at a level of 1, 5, or 10 percent after using this procedure.

In our context, the mapping from eligibility to enrollment is not one-to-one because students may not effectively enroll in the high schools for which they are eligible due to, for example, preferences for other programs or locations. Therefore, we present instrumental variable (IV) estimates where enrollment in a given selective high school is instrumented with eligibility for enrollment in this high school (Hahn et al., 2001). Note that these results should be interpreted cautiously because IV requires that the exclusion restriction and monotonicity hold.[15] Eligibility for a more selective school increases enrollment to a preferred school, but could also have indirect effects via changes in psychological factors such as aspirations and disappointment. We provide suggestive evidence that this is unlikely to be a major factor in that the estimated effects on mental health appear mostly after high school, and thus do not reflect the mere short-term effect of enrolling (or failing to enroll) in a preferred school. We also emphasize that we estimate the IV on a set of compliers that may have different characteristics than the average students at the thresholds.

Descriptive Statistics. Table A1 provides descriptive statistics for the students in our working sample. For the sake of comparison, the table includes three samples: all students completing 10th grade in Norway between 2006 and 2010, students completing 10th grade in the county of Hordaland (where the city of Bergen is located) between 2006 and 2010 and in Oslo in 2009 and 2010, and our regression discontinuity sample. The main takeaway is that the average student in Hordaland or Oslo (Column (3)) is comparable to our RD sample of students (Column (5)). However, when compared with the average student in Norway (Column (1)), we can see that students in Oslo and Bergen are positively selected on educational outcomes and demographic characteristics. For example, students in Oslo and Bergen area in our RD sample specialize more often in the general education track compared with the average student in Norway. In addition, these students have better-off peers with higher middle school GPAs. They are also more likely to graduate from high school and enroll in higher education up to four years after commencing high school. Interestingly, students in Oslo and Bergen and our RD sample are as likely to visit a GP or an ER as the average student completing 10th grade in Norway. There are also no differences in the use primary health care services or likelihood of being diagnosed or treated by GPs for mental health problems.

In section 4, we present the results for the RD sample, and, in addition, separately by the level of school selectivity, where schools with high (low) selectivity levels are schools whose admission threshold fell in the

[15]Violations of the monotonicity assumption are unlikely in our setting because this would mean that students eligible to enroll in a more selective school are less likely to enroll in the more selective school compared with the lower-ranked school. In addition, strong first stages (results available upon request) across subgroups support the monotonicity assumption.

top (bottom) half of the distribution of cutoffs by city and year.

3.4 Tests of Identifying Assumptions

Students just above and below the cutoffs differ in their eligibility to enroll in a more selective high school, but we assume that they are similar in all other (observable and unobservable) predetermined dimensions. Below, we present evidence for the validity of our identification assumption.

Strategic Manipulation around Cutoff. One threat to identification would be that students willing to enroll in specific high schools manage to earn a score just above the admission thresholds. To provide empirical evidence that there is no strategic manipulation of the running variable at the cutoffs, Figure A1 presents the results when implementing the density tests suggested in McCrary (2008) on the full sample and separately by selectivity level. The panels in the figure illustrate that the density of the running variable is continuous at the cutoffs for the three samples, providing evidence supporting our identifying assumption.

Covariate Balance. Further, to assess the validity of our identification assumption of no discontinuity in unobserved determinants of students' health and education at the cutoffs, Table A2 reports the results of estimating model (2) using student baseline characteristics such as gender, nationality, and parental background as dependent variables.[16] Consistent with our identification assumption, we do not observe systematic discontinuities in the predetermined characteristics of students whose middle school GPA fell just above or below the admission threshold of an oversubscribed high school. This is shown in Figure A2 in the Appendix including the corresponding graphical estimates of model (2), excluding controls X_i and ω_z, for the three samples we examine. The last row of each panel in Table A2 presents the F-test of joint significance obtained from regressing the eligibility dummy $\mathbb{1}\{f_i - f_z \geq 0\}$ on the full set of baseline variables. The F-tests presented in each panel suggest that there is no systematic manipulation around the cutoff because they do not reject the null hypothesis that the coefficients are jointly equal to zero.

The finding that student characteristics are continuous around admission thresholds is not very surprising in the setting we consider in that school admission cutoffs are ex ante impossible to predict precisely or manipulate. On average, school admission thresholds vary by 3.4 points from one year to the next, and they

[16]When estimating model (2) for balancing tests, we include a full set of cutoff/year dummies as control variables but do not control for student baseline characteristics.

are jointly determined by the preferences and middle school GPAs of all 10^{th} graders in Hordaland or Oslo, which are unknown at the time of application.

Note that the results reported in Table A2 and Figure A2 do not rule out that the average ability of student peers varies discontinuously at the thresholds, along with other characteristics of peers and the school environment. For example, a more selective school might be able to attract better teachers. In section 5, we discuss this in detail and attempt to quantify whether the changes in a high school's environment at the cutoff explains the effects of enrollment in a more selective high school on student education and health.

4 Empirical Results

In this section, we first investigate how eligibility for enrollment in a more selective school affects actual enrollment. We then turn to consider the impacts on subsequent education and health.

4.1 First Stage Results

Figure 1 presents our first stage results, that is, the effect of eligibility for enrollment in a more selective school on actual enrollment in this high school. For each figure, the solid lines plot the fitted regression lines after estimating model (2) without controls for student baseline characteristics or cutoff dummies (i.e., X_i and ω_z). The plotted points are the conditional means of the dependent variable for students in a one-unit binwidth. At the top of each figure, we report the estimated α, which is the estimated effect of eligibility for enrollment in a more selective high school on actual enrollment, and its standard error. There is one figure for each sample under consideration: the whole sample (Panel a), students located around the admission thresholds of schools with above-median selectivity level (Panel b), and students located around the admission thresholds of schools with below-median selectivity level (Panel c). The three figures depict a significant increase in enrollment probability at the cutoffs. More precisely, the figures show that the enrollment probability of students is close to 2% below admission cutoffs, and increases by about eight percentage points for students scoring just above the cutoffs.[17] This indicates that a significant share of students wants to attend a more selective school when offered this opportunity, and student willingness to attend more selective schools is somewhat higher for schools with higher selectivity levels.[18] The estimates

[17]Note that one reason why the enrollment probability is not zero below the cutoff is that students with special needs (e.g., physical disabilities) may be accepted with a lower GPA to the geographically closest school.

[18]Recall that we do not know individual student preferences, hence many students could have preferences for other programs or school locations, explaining why enrollment is not increasing even more at the threshold.

for α in model (2) in Column (1) in Table 1 confirm these results.

4.2 Educational Outcomes

Figure 2 and Figure 3 present the estimated effects of eligibility for enrollment in a more selective school on the subsequent education of students. We focus on two outcomes: high school graduation in the general track and enrollment in general higher education, either on time or after a gap year. Figure 2 shows a discontinuity of 2.4 percentage points at the cutoff on the likelihood of high school graduation, driven entirely by the most selective high schools (Panel b). Figure 3 exhibits no average impact on enrollment in higher education (Panel a). However, there is an increase of 2.9 percentage points for the most selective high schools (Panel b). Columns (2) and (3) in Table 1 confirm these results. Note that the main findings remain significant after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).[19]

Our finding that eligibility for enrollment in a more selective school has positive effects on student educational outcomes differs from previous studies showing that elite school attendance in the US does not affect educational outcomes (see e.g., Abdulkadiroğlu et al., 2017, 2014; Dobbie and Fryer Jr, 2014)). However, it is in line with Pop-Eleches and Urquiola (2013) and Jackson (2013) who also consider nonelite settings and document the positive effects of attending more selective schools.[20] Hence, our focus on nonelite high schools—implying that the marginal students differ by context—may be an explanation for the differences in effects compared with the US. Other features of the education system, such as the centralized admission system to higher education in Norway, may also play a role in our findings. In particular, student ranks within their class or school are not of direct importance for access to higher education because only their rank in the national high school GPA distribution is crucial for the centralized admission system. This setting is different from the setting in the US or France where rank in a class or school is a central factor in college applications (Dobbie and Fryer Jr, 2014; Landaud et al., 2018).

Columns (1) and (2) in Table A3 in the Appendix present the IV estimates, where we rescale the intention-to-treat estimates by the probability of enrollment in a selective high school upon gaining eligibility for enrolment. Panel A shows that enrollment in a more selective high school increases the probability of

[19]The effects on educational outcomes are greater for boys and for the children of less-educated parents, although the differences are not significant (see Table A9).

[20]Even for the sample of above-median selectivity, we cover a large part of the GPA distribution. The more selective school admission cutoffs are located between the 39$^{\text{th}}$ and the 97$^{\text{th}}$ percentiles of the test score distribution after middle school in the areas of interest and on average located around the 63$^{\text{rd}}$ percentile.

high school graduation and enrollment in higher education by 28 and 19 percentage points, respectively. While these estimates are large, the results are quite imprecise, and we cannot rule out quite modest effects. In most cases though, the IV estimates are statistically different from zero for the same outcomes as the reduced form effects. As discussed in subsection 3.3, we should interpret these results cautiously for several reasons. First, while the effects sizes are large in magnitude, the confidence intervals are also large and so we cannot rule out quite modest effects. Second, the compliers may differ from the average student around the discontinuity. Lastly, there could be violations of the exclusion restriction if eligibility operates through mechanisms other than enrollment. However, the fact that we find that many of the impacts evolve after high school suggests that this is likely not the main driver.

4.3 Health Outcomes

Next, we analyze the impacts of eligibility for enrollment in a more selective school on student health during and following high school. We first focus on the probability and number of visits to GPs or ERs. We then split the visits into two types: visits during which patients are diagnosed or treated for a mental health issue (i.e., ICPC-02 codes beginning with a "P" as described in Appendix B) and visits for other health assessments or treatments. Figure 4 depicts no discontinuities around the eligibility cutoffs in the probability of consulting with GPs or ERs (for any type of visit) during the six years after middle school graduation. However, Figure 5 shows a reduction of 1.7 percentage points in the likelihood of being diagnosed or treated for a mental health problem during GP or ER visits (Panel a). Individuals gaining access to high schools with above-median selectivity levels (Panel b) drive this fall. The estimates in Columns (4)–(7) in Table 1 present the corresponding point estimates for α in model (2). As shown, the estimated effect on mental health is driven by female students (see Column (5) in Table A9) and is stronger post high school (see Table A5).[21]

In Table 2, we examine the use of primary health care services in detail. In particular, we use the ICPC-2 codes to classify the different types of mental health problems, and create four categories: anxiety or depression symptoms and diseases, substance use, hyperkinetic disorders, and other psychological symptoms or disorders (see Table A4 for the classification of mental health conditions).[22] As shown, the reduction in

[21] Columns (3) and (4) in Table A3 in the Appendix present the corresponding IV estimates, carrying with them the same cautiousness in interpretation as discussed for educational outcomes. Enrollment in a more selective high school instrumented by eligibility reduces the likelihood of being diagnosed or treated by a GP or an ER for psychological symptoms and diseases by 21 percentage points.

[22] We bundle anxiety and depression together given the possibility of co-diagnoses and common treatments for both conditions (see, e.g., Pratt et al. (2017)). Hyperkinetic disorders include inattention, overactivity, and impulsivity. They include a variety of attention disorders such as attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD).

visits with depression or anxiety drives the reduction in the likelihood of consultations with mental health diagnoses or treatments. Note that this finding remains significant after adjusting the inference for multiple hypothesis testing.

4.4 Robustness Checks

To assess the robustness of our results, we check whether our main findings are sensitive to the choice of control variables, to different functional forms, to alternative bandwidths, and to focusing separately on the two cities we consider.

In our main specification, model (2), we control for several predetermined individual characteristics. In Table A6 we check that our main findings are robust to excluding these control variables, or to selecting a smaller set of control variables. Table A6 presents estimates for five outcomes: high school enrollment, high school graduation, enrollment in higher education, the probability of visits to GP/ER, and the probability of mental health diagnosis or treatment. For each outcome in Table A6, the first column does not include controls for the predetermined individual characteristics. In the second column, we select relevant control variables using the double lasso procedure suggested in Belloni et al. (2013). The point estimates remain nearly unchanged relative to our baseline results.

In addition, the estimates reported in Table A7 show that our main findings are robust to different functional forms for the running variable. Our preferred model controls for a linear spline function of the running variable with triangular weights. Table A7 presents the results with alternative functional forms for each of the five main outcomes. For each of the outcomes in Table A7, we allow for cutoff-specific trends when estimating model (2) in the first column. In the second column, we follow Lee and Lemieux (2010) who propose goodness-of-fit tests as an ancillary means to select an optimal polynomial function. In the third column, we employ nonparametric estimations using local linear regressions. The results are again similar to our baseline estimates.

In Figure A4, we report the point estimates and confidence intervals for our main outcomes for a wide range of bandwidths. The estimates show that our baseline estimates are highly robust to the choice of bandwidths in the neighborhood of the optimal bandwidth (i.e., the bandwidth that minimizes the mean square error).

Last, we turn our attention to see if a particular city is driving our main results. Table A8 presents estimates for α in equation 2 separately for each city (Bergen and Oslo). The estimates for α are similar for both cities, suggesting that the main findings are not driven by one city alone. This provides suggestive evidence regarding the external validity of our results across cities.

There are different explanations for our estimated impacts on mental health. More selective schools could have an incapacitation effect if, for example, students have to study longer hours in more selective schools and do not have time to visit health services. This does not appear as a likely mechanism because we do not find any impact on the extensive or intensive margin of visits to GP/ER (Columns (4) and (5) of Table 1). Alternatively, our effects could reflect differences across schools in the availability or quality of school nurses.[23] To shed light on this potential mechanism, we evaluate year by year how GP or ER consultations with a psychological diagnosis or treatment vary across our sample. If school nurses were substitutes for psychological consultations during high school years, we would expect a sharp rise in the number of consultations with a psychological diagnosis or treatment after high school graduation (i.e., between year three and year four post-middle school graduation). Figure A3 in the Appendix reports the prevalence of mental health diagnoses or treatments upon GP/ER visits in our sample for each year after middle school graduation. The figure depicts a stable increase in the prevalence of primary health services with mental health diagnoses or treatments, which provides suggestive evidence that school nurses do not seem to act as substitutes for GP/ER visits. Finally, in our setting, gaining access to a more selective school also implies gaining access to a preferred school. As discussed earlier, our estimated effects on mental health appear mostly after high school (see Table A5), providing suggestive evidence that our effects do not reflect the mere short-term effect of enrolling (or failing to enroll) in a preferred school. Overall, our results do not seem driven by incapacitation effects, differences in the supply of health services, nor do they seem to link to a short-term feeling of success or failure. Rather, our results suggest that a more selective schooling environment is protective of (female) mental health. It is still possible that students perceive a more selective high school environment as more stressful, but our results suggest that the positive aspects of a more selective environment outweigh any potential increase in school pressure.

In section 5, we turn to studying whether peer and teacher characteristics or other school features vary discontinuously at the thresholds and whether these changes in school characteristics help to explain the effects on student mental health and longer-term educational outcomes.

[23]As discussed in Section 2.3, school nurses are employed by municipalities not by schools.

5 Suggestive Mechanisms

Although all public Norwegian high schools follow a similar national curriculum, high schools vary along several dimensions. Because high school assignment is based on middle school GPA, student average ability varies significantly from one high school to another. Further, as a student's middle school GPA is correlated with their gender and family background, the proportion of female students and student parental backgrounds may also vary significantly across high schools. In addition, schools are independent in their hiring decisions resulting in a heterogeneous distribution of teacher characteristics across schools. Moreover, the allocation of financial resources to schools depends on the number of students, so that financial resources also vary by school size. To provide insights into what features of the schooling environment may influence student health and education outcomes, we also investigate changes in school characteristics at the thresholds. In a second step, we implement a heterogeneity analysis where we estimate our regression discontinuity model for each admission threshold and each school feature separately. This helps us to consider whether changes in longer-term educational choices and health outcomes are larger when students gain eligibility to schools where peer characteristics, teacher characteristics, or school resources change by a larger margin at the admission threshold.

First, Table 3 documents changes in peer characteristics at the threshold. Panel A of Table 3 shows that eligibility for enrollment in a more selective school improves the ability level of peers, increasing peer average middle school GPA by 4.4% of a standard deviation.[24] Just above the threshold, peers also have more educated parents with higher income levels. In contrast, we do not identify differences in the gender composition of peers on average (Panel A). The estimated impacts on peer ability are similar for high schools in the top and bottom halves of the selectivity distribution (Panels B and C). However, eligibility to enroll in a more selective school increases the share of female peers for the top half of the selectivity distribution but does not change peer parental background. On the contrary, there is no effect on the share of female peers, but a significant impact on peers' parental income and education for schools with lower selectivity levels.

Next, we explore how eligibility for enrollment impacts the high school educational program and school and teacher characteristics (see Table 4). The estimates in Columns (1) and (2) show that eligibility to enroll in a more selective high school increases the likelihood of enrolling in the general track, and correspondingly decreases the probability of enrolling in the vocational track. There are no impacts on high school programs

[24]For each student, we computed the average standardized middle school GPA among students enrolled in the same track and high school in August following middle school completion.

around the cutoffs of highly selective high schools (Panel B); instead, schools in the bottom half of the selectivity distribution (Panel C) appear to drive this program substitution.

Then, we study school financial resources and the number of teachers and staff members per student. As discussed, the central allocation of financial resources is to schools based on the number of students. Hence, we proxy financial resources by the number of students enrolled in the same program-cohort. The estimates in Column (3) show that eligibility to enroll in a more selective high school is associated with 4.76 extra students in each student's own program at the cutoff (i.e., about 7% of the control mean). This appears driven by high schools in the bottom half of the selectivity distribution. Eligibility to enroll in a more selective high school also decreases the number of students per teacher but does not change the number of students per nonteaching staff (Columns (4) and (5)).

Lastly, we consider variations in teacher characteristics. In particular, we study whether eligibility to enroll in a more selective school changes the proportion of teachers with a master degree, the average age of high school teachers, and the proportion of female teachers. Panel A shows no significant discontinuities in teacher characteristics, expect for the proportion of female teachers.

In sum, enrollment in a more selective high school not only directly affects the characteristics of the peers with whom students interact but also the types of programs in which students enroll, the characteristics of their teachers and their number, and the financial resources of their school. The impacts on peers, teachers, and resources vary across the selectivity distribution and motivate the next section where we use these variations to explore the most likely mechanism driving our estimates.

5.1 Heterogeneity Analysis by Changes in School Inputs at the Thresholds

5.1.1 Empirical Approach

To further our understanding of selective school effects on education and health, we develop a heterogeneity analysis, which makes use of the fact that we have 84 different admission cutoffs with variations in how school characteristics change around these cutoffs. In our setting, for each admission threshold, the magnitude of the estimated eligibility effects on school inputs depends on two parameters: (1) the characteristics of the high school corresponding to the admission threshold under consideration and (2) the characteristics of high schools with lower selectivity levels. In this section, we analyze whether we obtain larger estimated effects on health and education around thresholds with larger changes in peer characteristics, teacher characteristics, or other school features.

We restrict the analysis to two outcomes of interest: student enrollment in higher education and the probability of diagnosis or treatment of students by GPs or ERs for psychological conditions. We consider 11 different school inputs: the average middle school GPA of peers, the proportion of female students among high school peers, the parental education of peers, peers' parental income, the proportion of teachers with a master degree, the average age of teachers, the proportion of female teachers, the number of students per teacher, school size, the number of students per nonteaching staff, and student probability of enrolling in the general track. For each admission threshold z and each school input m, we estimate our standard RD model described in the previous section:

$$Y_{m,z,i} = \delta_{m,z} + \alpha_{m,z}\mathbb{1}\left\{f_i - f_z \geq 0\right\} + \eta_{m,z}\left(f_z - f_i\right) + \lambda_{m,z}\left(f_i - f_z\right) \times \mathbb{1}\left\{f_i - f_z \geq 0\right\} + X_i\gamma + u_{m,z,i}. \quad (3)$$

The only difference relative to model (2) is that we estimate model (3) for each admission threshold separately, rather than pooling all admission thresholds with cutoffs by year fixed effects. For each school input and each admission threshold, we obtain the estimated parameters $\widehat{\alpha_{m,z}}$, which indicate the magnitude of the variation in the school input m around the admission threshold z. For each school input separately, we then divide the sample depending on whether the estimated effect on the input under consideration is above or below the median estimated effect, $\widetilde{\alpha_{m,z}}$.

For each outcome and school input, we then estimate our basic RD model separately on subsamples characterized by the magnitude of the change in the school input under consideration at the thresholds. We use this heterogeneity analysis to respond to the following question: do larger changes in peer characteristics or teacher characteristics or in other school features coincide with greater estimated effects on student education and mental health?

5.2 Findings

Figure 6 provides the results of our heterogeneity analysis. First, Panel a in Figure 6 documents that there are significant differences in how each school input varies at the thresholds. Along all the dimensions we consider, the average change at the threshold in the input under consideration is significantly different for schools with a below- or above-median change. For example, for one group of schools, eligibility for enrollment in a more selective school implies an increase in the share of female peers, while it implies a decrease in the share of female peers in the second group of schools. Similarly, for one group of schools, eligibility for enrollment in a more selective school implies an increase in the ratio of students per teacher, but a decrease in this ratio for the second group of schools.

Panel b of Figure 6 reports the RD results on enrollment in higher education using the same subsamples as in Panel a. This figure documents two significant differences: larger changes in the student–teacher ratio and the age of teachers coincide with larger estimated effects on enrollment in higher education. Panel c of Figure 6 reports the results for the probability of diagnosis or treatment by a GP for psychological symptoms or diseases. We identify significant differences in the estimated effects depending on the changes in the proportion of female teachers. By contrast, we find no empirical evidence that larger changes in peer ability or gender are important drivers of the results for education or health outcomes. Overall, our heterogeneity analysis suggests that changes in teacher characteristics are probably important to explain the observed positive impacts of attending a more selective high school.

Note that this analysis is only descriptive and that we should not interpret the findings as causal effects. The estimates are also not fully robust to the adjustments for multiple hypothesis testing. Moreover, the analysis does not exclude alternative mechanisms such as changes in student ambitions or confidence in the future.

6 Conclusion

This paper provides new insights into the relationship between the selectivity of the schooling environment and student educational outcomes and mental health. To identify causal effects, we build on the features of the high school assignment system in the two largest Norwegian cities, where the assignment of middle school students to high school is through a centralized process that gives priority to students with the best average middle school grades. This assignment system enables a regression discontinuity analysis, where we compare the education and health outcomes of students that are similar at the end of middle school but are eligible to enroll in more or less selective high schools. The direction of the effect on health and education outcomes is theoretically ambiguous. On the one hand, a selective school environment might be a stressful experience for marginal students and increase their (mental) health problems. On the other hand, a more selective school with better peers and different teachers might be an inspiring experience that opens up new perspectives and improves student (mental) health in both the short and long term.

Our results show that eligibility for enrollment in a more selective school significantly improves school outcomes, increasing the likelihood of both high school completion and enrollment in higher education. In addition, we document that the eligibility to enroll in a more selective school does not affect the overall use of primary care services up to six years after high school completion, but does decrease a student's likelihood of diagnosis or treatment by a GP for mental health issues. These estimated effects on education and mental health appear driven by access to schools in the top half of the selectivity distribution, whereas female students drive the health effects.

Our heterogeneity analysis exploiting the 84 different admission cutoffs reveals that larger changes in the student–teacher ratio and age of teachers coincides with larger estimated effects on enrollment in higher education, and that larger changes in the share of female teachers coincide with larger estimated effects on student mental health. Overall, our heterogeneity analysis suggests that changes in teacher characteristics—and not necessarily peer characteristics—could be important for explaining the effects of a more selective school environment for a student's subsequent education and health.

An important open question for future research concerns the relationship between the estimated effects on health and educational outcomes. Do students graduate more from high school and enroll more in higher education because they are in better health (especially better mental health), or are they in better health because they are boosted by better educational prospects? Previous literature analyzing the effect of increases in compulsory education or changes in school tracking suggests that there are positive effects of expanding compulsory schooling on women's mental health and particularly self-reported depressive symptoms (Böckerman et al., 2019; Crespo et al., 2014; Dursun and Cesur, 2016). A question remains whether better educational prospects by the end of high school have similar positive effects on mental health. Alternatively, it could also be the case that similar improvements in school inputs drive both health and longer-term educational outcomes, even if they do not affect each other. For example, Elsner and Isphording (2017) argue that the ordinal ability rank of students in their cohort, which is negatively impacted when students gain eligibility to a more selective school, is an important determinant of engaging in risky behaviors that can impact both educational and health outcomes.

Besides complementing the existing literature on the effects of school selectivity on educational outcomes, we provide new knowledge on the relationship between school selectivity and mental health, and demonstrate that access to more selective schools decreases the risk of mental health problems. While a selective school environment might still be a stressful experience for marginal students, our results suggest that the positive effects of enrolling in a more selective school outweigh this extra pressure over the long term.

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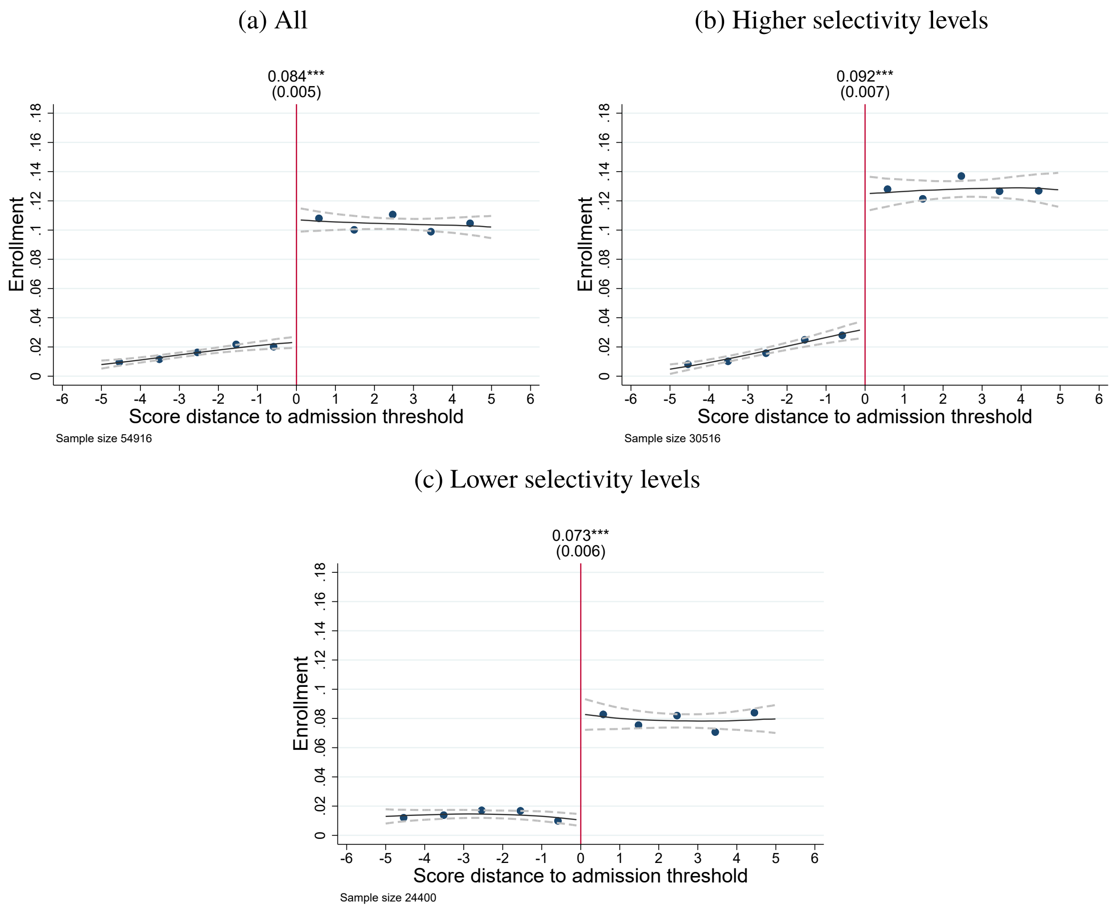
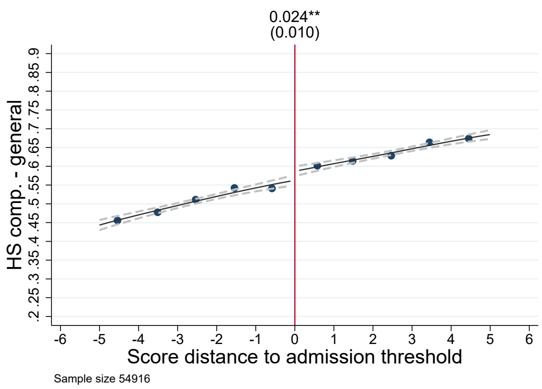
Figure 1 – Enrollment probability



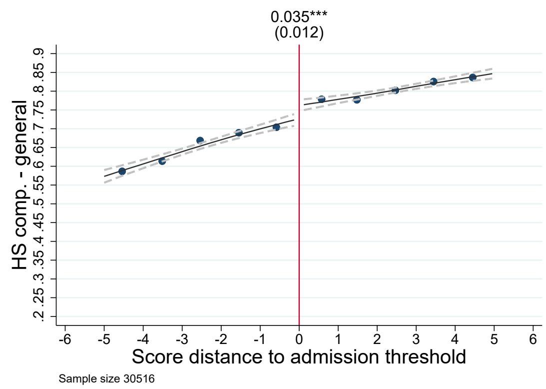
NOTE: These figures plot the point estimates of α from equation (2) using a linear trend specification and triangular weights. The standard errors for the point estimates are clustered at individual level. The dashed lines are 95 percent confidence intervals. *** p<0.01, ** p<0.05, * p<0.1.

Figure 2 – High School Graduation

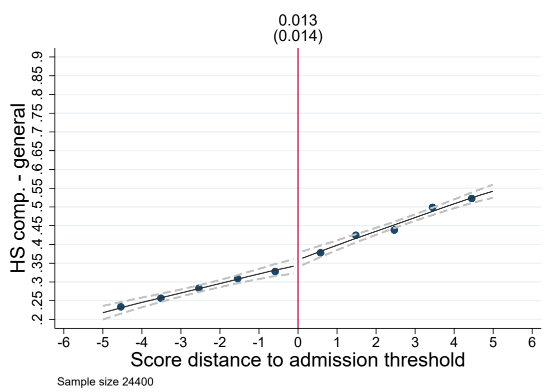
(a) All



(b) Higher selectivity levels



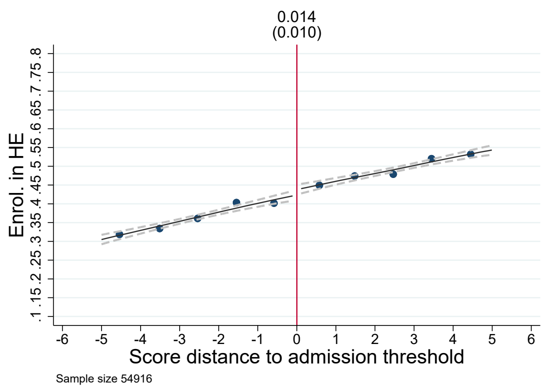
(c) Lower selectivity levels



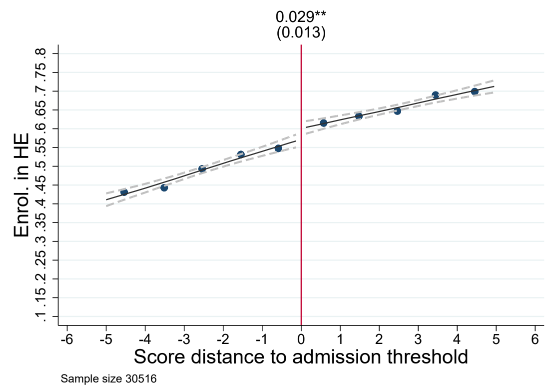
NOTE: These figures plot the point estimates of α from equation (2) using a linear trend specification and triangular weights. The standard errors for the point estimates are clustered at individual level. The dashed lines are 95 percent confidence intervals. *** p<0.01, ** p<0.05, * p<0.1.

Figure 3 – Enrollment in Higher Education

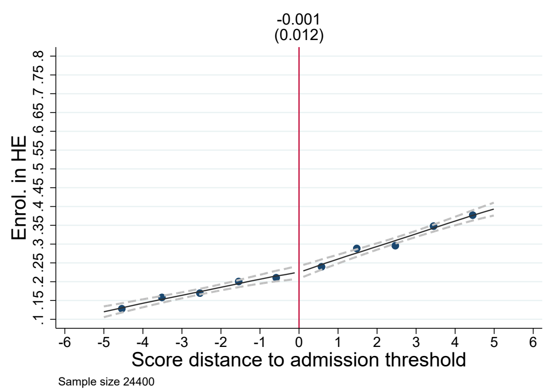
(a) All



(b) Higher selectivity levels



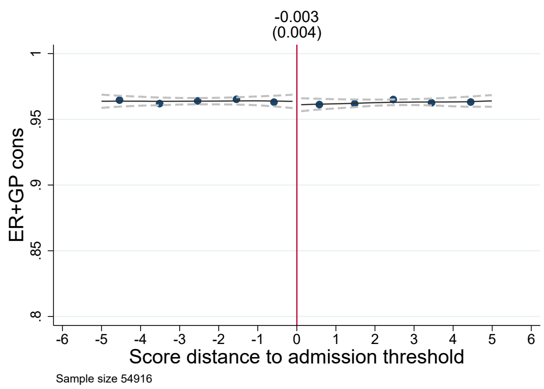
(c) Lower selectivity levels



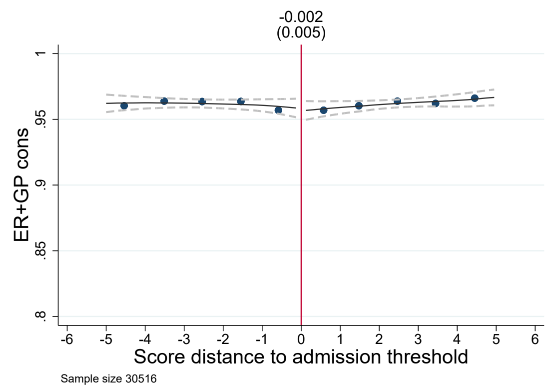
NOTE: These figures plot the point estimates of α from equation (2) using a linear trend specification and triangular weights. The standard errors for the point estimates are clustered at individual level. The dashed lines are 95 percent confidence intervals. *** p<0.01, ** p<0.05, * p<0.1.

Figure 4 – Probability of Consulting with a GP or an ER

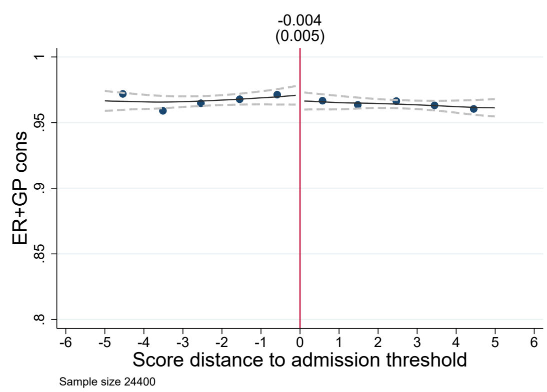
(a) All



(b) Higher selectivity levels



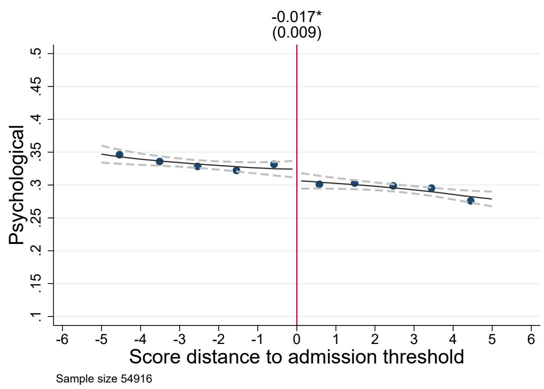
(c) Lower selectivity levels



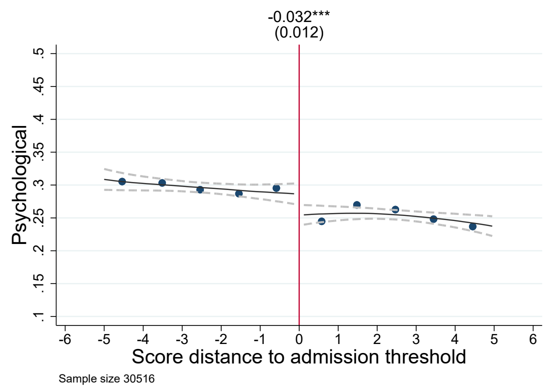
NOTE: These figures plot the point estimates of α from equation (2) using a linear trend specification and triangular weights. The standard errors for the point estimates are clustered at individual level. The dashed lines are 95 percent confidence intervals. *** p<0.01, ** p<0.05, * p<0.1.

Figure 5 – Probability of being Diagnosed or Treated for a Mental Health Issue

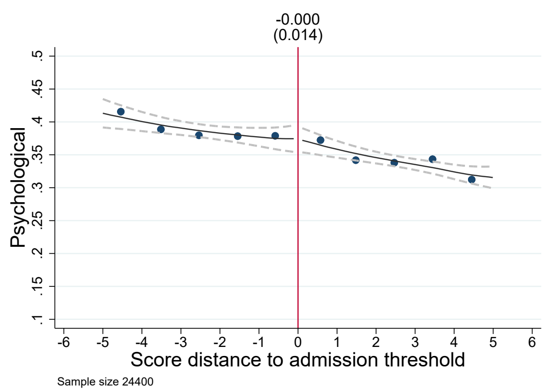
(a) All



(b) Higher selectivity levels



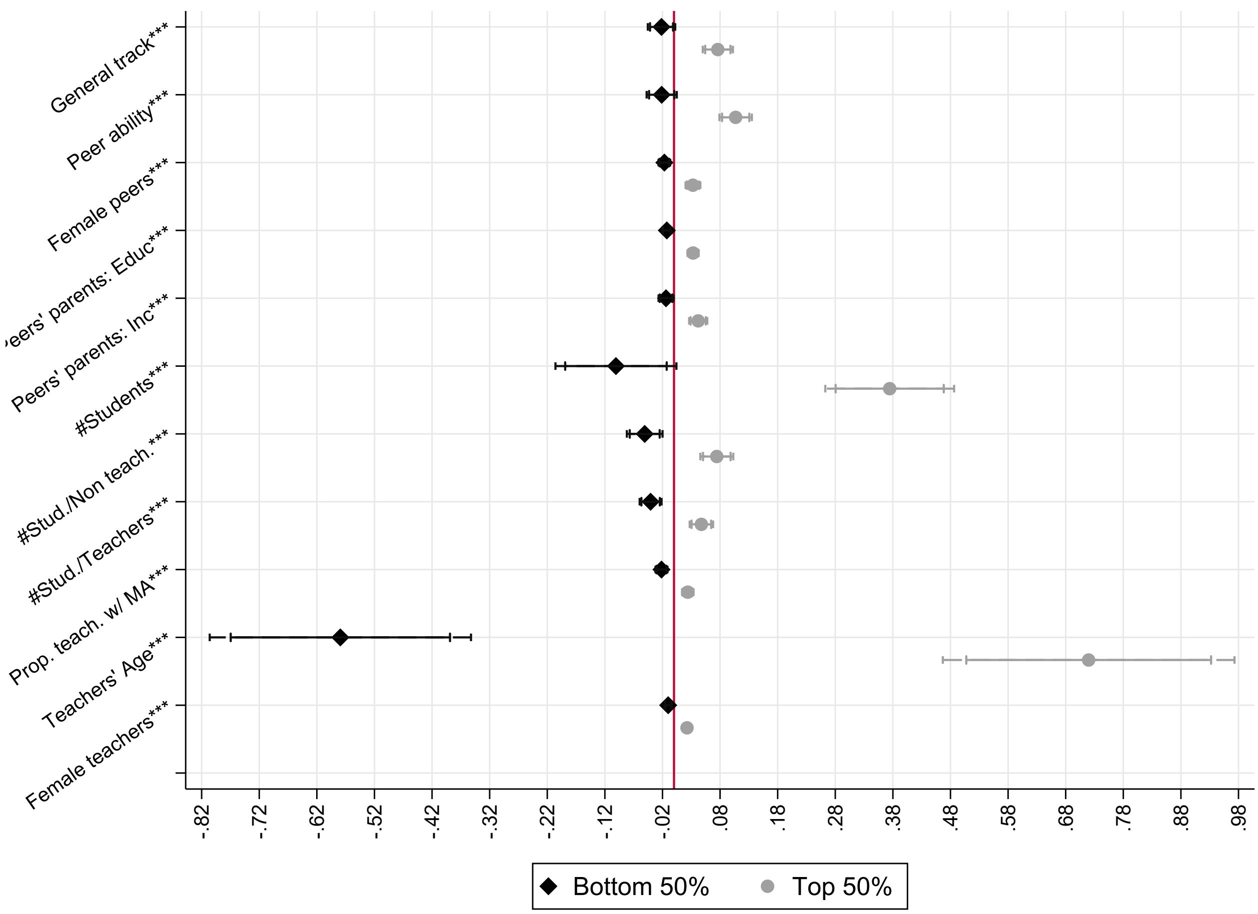
(c) Lower selectivity levels



NOTE: These figures plot the point estimates of α from equation (2) using a linear trend specification and triangular weights. The standard errors for the point estimates are clustered at individual level. The dashed lines are 95 percent confidence intervals. *** p<0.01, ** p<0.05, * p<0.1.

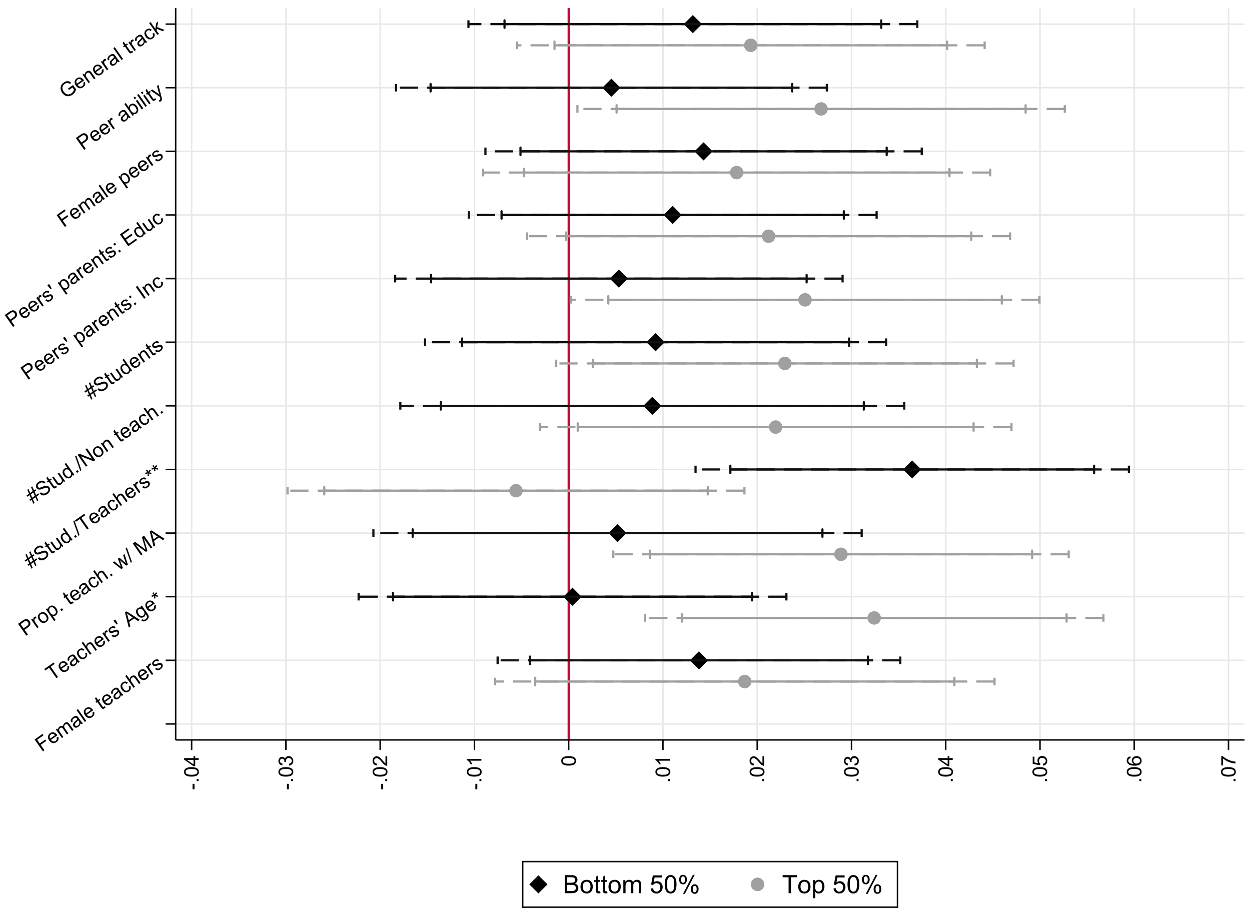
Figure 6 – Heterogeneity of Selective School Effects by Changes in School Characteristics

(a) Changes in School Characteristics at the Thresholds



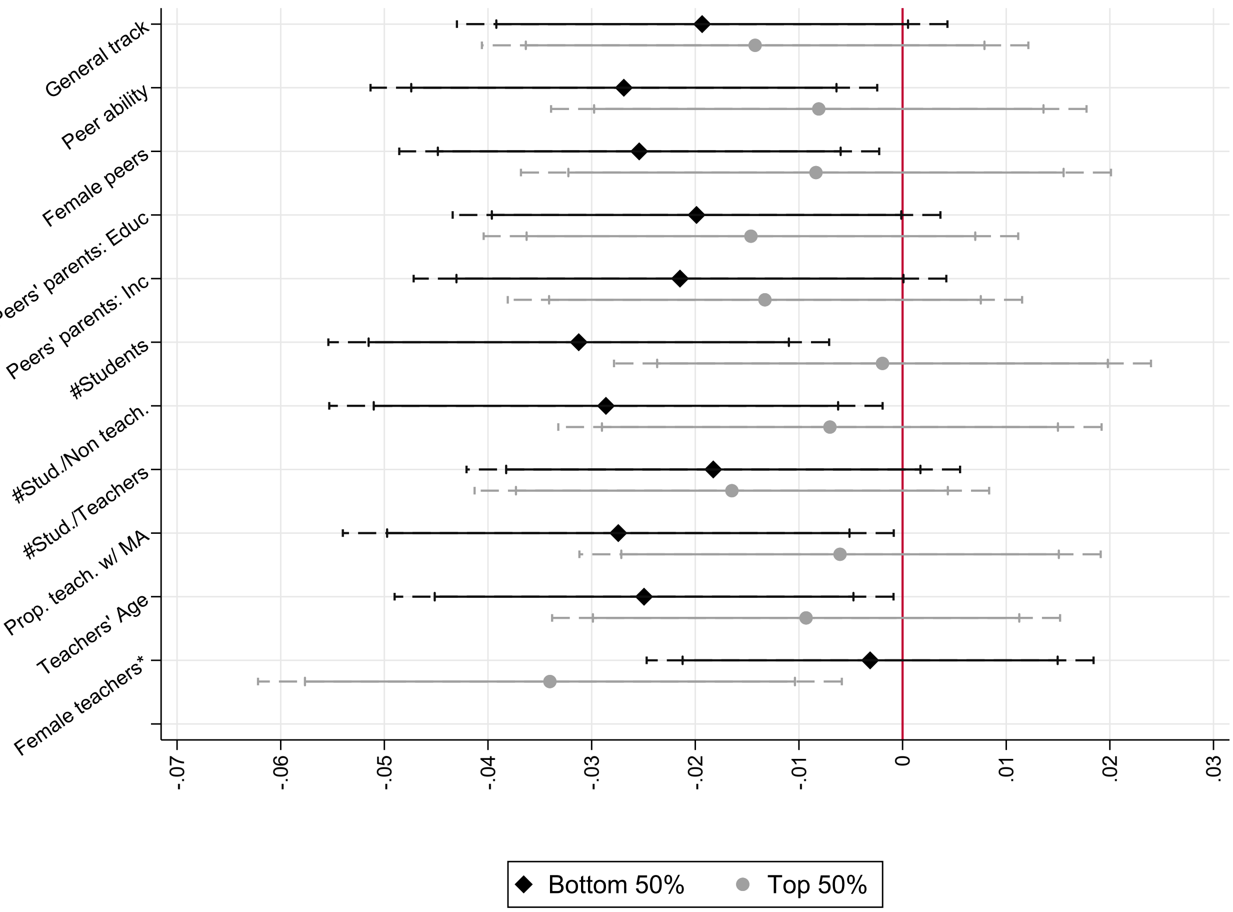
Note: Asterisks refer to the results of tests of the null hypothesis of no difference in the changes in inputs above or below the median estimated parameter where *** p<0.01, ** p<0.05, * p<0.1. All estimates are statistically different at the 5% level after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

(b) Changes in School Characteristics and Enrollment in Higher Education



Note: Asterisks refer to the results of tests of the null hypothesis of no difference in the changes in inputs above or below the median estimated parameter where *** p<0.01, ** p<0.05, * p<0.1. Joint tests of the estimates are no longer statistically different at the 10% (or lower) level after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

(c) Changes in School Characteristics and Mental Health Issues



Note: Asterisks refer to the results of tests of the null hypothesis of no difference in the changes in inputs above or below the median estimated parameter where *** p<0.01, ** p<0.05, * p<0.1. Joint tests of the estimates are no longer statistically different at the 10% (or lower) level after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table 1 – High School Selectivity, Education, and Health

	(1) First stage enrollment	(2) High School graduation	(3) Enrollment in HE	(4) GP - ER cons.	(5) Nb. of GP - ER cons.	(6) Mental health issue	(7) Other health issue
Panel A: All							
Eligibility	0.083***	0.023***	0.016*	-0.003	-0.343	-0.017*	-0.004
	$(0.005)^{+++}$	$(0.009)^{++}$	(0.009)	(0.004)	(0.359)	(0.009)	(0.004)
Control mean	.021	.542	.402	.964	17.7	.327	.962
N	54916	54916	54916	54916	54916	54916	54916
Panel B: Higher selectivity Levels							
Eligibility	0.091***	0.031***	0.026**	-0.003	-0.738	-0.032***	-0.004
	$(0.007)^{+++}$	$(0.011)^{+}$	$(0.012)^{+}$	(0.005)	(0.457)	$(0.011)^{+++}$	(0.005)
Control mean	.027	.696	.539	.961	16.6	.291	.960
N	30516	30516	30516	30516	30516	30516	30516
Panel C: Lower selectivity Levels							
Eligibility	0.073***	0.015	0.004	-0.005	0.185	0.002	-0.006
	$(0.006)^{+++}$	(0.013)	(0.011)	(0.005)	(0.555)	(0.014)	(0.005)
Control mean	.013	.321	.206	.969	19.2	.380	.965
N	24400	24400	24400	24400	24400	24400	24400

NOTE: This table reports point estimates of α from equation (2) using a linear trend specification and triangular weights. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table 2 – High School Selectivity and Mental Health Diagnoses and Treatments

	(1) Depression/Anxiety	(2) Subs. abuse	(3) ADHD	(4) Other psy.
Panel A: All				
Eligibility	-0.015*	0.001	-0.004	-0.008
	(0.008)	(0.004)	(0.003)	(0.007)
Control mean	.233	.0514	.0334	.153
N	54916	54916	54916	54916
Panel B: Higher Selectivity Levels				
Eligibility	-0.028***	-0.001	-0.006	-0.013
	$(0.010)^{+++}$	(0.005)	(0.004)	(0.009)
Control mean	.211	.0384	.024	.134
N	30516	30516	30516	30516
Panel C: Lower Selectivity Levels				
Eligibility	0.002	0.004	-0.001	-0.001
	(0.013)	(0.008)	(0.006)	(0.011)
Control mean	.264	.0701	.0468	.18
N	24400	24400	24400	24400

NOTE: This table reports the point estimates of α from equation (2) using a linear trend specification and triangular weights. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$; $^{+++}$ $p<0.01$, $^{++}$ $p<0.05$, $^{+}$ $p<0.1$ after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table 3 – Characteristics of High School Peers

	(1)	(2)	(3)	(4)
	Peers' av. MS GPA	Prop. of female peers	Parents of Peers	
			Av. inc. (log)	Education
Panel A: All				
Eligibility	0.044***	0.006	0.016***	0.011***
	(0.010)$^{+++}$	(0.004)	(0.005)$^{+++}$	(0.003)$^{+++}$
Control mean	.0644	.463	13.5	.481
N	54916	54916	54916	54916
Panel B: Higher Selectivity Levels				
Eligibility	0.039***	0.012***	0.011	0.007
	(0.012)$^{+++}$	(0.004)$^{+++}$	(0.007)	(0.004)
Control mean	.353	.496	13.8	.568
N	30516	30516	30516	30516
Panel C: Lower Selectivity Levels				
Eligibility	0.046***	0.000	0.018***	0.015***
	(0.015)$^{+++}$	(0.007)	(0.007)$^{+++}$	(0.005)$^{+++}$
Control mean	-.349	.416	13.1	.357
N	24400	24400	24400	24400

NOTE: This table reports the point estimates of α from equation (2) using a linear trend specification and triangular weights. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table 4 – High School Education and Characteristics of High Schools Attended

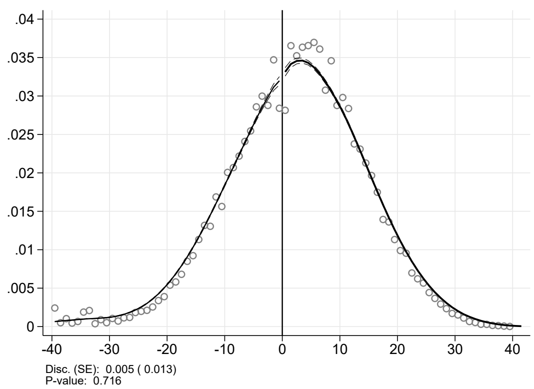
	(1) General track	(2) Vocational track	(3) #Stud. own program	(4) #Stud. /teachers	(5) #Stud. /non-teacher	(6) Share teachers w. masters	(7) Teachers' mean age	(8) Share female teachers
Panel A: All								
Eligibility	0.022**	-0.018**	4.757***	-0.475*	0.189	-0.001	0.049	0.005**
	$(0.009)^{++}$	$(0.008)^{++}$	$(1.153)^{+++}$	(0.280)	(0.348)	(0.003)	(0.089)	$(0.002)^{+}$
Control mean	.539	.403	69.3	15	21.2	.225	45.6	.498
N	54916	54916	54916	54916	54916	54916	54916	54916
Panel B: Higher Selectivity Levels								
Eligibility	0.007	-0.002	3.032*	-0.539	-0.142	-0.007	0.104	0.005
	(0.012)	(0.010)	(1.671)	(0.351)	(0.430)	(0.005)	(0.124)	(0.003)
Control mean	.673	.241	92.1	15.6	22.8	.244	45.7	.517
N	30516	30516	30516	30516	30516	30516	30516	30516
Panel C: Lower Selectivity Levels								
Eligibility	0.042***	-0.041***	6.890***	-0.450	0.569	0.006	-0.024	0.006
	$(0.014)^{+++}$	$(0.013)^{+++}$	$(1.481)^{+++}$	(0.530)	(0.552)	(0.005)	(0.124)	(0.004)
Control mean	.346	.635	36.7	14.2	18.8	.197	45.4	.472
N	24400	24400	24400	24400	24400	24400	24400	24400

NOTE: This table reports the point estimates of α from equation (2) using a linear trend specification and triangular weights. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

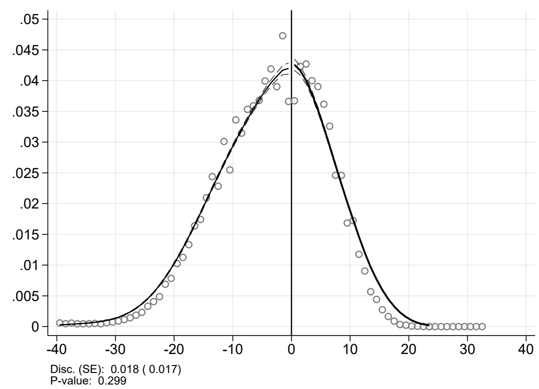
Appendix A

Figure A1 – Density of Observations around Admission Cutoffs

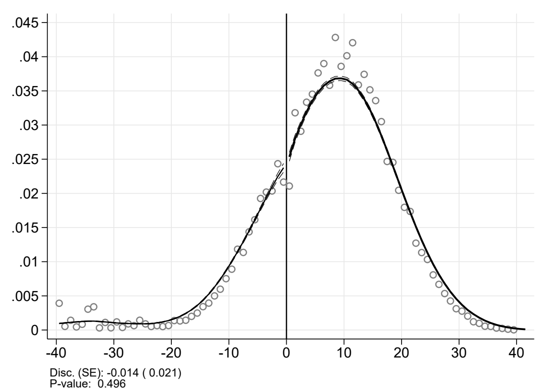
(a) All



(b) Higher selectivity levels



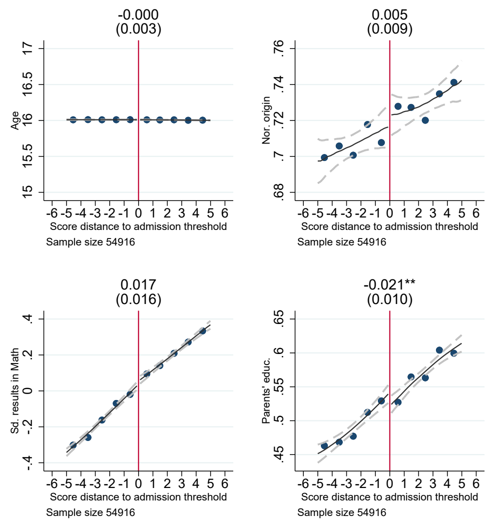
(c) Lower selectivity levels



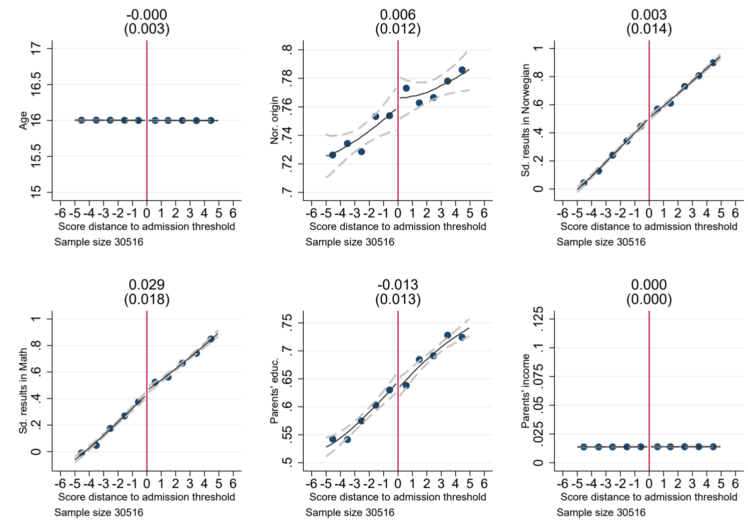
NOTE: These figures present nonparametric estimates of the density of observations on either side of the cutoff score following McCrary (2008). Each circle shows the average frequency of students per bin of the running variable. The solid lines represent estimated density functions, and the dashed lines are the 95 percent confidence intervals around it. The bottom right of each figure includes the estimated discontinuity for the density at the cutoff (standard errors in parentheses).

Figure A2 – Balancing of Covariates

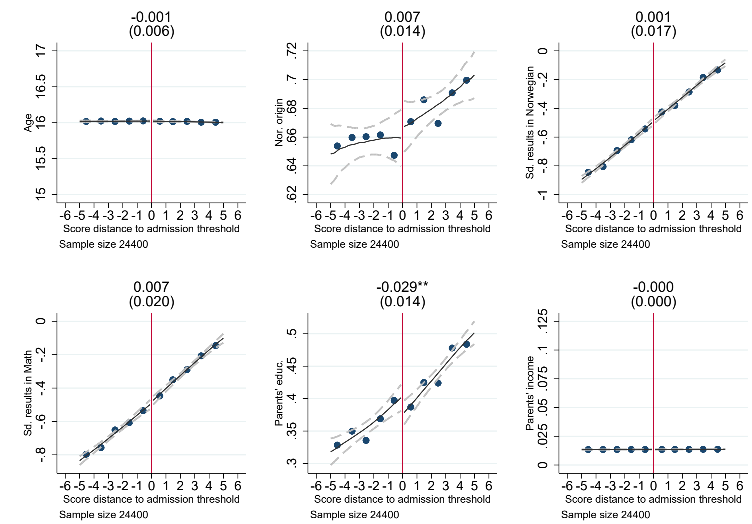
(a) All



(b) Higher selectivity levels



(c) Lower selectivity levels



NOTE: These figures plot the point estimates of α from equation (2) using a linear trend specification and triangular weights. The standard errors for the point estimates are clustered at individual level. The dashed lines are 95 percent confidence intervals. *** p<0.01, ** p<0.05, * p<0.1.

Figure A3 – Prevalence of Mental Health Diagnoses and Treatments

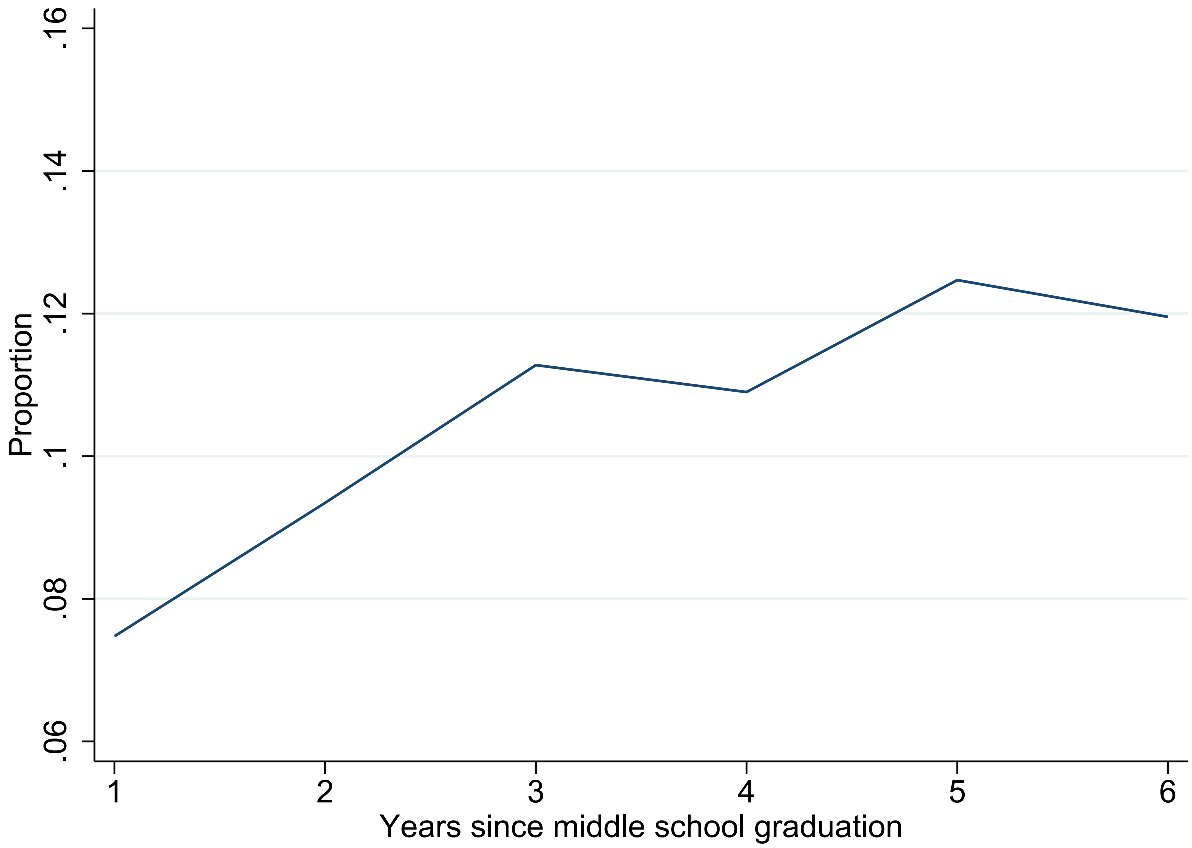
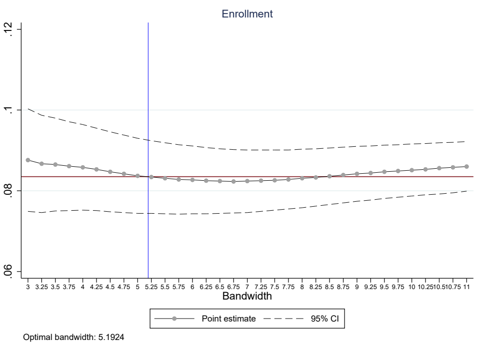
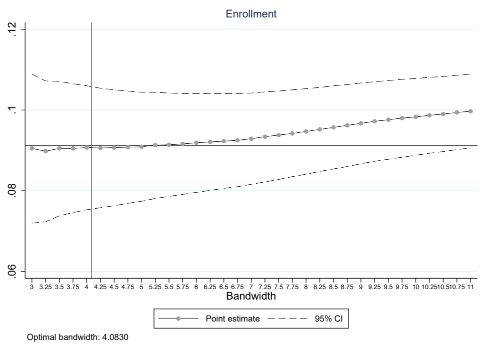


Figure A4 – Robustness to Bandwidth Selection

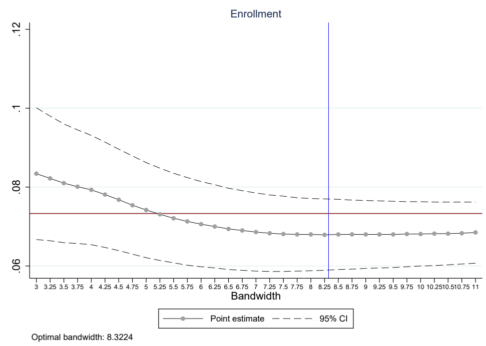
First stage enrollment
All



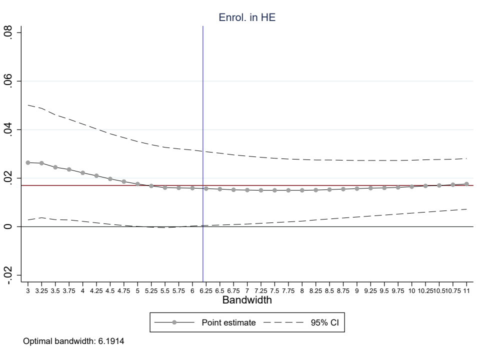
First stage enrollment
Higher selectivity levels



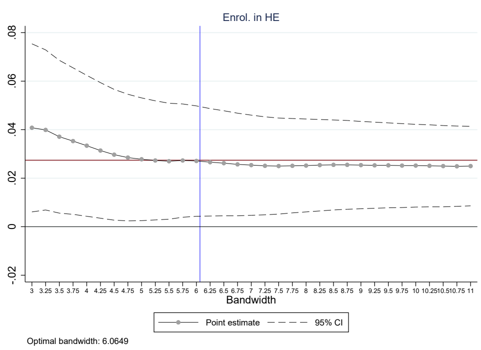
First stage enrollment
Lower selectivity levels



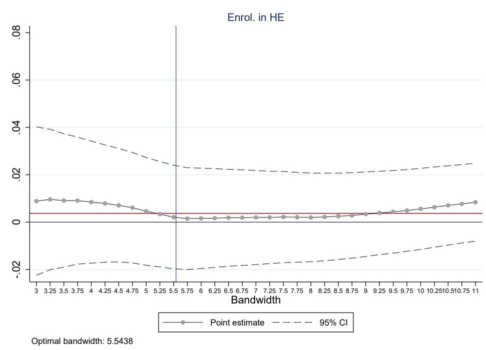
Enrollment in HE
All



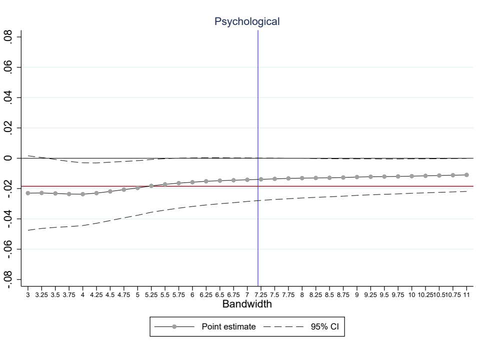
Enrollment in HE
Higher selectivity levels



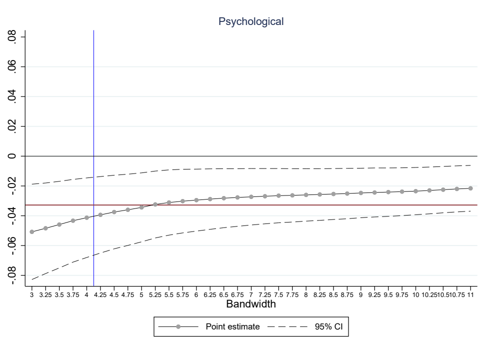
Enrollment in HE
Lower selectivity levels



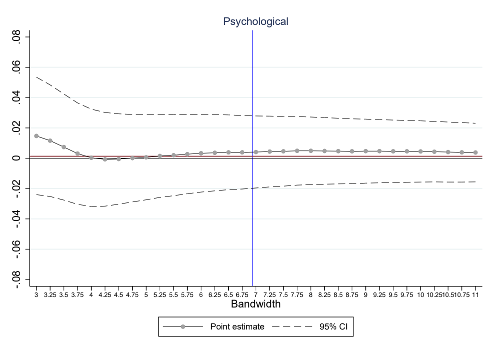
Mental health issues
All



Mental health issues
Higher selectivity levels



Mental health issues
Lower selectivity levels



NOTE: Each point reports α from equation (2) with varying bandwidths. The solid red line represents the point estimates from a global linear specification with triangular weights. The vertical blue line shows the optimal bandwidth. The dashed lines are 95 percent confidence intervals.

Table A1 – Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Bergen area & Oslo		RD Sample	
	Mean	SD	Mean	SD	Mean	SD
Female	0.486	0.500	0.486	0.500	0.476	0.499
Age	16.078	0.906	16.038	0.649	16.008	0.154
Norwegian origin	0.827	0.378	0.793	0.405	0.734	0.442
Sd. results in Norwegian	0.000	0.987	0.112	0.965	0.081	0.858
Sd. results in Math	-0.000	0.985	0.074	0.982	0.054	0.916
Parental Background						
Parents' educ.	0.429	0.495	0.460	0.498	0.516	0.500
Parents' income	1018.177	1052.238	1091.964	1648.111	1159.468	1355.331
School Environment						
General studies	0.398	0.489	0.462	0.499	0.541	0.498
Vocational studies	0.509	0.500	0.475	0.499	0.405	0.491
#Students/Teacher	13.021	17.246	13.117	14.509	14.862	16.794
#Students/Non-Teacher	20.701	15.225	19.922	13.803	21.084	16.145
Share Teachers with Masters	0.308	0.206	0.276	0.232	0.253	0.253
Teachers age	48.308	4.031	48.122	4.379	47.470	4.628
Sh Female Teachers	0.508	0.125	0.499	0.133	0.518	0.132
#Stud own Program	53.859	71.566	55.685	64.991	71.757	71.139
Peers' Characteristics						
Peers' mean MS GPA	-0.010	0.693	0.104	0.703	0.134	0.715
Prop of female peers	0.461	0.285	0.462	0.277	0.472	0.251
Av Inc of Peers' parents	973147.298	345181.207	1039018.858	406465.607	1128266.195	447111.263
Education of Peers' parents	0.405	0.219	0.432	0.230	0.485	0.225
Mental Health of Peers' parents	0.243	0.090	0.243	0.086	0.248	0.078
Education						
HS graduation	0.615	0.487	0.634	0.482	0.657	0.475
Enrollment in HE	0.381	0.486	0.394	0.489	0.423	0.494
General Health						
GP - ER cons.	0.975	0.155	0.970	0.170	0.966	0.181
Nb. of GP - ER cons.	20.654	21.987	18.980	20.955	17.672	19.398
Physical health issue	0.973	0.163	0.968	0.177	0.963	0.188
Mental health issue	0.320	0.466	0.326	0.469	0.314	0.464
Mental Health Disorders						
Depression/Anxiety	0.220	0.414	0.232	0.422	0.223	0.416
Substance Use	0.053	0.223	0.057	0.232	0.052	0.222
ADHD	0.041	0.199	0.035	0.185	0.031	0.174
Other Psychological	0.155	0.361	0.153	0.360	0.143	0.350
N	312267		41306		19932	

NOTE: Means and (standard deviations) of background, school environment, education, and health during the period studied (i.e., 10th graders completing middle school between 2006 and 2010). The table includes three samples: all students completing the 10th grade in Norway between 2006 and 2010, students completing the 10th grade in the county of Hordaland (where the city of Bergen is located) between 2006 and 2010 and in Oslo in 2009 and 2010, and our regression discontinuity (RD) sample.

Table A2 – Balancing tests

	(1) Female	(2) Age	(3) Nor. origin	(4) Sd. results in Norwegian	(5) Sd. results in Math	(6) Parents' educ.	(7) Parents' Income (log)
Panel A: All							
Eligibility	0.015	0.000	-0.002	-0.006	0.014	-0.020**	-0.018
	(0.010)	(0.003)	(0.008)	(0.008)	(0.011)	(0.009)+	(0.019)
Control mean	.451	16	.713	-.00739	-.0467	.532	13.8
N	54916	54916	54916	54916	54916	54916	54916
p-value F-Test	0.878						
Panel B: Higher Selectivity Levels							
Eligibility	0.021	-0.000	0.003	-0.009	0.020	-0.015	0.004
	(0.013)	(0.003)	(0.011)	(0.010)	(0.015)	(0.012)	(0.023)
Control mean	.486	16	.748	.391	.316	.622	13.9
N	30516	30516	30516	30516	30516	30516	30516
p-value F-Test	0.715						
Panel C: Lower Selectivity Levels							
Eligibility	0.006	-0.000	-0.007	-0.003	0.005	-0.026*	-0.043
	(0.015)	(0.006)	(0.013)	(0.012)	(0.016)	(0.014)	(0.029)
Control mean	.4	16	.664	-.582	-.577	.4	13.7
N	24400	24400	24400	24400	24400	24400	24400
p-value F-Test	0.529						

NOTE: This table reports the point estimates of α from equation (2) using a linear trend specification and triangular weights. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table A3 – Local Average Treatment Effects

	(1) High School Graduation	(2) Enrollment in HE	(3) GR - ER cons.	(4) Mental health issue
Panel A: All				
Enrollment	0.280***	0.191*	-0.041	-0.208*
	(0.103)$^{+++}$	(0.104)$^{+}$	(0.044)	(0.107)$^{+}$
N	54916	54916	54916	54916
Panel B: Higher selectivity Levels				
Enrollment	0.348***	0.292**	-0.032	-0.356***
	(0.127)$^{+++}$	(0.139)$^{++}$	(0.057)	(0.129)$^{+++}$
N	30516	30516	30516	30516
Panel C: Lower selectivity Levels				
Enrollment	0.208	0.055	-0.064	0.025
	(0.176)	(0.155)	(0.071)	(0.191)
N	24400	24400	24400	24400

NOTE: This table reports the point estimates when instrumenting enrollment in a higher-ranked school by eligibility for enrollment, using a linear trend specification and triangular weights. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table A4 – Classification of Mental Health Conditions

Mental Health Condition Grouping	
Anxiety	P01 Feeling anxious/nervous/tense
	P02 Acute stress reaction
	P06 Sleep disturbance
	P74 Anxiety disorder/anxiety state
Depression	P03 Feeling depressed
	P76 Depressive disorder
	P77 Suicide/suicide attempt
Substance Use	P15 Chronic alcohol abuse
	P16 Acute alcohol abuse
	P17 Tobacco abuse
	P18 Medication abuse
	P19 Drug abuse
Hyperkinetic Disorders	P81 Hyperkinetic disorder
Other	P04 Feeling/behaving irritable/angry
	P07 Sexual desire reduced
	P08 Sexual fulfilment reduced
	P09 Sexual preference concern
	P10 Stammering/stuttering/tic
	P11 Eating problem in child
	P12 Bedwetting/enuresis
	P13 Encopresis/bowel training problem
	P20 Memory disturbance
	P22 Child behaviour symptom/complaint
	P23 Adolescent behav. Symptom/complt.
	P24 Specific learning problem
	P25 Phase of life problem adult
	P27 Fear of mental disorder
	P28 Limited function/disability (p)
	P29 Psychological symptom/complt other
	P70 Dementia
	P71 Organic psychosis other
	P72 Schizophrenia
	P73 Affective psychosis
	P75 Somatization disorder
	P78 Neuraesthenia/surmenage
	P79 Phobia/compulsive disorder
	P80 Personality disorder
	P82 Post-traumatic stress disorder
	P85 Mental retardation
	P86 Anorexia nervosa/bulimia
	P98 Psychosis NOS/other
	P99 Psychological disorders, other

NOTE: This table presents the grouping of mental health problems based on the ICPC-02 diagnoses.

Table A5 – Reduced Form Estimates: Mental Health Impacts During and After High School Years

	(1) High School Years	(2) Post-High School Years
Panel A: All		
Eligibility (α)	0.004	-0.018**
	(0.007)	(0.008)$^{++}$
Control Mean	.182	.239
N	54916	54916
P-Value: HA: $\alpha_{col1} < \alpha_{col2}$	0.008	
Panel B: Higher Levels of Selectivity		
Eligibility (α)	-0.006	-0.027***
	(0.009)	(0.010)$^{++}$
Control Mean	.155	.211
N	30516	30516
P-Value: HA: $\alpha_{col1} < \alpha_{col2}$	0.036	
Panel C: Lower Levels Selectivity		
Eligibility (α)	0.018	-0.006
	(0.012)	(0.013)
Control Mean	.220	.279
N	24400	24400
P-Value: HA: $\alpha_{col1} < \alpha_{col2}$	0.048	

NOTE: This table reports the point estimates of α from equation (2) using a linear trend specification and triangular weights. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table A6 – Robustness Checks: Controls

	First stage enrollment		High School Graduation		Enrollment in HE		GR - ER cons.		Mental health issue	
	No controls	Double Lasso	No controls	Double Lasso	No controls	Double Lasso	No controls	Double Lasso	No controls	Double Lasso
Panel A: All										
Eligibility	0.083***	0.082***	0.024***	0.022**	0.017**	0.015*	-0.003	-0.003	-0.016*	-0.018**
	(0.005)	(0.005)	(0.009)	(0.009)	(0.009)	(0.009)	(0.004)	(0.004)	(0.009)	(0.009)
Panel B: Higher Selectivity Levels										
Eligibility	0.090***	0.091***	0.033***	0.032***	0.029**	0.025**	-0.002	-0.002	-0.031***	-0.032***
	(0.007)	(0.007)	(0.011)	(0.012)	(0.013)	(0.012)	(0.005)	(0.005)	(0.012)	(0.011)
Panel C: Lower Selectivity Levels										
Eligibility	0.073***	0.070***	0.015	0.015	0.004	0.001	-0.004	-0.005	0.001	-0.000
	(0.006)	(0.006)	(0.013)	(0.012)	(0.012)	(0.011)	(0.005)	(0.005)	(0.014)	(0.014)

NOTE: In this table, for each outcome presented, the first column reports estimates of model (2) without any control variable for the predetermined individual characteristics. The second column provides the point estimates of α where the relevant control variables are selected using the double lasso procedure in Belloni et al. (2013). Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A7 – Robustness Checks: Functional Forms

	(1)	(2) First stage enrollment	(3)	(4)	(5) High School Graduation	(6)	(7)	(8) Enrollment in HE	(9)	(10)	(11) GR - ER cons.	(12)	(13)	(14) Mental health issue	(15)
	Cutoffs trends	Optimal	Local linear	Cutoffs trends	Optimal	Local linear	Cutoffs trends	Optimal	Local linear	Cutoffs trends	Optimal	Local linear	Cutoffs trends	Optimal	Local linear
Panel A: All															
Eligibility	0.084***	0.083***	0.084***	0.025***	0.023***	0.024**	0.017*	0.016*	0.014	-0.004	-0.003	-0.003	-0.019**	-0.017*	-0.017*
	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)	(0.011)	(0.009)	(0.009)	(0.011)	(0.004)	(0.004)	(0.004)	(0.009)	(0.009)	(0.010)
Degree of opt. poly.		1			1			1			1			1	
Panel B: Higher selectivity Levels															
Eligibility	0.091***	0.091***	0.092***	0.033***	0.054***	0.035***	0.027**	0.026**	0.029**	-0.003	-0.003	-0.002	-0.033***	-0.052***	-0.032**
	(0.007)	(0.007)	(0.007)	(0.012)	(0.018)	(0.013)	(0.013)	(0.012)	(0.014)	(0.005)	(0.005)	(0.006)	(0.012)	(0.018)	(0.013)
Degree of opt. poly.		1			2			1			1			2	
Panel C: Lower selectivity Levels															
Eligibility	0.073***	0.089***	0.073***	0.015	0.015	0.013	0.004	0.004	-0.001	-0.005	-0.005	-0.004	0.001	0.036	-0.000
	(0.006)	(0.010)	(0.006)	(0.013)	(0.013)	(0.015)	(0.011)	(0.011)	(0.014)	(0.005)	(0.005)	(0.006)	(0.014)	(0.033)	(0.016)
Degree of opt. poly.		2			1			1			1			3	

NOTE: In this table, for each outcome presented, the first column reports estimates of model (2) controlling for cutoff-specific trends. The second column provides the point estimates of α where the polynomial is obtained from a bins test (i.e., estimating models with a full set of score dummies together with the different parametric trends for order 1 to 4 polynomials, and where the recommended polynomial is the specification in which the set of bin dummies are jointly insignificant). The third column reports point estimates of α using local linear estimations. All estimates include triangular weights. *** p<0.01, ** p<0.05, * p<0.1.

Table A8 – Robustness Checks: Analysis by City

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	First stage enrollment		High School Graduation		Enrollment in HE		GR - ER cons.		Mental health issue	
	Bergen	Oslo	Bergen	Oslo	Bergen	Oslo	Bergen	Oslo	Bergen	Oslo
Panel A: All										
Eligibility	0.099***	0.066***	0.022**	0.024*	0.015	0.018	-0.003	-0.004	-0.015	-0.018
	$(0.007)^{+++}$	$(0.006)^{+++}$	$(0.011)^{+}$	(0.013)	(0.011)	(0.014)	(0.005)	(0.006)	(0.011)	(0.014)
Control mean	0.029	0.013	0.547	0.537	0.352	0.455	0.966	0.962	0.334	0.321
N	28516	26400	28516	26400	28516	26400	28516	26400	28516	26400
Panel B: Higher selectivity Levels										
Eligibility	0.107***	0.075***	0.030**	0.035**	0.025	0.030*	-0.002	-0.004	-0.028*	-0.035**
	$(0.011)^{+++}$	$(0.008)^{+++}$	$(0.015)^{+}$	$(0.017)^{+}$	(0.017)	(0.018)	(0.007)	(0.008)	(0.015)	$(0.017)^{+}$
Control mean	.040	.014	.718	.676	.498	.577	.960	.963	.282	.299
N	14809	15707	14809	15707	14809	15707	14809	15707	14809	15707
Panel C: Lower selectivity Levels										
Eligibility	0.090***	0.052***	0.016	0.012	0.005	0.002	-0.005	-0.004	-0.001	0.007
	$(0.009)^{+++}$	$(0.008)^{+++}$	(0.017)	(0.020)	(0.014)	(0.019)	(0.007)	(0.008)	(0.018)	(0.021)
Control mean	.015	.012	.336	.302	.172	.249	.974	.961	.398	.356
N	13707	10693	13707	10693	13707	10693	13707	10693	13707	10693

NOTE: This table reports the point estimates of α from equation (2) using a linear trend specification and triangular weights. Equation (2) estimated separately for students located in Hordaland (Bergen) or Oslo. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Table A9 – Heterogeneity Analysis by Student Gender and Social Background

	(1) First stage enrollment	(2) High School Graduation	(3) Enrollment in HE	(4) GR - ER cons.	(5) Mental health issue
Panel A: Girls					
Eligibility	0.076***	0.019	0.010	-0.001	-0.032**
	(0.007)$^{+++}$	(0.013)	(0.013)	(0.004)	(0.014)$^{++}$
Control mean	0.023	0.620	0.481	0.986	0.386
N	25561	25561	25561	25561	25561
Panel B: Boys					
Eligibility	0.089***	0.029**	0.022*	-0.005	-0.005
	(0.006)$^{+++}$	(0.011)$^{++}$	(0.011)$^{+}$	(0.006)	(0.012)
Control mean	0.020	0.478	0.338	0.947	0.279
N	29355	29355	29355	29355	29355
Panel C: Parents with higher education					
Eligibility	0.099***	0.012	0.012	-0.002	-0.015
	(0.007)$^{+++}$	(0.012)	(0.012)	(0.005)	(0.012)
Control mean	0.026	0.631	0.471	0.958	0.311
N	29478	29478	29478	29478	29478
Panel D: Parents without higher education					
Eligibility	0.064***	0.035***	0.020*	-0.005	-0.020
	(0.006)$^{+++}$	(0.013)$^{+++}$	(0.012)	(0.005)	(0.013)
Control mean	0.016	0.444	0.327	0.971	0.346
N	25438	25438	25438	25438	25438
Panel E: high parental income					
Eligibility	0.097***	0.024**	0.006	-0.007	-0.026**
	(0.007)$^{+++}$	(0.012)$^{+}$	(0.012)	(0.006)	(0.012)$^{++}$
Control mean	0.023	0.634	0.481	0.962	0.292
N	27738	27738	27738	27738	27738
Panel F: low parental income					
Eligibility	0.068***	0.021*	0.025**	0.001	-0.010
	(0.006)$^{+++}$	(0.012)	(0.012)$^{++}$	(0.005)	(0.013)
Control mean	0.020	0.455	0.327	0.966	0.361
N	27178	27178	27178	27178	27178

NOTE: This table reports the point estimates of α from equation (2) using a linear trend specification and triangular weights. The calculated mean of the outcome variable is for the control group, i.e., those with a score distance to admission cutoffs at most two points below the cutoff. Clustered standard errors (at individual level) in parentheses. *** p<0.01, ** p<0.05, * p<0.1; $^{+++}$ p<0.01, $^{++}$ p<0.05, $^{+}$ p<0.1 after accounting for multiple hypothesis testing using the procedure described in Romano and Wolf (2005).

Appendix B

ICPC-2 – English

International Classification of Primary Care – 2nd Edition

Wonca International Classification Committee (WICC)

Wonca

Process codes

- -30 Medical Exam/Eval-Complete
- -31 Medical Examination/Health Evaluation-Partial/Pre-op check
- -32 Sensitivity Test
- -33 Microbiological/Immunological Test
- -34 Blood Test
- -35 Urine Test
- -36 Faeces Test
- -37 Histological/Exfoliative Cytology
- -38 Other Laboratory Test NEC
- -39 Physical Function Test
- -40 Diagnostic Endoscopy
- -41 Diagnostic Radiology/Imaging
- -42 Electrical Tracings
- -43 Other Diagnostic Procedures
- -44 Preventive Imunisations/Medications
- -45 Observe/Educate/Advice/Diet
- -46 Consult with Primary Care Provider
- -47 Consultation with Specialist
- -48 Clarification/Discuss Patient's RFE
- -49 Other Preventive Procedures
- -50 Medicat-Script/Reqst/Renew/Inject
- -51 Incise/Drain/Flush/Aspirate
- -52 Excise/Remove/Biopsy/Destruction/Debride
- -53 Instrument/Catheter/Intubate/Dilate
- -54 Repair/Fixate-Suture/Cast/Prosthetic
- -55 Local Injection/Infiltration
- -56 Dress/Press/Compress/Tamponade
- -57 Physical Medicine/Rehabilitation
- -58 Therapeutic Counselling/Listening
- -59 Other Therapeutic Procedure NEC
- -60 Results Tests/Procedures
- -61 Results Exam/Test/Record
- -62 Administrative Procedure
- -63 Follow-up Encounter Unspecified
- -64 Encounter Initiated by Provider
- -65 Encounter Initiated third person
- -66 Refer to Other Provider (EXCL. M.D.)
- -67 Referral to Physician/Specialist/Clinic/Hospital
- -68 Other Referrals NEC
- -69 Other Reason for Encounter NEC

General and Unspecified A

- A01 Pain general/multiple sites
- A02 Chills
- A03 Fever
- A04 Weakness/tiredness general
- A05 Feeling ill
- A06 Fainting/syncope
- A07 Coma
- A08 Swelling
- A09 Sweating problem
- A10 Bleeding/haemorrhage NOS
- A11 Chest pain NOS
- A13 Concern/fear medical treatment
- A16 Irritable infant
- A18 Concern about appearance
- A20 Euthanasia request/discussion
- A21 Risk factor for malignancy
- A23 Risk factor NOS
- A25 Fear of death/dying
- A26 Fear of cancer NOS
- A27 Fear of other disease NOS
- A28 Limited function/disability NOS
- A29 General symptom/complaint other
- A70 Tuberculosis
- A71 Measles
- A72 Chickenpox
- A73 Malaria
- A74 Rubella
- A75 Infectious mononucleosis
- A76 Viral exanthem other
- A77 Viral disease other/NOS
- A78 Infectious disease other/NOS
- A79 Malignancy NOS
- A80 Trauma/injury NOS
- A81 Multiple trauma/injuries
- A82 Secondary effect of trauma
- A84 Poisoning by medical agent
- A85 Adverse effect medical agent
- A86 Toxic effect non-medicinal substance
- A87 Complication of medical treatment
- A88 Adverse effect physical factor
- A89 Effect prosthetic device
- A90 Congenital anomaly OS/multiple
- A91 Abnormal result investigation NOS
- A92 Allergy/allergic reaction NOS
- A93 Premature newborn
- A94 Perinatal morbidity other
- A95 Perinatal mortality
- A96 Death
- A97 No disease
- A98 Health maintenance/prevention
- A99 General disease NOS

Blood, Blood Forming Organs and Immune Mechanism B

- B02 Lymph gland(s) enlarged/painful
- B04 Blood symptom/complaint
- B25 Fear of aids/HIV
- B26 Fear cancer blood/lymph
- B27 Fear blood/lymph disease other
- B28 Limited function/disability
- B29 Sympt/complt lymph/immune other
- B70 Lymphadenitis acute
- B71 Lymphadenitis non-specific
- B72 Hodgkin's disease/lymphoma
- B73 Leukaemia
- B74 Malignant neoplasm blood other
- B75 Benign/unspecified neoplasm blood
- B76 Ruptured spleen traumatic
- B77 Injury blood/lymph/spleen other
- B78 Hereditary haemolytic anaemia
- B79 Congen.anom. blood/lymph other
- B80 Iron deficiency anaemia
- B81 Anaemia, Vitamin B12/folate def.
- B82 Anaemia other/unspecified
- B83 Purpura/coagulation defect
- B84 Unexplained abnormal white cells
- B87 Splenomegaly
- B90 HIV-infection/aids
- B99 Blood/lymph/spleen disease other

PROCESS CODES

SYMPTOMS/COMPLAINTS

INFECTIONS

NEOPLASMS

INJURIES

CONGENITAL ANOMALIES

OTHER DIAGNOSES

Digestive D

- D01 Abdominal pain/cramps general
- D02 Abdominal pain epigastric
- D03 Heartburn
- D04 Rectal/anal pain
- D05 Perianal itching
- D06 Abdominal pain localized other
- D07 Dyspepsia/indigestion
- D08 Flatulence/gas/belching
- D09 Nausea
- D10 Vomiting
- D11 Diarrhoea
- D12 Constipation
- D13 Jaundice
- D14 Haematemesis/vomiting blood
- D15 Melaena
- D16 Rectal bleeding
- D17 Incontinence of bowel
- D18 Change faeces/bowel movements
- D19 Teeth/gum symptom/complaint
- D20 Mouth/tongue/lip symptom/complt.
- D21 Swallowing problem
- D23 Hepatomegaly
- D24 Abdominal mass NOS
- D25 Abdominal distension
- D26 Fear of cancer of digestive system
- D27 Fear of digestive disease other
- D28 Limited function/disability (d)
- D29 Digestive symptom/complaint other
- D70 Gastrointestinal infection
- D71 Mumps
- D72 Viral hepatitis
- D73 Gastroenteritis presumed infection
- D74 Malignant neoplasm stomach
- D75 Malignant neoplasm colon/rectum
- D76 Malignant neoplasm pancreas
- D77 Malig. neoplasm digest other/NOS
- D78 Neoplasm digest benign/uncertain
- D79 Foreign body digestive system
- D80 Injury digestive system other
- D81 Congen. anomaly digestive system
- D82 Teeth/gum disease
- D83 Mouth/tongue/lip disease
- D84 Oesophagus disease
- D85 Duodenal ulcer
- D86 Peptic ulcer other
- D87 Stomach function disorder
- D88 Appendicitis
- D89 Inguinal hernia
- D90 Hiatus hernia
- D91 Abdominal hernia other
- D92 Diverticular disease
- D93 Irritable bowel syndrome
- D94 Chronic enteritis/ulcerative colitis
- D95 Anal fissure/perianal abscess
- D96 Worms/other parasites
- D97 Liver disease NOS
- D98 Cholecystitis/cholelithiasis
- D99 Disease digestive system, other

Eye F

- F01 Eye pain
- F02 Red eye
- F03 Eye discharge
- F04 Visual floaters/spots
- F05 Visual disturbance other
- F13 Eye sensation abnormal
- F14 Eye movements abnormal
- F15 Eye appearance abnormal
- F16 Eyelid symptom/complaint
- F17 Glasses symptom/complaint
- F18 Contact lens symptom/complaint
- F27 Fear of eye disease
- F28 Limited function/disability (f)
- F29 Eye symptom/complaint other
- F70 Conjunctivitis infectious
- F71 Conjunctivitis allergic
- F72 Blepharitis/stye/chalazion
- F73 Eye infection/inflammation other
- F74 Neoplasm of eye/adnexa
- F75 Contusion/haemorrhage eye
- F76 Foreign body in eye
- F79 Injury eye other
- F80 Blocked lacrimal duct of infant
- F81 Congenital anomaly eye other
- F82 Detached retina
- F83 Retinopathy
- F84 Macular degeneration
- F85 Corneal ulcer
- F86 Trachoma
- F91 Refractive error
- F92 Cataract
- F93 Glaucoma
- F94 Blindness
- F95 Strabismus
- F99 Eye/adnexa disease, other

Ear H

- H01 Ear pain/earache
- H02 Hearing complaint
- H03 Tinnitus, ringing/buzzing ear
- H04 Ear discharge
- H05 Bleeding ear
- H13 Plugged feeling ear
- H15 Concern with appearance of ears
- H27 Fear of ear disease
- H28 Limited function/disability ear
- H29 Ear symptom/complaint other
- H70 Otitis externa
- H71 Acute otitis media/myringitis
- H72 Serous otitis media
- H73 Eustachian salpingitis
- H74 Chronic otitis media
- H75 Neoplasm of ear
- H76 Foreign body in ear
- H77 Perforation ear drum
- H78 Superficial injury of ear
- H79 Ear injury other
- H80 Congenital anomaly of ear
- H81 Excessive ear wax
- H82 Vertiginous syndrome
- H83 Otosclerosis
- H84 Presbyacusis
- H85 Acoustic trauma
- H86 Deafness
- H99 Ear/mastoid disease, other

Cardiovascular K

- K01 Heart pain
- K02 Pressure/tightness of heart
- K03 Cardiovascular pain NOS
- K04 Palpitations/awareness of heart
- K05 Irregular heartbeat other
- K06 Prominent veins
- K07 Swollen ankles/oedema
- K22 Risk factor cardiovascular disease
- K24 Fear of heart disease
- K25 Fear of hypertension
- K27 Fear cardiovascular disease other
- K28 Limited function/disability (k)
- K29 Cardiovascular sympt./complt. other
- K70 Infection of circulatory system
- K71 Rheumatic fever/heart disease
- K72 Neoplasm cardiovascular
- K73 Congenital anomaly cardiovascular
- K74 Ischaemic heart disease w. angina
- K75 Acute myocardial infarction
- K76 Ischaemic heart disease w/o angina
- K77 Heart failure
- K78 Atrial fibrillation/flutter
- K79 Paroxysmal tachycardia
- K80 Cardiac arrhythmia NOS
- K81 Heart/arterial murmur NOS
- K82 Pulmonary heart disease
- K83 Heart valve disease NOS
- K84 Heart disease other
- K85 Elevated blood pressure
- K86 Hypertension uncomplicated
- K87 Hypertension complicated
- K88 Postural hypotension
- K89 Transient cerebral ischaemia
- K90 Stroke/cerebrovascular accident
- K91 Cerebrovascular disease
- K92 Atherosclerosis/PVD
- K93 Pulmonary embolism
- K94 Phlebitis/thrombophlebitis
- K95 Varicose veins of leg
- K96 Haemorrhoids
- K99 Cardiovascular disease other

Musculoskeletal L

- L01 Neck symptom/complaint
- L02 Back symptom/complaint
- L03 Low back symptom/complaint
- L04 Chest symptom/complaint
- L05 Flank/axilla symptom/complaint
- L07 Jaw symptom/complaint
- L08 Shoulder symptom/complaint
- L09 Arm symptom/complaint
- L10 Elbow symptom/complaint
- L11 Wrist symptom/complaint
- L12 Hand/finger symptom/complaint
- L13 Hip symptom/complaint
- L14 Leg/thigh symptom/complaint
- L15 Knee symptom/complaint
- L16 Ankle symptom/complaint
- L17 Foot/toe symptom/complaint
- L18 Muscle pain
- L19 Muscle symptom/complaint NOS
- L20 Joint symptom/complaint NOS
- L26 Fear of cancer musculoskeletal
- L27 Fear musculoskeletal disease other
- L28 Limited function/disability (l)
- L29 Sympt/complt. Musculoskeletal other
- L70 Infections musculoskeletal system
- L71 Malignant neoplasm musculoskeletal
- L72 Fracture: radius/ulna
- L73 Fracture: tibia/fibula
- L74 Fracture: hand/foot bone
- L75 Fracture: femur
- L76 Fracture: other
- L77 Sprain/strain of ankle
- L78 Sprain/strain of knee
- L79 Sprain/strain of joint NOS
- L80 Dislocation/subluxation
- L81 Injury musculoskeletal NOS
- L82 Congenital anomaly musculoskeletal
- L83 Neck syndrome
- L84 Back syndrome w/o radiating pain
- L85 Acquired deformity of spine
- L86 Back syndrome with radiating pain
- L87 Bursitis/tendinitis/synovitis NOS
- L88 Rheumatoid/seropositive arthritis
- L89 Osteoarthrosis of hip
- L90 Osteoarthrosis of knee
- L91 Osteoarthrosis other
- L92 Shoulder syndrome
- L93 Tennis elbow
- L94 Osteochondrosis
- L95 Osteoporosis
- L96 Acute internal damage knee
- L97 Neoplasm benign/unspec musculo.
- L98 Acquired deformity of limb
- L99 Musculoskeletal disease, other

Neurological N

- N01 Headache
- N03 Pain face
- N04 Restless legs
- N05 Tingling fingers/feet/toes
- N06 Sensation disturbance other
- N07 Convulsion/seizure
- N08 Abnormal involuntary movements
- N16 Disturbance of smell/taste
- N17 Vertigo/dizziness
- N18 Paralysis/weakness
- N19 Speech disorder
- N26 Fear cancer neurological system
- N27 Fear of neurological disease other
- N28 Limited function/disability (n)
- N29 Neurological symptom/complt. other
- N70 Poliomyelitis
- N71 Meningitis/encephalitis
- N72 Tetanus
- N73 Neurological infection other
- N74 Malignant neoplasm nervous system
- N75 Benign neoplasm nervous system
- N76 Neoplasm nervous system unspec.
- N79 Concussion
- N80 Head injury other
- N81 Injury nervous system other
- N85 Congenital anomaly neurological
- N86 Multiple sclerosis
- N87 Parkinsonism
- N88 Epilepsy
- N89 Migraine
- N90 Cluster headache
- N91 Facial paralysis/bell's palsy
- N92 Trigeminal neuralgia
- N93 Carpal tunnel syndrome
- N94 Peripheral neuritis/neuropathy
- N95 Tension headache
- N99 Neurological disease, other

Psychological P

- P01 Feeling anxious/nervous/tense
- P02 Acute stress reaction
- P03 Feeling depressed
- P04 Feeling/behaving irritable/angry
- P05 Senility, feeling/behaving old
- P06 Sleep disturbance
- P07 Sexual desire reduced
- P08 Sexual fulfilment reduced
- P09 Sexual preference concern
- P10 Stammering/stuttering/tic
- P11 Eating problem in child
- P12 Bedwetting/enuresis
- P13 Encopresis/bowel training problem
- P15 Chronic alcohol abuse
- P16 Acute alcohol abuse
- P17 Tobacco abuse
- P18 Medication abuse
- P19 Drug abuse
- P20 Memory disturbance
- P22 Child behaviour symptom/complaint
- P23 Adolescent behav. Symptom/complt.
- P24 Specific learning problem
- P25 Phase of life problem adult
- P27 Fear of mental disorder
- P28 Limited function/disability (p)
- P29 Psychological symptom/complt other
- P70 Dementia
- P71 Organic psychosis other
- P72 Schizophrenia
- P73 Affective psychosis
- P74 Anxiety disorder/anxiety state
- P75 Somatization disorder
- P76 Depressive disorder
- P77 Suicide/suicide attempt
- P78 Neuraesthenia/surmenage
- P79 Phobia/compulsive disorder
- P80 Personality disorder
- P81 Hyperkinetic disorder
- P82 Post-traumatic stress disorder
- P85 Mental retardation
- P86 Anorexia nervosa/bulimia
- P98 Psychosis NOS/other
- P99 Psychological disorders, other

Respiratory R

- R01 Pain respiratory system
- R02 Shortness of breath/dyspnoea
- R03 Wheezing
- R04 Breathing problem, other
- R05 Cough
- R06 Nose bleed/epistaxis
- R07 Sneezing/nasal congestion
- R08 Nose symptom/complaint other
- R09 Sinus symptom/complaint
- R21 Throat symptom/complaint
- R23 Voice symptom/complaint
- R24 Haemoptysis
- R25 Sputum/phlegm abnormal
- R26 Fear of cancer respiratory system
- R27 Fear of respiratory disease, other
- R28 Limited function/disability (r)
- R29 Respiratory symptom/complaint oth.
- R71 Whooping cough
- R72 Strep throat
- R73 Boil/abscess nose
- R74 Upper respiratory infection acute
- R75 Sinusitis acute/chronic
- R76 Tonsillitis acute
- R77 Laryngitis/tracheitis acute
- R78 Acute bronchitis/bronchiolitis
- R79 Chronic bronchitis
- R80 Influenza
- R81 Pneumonia
- R82 Pleurisy/pleural effusion
- R83 Respiratory infection other
- R84 Malignant neoplasm bronchus/lung
- R85 Malinant neoplasm respiratory, other
- R86 Benign neoplasm respiratory
- R87 Foreign body nose/larynx/bronch
- R88 Injury respiratory other
- R89 Congenital anomaly respiratory
- R90 Hypertrophy tonsils/adenoids
- R92 Neoplasm respiratory unspecified
- R95 Chronic obstructive pulmonary dis
- R96 Asthma
- R97 Allergic rhinitis
- R98 Hyperventilation syndrome
- R99 Respiratory disease other

PROCESS CODES

SYMPTOMS/COMPLAINTS

INFECTIONS

NEOPLASMS

INJURIES

CONGENITAL ANOMALIES

OTHER DIAGNOSES

Skin S

- S01 Pain/tenderness of skin
- S02 Pruritus
- S03 Warts
- S04 Lump/swelling localized
- S05 Lumps/swellings generalized
- S06 Rash localized
- S07 Rash generalized
- S08 Skin colour change
- S09 Infected finger/toe
- S10 Boil/carbuncle
- S11 Skin infection post-traumatic
- S12 Insect bite/sting
- S13 Animal/human bite
- S14 Burn/scald
- S15 Foreign body in skin
- S16 Bruise/contusion
- S17 Abrasion/scratch/blister
- S18 Laceration/cut
- S19 Skin injury other
- S20 Corn/callosity
- S21 Skin texture symptom/complaint
- S22 Nail symptom/complaint
- S23 Hair loss/baldness
- S24 Hair/scalp symptom/complaint
- S26 Fear of cancer of skin
- S27 Fear of skin disease other
- S28 Limited function/disability (s)
- S29 Skin symptom/complaint other
- S70 Herpes zoster
- S71 Herpes simplex
- S72 Scabies/other acariasis
- S73 Pediculosis/skin infestation other
- S74 Dermatophytosis
- S75 Moniliasis/candidiasis skin
- S76 Skin infection other
- S77 Malignant neoplasm of skin
- S78 Lipoma
- S79 Neoplasm skin benign/unspecified
- S80 Solar keratosis/sunburn
- S81 Haemangioma/lymphangioma
- S82 Naevus/mole
- S83 Congenital skin anomaly other
- S84 Impetigo
- S85 Pilonidal cyst/fistula
- S86 Dermatitis seborrhoeic
- S87 Dermatitis/atopic eczema
- S88 Dermatitis contact/allergic
- S89 Diaper rash
- S90 Pityriasis rosea
- S91 Psoriasis
- S92 Sweat gland disease
- S93 Sebaceous cyst
- S94 Ingrowing nail
- S95 Molluscum contagiosum
- S96 Acne
- S97 Chronic ulcer skin
- S98 Urticaria
- S99 Skin disease, other

Endocrine/Metabolic and Nutritional T

- T01 Excessive thirst
- T02 Excessive appetite
- T03 Loss of appetite
- T04 Feeding problem of infant/child
- T05 Feeding problem of adult
- T07 Weight gain
- T08 Weight loss
- T10 Growth delay
- T11 Dehydration
- T26 Fear of cancer of endocrine system
- T27 Fear endocrine/metabolic dis other
- T28 Limited function/disability (t)
- T29 Endocrine/met./sympt/complt other
- T70 Endocrine infection
- T71 Malignant neoplasm thyroid
- T72 Benign neoplasm thyroid
- T73 Neoplasm endocrine oth/unspecified
- T78 Thyroglossal duct/cyst
- T80 Congenital anom endocrine/metab.
- T81 Goitre
- T82 Obesity
- T83 Overweight
- T85 Hyperthyroidism/thyrotoxicosis
- T86 Hypothyroidism/myxoedema
- T87 Hypoglycaemia
- T89 Diabetes insulin dependent
- T90 Diabetes non-insulin dependent
- T91 Vitamin/nutritional deficiency
- T92 Gout
- T93 Lipid disorder
- T99 Endocrine/metab/nutrit. dis. other

Urological U

- U01 Dysuria/painful urination
- U02 Urinary frequency/urgency
- U04 Incontinence urine
- U05 Urination problems other
- U06 Haematuria
- U07 Urine symptom/complaint other
- U08 Urinary retention
- U13 Bladder symptom/complaint other
- U14 Kidney symptom/complaint
- U26 Fear of cancer of urinary system
- U27 Fear of urinary disease other
- U28 Limited function/disability urinary
- U29 Urinary symptom/complaint other
- U70 Pyelonephritis/pyelitis
- U71 Cystitis/urinary infection other
- U72 Urethritis
- U75 Malignant neoplasm of kidney
- U76 Malignant neoplasm of bladder
- U77 Malignant neoplasm urinary other
- U78 Benign neoplasm urinary tract
- U79 Neoplasm urinary tract NOS
- U80 Injury urinary tract
- U85 Congenital anomaly urinary tract
- U88 Glomerulonephritis/nephrosis
- U90 Orthostatic albumin./proteinuria
- U95 Urinary calculus
- U98 Abnormal urine test NOS
- U99 Urinary disease, other

Pregnancy, Childbearing, Family Planning W

- W01 Question of pregnancy
- W02 Fear of pregnancy
- W03 Antepartum bleeding
- W05 Pregnancy vomiting/nausea
- W10 Contraception postcoital
- W11 Contraception oral
- W12 Contraception intrauterine
- W13 Sterilization
- W14 Contraception other
- W15 Infertility/subfertility
- W17 Post-partum bleeding
- W18 Post-partum symptom/complaint oth.
- W19 Breast/lactation symptom/complaint
- W21 Concern body image in pregnancy
- W27 Fear complications of pregnancy
- W28 Limited function/disability (w)
- W29 Pregnancy symptom/complaint other
- W70 Puerperal infection/sepsis
- W71 Infection complicating pregnancy
- W72 Malignant neoplasm relate to preg.
- W73 Benign/unspec. neoplasm/pregnancy
- W75 Injury complicating pregnancy
- W76 Congenital anomaly complicate preg.
- W78 Pregnancy
- W79 Unwanted pregnancy
- W80 Ectopic pregnancy
- W81 Toxaemia of pregnancy
- W82 Abortion spontaneous
- W83 Abortion induced
- W84 Pregnancy high risk
- W85 Gestational diabetes
- W90 Uncomplicate labour/delivery live
- W91 Uncomplicate labour/delivery still
- W92 Complicate labour/ delivery livebirth
- W93 Complicate labour/delivery stillbirth
- W94 Puerperal mastitis
- W95 Breast disorder in pregnancy other
- W96 Complications of puerperium other
- W99 Disorder pregnancy/delivery, other

Female Genital X

- X01 Genital pain female
- X02 Menstrual pain
- X03 Intermenstrual pain
- X04 Painful intercourse female
- X05 Menstruation absent/scanty
- X06 Menstruation excessive
- X07 Menstruation irregular/frequent
- X08 Intermenstrual bleeding
- X09 Premenstrual symptom/complaint
- X10 Postponement of menstruation
- X11 Menopausal symptom/complaint
- X12 Postmenopausal bleeding
- X13 Postcoital bleeding
- X14 Vaginal discharge
- X15 Vaginal symptom/complaint other
- X16 Vulval symptom/complaint
- X17 Pelvis symptom/complaint female
- X18 Breast pain female
- X19 Breast lump/mass female
- X20 Nipple symptom/complaint female
- X21 Breast symptom/complt. female other
- X22 Concern breast appearance female
- X23 Fear sexually transmitted disease (f)
- X24 Fear of sexual dysfunction female
- X25 Fear of genital cancer female
- X26 Fear of breast cancer female
- X27 Fear genital/breast disease other (f)
- X28 Limited function/disability (x)
- X29 Genital symptom/complt female oth.
- X70 Syphilis female
- X71 Gonorrhoea female
- X72 Genital candidiasis female
- X73 Genital trichomoniasis female
- X74 Pelvic inflammatory disease
- X75 Malignant neoplasm cervix
- X76 Malignant neoplasm breast female
- X77 Malignant neoplasm genital other (f)
- X78 Fibromyoma uterus
- X79 Benign neoplasm breast female
- X80 Benign neoplasm female genital
- X81 Genital neoplasm oth/unspecied (f)
- X82 Injury genital female
- X83 Congenital anomaly genital female
- X84 Vaginitis/vulvitis NOS
- X85 Cervical disease NOS
- X86 Abnormal cervix smear
- X87 Uterovaginal prolapse
- X88 Fibrocystic disease breast
- X89 Premenstrual tension syndrome
- X90 Genital herpes female
- X91 Condylomata acuminata female
- X92 Chlamydia infection genital (f)
- X99 Genital disease female, other

Male Genital Y

- Y01 Pain in penis
- Y02 Pain in testis/scrotum
- Y03 Urethral discharge
- Y04 Penis symptom/complaint other
- Y05 Scrotum/testis sympt/complt. other
- Y06 Prostate symptom/complaint
- Y07 Impotence NOS
- Y08 Sexual function sympt./complt.(m)
- Y10 Infertility/subfertility male
- Y13 Sterilization male
- Y14 Family planning male other
- Y16 Breast symptom/complaint male
- Y24 Fear of sexual dysfunction male
- Y25 Fear sexually transmitted dis. male
- Y26 Fear of genital cancer male
- Y27 Fear of genital disease male other
- Y28 Limited function/disability (y)
- Y29 Genital sympt./complt.male other
- Y70 Syphilis male
- Y71 Gonorrhoea male
- Y72 Genital herpes male
- Y73 Prostatitis/seminal vesiculitis
- Y74 Orchitis/epididymitis
- Y75 Balanitis
- Y76 Condylomata acuminata male
- Y77 Malignant neoplasm prostate
- Y78 Malign neoplasm male genital other
- Y79 Benign/unspec. neoplasm gen. (m)
- Y80 Injury male genital
- Y81 Phimosis/redundant prepuce
- Y82 Hypospadias
- Y83 Undescended testicle
- Y84 Congenital genl anomaly (m) other
- Y85 Benign prostatic hypertrophy
- Y86 Hydrocoele
- Y99 Genital disease male, other

Social Problems Z

- Z01 Poverty/financial problem
- Z02 Food/water problem
- Z03 Housing/neighbourhood problem
- Z04 Social cultural problem
- Z05 Work problem
- Z06 Unemployment problem
- Z07 Education problem
- Z08 Social welfare problem
- Z09 Legal problem
- Z10 Health care system problem
- Z11 Compliance/being ill problem
- Z12 Relationship problem with partner
- Z13 Partner's behaviour problem
- Z14 Partner illness problem
- Z15 Loss/death of partner problem
- Z16 Relationship problem with child
- Z18 Illness problem with child
- Z19 Loss/death of child problem
- Z20 Relationship prob. parent/family
- Z21 Behaviour problem parent/family
- Z22 Illness problem parent/family
- Z23 Loss/death parent/family member
- Z24 Relationship problem friend
- Z25 Assault/harmful event problem
- Z27 Fear of a social problem
- Z28 Limited function/disability (z)
- Z29 Social problem NOS

Abbreviations

Anom	anomaly
behav.	behaviour
bronch.	bronchus
complicat.	complication
congen.	congenital
dis.	disease
eval.	evaluation
exam.	examination
gen.	genital
malig.	malignant
metab.	metabolic
musculo.	musculoskeletal
NEC	not elsewhere classified
NOS	not otherwise specified
nutrit.	nutrition
oth	other
preg.	pregnancy
prob.	problem
RFE	reason for encounter
sympt.	symptom
unspec.	unspecified
w	with
w/o	without